Request for Proposal

Design, Supply, Testing, Installation, Commissioning, Operation and Maintenance of cumulative capacity of 57.5 MW / 115 MWh Battery Energy Storage Systems (BESS) at 66/11 kV Grid Stations in Delhi under Tariff-Based Competitive Bidding

Ref: TERI/MAT/2026-2027/039
Tender publishing date: 06/07/2026
Due Date for Submission of Bids: 27/07/2026

Introduction and Background of the Project

The power sector in India today is experiencing major technological disruptions, with the biggest being addition of RE generation alongside the thermal based generation. India's National Electricity Plan has projected nearly 600 GW of renewable electricity capacity by 2031-32, including 365 GW solar and 122 GW of wind energy**Error! Bookmark not defined.**. Renewable Energy (RE) has also become the most affordable and cheapest source for meeting the energy requirements. As per Central Electricity Authority, India has a total renewable energy installed capacity of 230.78 GW as on 31st May 2026.

For the period 2025-2026, India's renewable energy share (solar, wind, small hydro and biomass) of gross generation stood at ~18.23%.

The increasing share of renewable energy generations in the grid has impacted the traditional approach of grid balancing. The renewable energy sources are intermittent in nature due to dependence on external climactic conditions, such as sunshine or wind. Therefore, the variability of renewable generation must be considered while adjusting output of load following generating stations for the purpose of balancing.

Large penetration of Renewable energy sources and Distributed Energy Resources (DERs), such as rooftop solar into the Distribution Network (DN), fast changing demand patterns and the electrification of transportation through electric vehicles pose technical challenges to existing power distribution networks. Technical/operational challenges in terms of loss of load, deviations in power flow, fault/congestion in electricity distribution network and power quality distortions are expected to affect the performance of distribution utilities. This will impact the overall power system stability and dynamic behaviour of the system.

The National Electricity Plan (NEP) identifies Pumped Hydro Storage System (PSP) and Battery Energy Storage Systems (BESS) as the commercially deployable solutions for providing requisite storage capacity. CEA's modelling for the NEP projects BESS requirement of 8.68 GW/ 34.72 GWh by the year 2027-28 and 47.24 GW/ 236.22 GWh by 2031-32. BESS can thus be an effective solution to address issues of RE integration; it provides capabilities for shifting generation, regulating dispatch of electricity, maintaining flow control in transmission system, and strengthening reliability of the power system without adding new capacity.

BSES Rajdhani Power Limited (BRPL) has envisaged for deploying cumulative capacities of **57.5 MW/ 115 MWh** BESS at four (4) nos. of 66/11 kV grid stations within their licensed area, which is a timely and much needed step towards mitigating challenges arising from RE integration. Therefore, BRPL has appointed The Energy and Resources Institute (TERI) to invite bids from prospective bidders through tendering, as per the details given in the RfP document.

BRPL invites bids from prospective bidders through tendering for **site survey, planning, design, engineering, and transportation & supply at site, insurance, un-loading, handling, installation, integration, testing, commissioning, operation and maintenance of BESS**, as per the details given in the tender document

The Hon'ble Delhi Electricity Regulatory Commission (DERC) has provided an in-principle approval for the Project.

This Request for Proposal is meant to invite applications from interested Bidder(s) capable of delivering the BESS described herein. The content of this RfP has been documented as a set of three volumes explained below:

Volume I: Instructions to Bidders and Evaluation Criteria: Volume I contains instructions for bidders when responding to this RfP. It also contains the eligibility conditions and the evaluation criteria for selecting of successful bidder.

Volume II: General Conditions of contract (Battery Energy Storage System Agreement – BESSA): Volume II explains the draft contractual terms that Buying Utility wishes to specify at this stage. Prospective bidders must follow the respective terms and conditions in each agreement.

Volume III: Scope of Work and Technical Specifications: Volume III of this RfP contains details regarding the scope of work and technical specifications of the BESS that Buying Utility deems necessary. The information set out in volume III includes the detailed technical specifications of the BESS which is to be installed and operated.

It is envisioned that the following agreement will be signed with the selected bidder.

Type of agreement and Scope	Involved parties	Estimated Period of Performance
Battery Energy Storage Service Agreement (BESSA)	Buying Utility and Winning Bidder BESS Developer (BESSD)	From signing of BESSA until 12 years post Commercial Operation Date (COD) of BESS

Volume I: Instructions to Bidders

The document is structured to navigate the Bidder through:

a. **Schedule of Bidding process**: Details the important dates with the key milestones throughout the Bidder selection process.

b. **Formats and Annexures**

c. **Eligibility conditions**

d. **Instructions to Bidders:** Highlights the important instructions to follow while preparing the response to the RfP and proposal submission. E.g. the Language of the Proposal, Currency of the Proposal and so on.

e. **Opening and Evaluation of Bids:** The process that will be followed during evaluation of the Technical and Financial bids.

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A. Schedule of Bidding Process

S.No	Milestone	Date & Time
1	Release of Tender	Monday, 6 July 2026
2	Site visit	Monday, 13 July 2026
3	Pre-Bid Meeting	Tuesday, 14 July 2026
4	Last date for submission of written queries by bidders	Wednesday, 15 July 2026
5	Response to queries	Monday, 20 July 2026
6	Last date for submission of technical and financial bids	Monday, 27 July 2026, 5:00 p.m. IST
7	Opening of technical bids	Tuesday, 28 July 2026, 11:00 a.m. IST
8	Presentation by prospective Bidders as per Clause 2.1 of Volume I	Tuesday, 28 July 2026, 12:00 p.m. IST
9	Declaration of shortlisted firms on the basis of technical evaluation	Friday, 31 July 2026
10	Financial bid opening of only technically qualified bidders	Monday, 3 August 2026, 11:00 a.m. IST
11	e-Reverse Auction	Wednesday, 5 August 2026, 11 a.m. IST
12	Finalization of Bidder and issuance of Letter of Intent (to be notified via e-mail) *	Tuesday, 11 August, 2026
13	Signing of BESS Agreement (BESSA) with L1 Bidder	Friday, 21 August, 2026
14	Submission of petition for tariff adoption before the Appropriate Commission	Wednesday, 26 August, 2026
15	Incorporation of the SPV by the Selected Bidder/Consortium	Thursday, 10 September, 2026
16	Execution of BESSA*	Tuesday, 15 September, 2026

* BESSA will be effective after the approval of the Appropriate Commission.

B. Checklist of Formats and Annexures

S. No.	Format/ Annexure	Particulars
1.	Annexure 1	Sample Financial Bid
2.	Format 1	Covering Letter
3.	Format 2	Technical Bid
4.	Format 3	Financial Bid
5.	Format 4	General Particulars of the Bidder
6.	Format 5	Minimum Eligibility Conditions

S. No.	Format/ Annexure	Particulars
7.	Format 6	Format for EMD
8.	Format 7	Performance Bank Guarantee
9.	Format 8	Undertaking regarding no wilful default and no major litigation pending
10.	Format 9	Format for Experience Letter
11.	Format 10	CA Certificate for Audited Statement
12.	Format 11	Details of Consortium (only where applicable)
13.	Format 12	Acceptance Form for Participation in Reverse Auction
14.	Format 13	Affidavit by BESS Developer for Utilization of BESS by Buying Utility
15.	Format 14	Declaration for passing on benefit of eligible Input Tax Credit to the Buying Utility
16.	Format 15	Undertaking for site condition acceptance
17.	Format 16	Project Timeline

C. Eligibility Conditions

1. General Eligibility Criteria

1.1 Bidders participating in this RfP shall fall under one of the following categories:

i) A Company under the Companies Act, 2013.
ii) A Foreign Company under the respective nation's laws.
iii) Alternative Investment Funds (AIF) as registered under SEBI. "AIF" shall be as defined by SEBI.
iv) A Consortium comprising the above entities.

1.2 Consortium of up-to two firms/organizations with the above eligibility criteria, as members is allowed, with one of the consortium members identified as the Lead Member. Project execution will be the responsibility of the lead member which will remain the point of contact for all queries and will be held liable for all the discrepancies in Project execution in line with this tender.

1.3 The selected bidder has to form a "Special Purpose Vehicle" (SPV), i.e., an Indian Company registered under the Companies Act, 2013 as its subsidiary Company, with 100% shareholding in the SPV, before signing of the BESSA. The Consortium shortlisted and selected based on this RfP has to necessarily form a Project Company and get it registered under the Companies Act, 2013 prior to signing of the BESSA, keeping the original shareholding of the Bidding Consortium unchanged.

1.4 The Bidder or any of its Affiliate including any Consortium Member & any of its Affiliate, and their directors should not be a wilful defaulter to any lender. Further, the Bidder &

any of its Affiliate including any Consortium Member & any of its Affiliate, and their directors should not have been barred or included in the blacklist by any entity, government agency or authority in India, the government of the jurisdiction of the Bidder or Members where they are incorporated or the jurisdiction of their principal place of business, any international financial institution such as the World Bank Group, Asian Development Bank, African Development Bank, Inter-American Development Bank, Asian Infrastructure Investment Bank etc or the United Nations or any of its agencies. The Bidder shall submit an undertaking to this effect as per Format-8 of the RfP along with an auditor certificate.

1.5 Bidder must carry out site survey and assessment before the last date of submission of their Bids and provide undertaking in format-15 for developing the Project at the Project allocated area on as-is basis. The Bidder shall, at its own cost and responsibility, carry out a detailed site survey, inspection, and assessment of the Project Site before the last date for submission of the Bid. The Bidder shall satisfy itself regarding all site conditions, access arrangements, technical constraints, statutory requirements, and any other factors that may affect the development, execution, operation, and maintenance of the Project. As part of the Bid submission, the Bidder shall submit an unconditional undertaking in Format-15 confirming that it has inspected the allocated Project Area and is willing to develop, implement, operate, and maintain the Project on an **"as-is-where-is" basis**, without any reservation, qualification, or claim against the Buying Utility / Bid Manager regarding the suitability of the site. Submission of the Bid shall be deemed to constitute the Bidder's acceptance of all site conditions and confirmation that no subsequent claim for additional cost, time extension, compensation, or change in scope arising from site conditions shall be entertained.

2. Technical Eligibility Criteria

2.1 The Bidder is required to submit the Technical Bid as per the enclosed Formats 2 and 5, along with a technical presentation. The technical presentation shall include but not be limited to:

i. Capabilities and credentials of the bidder.
ii. Brief Design Architecture of system and technology characteristics for applications mentioned in the tender document (detailed under Volume III of this RfP).
iii. Introduction to technology and associated equipment such as PCS, Battery cell/modules, Spare parts etc. (with specifications).
iv. Suitability of the technology characteristics for applications mentioned in the tender document (detailed under Volume III of this RfP).
v. Technical design of BESS (detailed under Volume III of this RfP).
vi. Performance parameters such as throughput consumed & throughput remaining, C-rate assessment (maximum, minimum and average), degradation curve, down-time assessment, depth of discharge assessment (maximum, minimum and average),

auxiliary consumption assessment, round-trip efficiency, PCS efficiency, battery/module-wise health parameters, etc.

vii. Battery Management Software and Battery Operations Optimization Software, SCADA Integration, Energy Management Platform, Energy Optimisation, Demand, and price forecasting, Optimal BESS scheduling capabilities.

viii. Safety Design and Fire-fighting system.

ix. Technical team experience, Team Composition, Project Completion Schedule (Gantt Chart) as enclosed in Format 16.

x. Any other information bidder desires to provide at the evaluation stage.

2.2 The Projects shall also comply with the performance criteria as detailed in Volume III of the RfP, with supporting evidence included with the technical bid.

2.3 The Bidder should have successfully commissioned proven technology of grid-connected Battery Energy Storage System(s) (BESS) with an aggregate/cumulative installed capacity of at least 4 MWh, only in India, within the last five (5) years. Such Project(s) shall include: (i) integration of the BESS with the electrical grid at a voltage level of 11 kV or higher through switchgear, protection, control, metering systems, an Energy Management System (EMS), and (ii) SCADA integration for monitoring, control, scheduling and operation of the BESS. Preferably, at least one such Project shall have been implemented in utility/distribution network, urban or commercial/industrial environment involving space constraints, interface with existing electrical infrastructure, and integration within an energized substation or distribution system without material disruption to existing operations. The Bidder shall submit the following documents:

2.3.1 A certificate issued by the Client confirming successful commissioning certificate and satisfactory operation of the BESS Project(s), without any adverse remarks, and certifying that the Project has been integrated with the grid at 11 kV or higher voltage level through switchgear and operated through an EMS; and

2.3.2 Documentary evidence such as Single Line Diagrams (SLDs), commissioning certificates, completion certificates, system architecture drawings, or client certifications demonstrating the above.

2.4 Bidder must possess valid Type test certificate along with Test report as per table 5.1 & 5.2 and Table 2 of Annexure 3 of Volume III carried out at CPRI/ERDA/accredited International Agency within last 5 (five) years. In case type test reports are older than five (5) years from the date of bid opening, bidder shall submit the undertaking that there is “No Design Change”. Non submission of type test reports will lead to rejection of the offer. Type test older than 10 (ten) years shall not be acceptable and bid is liable for rejection. Type Tests reports are required for each rating of all components used in BESS as per the Bidders’ engineering design.

2.5 The bidder must have certifications for ISO 9001:2015 quality management system and ISO 14001:2015 Environment management system, ISO 45001:2018 Operational health & safety and preferably ISO 27001:2022 Information Security Management System.

In case of the Bidder being a Bidding Consortium, the above certifications shall be met by the Lead Member of the Consortium.

2.6 Bidder must provide the responsibility matrix of all the consortium partners for Project execution phase and BESSA period i.e. Project tenure of 12 years as per Format 11.

3. Financial Eligibility Criteria

3.1 Net-Worth

The net-worth requirement should be at least 20% (twenty per cent) of the estimated capital cost of the Project as at least 7 days prior to the Bid submission deadline. In case of the Bidder being a SEBI registered AIF, the cumulative value of Assets Under Management (AUM) shall be demonstrated as part of Financial Eligibility Criteria. In this context, AUM shall mean the amount as certified by the Statutory Auditor of the AIF.

The net-worth/value of AUM to be considered for the above purpose will be the cumulative net-worth of the bidding company/AIF or consortium members. Except in the case of AIFs, the Bidder may seek qualification on the basis of financial capability of its Affiliate(s) for the purpose of meeting the Net Worth criteria as per the RfP. In case of the Bidder being a Bidding Consortium, any Member may meet the above criteria on the basis of financial capability of its Affiliate(s). In both cases, such Affiliates shall undertake to contribute the required equity funding and performance bank guarantees in case the bidder(s) fail to do so in accordance with the RfP.

It is clarified that the net-worth to be considered for this clause will be the total net-worth as calculated in accordance with the Companies Act, 2013, and AUM or investible funds to be considered under this clause will be calculated in accordance with applicable SEBI (AIF) Regulations.

For the limited purpose of meeting the technical and financial eligibility criteria in the tenders, in addition to using credentials of the Affiliates having more than 50% shareholding in the bidding company, the bidders may also use credentials of those Affiliates who do not control more than 50% of the bidding company, subject to the following:

a) The qualification criteria parameters will be met proportionately to the equity contribution of the entity whose credentials are being used to meet the requirement. For example, in case of Net Worth requirement being Rs. 100 Cr., and the strength of an Affiliate is used which owns 30% of the total shareholding in

the bidder, the said Affiliate should be able to meet up to Rs. 30 Cr. of the Net Worth.

b) In case the strength of an Affiliate is being used for meeting the eligibility criteria, shareholding pattern of the respective Affiliate will be locked-in upto COD of the Project.

3.2 A Company/Consortium would be required to submit annual audited accounts for the last financial year i.e. FY 2025-26 or as on the date at least 7 days prior to the bid submission deadline along with net worth from a practicing Chartered Accountant/ Statutory Auditor to demonstrate fulfilment of the criteria.

Please refer to Format 5 for furnishing information and compliance to the above eligibility requirements.

D. Method of Submission of Response to RfP by the Bidder

1. The bidder has to submit original of the following documents offline:

a. Bank Guarantee towards Earnest Money Deposit (EMD) as mentioned in the Bid Information Sheet (as per Format 6). One EMD of **INR 2,50,00,000/- (Two Crores and Fifty Lakhs only)** to be submitted for the capacity of 57.5 MW/ 115 MWh.

b. Pass-phrases for Techno-commercial and financial bids submitted on the portal.

No bid will be accepted in-person, on or before the date of bid submission.

2. Bank Guarantee against EMD needs to be submitted in both online and offline modes. The bidders will be required to submit the bank guarantee, either in-person or through post, at the office of Bid Manager until the date as on 2 working days after the closing date of bid submission. The 2-day duration will be counted from the date of bid submission.

2.1 Bidders shall furnish EMD for an amount of INR 2,50,00,000/- (Two Crores and Fifty Lakhs only). The Bidders shall have the option to furnish EMD in the form of:

i) Bank Guarantee

OR

ii) "Payment on Order instrument" / Letter of Undertaking to pay in case situation of default of BESSD in terms of BESPA arises, from any agency as notified by the Government of India or State Governments from time to time, for this purpose, to be furnished by the bidders.
"Payment on Order instrument" means Letter of Undertaking from any agency as notified by the Government of India or State Governments from time to time for this purpose, to be enforced in case of situation of default of Battery Energy Storage

System Developer (BESSD) in terms Battery Energy Storage System Agreement (BESSA). Such Letter(s) will have same effect as that of a Bank Guarantee issued by any public sector bank. Such "Payment on Order instrument" would have terms and conditions similar to that of any Bank Guarantee given by any public sector bank and would promise to pay the Buying Utility on demand within stipulated time. BESSD can seek such Letters(s) by offering due security to the above mentioned three non-banking financial institutions mentioned above. The Buying Utility shall not accept the instrument of 'Letter of Undertaking' as described above or in any other form, from any other non-banking financial institutions or bank, except from the institutions as notified above.

As an alternative to submission of EMD, the Bidder also has an option to submit a letter of undertaking issued by either of the following three organizations, viz. (i) Indian Renewable Energy Development Agency Limited (IREDA) or (ii) Power Finance Corporation Limited or (iii) REC Limited. This Letter of Undertaking shall be issued as “Payment on Order Instrument” (POI), wherein the POI issuing organization undertakes to pay in all scenarios under which the EMD would be liable to be encashed by Buying Utility within the provisions of BESSA.

Note: Forfeiture of EMD and/or blacklisting/debarring shall be undertaken if the BESSD/successful bidder fails to execute the BESSA within the time period stipulated in clause no 14, table A (Schedule of Bid Process) mentioned above.

For e.g., if the bid submission deadline is 18:00 hrs on 10th March 2025, the above deadline will expire at 18:00 hrs on 12th March 2025. In case of the above deadline being a holiday, the next business day in Bid Manager’s office will be the deadline for submission of Bank Guarantees.

Note: In all cases, the Bank Guarantee/POI against EMD (if applicable), shall be issued on or before the bid submission deadline. These instruments issued after the expiry of the deadline will be summarily rejected. The Bank Guarantee/POI against EMD, shall be issued in favour of BSES Rajdhani Power Limited. The EMD shall be valid for 120 (One Twenty) days. The relevant bank details are provided below.

The bidding envelope shall contain the following sticker:

RfP for Design, Supply, Testing, Installation, Commissioning, Operation and Maintenance of 57.5 MW/ 115 MWh Battery Energy Storage System (BESS)	
RfP Reference No.	
Submitted by	*(Enter Full name and address of the Bidder)*

Organization ID (OID) on ETS portal	*(Enter the OID through which the Bid has been submitted online on ETS portal)*
Authorized Signatory	*(Signature of the Authorized Signatory)* *(Name of the Authorized Signatory)* *(Stamp of the Bidder)*
Bid Submitted to	*The Energy and Resources Institute (TERI)* *Darbari Seth Block, Core 6C,* *India Habitat Centre, Lodhi Road,* *New Delhi - 110 003, India*

BRPL's details for preparation of EMD:

BSES RAJDHANI POWER LIMITED (BRPL),
BSES BHAWAN, NEHRU PLACE, 110019
NEW DELHI, INDIA, 110019
IFSC Code: SBIN0009601
Account No. 10277791773
STATE BANK OF INDIA, IFB, NEW DELHI
15TH FLOOR, JAWAHAR VYAPAR, BHAWAN
1, TOLSTOY MARG, JANPATH, NEW DELHI
110001, NEW DELHI, DL, IN

3. **Documents to be Submitted Online**

The bidders shall strictly follow the instructions mentioned in respective technical bid and financial bid while filling the form.

If the Bidder has submitted bid online and fails to submit the Bank Guarantee for requisite amount offline within 2 working days from last date of bid submission, then the same shall be treated as incomplete bid, the EMD shall be returned and the submitted bid will stand cancelled.

All documents of the response to RfP submitted online must be digitally signed and uploaded on the website, ***www.bharat-electronictender.com***, Response to RfP shall contain the following:

I. Technical Bid

The Bidder shall upload single technical bid containing **scanned copies** of the following documents duly signed and stamped on each page by the authorized signatory as mentioned below.

(a) All Formats as elaborated in Volume I of the RfP.

(b) All attachments elaborated below, with proper file names.

i) Memorandum of Association (MoA) and Article of Association (AoA) needs to be attached along with the bid. The bidder should also highlight the relevant provision which highlights the objects relating to Power/ Energy/ Renewable Energy/ Standalone Battery Energy Storage System development.

- In case, there is no mention of the above provisions in the AoA of the bidding company, the same has to be amended and submitted prior to signing of BESSA, if the bidder is selected as successful bidder.
- If the selected bidder wishes to execute the Project through a Special Purpose Vehicle (SPV), the AoA of the SPV highlighting the relevant provision which highlights the objects relating to Power/ Energy/ Renewable Energy/Standalone Battery Energy Storage System development has to be submitted prior to signing of BESSA

ii) Certificate of Incorporation of Bidding Company/ all member companies of Bidding Consortium.

iii) A certificate of shareholding of the bidding company, duly certified by a practicing Chartered Accountant/ Company Secretary as on a date within 30 days prior to the last date of bid submission. Bid Manager reserves the right to seek additional information, as required for evaluation purpose.

iv) Certified copies of annual audited accounts for the current financial year, i.e., FY 2026-27, and provisional audited accounts, along with certified copies of Balance Sheet, Profit & Loss Account, Schedules, and Cash Flow Statement supported with bank statements as on the date at least 7 days prior to the due date of bid submission (if applicable), shall be required to be submitted.

(c) All supporting documents regarding meeting the eligibility criteria.

(d) Scanned Copies of requisite amount of Bank Guarantee towards EMD as mentioned in the Bid Information Sheet (as per Format 6).

II. Financial Bid

Bidders shall upload the single Financial Bid with pass-phrases containing the scanned copy of following document(s):

(a) Covering letter and estimate of cost of the Project as per Format III of the RfP

The instructions mentioned in the Financial Bid Electronic Form have to be strictly followed without any deviation, else the bid shall be considered as non-responsive.

Important Note:

(a) The Bidders shall not deviate from the naming and the numbering formats of envelops mentioned above, in any manner.

(b) In each of the bid (as part of online bid submission), all the documents enclosed shall be indexed and flagged/bookmark appropriately, with the index list indicating the name of the document against each flag/bookmark.

(c) In case the Bidder submits the online documents on ISN-ETS within the bid submission deadlines and fails to submit the offline documents (as per clause-D (1)) in the office of Bid Manager within the bid submission deadlines, the online bid of the Bidder shall not be opened and shall be 'archived' on the ISN-ETS portal. Similarly, bid submitted offline but without any online submission on ISN-ETS portal shall not be opened and the EMD shall be returned to the respective bidder.

(d) **In case of submission of Bank Guarantee against EMD online on or before the bid submission deadline, and non-submission of the hard copy of the Bank Guarantee to Bid Manager within the date as on 2 business days subsequent to bid submission deadline, the RfP the bid submitted will be cancelled.**

(e) The pass-phrases of financial bid to be submitted by the technically qualified bidders.

E. Instructions to Bidders

GENERAL

BSES Rajdhani Power Limited (BRPL), hereinafter referred to as the "Buying Utility" or the "Purchaser" is desirous of setting up the Battery Energy Storage system at their respective licensed area in Delhi. The Energy and Resources Institute (TERI), hereinafter referred to as the "Bid Manager", seeks to invite bids from prospective bidders through competitive bidding.

SCOPE OF WORK: The scope shall include site survey, planning, design, engineering, procurement, transportation & supply at site, insurance, un-loading, handling, installation, integration, testing, commissioning, operation and maintenance of Battery energy Storage System conforming to the Technical Specifications of the RfP.

DISCLAIMER

This Document has been prepared in good faith, and on best endeavour basis includes statements, which reflect various assumptions, which may or may not be accurate. Each Bidder/ Bidding Consortium should conduct its own estimation and analysis and should check the accuracy, reliability, and completeness of the information in this Document and obtain independent advice from appropriate sources in their own interest.

Neither the Buying Utility nor Bid Manager or their employees will have any liability, whatsoever, to any Bidder or any other person under the law or contract, the principles of restitution or unjust enrichment or otherwise for any loss, expense or damage, whatsoever, which may arise from or be incurred or suffered in connection with anything contained in this Document, any matter deemed to form part of this Document, provision of Services and any other information supplied by or on behalf of Buying Utility or its employees, or otherwise a rising in any way from the selection process for the Supply.

Though adequate care has been taken while issuing the Bid document, the Bidder should satisfy itself that Documents are complete in all respects. Intimation of any discrepancy shall be given to this office immediately.

This Document and the information contained herein are Strictly Confidential and are for the use of only the person(s) to whom it is issued. It may not be copied or distributed by the recipient to third parties (other than in confidence to the recipient's professional advisors).

1. Bidding Documents

The Bidding Procedures , Contract Terms and Scope of Work, are described in the Bidding Documents. Failure to furnish all information required by the Bidding documents or submission of a Bid not substantially responsive to the Bidding Documents in every respect will may result in the rejection of the Bid.

2. Amendment of Bidding Documents

2.1 At any time prior to the deadline for submission of Bids, Bid Manager may for any reasons, whether at its own initiative or in response to a clarification requested by a prospective Bidder, modify the Bidding Documents by Amendment. BRPL may, at any time prior to the execution of the BESSA, issue such clarifications, interpretations, or explanations in respect of the intent, meaning, or scope of any provision of the RfP as it may deem necessary for the successful implementation and timely completion of the Project. Such clarifications shall be deemed to form an integral part of the RfP.

2.2 The Amendment shall be part of the Bidding Documents, and it will be notified through TERI's website but uploaded on the ISN-ETS portal.

2.3 In order to afford prospective Bidders reasonable time in which to take the Amendment into account in preparing their Bids, Bid Manager may, at its discretion, extend the deadline for the submission of Bids.

3. Clarification of RfP Documents and Pre-bid Meeting

Bidders requiring any clarification on the RfP document may notify Bid Manager by writing on the ISN-ETS portal until the date mentioned in Schedule of Bidding Process above.All clarification requests and responses shall be uploaded on the ISN-ETS portal. Bidders shall regularly monitor the portal for the updates.
Bid Manager shall conduct a pre-bid meeting as per the detailsdetails mentioned in Table A: Schedule of Bidding Process.

If a bidder discovers any significant ambiguity, error, conflict, discrepancy, omission, or other deficiency in this RfP, it should immediately notify through portal only. Bid Manager is not responsible to make any representation to the completeness or accuracy of the responses.

4. Preparation of Bids

i. Language of the bid

The Bid prepared by the Bidder, and all correspondence and documents relating to the Bid exchanged by the Bidder and Bid Manager, shall be written in the English Language. Any printed literature furnished by the Bidder may be written in another Language, provided that this literature is accompanied by an English translation, in which case, for purposes of interpretation of the Bid, the English translation shall govern.

ii. Documents comprising the bid:

The Bid prepared and submitted by the Bidder shall comprise the following components:

a) Bid Forms, Price & other Schedules (STRICTLY AS PER FORMAT) and Technical Data Sheets.
b) All the Bids must be accompanied with the required EMD.
c) Power of Attorney or Authorization letter indicating that the person(s) signing the Bid have the authority to sign the Bid and thus that the Bid is binding upon the Bidder during the full period of its validity.

5. Bid Prices

Bidders shall quote the **capital investment, levelized tariff, and levelized Operations and Maintenance (O&M) charges** as part of their Financial Bid (Format 3). The Financial Bid shall also include project cash flows as per the table in Format 3. The capital investment shall cover all the BESSD's obligations mentioned in the Bidding Documents up to the commissioning of the Project. These include site survey, planning, design, engineering, procurement, transportation and supply at site, insurance, un-loading, handling, installation, integration, testing, commissioning, operation, and maintenance of BESS all in accordance with the requirement of Bidding Documents. Any future capital expenditure (capex) after COD of the Project (e.g., capacity augmentation in later years) shall be mentioned as separate line items.

The Developer (BESSD) should ensure that the cost considered in the tariff fixation are excluding input GST for which the BESSD is eligible to avail input tax credit. In order to ensure this BESSD shall submit the details of the expected capital investment and O&M Charges along with a declaration stating that such cost is exclusive of input GST. Declaration is to be submitted as per Format-14.

The levelized capacity tariff shall be based on all expenses including capex, O&M, capacity augmentation, return on equity, interest on loan, administrative cost, Tax credit if any etc. The levelized tariff including O&M charges shall be quoted in INR/MW/year and remain constant over the entire duration of the Project (not affected by battery capacity & efficiency degradation within the planned limit).

The capital investment, tariff, and O&M charges quoted shall be inclusive of all costs as well as Duties, Taxes and Levies paid or payable during execution of the supply work, breakup of price constituents with and without GST, should be there as per Annexure-1. Prices quoted by the Bidder shall be Firm and not subject to any price adjustment (except for change in GST Law) during the performance of the Contract. A Bid submitted with an adjustable price quotation will be treated as non-responsive and rejected.

6. Bid Currencies

Prices shall be quoted in Indian Rupees (INR) only.

7. Period of validity of bids

Bids shall remain valid for 120 (One Hundred Twenty) days from the bid opening date. Notwithstanding above, Buying Utility may solicit the Bidder's consent to an extension of the Period of Bid Validity. The request and the responses thereto shall be made in writing by email.

8. Submission of Bids

8.1 Bids must be submitted by the bidder on the date, time, and address specified in the tender notice/documents.

8.2 The original Bid, together with the required copies, must be received by Bid Manager as per the Schedule of Bidding Process. Any Bid received after the deadline will be declared "Late" and rejected to the Bidder over email.

8.3 The Bid Manager may extend the deadline for the submission of Bids by amending the Bidding Documents if required to improve the number and quality of bid responses. All rights and obligations of Bid Manager and Bidders previously subject to the deadline will, thereafter, be subject to the deadline, as extended.

9. One Bid per bidder

Each Bidder shall submit only one bid either by itself, or as a member in a consortium. A Bidder who submits or participates in more than one Bid will cause all those Bids to be rejected.

10. Process to be confidential

Information relating to the examination, clarification, evaluation and comparison of Bids and recommendations for the award of a contract shall not be disclosed to Bidders or any other persons not officially concerned with such process. Any effort by a Bidder to influence Bid Manager's processing of Bids or award decisions may result in the rejection of the Bidder's Bid.

11. Clarification of Bids

To assist in the examination, evaluation and comparison of Bids, Bid Manager may, at its discretion, ask the bidder for a clarification of its Bid. All responses to requests for clarification shall be in writing and no change in the price or substance of the Bid shall be sought, offered, or permitted.

12. Contacting Bid Manager

Any effort by a Bidder to influence Bid Manager and/or Bid Manager’s decisions in respect of Bid evaluation, Bid comparison, or Contract Award will result in the rejection of the Bidder’s Bid.

13. Bid Manager's right to accept any bid and to reject any or all bids

Bid Manager reserves the right to reject any Bid and to annul the Bidding process and reject all Bids at any time prior, without any liability to the affected Bidder or Bidders or any obligation to inform the affected Bidder or Bidders of the grounds for Bid Manager's action.

14. Contract award

Bid Manager will announce to Buying Utility the name of the successful Bidder whose Bid has been determined to be the lowest (L1) tariff after e-Reverse Auction (e-RA) as per the evaluation criteria mentioned in the following section.

It is envisioned that the following agreement will be signed with the selected BESS developer (BESSD):

Type of agreement and Scope	Involved parties	Estimated Period of Performance
Battery Energy Storage Service Agreement (BESSA)	Buying Utility and Winning Bidder (BESS Developer (BESSD))	From signing of BESSA until 12 years post Commercial Operation Date (COD) of BESS

15. Performance Bank Guarantee

The successful Bidder shall furnish a Performance Bank Guarantee for an amount of 5% (Five percent) of the Project cost after issuance of LOI in accordance with the format provided (Format 7). The Performance Bank Guarantee would be applicable for **site survey, planning, design, engineering, procurement, transportation and supply at site, insurance, un-loading, handling, installation, integration, testing, commissioning, operation and maintenance of BESS** and should be effective from the date of signing of BESSA.

The Performance Bank Guarantee shall be valid from the date of signing of BESSA and shall be valid for a period of 15 (fifteen) months from the Commercial Operation Date (COD). Upon submission of the performance bank guarantee, the Earnest Money Deposit (EMD) shall be released.

16. Corrupt or Fraudulent practices

Bid Manager requires that the Bidders observe the highest standard of ethics during the procurement and execution of the Project. In pursuance of this policy, Bid Manager:

a) Defines, for the purposes of this provision, the terms set forth below as follows:

i) "Corrupt practice" means behaviour on the part of officials in the public or private sectors by which they improperly and unlawfully enrich themselves and/or those close to them, or induce others to do so, by misusing the position in which they are placed, and it includes the offering, giving, receiving, or soliciting of anything of value to influence the action of any such official in the procurement process or in contract execution; and

ii) "Fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of Bid Manager and includes collusive practice among Bidders (prior to or after Bid submission) designed to establish Bid prices at artificial non-competitive levels and to deprive Bid Manager of the benefits of free and open competition.

b) Will reject a bid forward if it determines that the Bidder recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question;

c) Will declare a firm ineligible, either indefinitely or for a stated period of time, to be awarded a contract if it at any time determines that the firm has engaged in corrupt or fraudulent practices in competing for, or in executing, a contract.

Furthermore, Bidders shall be aware of the provisions stated in the General Conditions of Contract.

17. Lack of Information to Bidder

The Bidder shall be deemed to have carefully examined all RfP documents to its entire satisfaction. Any lack of information shall not in any way relieve the Bidder of its responsibility to fulfill its obligation under the RfP.

18. Acknowledgement of Understanding of Terms

18.1 By submitting a bid, each bidder shall be deemed to acknowledge that it has carefully read all sections of this RfP, including all forms, schedules, and annexure hereto, and has fully informed itself as to all existing conditions and limitations.

18.2 By submitting a bid in response to this RfP, the Bidder shall also be deemed to acknowledge that the company is in agreement with the terms and conditions of the RfP and the procedures for Applying & evaluation.

19. Disqualification

The Bid Manager may, at its discretion and at any time during the evaluation of bid, disqualify any bidder. Grounds for such disqualification include, but not limited to the following cases:

a) The documents are not signed as per the RfP.
b) If it does not comply with the requirements and scope of this RfP.
c) If a bidder does not follow the format requested in this RfP or does not appear to address the particular requirements of the RfP.
d) The Bid validity period is shorter than the required period.
e) During validity of the Bid, or its extended period, if any, the Bidder increases its quoted prices.
f) Bid submitted with conditions.
g) Bid is received in incomplete form.
h) Bid is received after due date and time.
i) The Bidder has quoted for goods, applications, solutions manufactured/ developed by a different firm without required authority letter (or self-declaration where appropriate) from the OEM (if applicable).
j) Bid is not accompanied by all requisite documents.
k) Bidder has a conflict of interest.
l) Providing incorrect declaration to compliance requirement for minimum functional and technical specifications.
m) Any Bidder submits multiple Bids.
n) If information submitted in Technical Bid is found to be misrepresented, incorrect or false, accidentally, unwittingly, or otherwise, at any time during the processing of the contract (no matter at what stage) or during the tenure of the contract including the extension period if any, then the Bid will be considered non-responsive and may lead to its disqualification.
o) The deliverables as given in the Technical Bid should be in consonance with the Financial Bid. Any deviations in the final deliverables between Technical and Financial Bids shall make the Bidder unresponsive and may lead to disqualification of the Bid.
p) Any other reasons as appropriately determined by the Evaluation Committee.

In case of disqualification of any Bidder, the Earnest Money Deposit (EMD) shall be returned to the bidder.

F. Evaluation criteria and finalization of bid

Bid evaluation will be carried out considering the information furnished by Bidders as per provisions of this RfP. The detailed evaluation procedure and selection of bidders are described in subsequent clauses in this Section.

1. This is a two-part bid process. Bidders are to submit the bids (a) Technical Bid (b) Price Bid on the portal.

2. Bidders are requested to submit the bid in on the portal.

a) The Part-I (Technical Bid) - Technical Bid should not contain any cost information whatsoever. In case of Bids where the qualification requirements, technical suitability and other requirements are found to be inadequate, Part-II "Financial Bid" will be returned unopened.

b) Part II (Financial Bid) - Qualified bidders will be intimated after technical evaluation of all the bids is completed. Please refer Table A: Schedule of Bidding Process. Notwithstanding anything stated above, Bid Manager reserves the right to assess bidder's capability to perform the contract, should the circumstances warrant such assessment in the overall interest of Bid Manager. In this regard the decision of Bid Manager is final.

3. Opening of bids and criteria for award.

Step 1: Technical bid evaluation

a) First, the technical bids shall be opened and evaluated. The Technical Bids submitted online of only those bidders will be opened by Evaluation Committee whose required documents as mentioned in the previous section.

For e.g., if the bid submission deadline is 18:00 hrs on ----------, the online bid opening will be conducted on ----------. In case of the above deadline being a holiday, the bids will be opened on the next working day.

b) Each technical bid will be evaluated by an evaluation committee included but not limited to representatives from Bid Manager and Buying Utility. Bid Manager may engage third-party/ parties to provide support for the technical evaluation. Bids that are evaluated as technically qualified by the evaluation committee will proceed to financial bid evaluation.

c) Subject to furnishing of all required documents, each responsive bid will be evaluated as per the criteria mentioned below. Then the price bid of technically and financially qualified bidders shall be opened. The Evaluation Committee intends to award the tender through Cost-Based Selection, based on qualification criterion. The Bidder with the bid that delivers the lowest tariff (after reverse auction) for BESS while meeting the technical criteria, will be issued the Letter of Intent, and invited for BESSA contract signing.

d) The Technical Bids would be evaluated by the Evaluation Committee based on the criteria and sub criteria listed below. When deemed necessary, the evaluation committee may seek clarifications or additional information on relevant aspects from the bidder. However, that would not entitle the bidder to change or cause any change in the substance of the bid submitted or price quoted. Bids will be reviewed to assess completeness with the requirements set out in this RfP. Bids that do not fully comply with the minimum requirements will be rejected without further consideration.

S No.	Criteria
1	Bidder's experience as a prime developer/EPC within 5 (five) years from the last date of Bid submission for Supply, installation, Commissioning, operation & maintenance of grid-connected BESS in India along with Purchase order, Commissioning certificate and proof of satisfactory operations from central / State Government Agencies / PSU / Private firms. The Bidder has to mention the: • Total Cumulative Installed Capacity of grid interactive BESS in terms of MWh (commissioned and operational for at least six months) • Total Cumulative Installed Capacity of grid interactive BESS in terms of MWh (under commissioning/ commissioned and operational for less than six months) • Largest grid interactive BESS installation in terms of MW and MWh (This experience would include credentials of all consortium members, if applicable)
2	Bidder's net-worth at the end of previous Financial Year (In case of a consortium, each member would be given weightage in proportion to shareholding)
3	Bidder's total years of operation in Supply, installation, Commissioning, operation & maintenance of grid-connected BESS (Can be met by either member of the consortium)
4	Bidders will also submit a technical presentation of BESS (offered within the bid). Presentation must include brief about the points detailed under technical eligibility criteria as mentioned in 'Technical Eligibility Criteria'

Step 2: Financial bid evaluation

For the purpose of this bid, the bidder is expected to develop the financial bid as per the terms given below:

Opening and evaluation of financial bids

a) In this step, Technically Qualified Bids shall be evaluated based on the expected tariffs quoted by the Bidder in the Electronic Form of Financial Bid (as per Format 3).

b) The Bidder will have to submit a single bid quoting the capital expenditure for BESS and a single tariff (capacity charges) in Indian Rupee per MW per year. **The financial bid shall be inclusive of all duties and taxes. The capital expenditure and tariff have to be quoted in Indian Rupees in whole numbers only (no decimal places allowed).** If it is quoted with any decimal places, the digits in the decimal places shall be ignored.

c) Financial bid only those bidders shall be opened whose technical bids are found to be qualified as per the RfP.

d) In this step, evaluation will be carried out based on the tariffs quoted by the Bidders. The bidder quoting the lowest tariff for providing BESS to Buying Utility would be declared as L1 after scrutiny.

e) To ensure competitiveness, the minimum number of qualified Bidders should be two. If the number of qualified bidders is less than two, even after three attempts of bidding, and the Buying Utility still wants to continue with the bidding process, the same may be done with the consent of the Appropriate Commission.

f) Ranking of bidders after Financial Bid Evaluation: Following illustrates an example of ranking of bidders after financial bid opening and evaluation

Bidder	Expected tariff	Capital expenditure (INR Cr) (Inclusive of all duties/ taxes)	Ranking
B1	₹ 35 (Tariff in ₹ lakh/ MW/ year)	*63*	*L1*
B2	₹ 40 (Tariff in ₹ lakh/ MW/ year)	*72*	*L2*
B3	₹ 45 (Tariff in ₹ lakh/ MW/ year)	*82*	*L3*
B4	₹ 50 (Tariff in ₹ lakh/ MW/ year)	*94*	*L4*
B5	₹ 55 (Tariff in ₹ lakh/ MW/ year)	*107*	*L5*
B6	₹ 60 (Tariff in ₹ lakh/ MW/ year)	*123*	*L6*

Step 3: Reverse auction and selection of Successful Bidders

The reverse auction for the total tendered capacity shall be conducted on the portal https://www.bharat-electronictender.com on the day as intimated by Bid Manager to the eligible bidders. Rules of the auction process are brought out below, and are also contained in Format12 of the RfS. As part of submission of their response to RfS, the Bidders shall submit the scanned copy of Format12 of the RfS duly signed and stamped by the Authorized signatory, as an acceptance of the provisions contained therein,

The basic reverse auction process is mentioned below.

1. Opening of financial bid prior to the reverse auction:

   a. Initial financial quotes submitted by the vendor shall be opened prior to the start of RA process
   b. Bid Manager shall decide the start price for the e-RA by using the L1 quote from the initial financial quotations.
   c. On conclusion of the RA, the L1 bidder in the e-RA would be considered for award of the order.
   d. For the purpose of splitting, relative ranks of bidders shall be taken into consideration. For the same purpose, bidders who had submitted their “no

regret price" and did not participate in the e-RA, shall also be considered. Defined splitting guidelines shall be followed.

2. At least two working days prior to reverse auction, an advance intimation regarding the date and time of the reverse auction will be sent by e-mail to all the bidders who are technically and financially qualified. However, from this advance intimation it shall not be construed by the bidders that they have been shortlisted for e-Reverse Auction. Further, at least two hours before the scheduled start time of e-Reverse Auction, a system generated email for invitation for Reverse Auction will be sent to all qualified bidders.

3. Shortlisted bidders for Reverse Auction will be able to login into the ISN-ETS portal of reverse auction 15 minutes before the start time of reverse auction.

4. During the 15 minutes prior to start of reverse auction process, the respective tariff of the bidder shall be displayed on its window

5. Reverse auction shall be held on quoted tariff excluding GST or any applicable taxes of BESS.

6. Logical tariff strategy should be adopted to maximize benefits from the e-RA.

7. The discount received after the e-RA and final negotiation, w.r.t the initial financial bid shall be applied on all line items on a pro-rata basis.

8. The bid decrement value shall be equal to or above 0.25% of the starting quoted tariff. This would ensure that the auction does not stretch for too long.

9. Bidders can only quote any value lower than their previous quoted tariff taking into consideration the minimum decrement value mentioned in the previous clause. However, at any stage, increase in tariff will not be permissible. Bidders can improve their ranking by quoting the tariff lower than their last quoted tariff.

10. In the bidder's bidding window, the following information can be viewed by the bidder:

    a. Its tariff as the initial start price and there after last quoted tariff.
    b. The list of all the Bidders with their following details: Pseudo Identity, last quoted tariff and Project capacity.

11. Auction duration may be set for 30 (Thirty) minutes. If a new L1 is placed in the last 8 minutes of closing, then the auction duration shall be extended by another 8 minutes.

12. If a bid is placed which matches an existing L1, then the same would be counted as L2 (i.e. the first vendor to quote L1 should be considered as the final L1 in case of a tie). The rule would be same for other ranks as well.

13. Number of vendors participating and name of vendors shall be masked during the e-RA process.

14. The reverse auction shall be repeated only when an e-RA fails due to system issues attributable to ISN-ETS Platform.

15. If final quoted Tariff is significantly higher than the prevailing market price it is recommended that firstly, Bid Manager should analyse the budgeted/justified price, and secondly, the L1 vendor should be asked to give justification of the costing (including breakup). If, however, the cost still remains above the justified/budgeted cost, Bid Manager may ask for a "no-regret price" in a sealed envelope, from all qualified vendors, after taking approval from competent authority.

16. Failure of RA

The reverse auction may be deemed as failure if no bidder accepts the start Tariff or participates in the RA. In such a scenario:

a. A final "no-regret" price shall be asked from vendors in sealed envelopes.
b. The financial quotes initially received or the "no regret price", whichever is lower, shall be considered for processing. L1 among this list shall be considered as final L1.

Conclusion of the e-RA process, the Bidder with the bid that achieves the lowest tariff, will be issued the Letter of Intent (LoI).

Step 4: Issuance of LoI

(a) At the end of the selection process, a Letter of Intent (LoI) will be issued to the successful Bidder by the Buying Utility. In case of a Consortium being selected as the successful Bidder, the LoI shall be issued to the Lead Member of the Consortium.
(b) In all cases, Bid Manager's decision regarding selection of Bidder or annulment of tender process shall be final and binding on all participating bidders.
(c) After the issuance of LoI, Buying Utility and BESSD will sign the BESSA Agreement within (10) ten days with Lead Bidder of the winning Bidder consortium if applicable and will approach the Appropriate Commission for final approval of the tariff as well as signed BESSA.
(d) Winning bidder is required to form SPV along with the consortium partners, if applicable, within (30) Thirty days after issuance of LOI and same BESSA shall be signed between Buying Utility and SPV within (30) Thirty days of issuance of LOI. In case of delay in signing of BESSA beyond 6 months from the date of issuance of LoI, or any other extended date as mutually agreed between the Buying Utility and the successful bidders, the awarded capacity shall stand cancelled.

Market Integrity:

We have a fair and competitive marketplace. The rules for bidders are outlined in the Terms & Conditions. Bidders must agree to these rules prior to participating. In addition to other remedies available, we reserve the right to exclude a bidder from participating in future markets due to the bidder's violation of any of the rules or obligations contained in the Terms & Condition. Bidders who violate the marketplace rules or engage in behaviour that disrupts the fair execution of the marketplace restricts a bidder to length of time, depending upon the seriousness of the violation. Examples of violations include, but are not limited to:

- Failure to honour prices submitted to the marketplace.
- Breach of the terms of the published in Request for Proposal.

Supplier Confidentiality

All information contained in this RfP is confidential and may not be disclosed, published, or advertised in any manner without written authorization from Bid Manager. This includes all bidding information submitted. All RfP documents remain the property of Bid Manager and all suppliers are required to return these documents to Bid Manager upon request. Suppliers who do not honour this confidentiality provisions will be excluded from participating in future bidding events.

Annexure 1: Sample financial bid for the Project

Financial Bid Format

S. No.	Description	Details	Unit	Value
1	Capital expenditure	Includes all expenses related to installation such as cost of batteries, auxiliary equipment, setup costs, etc. Any capex for augmentation, if required during the Project tenure, is to be mentioned as a separate line item	INR	----------
2	Operations & Maintenance (O&M) charge	levelized O&M charges incurred for the BESS, recovered through tariff as specified in S. No. 3 of this table	INR/MW/ Year in numbers & in words	----------
3	Quoted Tariff	Levelized tariff which will be submitted to the Appropriate Commission excluding GST	INR/MW/ Year in numbers & in words	----------

Expected year-on-year Project cash flows for the BESSD

Year	Capital investment, if any (INR)*	Operations & Maintenance (INR)*	Other expenses (INR) (e.g., Taxes, working capital costs)	Return to equity (INR)	BESSA Tariff (INR) excluding GST	BESSA Tariff (INR) Including GST#

BESSD has to provide full breakup of cost (capital Investment & O&M) and the GST component thereof

After considering the Benefit of Input Tax Credit (ITC)

Format 1: Covering Letter

To
Head of the Department
Contracts & Materials
The Energy and Resources Institute
New Delhi 110003

Sir,

We understand that BSES Rajdhani Private Limited (BRPL) is desirous of procuring Battery Energy Storage Systems for use in its licensed distribution network area. Having examined the Bidding Documents for the above-named works, we the undersigned, offer to deliver the goods in full conformity with the Conditions of Contract, and specifications for the sum of AS PER PRICE BID ENCLOSED or such other sums as may be determined in accordance with the terms and conditions of the contract. The above amounts are in accordance with the Price Schedules attached herewith and are made part of this bid.

If our Bid is accepted, we undertake to deliver the entire goods as per delivery schedule given by you from the date of signing of Battery Energy Storage Service Agreement (BESSA).

If our Bid is accepted, we will furnish two performance bank guarantees, each for an amount of 5% (five) percent of the Project cost for due performance of the Contract in accordance with the Conditions of Contract.

We agree to abide by this Bid for a period of 120 days from the date fixed for bid opening, and it shall remain binding upon us and may be accepted at any time before the expiration of that period.

We declare that we have studied the provision of Indian Income Tax Law and other Indian Laws for supply of equipment/materials and the prices have been quoted accordingly.

The terms of this Bid will remain fixed unless and until the BESSA is signed.

We understand that you are not bound to accept the lowest, or any bid you may receive.

There is provision for Resolution of Disputes under this Contract, in accordance with the Laws and Jurisdiction of Contract in Volume 3 of the RfP.

Dated this.....day of.....20.....

Signature.....

In the capacity of…….....
duly authorized to sign for and on behalf of (IN BLOCK CAPITALS) ……

Format 2- Technical Bid

S No	Description	Unit	Details to be furnished by bidder
A	Battery		
1	Make/Manufacturer		
2	Type / Chemistry		
3	System Configuration	Cell/Module connections	
4	Designed capacity of battery (Nameplate Reading)	MWh	
5	Dispatchable Capacity	MWh	
6	Service Life	Years	
7	No. of Cycles	Nos.	
8	Cell Capacity	Ah	
9	Cell Nominal Voltage	V	
10	Cell Operating Voltage Range	V	
11	Cell Energy	Wh	
12	Cell Dimensions	L x b x h	
13	Cell Type	Geometry	
14	Cell Weight	kg	
15	No. of Battery Cells	Nos.	
16	Short circuit current	A	
17	Storage temperature range	Deg C	
18	Module Capacity	Ah	
19	Module Nominal Voltage	V	
20	Module Operating Voltage Range	V	
21	Module Energy	Wh	
22	Module Dimensions	lxbxh	
23	Module Weight	kg	
24	No. of Battery Modules	Nos.	
25	Design Capacity of Battery Modules	kWh	
26	No. of Battery Racks	Nos.	
27	Rack Dimensions	lxbxh	
28	Rack Weight	Kg	
29	Design Capacity of each Battery Rack	MWh	
30	Charging Operating temperature range	Deg C	
31	Discharging Operating temperature range	Deg C	
32	Battery Enclosure Dimensions	L x b x h	
33	Battery Enclosure Weight	Kg	

S No	Description	Unit	Details to be furnished by bidder
34	Battery Enclosure IP Rating	Rating	
35	Self-Discharge rate	C	
36	DOD	%	
37	Life cycle of battery (at specified DoD)	Nos.	
38	Service life	Years	
39	Charging time (hours) from rated DoD to full capacity	C	
40	All Tests certificates for battery cell/module	IEC/UL/IEEE/ BIS	
B	**Power Conditioning Unit**		
1	Make/manufacturer		
2	Inverter- power rating	kVA	
3	Inverter power rating	kW	
4	Inverter Nominal Voltage	V	
5	Inverter Frequency	Hz	
6	Inverter Power Factor Range	Quadrant	
7	Inverter DC Voltage Range	V	
8	Inverter Operational Modes	VSI VF/CSI PQ, Islanding, Black Start, Anti-islanding	
9	Transformer Type	Oil filled/Dry Type	
10	Transformer Enclosure IP	Rating	
11	Inverter Dimension	lxbxh	
12	Inverter Weight	Kg	
13	Inverter minimum response time		
14	Inverter Communication option		
15	Test certificate available	IEC/UL/IEEE/ BIS	
C	**Lighting Arrestor**		
1	Type of Lighting Arrestor and make	Rod/sphere/ horn/multi gap/electrolyte/metal oxide	
2	Class of Lightning Arrestor/Surge Protection Devices	II/III	
D	**Earthing**		
1	Type of Earthing System (Configuration)	TT/IT/TN	

S No	Description	Unit	Details to be furnished by bidder
	Type of Earthing	Pipe/ Plate/ Strip	
	Earth Resistance Value	<1 ohm	
2	No of Earthing	Nos.	
E	**Connecting cables/wire**		
1	Material and size& specifications		
2	Details of Switches		
F	**Measurement & control devices**		
1	**Sensors**		
	Type/make		
	Accuracy/precision		
	Sensitivity		
2	**Transducers**		
	Type/make		
	Accuracy / precision		
	Sensitivity		
3	**Details of EMS & BMS**		
	Rack level BMS		
	Master BMS		
	External Power supply requirement to Master BMS	Y/N	
	Type of Power Supply	UPS/non-UPS	
	Supply voltage to Master BMS	V	
	BMS architecture	Y/N	
	Access to Master BMS		
	HMI dimensions (mm)	L x b x h	
	Supply voltage to HMI, if powered externally	V	
	Historical data storage in Master BMS	GB	
	Interface to access historical data of BMS		
	Threshold values of BMS protection activation and reset		
	List of BMS alarms		
	List of EMS alarms		
	Recording and sampling time interval		
	System efficiency (AC-AC)	%	
	System Response Time	seconds	
	System Architecture	Layout	

S No	Description	Unit	Details to be furnished by bidder
	System Performance Warranty in Years	12	
3	**Details of Fire Fighting**		
	Automatic Fire Fighting	Y/N	
	Configuration & Architecture		
	Type of Fire Suppression	Dry Chemical/Aerosol/Water/Gas	
	Design Standard (NFPA compliant Mention Standard)		

The bidders are requested to provide additional information, as deemed necessary, as part of a technical presentation in order to showcase the technology suitability. The technical presentation is expected to cover the points mentioned under technical evaluation criteria in Volume 2 of the RfP and must be submitted as a document attached to Format 2.

(Signature of Bidder with seal)

Format 3: Financial Bid

(The Covering Letter should be submitted on the Letter Head of the Bidding Company/ Lead Member of Consortium)

Ref. No. _____ Date: _____

From: _____ (Insert name and address of Bidding Company/ Lead Member of Consortium)

_____

_____

Tel. #:
Fax#:
E-mail address#

To

The Energy and Resources Institute (TERI)

Sub: Response to RfP No. _____ dated _____ for _____.

Dear Sir/ Madam,

I/ We, _____ (Insert Name of the Bidder) enclose herewith the Financial Bidfor selection of my firm for a capacity of 57.5MW/ 115 MWh in India as Bidder for the above.

I/We agree that this offer shall remain valid for a period of 120 (One Hundred and Twenty) days from the due date of submission of the response to RfP such further period as may be mutually agreed upon.

Dated the _____day of_____, 20….

Thanking you,

We remain,
Yours faithfully,
Name, Designation, Seal and Signature of Authorized Person in whose name Power of Attorney/ Board Resolution/ Declaration.

Bidders seal & signature

Notes:

1. *There can be only one constant tariff over the Project period of 12 years. If the bidder quotes multiple tariffs, then the bid shall be considered as nonresponsive*.

2. *If the bidder submits the financial bid not in line with the instructions mentioned therein, then the bid shall be considered as nonresponsive.*
3. *Tariff requirement shall be quoted as a fixed amount in Indian Rupees only. Conditional proposal shall be summarily rejected.*
4. *In the event of any discrepancy between the values entered in figures and in words, the values entered in words shall be considered.*
5. *Tariff should be in Indian Rupees in whole numbers only (no decimal places allowed). If it is quoted with any decimal places, the digits in the decimal places shall be ignored.*

PRELIMINARY ESTIMATE OF COST AND RETURNS FOR THE PROJECT

Payment of BESS tariff to BESSD

The Appropriate Commissions shall approve a levelized tariff in ₹ lakh/ MW/ year for the Project over the lifespan of 12 years. Buying Utility will pay this amount to the BESSD.

Assumptions to be provided by bidders

Financial Bid Format

S. No.	Description	Details	Unit	Value
1	Capital expenditure	Includes all expenses related to installation such as cost of batteries, auxiliary equipment, setup costs, etc. Any capex for augmentation, if required during the Project tenure, is to be mentioned as a separate line item	INR	----------
2	Operations & Maintenance (O&M) charge	Levelized O&M charges incurred for the BESS, recovered through tariff as specified in S. No. 3 of this table	INR/MW/Year in numbers and in Words	----------
3	Tariff	Levelized tariff which will be submitted to the Appropriate Commission **excluding GST**	INR/MW/ Year in numbers and in words	----------

Expected year-on-year Project cash flows for the BESSD

Year	Capital investment, if any (INR)*	Operations & Maintenance (INR)*	Other expenses (INR) (e.g., Taxes, working capital costs)	Return to equity (INR)	BESSA Tariff (INR) excluding GST	BESSA Tariff (INR) Including GST#
0						
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						

BESSD has to provide full breakup of cost (capital Investment & O&M) and the GST component thereof

After considering the Benefit of Input Tax Credit (ITC)

Format 4: General Particulars of the Bidder

S No	Name of the Bidder	To be furnished by bidder
1	Name of the Company	
2	Registered Office Address	
3	Year of Incorporation	
4	Postal Address	
5	Mobile number	
6	Telephone, Telex, Fax Number	
7	E-mail address	
8	Website	
9	PAN number (enclose a copy of the certificate)	
10	GST number (enclose a copy of the certificate)	
11	Name, designation, and mobile phone no. of the representative of the Bidder to whom all references shall be made	
12	Have the Bidder ever been debarred by any Government Dept. /Undertaking/Private Company for undertaking any work?	
13	Number of full-time technical / professional staff in the Company having experience in energy storage	
14	Any other information	

(Signature of Bidder with seal)

Format 5: Minimum Eligibility Conditions

S No.	Qualification criteria	Description	Documentary evidence attached at page no.
1	The Bidder shall fall within one of the eligible categories specified in Clause 1.1 of Section C of this RfP, namely: (a) a Company under the Companies Act, 2013; (b) a Foreign Company under the respective nation's laws; (c) an Alternative Investment Fund registered with SEBI; or (d) a Consortium comprising the foregoing entities, subject to the terms of this RfP.		
2	Bidders should not be under a declaration of ineligibility for corrupt and fraudulent practice. In this regard an undertaking (self-certificates) has to be provided as per Format 8 that the bidder has not been blacklisted/ debarred by any central/state government or any other institution including electricity boards		
3	Undertaking that the bidder is not a willful defaulter to any lender as per the General Eligibility Criteria (as per Format 8)		
4	The bidder should demonstrate experience of having installed, operationalized, and operated BESS in India integrated at minimum 11 KV Voltage level. Purchase Order/ Completion Certificates/ Agreement between Buyer and Developer along with work in progress certificate issued by Buyer should be enclosed (Minimum 4 MW -2 Hrs BESS capacity) as per Format 9		
5	The Bidder should have valid GST and PAN registration certificate. A copy of which should be enclosed		
6	Net Worth of the Company/ Firm/ Corporation in the current financial year (FY 2026-27) should be at least INR 25 Crs [-]		
7	The lead bidder has valid ISO 9001:2015 quality management system, ISO 14001:2015 Environment management system and ISO 45001: 2018 Occupational health and safety management systems		

S No.	Qualification criteria	Description	Documentary evidence attached at page no.
8	Bidder should have valid CPRI/ERDA/ equivalent international laboratory Type test certificate and report of offered battery storage system of all National & International standards for Battery and Inverter mentioned in Table 5.1 and 5.2 and Table 2 of Annexure of Volume III		
9	Technical presentation as per clause 2.1 of Volume I		
10	Bidder shall submit an unconditional under taking in Format-15 confirming that it has inspected the allocated Project Area and is willing to develop, implement, operate, and maintain the Project on an **"as-is-where-is" basis**		

(Signature of Bidder with seal)

Format 6: Format for Bank Guarantee for Earnest Money Deposit (EMD)

(To be stamped in accordance with Stamp Act, the Non-Judicial Stamp Paper of Appropriate Value)

Reference: ……..

Bank Guarantee No.: ..... Date: .....……...

In consideration of the _____ [*Insert name of the Bidder*] (hereinafter referred to as 'Bidder') submitting the response to RfP inter alia for _____[*Insert title of the RfP*] of the cumulative capacity of 57.5 MW/ 115 MWh for offering Battery Energy Storage System on long term basis, in response to the RfP No. _____ dated _____ issued by The Energy and Resources Institute (TERI) and considering such response to the RfP of ……[*Insert the name of the Bidder*] as per the terms of the RfP, the _____ [*Insert name & address of bank*] hereby agrees unequivocally, irrevocably and unconditionally to pay to BSES Rajdhani Private Limited (BRPL) at _____ [*Insert Name of the Place from the address of BRPL*] forthwith without demur on demand in writing from BRPL or any Officer authorized by it in this behalf, any amount of INR ----------(Rupees ----------) only, on behalf of M/s _____ [*Insert name of the Bidder*].

This guarantee shall be valid and binding on this Bank up to and including _____[*insert date of validity in accordance with this RfP*] and shall not be terminable by notice or any change in the constitution of the Bank or the term of contract or by any other reasons whatsoever and our liability hereunder shall not be impaired or discharged by any extension of time or variations or alternations made, given, or agreed with or without our knowledge or consent, by or between parties to the respective agreement.

Our liability under this Guarantee is restricted to INR 2,50,00,000/- (Indian Rupees Two Crores and Fifty Lakhs only). Our Guarantee shall remain in force until _____ [*insert date of validity in accordance with this RfP*]. BRPL shall be entitled to invoke this Guarantee till _____ [*insert date of validity in accordance with this RfP*].

The Guarantor Bank hereby agrees and acknowledges that the BRPL shall have a right to invoke this BANK GUARANTEE in part or in full, as it may deem fit.

The Guarantor Bank hereby expressly agrees that it shall not require any proof in addition to the written demand by BRPL, made in any format, raised at the above-mentioned address of the Guarantor Bank, in order to make the said payment to BRPL.

The Guarantor Bank shall make payment hereunder on first demand without restriction or conditions and notwithstanding any objection by _____ [*Insert name of the*

Bidder] and/ or any other person. The Guarantor Bank shall not require BRPL to justify the invocation of this BANK GUARANTEE, nor shall the Guarantor Bank have any recourse against BRPL in respect of any payment made hereunder.

This BANK GUARANTEE shall be interpreted in accordance with the laws of India and the courts at New Delhi shall have exclusive jurisdiction.

The Guarantor Bank represents that this BANK GUARANTEE has been established in such form and with such content that it is fully enforceable in accordance with its terms as against the Guarantor Bank in the manner provided herein.

This BANK GUARANTEE shall not be affected in any manner by reason of merger, amalgamation, restructuring or any other change in the constitution of the Guarantor Bank.

This BANK GUARANTEE shall be a primary obligation of the Guarantor Bank and accordingly BRPL shall not be obliged before enforcing this BANK GUARANTEE to take any action in any court or arbitral proceedings against the Bidder, to make any claim against or any demand on the Bidder or to give any notice to the Bidder or to enforce any security held by BRPL or to exercise, levy or enforce any distress, diligence or other process against the Bidder.

This BANK GUARANTEE shall be effective only when the Bank Guarantee issuance message is transmitted by the issuing Bank through SFMS to any Nationalized/Scheduled Bank in India and a confirmation in this regard is received by BRPL.

Notwithstanding anything contained hereinabove, our liability under this Guarantee is restricted to INR _____ (Indian Rupees _____ Only) and it shall remain in force until _____ [*Date to be inserted on the basis of this RfP*].

We are liable to pay the guaranteed amount or any part thereof under this Bank Guarantee only if BRPL serves upon us a written claim or demand.

Signature: _____
Name: _____
Power of Attorney No.: _____

For
_____ [*Insert Name and Address of the Bank*] __ Contact Details of the Bank:
E-mail ID of the Bank:
Banker's Stamp and Full Address.
Dated this ____ day of ____, 20__

Format 7: Performance Bank Guarantee

(*To be stamped in accordance with Stamp Act, the Non-Judicial Stamp Paper of Appropriate Value*)

Reference: ……..

Bank Guarantee No.: ..... Date: .....……...

In consideration of the _____ [*Insert name of the Bidder*] (hereinafter referred to as 'selected System Integrator') submitting the response to RfP inter alia for ……[*insert title of the* RfP] of the capacity of 57.5 MW/ 115 MWh, at ……*[Insert name of the place*], in response to the RfP dated…… issued by Bid Manager on behalf of BSES Rajdhani Power Limited (hereinafter referred to as BRPL) and considering such response to the RfP of ……[*Insert name of the Bidder*] (which expression shall unless repugnant to the context or meaning thereof include its executers, administrators, successors and assignees) and selecting the Project of the System Integrator (SI) and issuing Letter of Intent No. _____ to _____ (*Insert Name of selected* System Integrator) as per terms of RfP and the same having been accepted by the selected SI resulting in a Battery Energy Storage Service Agreement (BESSA) to be entered into, for procurement of capacity [from selected System Integrator or a Project Company, M/s _____ {a Special Purpose Vehicle (SPV) formed for this purpose}, if applicable].

As per the terms of the RfP, the _____ [*Insert name & address of Bank*] hereby agrees unequivocally, irrevocably and unconditionally to pay to BRPL at _____ [*Insert Name of the Place from the address of the BRPL*] forthwith on demand in writing from BRPL or any Officer authorised by it in this behalf, any amount up to and not exceeding Indian Rupees _____ [Total Value] only, on behalf of M/s _____ [*Insert name of the selected System Integrator/ Project Company*]

This guarantee shall be valid and binding on this Bank up to and including ……. and shall not be terminable by notice or any change in the constitution of the Bank or the term of contract or by any other reasons whatsoever and our liability hereunder shall not be impaired or discharged by any extension of time or variations or alternations made, given, or agreed with or without our knowledge or consent, by or between parties to the respective agreement.

Our liability under this Guarantee is restricted to INR _____ (Indian Rupees _____ Only).
Our Guarantee shall remain in force until……. BRPL shall be entitled to invoke this Guarantee till …….

The Guarantor Bank hereby agrees and acknowledges that BRPL shall have a right to invoke this BANK GUARANTEE in part or in full, as it may deem fit.

The Guarantor Bank hereby expressly agrees that it shall not require any proof in addition to the written demand by BRPL, made in any format, raised at the above-mentioned address of the Guarantor Bank, in order to make the said payment to BRPL.

The Guarantor Bank shall make payment hereunder on first demand without restriction or conditions and notwithstanding any objection by _____ [*Insert name of the selected* System Integrator/ *Project Company as applicable*] and/ or any other person. The Guarantor Bank shall not require BRPL to justify the invocation of this BANK GUARANTEE, nor shall the Guarantor Bank have any recourse against BRPL in respect of any payment made hereunder

This BANK GUARANTEE shall be interpreted in accordance with the laws of India and the courts at New Delhi shall have exclusive jurisdiction.

The Guarantor Bank represents that this BANK GUARANTEE has been established in such form and with such content that it is fully enforceable in accordance with its terms as against the Guarantor Bank in the manner provided herein.

This BANK GUARANTEE shall not be affected in any manner by reason of merger, amalgamation, restructuring or any other change in the constitution of the Guarantor Bank.

This BANK GUARANTEE shall be a primary obligation of the Guarantor Bank and accordingly BRPL shall not be obliged before enforcing this BANK GUARANTEE to take any action in any court or arbitral proceedings against the selected Battery Energy Storage System Developer/ Project Company, to make any claim against or any demand on the selected Battery Energy Storage System Developer/ Project Company or to give any notice to the selected Battery Energy Storage System Developer/ Project Company or to enforce any security held by BRPL or to exercise, levy or enforce any distress, diligence or other process against the selected Battery Energy Storage System Developer / Project Company.

This BANK GUARANTEE shall be effective only when the Bank Guarantee issuance message is transmitted by the issuing Bank through SFMS to IDFC First Bank and a confirmation in this regard is received by BRPL.

The Guarantor Bank acknowledges that this BANK GUARANTEE is not personal to BRPL and may be assigned, in whole or in part, (whether absolutely or by way of security) by BRPL to any entity to whom BRPL is entitled to assign its rights and obligations under the BESSA. Notwithstanding anything contained hereinabove, our liability under this Guarantee is restricted to INR _____ (Indian Rupees _____ Only) and it shall remain in force until ……. We are liable to pay the guaranteed amount or any part thereof under this Bank Guarantee only if BRPL serves upon us a written claim or demand.

Signature: _____

Name: _____

Power of Attorney No.: _____

For _____ *[Insert Name and Address of the Bank]* __

Contact Details of the Bank:

E-mail ID of the Bank:
Banker's Stamp and Full Address.

Dated this ____ day of ____, 20__

Witness:

1. ……..

Signature
Name and Address

2. ……

Signature
Name and Address

Notes:

1. The Stamp Paper should be in the name of the Executing Bank and of appropriate value.
2. The Performance Bank Guarantee shall be executed by any of the Scheduled Commercial Banks as listed on the website of Reserve Bank of India (RBI) and amended as on the date of issuance of Bank Guarantee. Bank Guarantee issued by foreign branch of a Scheduled Commercial Bank is to be endorsed by the Indian branch of the same bank or State Bank of India (SBI).

Format 8: Undertaking regarding no wilful default and no major litigation pending

(To be submitted on the letterhead of the Bidder)

We, hereby provide this undertaking to BSES Rajdhani Power Limited, in respect to our response to RfP vide RfP No. _____dated_____, that as on _____ (Insert bid submission deadline), M/s _____ (insert name of the Bidder), or any of its Affiliates is not a wilful defaulter to any lender. We further undertake that as on _____(insert bid submission deadline), M/s _____ (insert name of the Bidder) & any of its Affiliate including any Consortium Member & any of its Affiliate, their directors have not been barred or included in the blacklist by any entity, government agency or authority in India, the government of the jurisdiction of the Bidder or Members where they are incorporated or the jurisdiction of their principal place of business, any international financial institution such as the World Bank Group, Asian Development Bank, African Development Bank, Inter-American Development Bank, Asian Infrastructure Investment Bank etc., or the United Nations or any of its agencies.

(Name and Signature of the Authorized Signatory)

Format 9: Format for experience letter

Item	Particulars
Title & nature of the Project	
Category	
Entity for which the Project was constructed/ developed	
Location	
Size of Project (MW, MWh)	
Project cost	
Date of commencement of Project	
Date of completion / commissioning	
Copy of Purchase Order and Completion certificate from entity concerned	<to be attached below this table>

(Signature of Bidder with seal)

Format 10: Certificate for Financial Requirement

(This should be submitted on the Letter Head of the Bidding Company/ Lead Member of Consortium)

Ref. No. _____ Date: _____

From: _____ *(Insert name and address of Bidding Company/ Lead Member of Consortium*) Tel.#:
Fax#:
E-mail address#

To

BSES Rajdhani Power Limited
BSES Bhawan, Nehru Place
New Delhi 110 019

Sub: Response to RfP No. _____ dated _____ for _____.

Dear Sir/ Madam,

We certify that the Bidding Company/Member in a Bidding Consortium is meeting the financial eligibility requirements as per the provisions of the RfP. Accordingly, the Bidder, with the support of its Affiliates, (strike out if not applicable) is fulfilling the minimum Net Worth criteria, by demonstrating a Net Worth of Rs.25 Cr. (INR Twenty Five Crores only in words) as on the current Financial Year 2026-27 (Strike our wherever not applicable).

This Net Worth has been calculated in accordance with instructions provided in the RfP.

Exhibit (i): Applicable in case of Bidding Company

For the above calculations, we have considered the Net Worth by Bidding Company as per following details:

Name of Bidding Company	Name of Affiliate(s) whose net worth is to be considered	Relationship with Bidding Company*	Net Worth(in Rs. Crore)
Company 1			

Total	

**The column for "Relationship with Bidding Company" is to be filled only in case the financial capability of Affiliate has been used for meeting Qualification Requirements. Further, documentary evidence to establish the relationship, duly certified by a practicing company secretary/ chartered accountant is required to be attached with the format.*

Exhibit (ii): Applicable in case of Bidding Consortium

(To be filled by each Member in a Bidding Consortium separately)

Name of Member: [Insert name of the Member]

Net Worth Requirement to be met by Member in Proportion to the Equity Commitment: INR ---------- Crore (Equity Commitment (%) * Rs. [ ] Crore)

For the above calculations, we have considered Net Worth by Member in Bidding Consortium and/ or its Affiliate(s) per following details:

Name of Consortium Member Company	Name of Affiliate(s) whose net Worth is to be considered	Relationship with Bidding Company* (If any)	Net Worth (in Rs. Crore)	Equity Commitment (in %age) in Bidding Consortium	Committed Net Worth (In Rs. Crore)
Company 1					
Company 2					
Total					

** The column for "Relationship with Bidding Company" is to be filled only in case the financial capability of Affiliate has been used for meeting Qualification Requirements. Further, documentary evidence to establish the relationship, duly certified by a practicing company secretary/chartered accountant is required to be attached with the format*

(Signature & Name of the Authorized Signatory)
(Signature and Stamp of CA)

Membership No.

Regn. No. of the CA's Firm:
Date:

Note:

(i) Along with the above format, in a separate sheet on the letterhead of the Chartered Accountant's Firm, provide details of computation of Net Worth duly certified by the Chartered Accountant.

(ii) Certified copies of Balance sheet, Profit & Loss Account, and Cash Flow Statements are to be enclosed in complete form along with all the Notes to Accounts.

Format 11: Details of Consortium

THIS Consortium Agreement ("Agreement") executed on this ___ Day of _____ Two Thousand _____ between M/s _____ [*Insert name of Lead Member*] a Company incorporated under the laws of _____ and having its Registered Office at _____ (hereinafter called the "**Member-1**", which expression shall include its successors, executors and permitted assigns) and M/s _____ a Company incorporated under the laws of ____ and having its Registered Office at _____ (hereinafter called the "**Member-2**", which expression shall include its successors, executors and permitted assigns)for the purpose of submitting response to RfP and execution of Battery Energy Storage Purchase Agreement (in case of award), against RfP No. _____dated _____issued by The Energy and Resources Institute (TERI), a not-for-profit research organization, and registered under the Societies Registration Act XXI of 1860 with headquarters at Darbari Seth Block, IHC Complex, Lodhi Road, New Delhi-110003.

WHEREAS each Member individually shall be referred to as the "Member" and all of the Members shall be collectively referred to as the "Members" in this Agreement.

WHEREAS BRPL desires to purchase Power under RfP for _____ (insert title of the RfP);

WHEREAS, BRPL had invited response to RfP vide its Request for Proposal (RfP) dated _____

WHEREAS the RfP stipulates that in case response to RfP is being submitted by a Bidding Consortium, the Members of the Consortium will have to submit a legally enforceable Consortium Agreement in a format specified by BRPL wherein the Consortium Members have to commit equity investment of a specific percentage for the Project.

NOW THEREFORE, THIS AGREEMENT WITNESSTH AS UNDER:

In consideration of the above premises and agreements all the Members in this Bidding Consortium do hereby mutually agree as follows:

1. We, the Members of the Consortium and Members to the Agreement do hereby unequivocally agree that Member-1 (M/s_____), shall act as the Lead Member as defined in the RfP for self and agent for and on behalf of Member-2, ----, Member-n and to submit the response to the RfP.

2. The Lead Member is hereby authorized by the Members of the Consortium and Members to the Agreement to bind the Consortium and receive instructions for and on their behalf.

3. Notwithstanding anything contrary contained in this Agreement, the Lead Member shall always be liable for the equity investment obligations of all the Consortium Members i.e., for both its own liability as well as the liability of other Members.

4. The Lead Member shall be liable and responsible for ensuring the individual and collective commitment of each of the Members of the Consortium in discharging all of their respective equity obligations. Each Member further undertakes to be individually liable for the performance of its part of the obligations without in any way limiting the scope of collective liability envisaged in this Agreement.

5. Subject to the terms of this Agreement, the share of each Member of the Consortium in the issued equity share capital of the Project Company is/shall be in the following proportion:

Name	Percentage
Member 1 (Lead Member)	---
Member 2	---
Total	100%

We acknowledge that after the execution of BESSA, the controlling shareholding **(having not less than 51% of the voting rights and paid-up share capital)** in the Project Company developing the Project shall be maintained up to COD of the Project.

6. The Lead Member, on behalf of the Consortium, shall inter alia undertake full responsibility for liaising with Lenders or through internal accruals and mobilizing debt resources for the Project, and ensuring Financial Closure in terms of the BESSA.

7. In case of any breach of any equity investment commitment by any of the Consortium Members, the Lead Member shall be liable for the consequences thereof.

8. Except as specified in the Agreement, it is agreed that sharing of responsibilities as aforesaid and equity investment obligations thereto shall not in any way be a limitation of responsibility of the Lead Member under these presents.

9. It is further specifically agreed that the financial liability for equity contribution of the Lead Member shall not be limited in any way so as to restrict or limit its liabilities. The Lead Member shall be liable irrespective of its scope of work or financial commitments.

10. This Agreement shall be construed and interpreted in accordance with the Laws of India and courts at New Delhi alone shall have the exclusive jurisdiction in all matters relating thereto and arising there under.

11. It is hereby further agreed that in case of being selected as the Successful Bidder, the Members do hereby agree that they shall furnish the Performance Guarantee in favour of BRPL in terms of the RfP.

12. It is further expressly agreed that the Agreement shall be irrevocable and shall form an integral part of the Battery Energy Storage Service Agreement (BESSA) and shall remain valid until the expiration or early termination of the BESSA in terms thereof, unless expressly agreed to the contrary by BRPL.

13. The Lead Member is authorized and shall be fully responsible for the accuracy and veracity of the representations and information submitted by the Members respectively from time to time in the response to RfP.

14. It is hereby expressly understood between the Members that no Member at any given point of time, may assign or delegate its rights, duties, or obligations under the BESSA except with prior written consent of BRPL.

15. The broad roles and responsibilities of the Consortium Members shall be as follows:

Consortium Member	Role and Responsibility
Company-1 (Lead Member)	---------- ---------- ---------- ---------- Illustration: Overall project management, contract administration, coordination with Employer, Project execution oversight, quality assurance, compliance with contractual obligations, and performance monitoring.
Company-2 (Consortium Member)	---------- ---------- ---------- ---------- Illustration: Execution of assigned scope of work including engineering, supply, installation, commissioning, operation & maintenance, technical support, and other activities as defined under the Consortium Agreement.

16. We undertake that the composition of the Consortium, roles and responsibilities of the Consortium Members, and share of participation shall not be altered without prior written approval of the Buying Utility.

17. We further undertake that both Consortium Members shall remain **jointly and severally liable** to the Buying utility for the due performance and fulfilment of all obligations under the Contract, irrespective of the division of responsibilities among the Consortium Members.

18. This Agreement

    a) has been duly executed and delivered on behalf of each Member hereto and constitutes the legal, valid, binding and enforceable obligation of each such Member;
    b) sets forth the entire understanding of the Members hereto with respect to the subject matter hereof; and
    c) may not be amended or modified except in writing signed by each of the Members and with prior written consent of BRPL.

19. All the terms used in capitals in this Agreement but not defined herein shall have the meaning as per the RfP and BESSA.

IN WITNESS WHEREOF, the Members have, through their authorized representatives, executed this present on the Day, Month and Year first mentioned above.

For M/s---------- [Member 1] ----------

(Signature, Name & Designation of the person authorized vide Board Resolution Dated _____)

Witnesses:

1) Signature----------
Name:
Address:

For M/s----------[Member 2]

2) Signature ----------
Name:
Address: ----------

(Signature, Name & Designation of the person authorized vide Board Resolution Dated _____)

Witnesses:

1) Signature ----------
Name:
Address:

2) Signature ----------
Name:
Address:

_____

Signature and stamp of Notary of the place of execution

Format 12: Terms and Conditions of Reverse Auction

ENQUIRY NO & DATE: ----------
DUE DATE OF TENDER: ----------

(To be signed and stamped by the bidder prior to participation in the auction event)

After opening of financial bids and short-listing of bidders based on the tariff and total capacity of project of qualified Project(s), Bid Manager shall resort to "REVERSE AUCTION PROCEDURE". Reverse Auction shall be conducted as per methodology specified in *Step 3 of Evaluation criteria and Finalization of Bid* and other provisions of Reverse Auction in RfP Documents and their subsequent Addenda/ Amendments/ Clarifications. Bidders in their own interest are advised to go through the documents in entirety. The Terms & Conditions and Business Rules mentioned hereunder are in brief and may not give completer explanations. Further these are supplementary in nature.

1. Bidders shall ensure online submission of their 'Bid Price' within the auction period.

2. Bidders shall ensure to take all necessary training and assistance before commencement of reverse auction to the interested bidders on chargeable basis to be paid directly to ISN-ETS.

3. Business rules for Reverse Auction like event date, time, bid decrement, extension etc. shall be as per the business rules, enumerated in the RfP document or intimated later on, for compliance.

4. Reverse auction will be conducted on scheduled date & time, as mentioned in the RfP document.

5. Bidders should acquaint themselves of the 'Business Rules of Reverse Auction', which is enclosed separately in the RfP document.

6. If the Bidder or any of his representatives are found to be involved in Price manipulation/ cartel formation of any kind, directly or indirectly by communicating with other bidders, action as per extant Bid Manager guidelines, shall be initiated by Bid Manager.

7. The Bidder shall not divulge either their Bids or any other exclusive details of BID MANAGER to any other party.

8. Period of validity of Prices received through Reverse Auction shall be same as that of the period of validity of bids offered.

9. Bidders should also note that:

a. Although extension time is '8' minutes, there is a time lag between the actual placing the bid on the local computer of the bidder and the refreshing of the data on to the server for the visibility to the Owner. Considering the processing time for data exchange and the possible network congestion, bidders must avoid the last-minute hosting of the Financial Bid during reverse auction.
b. Participating bidder will agree to non-disclosure of trade information regarding the purchase, identity of TERI, bid process, bid technology, bid documentation and bid details.
c. It is brought to the attention of the bidders that the bid event will lead to the final price of bidders only.
d. Technical and other non-commercial queries (not impacting price) can only be routed to the Bid Manager contact personnel indicated in the RfP document.
e. Order finalization and post order activities such issue of LOI, signing of BESSA etc. would be transacted directly between successful bidder(s) and Buying Utility.
f. LOI shall be placed outside the ETS e-portal & further processing of the LOI shall also be outside the system.
g. In case of any problem faced by the bidder during Reverse Auction and for all Bidding process related queries, bidders are advised to Bid Manager contact personnel indicated in the RfP document.
h. Bidders are advised to visit the auction page and login into the system well in advance to identify/ rectify the problems to avoid last minute hitches.
i. BID MANAGER will not be responsible for any PC configuration/ Java related issues, software/ hardware related issues, telephone line glitches and breakdown/ slow speed in internet connection of PC at Bidder's end.
j. Bidders may note that it may not be possible to extend any help, during Reverse Auction, over phone or in person in relation to rectification of PC/ Internet/ Java related issues and Bidder may lose the chance of participation in the auction.
k. For access to the Reverse Auction site, the following URL is to be used: https://www.bharat-electronictender.com.
l. No queries shall be entertained while Reverse Auction is in progress.

BUSINESS RULES OF REVERSE AUCTION

Reverse Auction shall be conducted as per methodology specified in *Step 3 of Evaluation criteria and Finalization of Bid* and their subsequent Corrigenda/Amendments/ Clarifications/ Addenda. Bidders, in their own interest, are advised to go through the documents in entirety.

The following would be parameters for e-Reverse Auction:

S.NO.	Parameter	Value

1.	Date and Time of Reverse-Auction Bidding Event	To be intimated Later to Eligible Bidders
2.	Duration of Reverse-Auction Bidding Event	30 minutes
3.	Automatic extension of the 'Reverse-Auction closing Time', if last bid received is within a 'Predefined Time-Duration' before the 'Reverse-Auction Closing Time'	Yes
3.1	Pre-defined Time-Duration	08 minutes
3.2	Automatic extension Time-Duration	08 minutes
3.3	Maximum number of Auto-Extension	Unlimited Extension
4.	Entity-Start-Price	Tariff quoted by the bidders in Financial Bid (Second Envelope)

Online Reverse Auction shall be conducted by BID MANAGER on pre-specified date and time, while the bidders shall be quoting from their own offices/ place of their choice. Internet connectivity shall have to be ensured by bidders themselves.

During the Reverse Auction, any requests for extension of time will not be considered by TERI. Bidders are therefore requested to make all the necessary arrangements/ alternatives whatever required so that they are able to participate in the Reverse Auction successfully. Failure of power or loss of connectivity at the premises of bidders during the Reverse Auction cannot be the cause for not participating in the Reverse Auction. Bid Manager shall not be responsible for such eventualities.

Bidders are advised to get fully trained and clear all their doubts such as refreshing of Screen, capacity/ no. of projects being auctioned, auction rules etc.

Bid Manager reserves the right to cancel/ reschedule/ extend the Reverse Auction process/ tender at any time, before ordering, without assigning any reason.

Bid Manager shall not have any liability to bidders for any interruption or delay in access to the auction website irrespective of the cause. In such cases, the decision of Bid Manager shall be binding on the bidders.

Other terms and conditions shall be as per bidder's techno-commercial offers and as per the RfP document and other correspondences, if any, till date.

Format 13: Affidavit by BESS Developer for utilization of BESS by Buying Utility

Format 13: Affidavit by BESS Developer.

[On Non-Judicial Stamp Paper of Appropriate Value]
AFFIDAVIT

I, [Name], [Designation] of ----------., having its registered office at ----------, do hereby solemnly affirm and state as under:

.

1. That BSES Rajdhani Power Limited (BRPL) has been granted the right to use the entire contracted capacity of the said BESS of 57.5 MW / 115 MWh capacity to be installed at Bindapur Grid, New Delhi and **Battery Energy Storage System Agreement (BESSA)** to be executed between BRPL and ----------.

2. That the purpose of the BESS is to provide charging and discharging capability to BRPL on-demand basis. The BESS can be used by BRPL for Energy Arbitrage, Peak Saving, Reactive power support, Utilizing the full capacity to feed critical load during blackout condition and BRPL also intends to register the said BESS with NLDC/NRLDC to provide Ancillary Services as per the provisions under the RfP and BESSA.

3. ---------- has **no objection** to BRPL registering and operation of BESS under the name "**----------**" with NLDC/NRLDC for the provision of Ancillary Services.

4. That any commercial benefit or loss arising from such registration and participation in Ancillary Services shall be solely on the account of BRPL, and ---------- shall have no claim thereto.

5. That BRPL shall be responsible to indemnify and hold harmless **NLDC/NRLDC** from any claims, liabilities, losses, or damages arising from such registration or operation under Ancillary Services by BRPL.

VERIFICATION

I, the deponent above-named, do hereby verify that the contents of this affidavit are true and correct to my knowledge and belief. No part of it is false, and nothing material has been concealed there from.

Verified at _____ on this ___ day of _____ 2026.

Deponent
(Signature)
(Name & Designation)

Format 14: Declaration for passing on benefit of eligible Input Tax Credit to the Buying Utility

[On Non-Judicial Stamp Paper of Appropriate Value]

AFFIDAVIT

Declaration for passing on benefit of eligible Input Tax Credit to the Buying Utility

(To be submitted on the letterhead of the Bidder)

In accordance with the provisions of section 171 of the CGST Act., the service provider is required to ensure that any reduction in GST rates or benefit of input tax credit must be passed on to the service recipient by way of a proportionate decrease in prices.

In view of the above, we hereby declare that the costs of Capital Investment and Operation & Maintenance considered in arriving at the Bid price is excluding all the eligible Input Tax Credit in terms of section 16 and 17 of the CGST Act., that will be availed by the Bidder.

(Name and Signature of the Authorized Signatory)

Format 15: Undertaking for site condition acceptance

[On Non-Judicial Stamp Paper of Appropriate Value]

AFFIDAVIT

We, [Bidder/Consortium Name], having examined the site conditions at four (4) project locations with cumulative capacity of 57.5 MW / 115 MWh, hereby undertake and confirm the following:

1. **Site Inspection:** We have personally inspected and verified the land/site offered for the project and are fully satisfied with its condition, boundaries, access, and suitability for the intended works.
2. **Acceptance of Conditions:** We accept the land/site in its present condition, including any physical, environmental, or operational constraints, and shall not raise any claims or disputes regarding the same during execution of the project.
3. **Responsibility for Works:** We undertake to carry out all works, construction, installation, and commissioning activities at the site in compliance with applicable laws, regulations, and contractual obligations, without seeking any modification or compensation on account of site conditions.
4. **Consortium Declaration:** In case of consortium, all members jointly and severally accept the site conditions and confirm readiness to execute the project accordingly.
5. **Binding Effect:** This undertaking shall be binding upon us and shall form part of our bid/contract agreement.

Authorized Signatory

Name: _____

Designation: _____

Company/Consortium: _____

Date: _____

Seal/Stamp: _____

(Name and Signature of the Authorized Signatory)

Format 16: Project Execution Timeline

Milestones Chart		
	Key Milestones	**Day Considering Bid Submission date is Zero Date**
1	**Design and Engineering Approval**	
1.1	Plant Layout.	
1.2	BESS Single Line Diagram	
1.3	Drawing of Earthing of Electrodes / Mats	
1.4	Earthing calculation Report	
1.5	Civil Foundation of Battery Container	
1.6	Civil Foundation of PCS	
1.7	Civil Foundation of Transformer (IDT)	
1.8	Civil Drawing of Switchgear panel Room	
1.9	Civil Foundation of BESS Auxiliary System Main Panel	
1.10	Civil Foundation Drawing of Fire Wall	
1.11	Structural Design report of Firewall	
1.12	Civil Foundation of EMS	
1.13	Civil foundation Drawing of HVWS tank	
1.14	Civil Drawing of Civil Drawing of Gate and fencing	
1.15	Civil Drawing of Road and drainage system plan layout	
1.16	Studio Video of Visitor Room/ Architectural drawing of MCR building	
1.17	Power and control CableCable Trench Trench Sectional Drawing	
1.18	Cable schedule	

Milestones Chart

	Key Milestones	Day Considering Bid Submission date is Zero Date
1.19	Auxiliary System Single Line Diagram	
1.20	Plant Level BOM	
1.21	BESS Foundation Marking Layout	
1.22	Layout of HVWS	
1.23	Fire Fighting Safety Philosophy and Manual DBR of Fire Protection System	
1.24	Lighting Layout and CCTV	
1.25	Battery Datasheet and GTP	
1.26	General Arrangement of Battery	
1.27	Battery disposal plan at the end of life	
1.28	Battery and container Type Test-**UL 9540 + UL 9540A and (IEC TS 62933-5-1 + IEC 62933-5-2)** **IS 17092**	
1.29	Battery and container Type Test-**UL 1973 (battery)** or **(IEC 62619 (battery) + IEC 63056** (battery))	
1.30	Battery and container Type Test-**UL1642** or **UL 1973, Appendix E (cell)** or **IEC 62619 (cell) + IEC 63056 (cell)**	
1.31	Battery and container Type Test-**IEC62281/ UN38.3**	
1.32	Battery and container Type Test-**IEC61850/DNP3**	
1.33	Battery and container Type Test-**IEC61508**	
1.34	Battery and container Type Test-**IEC62933-5-4**	
1.35	Battery and container Type Test-**IEC62933-2-1**	
1.36	Battery and container Type Test-**IEC62933-3**	

Milestones Chart

	Key Milestones	Day Considering Bid Submission date is Zero Date
1.37	Battery and container Type Test-**IEC62933-4**	
1.38	Battery and container Type Test-**IEC / TS 62933-5**	
1.39	Battery and container Type Test-**IEEE2030.2.1-2019**	
1.40	Battery and container Type Test-**IS17387**	
1.41	Battery and container Type Test-**NFPA855**	
1.42	Battery and container Type Test-**IEC60529**	
1.43	PCS Datasheet and GTP	
1.44	General Arrangement of PCS	
1.45	Installation and Operation Manual	
1.46	PCS Type Test-IEC60529	
1.47	PCS Type Test-IEC61000-6-2	
1.48	PCS Type Test-IEC61000-6-4	
1.49	PCS Type Test-IEC62116	
1.50	PCS Type Test-IEC 62477	
1.51	PCS Type Test-IEEE519 / CEA Report	
1.52	PCS Type Test-IEEE1547	
1.53	PCS Type Test- IEC62909-1/ Equivalent IEC62477 and IEC 61727	
1.54	PCS Type Test- IEC62909-2	
1.55	PCS Type Test- IEC61683	
1.56	PCS Type Test- IEC60068-2-1	
1.57	PCS Type Test- IEC60068-2-2	
1.58	PCS Type Test- IEC60068-2-14	

Milestones Chart

	Key Milestones	Day Considering Bid Submission date is Zero Date
1.59	PCS Type Test- IEC60068-2-30	
1.60	PCS Type Test- UL1741	
1.61	GTP of Power Transformer	
1.62	General Arrangement of Power Transformer	
1.63	Power Transformer Type Test- IEC60076-1	
1.64	GTP of Switchgear Panel	
1.65	General Arrangement of Switchgear Panel	
1.66	Schematic drawings of Switchgear Panel	
1.67	Switchgear Panel Type Test- IEC61439	
1.68	GTP of BESS Auxiliary System Main Panel	
1.69	General Arrangement of BESS Auxiliary System Main Panel	
1.70	GTP of BESS Auxiliary System Cluster Panel	
1.71	General Arrangement of BESS Auxiliary System Cluster Panel	
1.72	GTP of EMS Panel (Architecture)	
1.73	General Arrangement of EMS Panel	
1.74	BESS Network Architecture	
1.75	EMS manual including troubleshooting and SOP	
1.76	GTP of UPS	
1.77	General Arrangement of UPS	
1.78	GTP of Hydrant Pre-Fab Tank	
1.79	DBR of Fire Protection System	
1.80	Factory Acceptance Test of Auxiliary Subsystem	

Milestones Chart

	Key Milestones	Day Considering Bid Submission date is Zero Date
1.81	Factory Acceptance Test of EMS Panel	
1.82	Factory Acceptance Test of Earthing	
1.83	Factory Acceptance Test of PCS	
1.84	Factory Acceptance Test of Transformer	
1.85	Factory Acceptance Test of cable	
1.86	Factory Acceptance Test of Switchgear Panel	
1.87	Factory Acceptance Test of Battery	
1.88	Factory Acceptance Test of UPS	
1.89	Operation Philosophy of BESS	
1.90	11kV Switchgear Protection Philosophy	
1.91	Trip matrix for 11kV switchgear	
1.92	Performance report format	
1.93	O&M Manual for BESS including Maintenance schedule	
1.94	System description and configuration	
1.95	Training Manual	
1.96	List of Statutory Compliances: security assessment done from Cert-in empanelled auditor	
1.97	Battery disposal plan at the end of life	
1.98	Asset Register	
1.99	List of Inventory and Spares	
2	**Procurement (PO placement)**	
2.1	Battery Order Finalisation	
2.2	PCS Order Finalisation	

Milestones Chart

	Key Milestones	Day Considering Bid Submission date is Zero Date
2.3	Inverter Duty Transformer Order Finalisation	
2.4	AC Distribution Board Order Finalisation	
2.5	Switchgear Panel Order Finalisation	
2.6	EMS Panel Order Finalisation	
2.7	HVWS Order Finalisation- Working on Design	
2.8	UPS Order Finalisation- Fuji	
2.9	Cable Order Finalisation	
2.10	Lighting and Lightning Mast Order Finalisation- Wipro	
2.11	Earthing Order Finalisation	
2.12	11 KV Interconnecting Panel	
3	**Procurement (Material Delivery)**	
3.1	AC Distribution Board Delivery:	
3.2	UPS Delivery	
3.3	PCS Delivery	
3.4	Inverter Duty Transformer Delivery	
3.5	Earthing Delivery	
3.6	Switchgear Panel Delivery	
3.7	11 KV Interconnecting Panel	
3.8	EMS Panel Delivery	
3.9	Cable Delivery	
3.10	HVWS Delivery	
3.11	Lighting and Lightning Mast Delivery	

Milestones Chart

	Key Milestones	Day Considering Bid Submission date is Zero Date
3.12	Battery Delivery	
4	**Civil Work**	
4.1	Foundation for PCS	
4.2	Foundation for Battery Container	
4.3	Foundation for Transformer	
4.4	Foundation for Transformer Electrical Panel Room (11 KV)	
4.5	Construction of Fire Wall	
4.6	Foundation for Metering Room for Permanent Connection	
4.7	Shifting of 11 KV cables	
4.8	Completion of Metering Room for Permanent Connection	
4.9	Construction of wall of Electrical Panel Room (11KV)	
4.10	Construction of roof /slab of Electrical Panel Room (11KV)	
4.11	Construction of Visitor Gallery	
4.12	Construction of Water Tank for fire-fighting system	
4.13	Site Levelling and Gravel Spreading - Fab'25	
4.14	Repair of Boundary Wall	
4.15	Construction of Gate and Fencing	
5	**Installation of Equipment**	
5.1	Installation of Transformer and switchgear for permanent connection	
5.2	Installation of Aux. Sub System	
5.3	Installation of EMS Panel	
5.4	Installation of PCS	

Milestones Chart

	Key Milestones	Day Considering Bid Submission date is Zero Date
5.5	Installation of Switchgear Panel	
5.6	Installation of UPS	
5.7	Completion of Earthing Grid	
5.8	Installation of interconnecting 11KV Panel	
5.9	Installation of Inverter Duty Transformer-	
5.10	Completion of Lighting and Lightning Mast	
5.11	Completion of HVWS	
5.12	Power and control Cable laying	
5.13	Installation of Battery Container	
6	**Pre Commissioning and commissioning**	
6.1	Site Acceptance Test of Auxiliary Subsystem	
6.2	Site Acceptance Test of UPS	
6.3	Site Acceptance Test of Earthing Grid	
6.4	Site Acceptance Test of Transformer	
6.5	Site Acceptance Test of Power and control Cable	
6.6	Site Acceptance Test of Switchgear Panel	
6.7	Site Acceptance Test of Lighting and Lighting Mask	
6.8	Site Acceptance Test of Power Transformer	
6.9	Site Acceptance Test of PCS	
6.10	Site Acceptance Test of Battery	
6.11	Site Acceptance Test of HVWS	
6.12	Site Acceptance Test Certification	

Milestones Chart

	Key Milestones	Day Considering Bid Submission date is Zero Date
6.14	Team Matrix	
6.15	Emergency Preparedness procedure and SOP	
6.16	Report regarding communication between DC BESS, PCS and EMS and Communication with Grid (Supporting documents as per IEC and UL standards)	
6.17	Report of Functional Safety at System level (Supporting documents as per IEC and UL standards)	
6.18	Risk Assessment Report for technical & project management	

Verified at _____ on this ___ day of _____ 2026.

Deponent
(Signature)
(Name & Designation)

Volume II: BATTERY ENERGY STORAGE SYSTEM AGREEMENT

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BATTERY ENERGY STORAGE SYSTEM AGREEMENT

This Battery Energy Storage System Agreement (the "Agreement") dated this __ day of ---------- 2026 executed at New Delhi, India

BY AND BETWEEN

BSES Rajdhani Power Limited, a company incorporated under the Companies Act, 2013 with CIN No. U40109DL2001PLC111527 and having its registered office at BSES Bhawan, Nehru Place, Delhi-110019, (hereinafter referred to as the Buyer or BRPL or Buying Utility which expression shall unless repugnant to the context or meaning thereof includes its successors and permitted assigns);

AND

----------, a company incorporated under the Companies Act, 1956 or the Companies Act 2013 with CIN ----------, and having its registered office at ---------- (hereinafter referred to as the BESSD which expression shall unless repugnant to the context or meaning thereof include its successors and permitted assigns).

The **Buyer** and **BESSD** are individually referred to as a **Party** and collectively, referred to as the Parties.

WHEREAS:

A. The Buyer is a Joint Venture of Reliance Infrastructure Limited and GoNCT of Delhi, and was incorporated on 04.07.2001, for Distribution of Power in West and Southwest part of Delhi.

B. Buyer had initiated a process to deploy a cumulative capacity of 57.5MW/115MWh at 66/11 KV at Sagarpur- DESU Colony- 30MW/60MWh, Bindapur (15MW/30MWh), Hari Nagar (7.5MW/15MWh) and G4 (5MW/10MWh) through a Competitive Bidding Process on the terms and conditions contained in the Request for Selection (hereinafter referred to as the "RFP" issued by The Energy and Resources Institute (TERI) on behalf of the Buyer vide NIT No. ----------.

C. The _____has been declared as a successful bidder in the competitive bidding process for setting up the Battery Energy Storage System (BESS) and interconnection of the BESS with the distribution grid at Grid substation with the primary objective of making the energy storage facility available to Buyer for charging/discharging of the BESS, on an "on demand" basis.

D. As per conditions of the RFP, has incorporated a project company, (hereinafter referred to as 'BESSD'), for "Development of BESS with cumulative capacity of

57.5 MW/115 MWh at Sagarpur- DESU Colony- 30MW/60MWh, Bindapur (15MW/30MWh), Hari Nagar (7.5MW/15MWh) and G4 (5MW/10MWh) BESS at its 66kV /11 kV Grid Substations of Buyer".

E. Buyer has issued the Letter of Intent (**"LoI"**) No ---------- in favour of the BESSD for 57.5 MW/ 115 MWh Battery Energy Storage System at 66KV /11KV Grid Stations at Sagarpur- DESU Colony- 30MW/60MWh, Bindapur (15MW/30MWh), Hari Nagar (7.5MW/15MWh) and G4 (5MW/10MWh) as per the terms and conditions contained in the RFP.

F. BESSD has agreed to provide the storage solution to Buyer for charging and discharging from the storage facility as per the terms and provisions of this Agreement.

G. In terms of the RFP and the Bid Documents, the BESSD has furnished the PBG of the sum of ₹ [•] in favour of Buyer and a copy of the said PBG provided is attached as Schedule B of this Agreement.

H. The BESSD has fulfilled the terms of the bidding and the terms of the LOI and other Bid Documents for signing this Battery Energy Storage System Agreement as a definitive agreement for establishing the Battery Energy Storage Project with cumulative capacity of 57.5MW / 115 MWh BESS at its 66kV / 11 kV Grid Sub-Station ''Sagarpur- DESU Colony- 30MW / 60MWh, Bindapur (15MW / 30MWh), Hari Nagar (7.5MW / 15MWh) and G4 (5MW / 10MWh)" (the "Project"), for making the storage facility for the charging and discharging of the electricity provided by Buyer.

I. The Parties have agreed to execute this Agreement in terms of the RFP and the Bid Documents for the establishment of the Project.

Definitions of Terms

Following terms used in the documents will carry the meaning and interpretations as described below:

1. "ACT" or "ELECTRICITY ACT, 2003" shall mean the Electricity Act, 2003 and include any modifications, amendments, and substitution from time to time

2. “ADJUSTED EQUITY” of a company shall mean the equity funded in Indian Rupees and adjusted on the first day of the current month (the "Reference Date"), in the manner set forth below, to reflect the change in its value on account of depreciation and variations in Wholesale Price Index (WPI), and for any Reference Date occurring between the first day of the month in which Financial Closure is achieved and the Reference Date:

    a. on or before COD, the Adjusted Equity shall be a sum equal to the equity funded in Indian Rupees and expended on the Project as evidenced by a certificate from the statutory auditor, revised to the extent of one half of the variation in WPI occurring between the first day of the month of in which Financial Closure is achieved and Reference Date;

    b. An amount equal to the Adjusted Equity as on COD shall be deemed to be the base (the “Base Adjusted Equity”);

    c. After COD, the Adjusted Equity hereunder shall be a sum equal to the Base Adjusted Equity, reduced by X% (wherein X=100% / (12 * Term of BESSA)) thereof at the commencement of each month following the COD and the amount so arrived at shall be revised to the extent of variation in WPI occurring between the COD and the Reference Date;

    For the avoidance of doubt, the Adjusted Equity shall, in the event of termination, be computed as on the Reference Date immediately preceding the date of termination of the BESSA; provided that no reduction in the Adjusted Equity shall be made for a period equal to the duration, if any, for which the term of the BESSA is extended, but the revision on account of WPI shall continue to be made;

3. “AFFILIATE” in relation to a Company shall mean a person who controls, is controlled by, or is under the common control with such Company.

4. “AGREEMENT" shall be construed as including a reference to its Schedules and/or Appendices and/or Annexures;

5. “APPROPRIATE COMMISSION” or “DERC” shall refer to the Honourable Delhi Electricity Regulatory Commission.

6. An "ARTICLE", a "RECITAL", a "SCHEDULE” and a “PARAGRAPH / CLAUSE" shall be construed as a reference to an Article, a Recital, a Schedule, and a paragraph/clause respectively of this Agreement;

7. “AVAILABILITY” shall be as defined in the Vol I of RFP.

8. “BATTERY ENERGY STORAGE SYSTEMS” or “BESS” shall mean the system(s)/projects utilizing methods and technologies such as electrochemical batteries (Li-ion, solid state batteries, flow batteries, etc.) or others, providing a facility that can store chemical energy and deliver the stored energy in the form of electricity, including ancillary facilities.

9. “BATTERY ENERGY STORAGE SYSTEM DEVELOPER” or “BESSD” or “DEVELOPER” shall mean the entity owning/operating the BESS facility for supply of power

10. “BATTERY ENERGY STORAGE SYSTEM AGREEMENT” or “BESSA” shall mean the agreement signed between the Selected Bidder/ BESSD and Buying Utility according for procurement of capacity from the BESS.

11. “BID” or “PROPOSAL” shall mean the documents submitted by the Bidder towards meeting the techno-commercial and financial qualifying requirements, along with the price bid submitted by the Bidder as part of its response to the RFP issued by Buying Utility.

12. “BIDDER” shall mean Bidding Company (including a foreign company) or a Bidding Consortium submitting the Bid. Any reference to the Bidder includes Bidding Company/ Bidding Consortium, Member of a Bidding Consortium including its successors, executors and permitted assigns and Lead Member of the Bidding Consortium jointly and severally, as the context may require; foreign companies participating in the bidding process shall be registered as companies as per the rules of their country of origin.

13. “BIDDING CONSORTIUM” or “CONSORTIUM” shall refer to a group of Companies that collectively submit the response in accordance with the provisions of this RFP under a Consortium Agreement.

14. “BID CAPACITY” shall mean aggregate Project capacity of the Battery Energy Storage System(s) as proposed by the Bidder.

15. "BID DOCUMENTS" shall mean the Volumes I, II and III of the RFP along with the subsequent corrigendum, clarifications and amendments issued by Buying Utility.

16. "BRPL" or "BUYING UTILITY" or "BUYER" shall mean BSES Rajdhani Power Limited, which utilizes the BESS as per use case defined in RFP.

17. "CAPACITY CHARGES/TARIFF" shall mean the levelized tariff/charges as approved and adopted by Appropriate Commission.

18. "CAPITAL EXPENDITURE" or "CAPEX" shall mean the capital expenditure for the Project as specified by the BESSD after the e-reverse auction

19. "CERC" shall mean Central Electricity Regulatory Commission

20. "CHARTERED ACCOUNTANT" shall mean a person practicing in India or a firm whereof all the partners practicing in India as a Chartered Accountant(s) within the meaning of the Chartered Accountants Act, 1949. For bidders incorporated in countries other than India, "Chartered Accountant" shall mean a person or a firm practicing in the respective country and designated/registered under the corresponding Statutes/ laws of the respective country.

21. "COMPANY" shall mean a body corporate incorporated in India under the Companies Act, 2013 or any law in India prior there to relating to Companies, as applicable.

22. "COMMERCIAL OPERATION DATE (COD)" shall be the date on which the commissioning certificate is issued by the Commissioning Committee upon successful commissioning of Project. The Commissioning Committee shall include members from Buying Utility and third-parties nominated by the Buying Utility. The conditions for commissioning are defined in subsequent sections.

In case of part commissioning, Commercial Operation Date (COD) will be declared only for that part of Project capacity. The Commercial Operation Date (COD) of the Project shall be considered as the next day after the actual date of commissioning of the full capacity of the Project or the last part capacity of the Project as the case may be, as declared in line with the commissioning procedure as provided in Volume 3. Similarly, for part commissioning, COD will be the next day after actual date of commissioning of the respective part capacity.

23. "CONTRACTED CAPACITY" shall mean the cumulative capacity of 57.5 MW for 2 hours (115 MWh) at Sagarpur- DESU Colony- 30MW/60MWh,

Bindapur (15MW/30MWh), Hari Nagar (7.5MW/15MWh) and G4 (5MW/10MWh) in 66kV / 11kV Grid Substations contracted with Buying Utility for providing Energy storage facility for charging and is charging the system on "on-demand" basis, based on which the BESSA is executed between BESSD and Buying Utility.

24. "CONTRACT YEAR" shall mean the period beginning from the Effective Date of the BESSA and ending on the immediately succeeding 31st March and thereafter each period of 12 months beginning on 1st April and ending on 31st March provided that:

    1. in the financial year in which the Scheduled Commissioning Date would occur, the Contract Year shall end on the date immediately before the Scheduled Commissioning Date and a new Contract Year shall commence once again from the Scheduled Commissioning Date and end on the immediately succeeding 31st March, and thereafter each period of 12 (Twelve) Months commencing on 1st April and ending on 31st March, and

    2. Provided further that the last Contract Year of this Agreement shall end on the last day of the Term of this Agreement.

25. "CONTROL" shall mean the ownership, directly or indirectly, of more than 50% (fifty percent) of the voting shares of such Company or right to appoint majority Directors.

26. "CONTROLLING SHAREHOLDING" shall mean more than 50% of the voting rights and paid-up share capital in the Company/ Consortium.

27. "CONFIDENTIAL INFORMATION" shall mean any information disclosed by one Party to the other Party, in any form including without limitation; terms and conditions of the transaction contemplated hereby to third parties, documents, business plans, source code, software, technical/ financial/ marketing/ customer/ business information, specifications, analysis, designs, drawings, data, computer programs, any information relating to personnel or affiliates of a Party and includes information disclosed by third parties at the direction of a disclosing Party and marked as confidential. Confidential Information shall however, exclude any information which (i) is/ was publicly known or comes into public domain; (ii) is received by the receiving Party from a third party, without breach of this Agreement; (iii) was already in the possession of receiving Party, without confidentiality restrictions, at the time of disclosure by the disclosing Party; (iv) is permitted

for disclosure by the disclosing Party in writing by law; (v) independently developed by the receiving Party without use of Confidential Information

28. A “CRORE” means a reference to ten million (10,000,000) and a “Lakh” means a reference to one tenth of a million (1,00,000);

29. “CENTRAL TRANSMISSION UTILITY (CTU)” shall mean the Central Transmission Utility as defined in sub-section (10) of section 2 of the Electricity Act 2003.

30. “DAY” shall mean calendar day.

31. “DEBT DUE” shall mean the aggregate of the following sums expressed in Indian Rupees outstanding on the date of termination:

    a. The principal amount of the debt provided by the Senior Lenders under the Financing Agreements for financing the Total Project Cost (the ‘Principal’) but excluding any part of the principal that had fallen due for repayment 2 (two) years prior to the date of transfer;

    b. All accrued interest, financing fees and charges payable under the Financing Agreements on, or in respect of, the debt referred to in sub-clause (a) above until the date of termination but excluding: (i) any interest, fees or charges that had fallen due 2 (two) years prior to the date of termination, (ii) any penal interest or charges payable under the Financing Agreements to any Senior Lender, (iii) any prepayment charges in relation to accelerated repayment of debt except where such charges have arisen due to Buying Utility Default, and (iv) any Subordinated Debt which is included in the Financial Package and disbursed by equity investors or their Affiliates for financing the Total Project Cost.

    Provided that if all or any part of the Debt Due is convertible into Equity at the option of Senior Lenders and/or the BESSD, it shall for the purposes of this Agreement be deemed not to be Debt Due even if no such conversion has taken place and the principal thereof shall be dealt with as if such conversion had been undertaken. Provided further that the Debt Due, on or after COD, shall in no case exceed 80% (eighty percent) of the Total Project Cost.

32. “DUE DATE” shall mean the forty-fifth (45th) day after a Monthly Bill (including all the relevant documents) or a Supplementary Bill is received in hard copy and duly acknowledged by the [BRPL] or, if such day is not a Business Day, the immediately succeeding Business Day, by which date such Monthly Bill or a Supplementary Bill is payable by the buying utility.

33. “DUTY CYCLE” OR “CYCLE” shall mean one equivalent full cycle that will represent the cumulative energy throughput of the battery and equivalent to one full charge and one full discharge of its usable energy capacity.

34. “DUTY CYCLE CALCULATION” OR “CYCLE CALCULATION” shall mean calculation of ratio between discharged energy throughput and rated energy capacity.

35. “EFFECTIVE DATE” shall mean the date determined in terms of Clause 2.1 of the Agreement.

36. “EXPIRY DATE” shall mean the date of transfer of the BESS Project from the BESSD to the Buying Utility at the end of the contract period of 12 years

37. An "ENCUMBRANCE" shall be construed as a reference to a mortgage, charge, pledge, lien or other encumbrance securing any obligation of any person or any other type of preferential arrangement (including, without limitation, title transfer and retention arrangements) having a similar effect;

38. “FINANCIAL CLOSURE” or “PROJECT FINANCING ARRANGEMENTS” means arrangement of necessary funds by the BESSD towards 100% Project Cost either by way of commitment of funds by the Company from its internal resources and/or tie up of funds through a bank/ financial institution by way of sanction of a loan or letter agreeing to finance;

39. “GUIDELINES” shall mean “Guidelines for Procurement and Utilization of Battery Energy Storage Systems as part of Generation, Transmission and Distribution assets, along with Ancillary Services” issued by Ministry of Power vide Gazette Resolution dated 10.03.2022, including subsequent amendments and clarification thereof, if any, issued until the last date of bid submission of this RFP.

40. “INTERCONNECTION/ DELIVERY/ METERING POINT” shall mean the point at 11kV bus at Grid Substation where the power from the Battery Energy Storage System is injected into the BRPL’s substation (including the Power Evacuation facilities from PCS output to 11kV panels). Metering shall be done at this interconnection point where the power is injected into. For interconnection with grid and metering, the BESSD shall abide by the

relevant DERC Regulations, Grid Code and Central Electricity Authority (Installation and Operation of Meters) Regulations, 2006 as amended and revised from time to time.

All charges and losses related to Transmission of power from Project up to Delivery Point as notified by the competent authority / regulator shall be borne by the BESSD and beyond the Delivery Point all charges and losses (including but not limited to Demand and Usage Charges, open access, transmission, Cross Subsidy, wheeling, SLDC Charges etc.) as notified by the competent authority / regulator from time to time shall be borne by Buying Utility.

41. "INTERCONNECTION FACILITIES" shall mean the facilities on BESSD's side of the Delivery Point for sending and metering the electrical output in accordance with this Agreement and, subject to Article 5, the Metering System required for supply of power.

42. "INDEBTEDNESS" shall be construed so as to include any obligation (whether incurred as principal or surety) for the payment or repayment of money, whether present or future, actual or contingent;

43. "JOINT CONTROL" shall mean a situation where a company has multiple promoters (but none of the shareholders has more than 50% of voting rights and paid-up share capital).

44. "LEAD MEMBER OF THE BIDDING CONSORTIUM" or "LEAD MEMBER": There shall be only one Lead Member, having the shareholding of not less 51% in the Bidding Consortium.

    Note:

    a. The successful bidder, if being a single company, shall ensure that its shareholding in the SPV / Project company executing the BESSA shall not fall below 51% (fifty-one per cent) at any time prior to Commercial Operation Date . In the event the successful bidder is a consortium, then the combined shareholding of the consortium members in the SPV / Project company executing the BESSA, shall not fall below 51% at any time prior to COD. Further, in case the Project is executed by the successful bidder itself, it shall ensure that the controlling shareholding of the bidding company/consortium remains unchanged until the COD.

    b. Any change in the shareholding after the COD can be undertaken under intimation to the Buying Utility.

    c. In the event the BESSD is in default to the lender(s), lenders

shall be entitled to undertake "Substitution of Promoter" in concurrence with the Buying Utility.

45. "LETTER OF INTENT" or "LoI" shall mean the letter issued by the Buying Utility to the selected Bidder for award of the Project.

46. "LIMITED LIABILITY PARTNERSHIP" or "LLP" shall mean a Company governed by Limited Liability Partnership Act 2008 or as amended.

47. "LLC" shall mean Limited Liability Company as defined under the Companies Act, 2013

48. "MEMBER IN A BIDDING CONSORTIUM" or "MEMBER" shall mean each Company in a Bidding Consortium. In case of a Technology Partner being a member in the Consortium, it has to be a Company.

49. "MONTH" shall mean calendar month.

50. "NET-WORTH" shall mean the Net-Worth as defined section 2 of the Companies Act, 2013.

51. "PAID-UP SHARE CAPITAL" shall mean the paid-up share capital as defined in Section 2 of the Companies Act, 2013.

52. "PART COMMISSIONING" shall mean 50% of Project Capacity or 29 MW, whichever is lower without prejudice to the imposition of penalty, in terms of the BESSA on the part which is not commissioned. The minimum part commissioning capacity for the 1st part will be 10 MW. The total number of instalments in which a Project can be commissioned will be not more than 3, i.e., 1st initial instalment and 2 subsequent instalments. However, the Scheduled Commissioning Date (SCD) will not get altered due to part commissioning. Irrespective of dates of part commissioning or full commissioning, the BESSA will remain in force for a period of minimum 12 years from the SCD or date of full commissioning of the Project capacity, whichever is later. In case of part-commissioning of the Project, the BESSD shall be required to submit commissioning certificate issued by the Commissioning Committee as defined in COD to establish the operations/right to use of BESS, corresponding to part capacity being

commissioned, in the name of the BESSD for a period not less than the complete term of the BESSA, on or before the date of such part-commissioning.

For capacity procurement contracts, in case of part-commissioning, payments as per the BESSA may be made on pro-rata basis, proportionate to the capacity commissioned. The procurement of part commissioned capacity will be based on the sole discretion of the Buying Utility. If the Buying Utility is not interested to consider procurement of the part capacity till commissioning, the part commissioned capacity will be allowed to sell in the open market till SCD.

53. "PARENT COMPANY" shall mean a Company, which holds more than 50% voting rights and paid-up share capital, either directly or indirectly in the Project Company or a Member in a Consortium developing the Project

54. "PGCIL" or "POWERGRID" shall mean Power Grid Corporation of India Limited

55. "POSOCO" or "GCI" or "NLDC" shall mean Grid Controller of India Limited (formerly known as Power System Operation Corporation Limited)

56. "PROJECT" shall mean the pilot project Battery Energy Storage System set up by the BESSD for supply of Power "on Demand" basis, having single point of injection into the grid at Interconnection/ Delivery/ Metering Point, or in case of sharing of transmission lines, by separate injection at Pooling Point and having separate control systems and metering. The Project shall also comprise auxiliaries and associated facilities, bay(s) for transmission system in the their switchyard, dedicated transmission line up to the injection point and all the other assets, buildings/structures, equipment, plant and machinery (pertaining to the BESS), facilities and related assets required for the efficient and economic operation of the power supply facility, whether completed or at any stage of development and construction or intended to be developed and constructed for the purpose of supply of power to Buying Utility. It is clarified that BESS charged using a source other than RE power would not qualify as RE power.

57. "PROJECT CAPACITY" shall mean the maximum AC capacity at the delivery point that can be scheduled from the Project.

58. “PROJECT COMMISSIONING”: The Project will be considered as commissioned in line with the Commissioning procedure defined in the RFP/BESSA.

59. “PROJECT LOCATION” shall mean the area identified by Buying Utility where the Project is being implemented. This will be the 66/11 kV Grid Substation in Delhi

60. “POWER ON DEMAND” shall mean the requirement of the Buying Utility to charge and discharge the BESS based on its requirements during the time of day, subject to provisions of the RFP and BESSA.

61. A "PERSON" shall be construed as a reference to any person, firm, company, corporation, society, trust, government, state or agency of a state or any association or partnership (whether or not having separate legal personality) of two or more of the above and a person shall be construed as including a reference to its successors, permitted transferees and permitted assigns in accordance with their respective interests;

62. “RENEWABLE ENERGY (RE) POWER” shall mean power from a RE Power generation facility.

63. “RFP” or “RFP DOCUMENT” or “BIDDING DOCUMENT(S)” or “TENDER DOCUMENTS” shall mean the “Request for Proposal” document issued by Buying Utility including standard Contracts, along with subsequent clarifications and amendments thereof, vide RFP No. [-] dated [-]

64. "RUPEE", "RUPEES”, “Rs”, “INR”, or new rupee symbol “₹” shall denote Indian Rupees, the lawful currency of India;

65. “SCHEDULED COMMISSIONING DATE” or “SCD” shall be the date as indicated in subsequent sections of this BESSA.

66. “SCOPE OF WORK” or “SOW” shall be the Scope of Work as indicated in Volume III of RFP and enclosed as Annexure 1 of this BESSA

67. “SELECTED BIDDER” or “SUCCESSFUL BIDDER” shall mean the Bidder selected pursuant to this RFP to set up the Project and who has signed up to supply electrical output as per the terms of BESSA.

68. “STATE TRANSMISSION UTILITY” or “STU” shall mean the Board, or the Government Company notified by the respective State Government under Sub-Section I of Section 39 of the Electricity Act, 2003.

69. “STATE LOAD DESPATCH CENTRE” or “SLDC” shall mean the State Load Despatch Center, Delhi.

70. “TERI” or “Bid Manager” “BUYING UTILITY” shall mean The Energy and Resources Institute, which will be the Bid Manager of the Buying Utility for this RFP.

71. “TOE” shall mean Tender Opening Event.

72. “WEEK” shall mean calendar week;

73. The "WINDING-UP", "DISSOLUTION", "INSOLVENCY", or "REORGANIZATION" of a company or corporation shall be construed so as to include any equivalent or analogous proceedings under the Law of the jurisdiction in which such company or corporation is incorporated or any jurisdiction in which such company or corporation carries on business including the seeking of liquidation, Winding-up, reorganization, dissolution, arrangement, protection, or relief of debtors;

Words imparting the singular shall include the plural and vice versa;
This Agreement itself or any other agreement or document shall be construed as a reference to this or to such other agreement or document as it may have been, or may from time to time be, amended, varied, novated, replaced or supplemented;

A Law shall be construed as a reference to such Law including its amendments or re-enactments from time to time;

A time of day shall, save as otherwise provided in any agreement or document be construed as a reference to Indian Standard Time;

Different parts of this Agreement are to be taken as mutually explanatory and supplementary to each other and if there is any inconsistency between or among the parts of this Agreement, they shall be interpreted in a harmonious manner so as to give effect to each part;

The tables of contents and any headings or sub-headings in this Agreement have been inserted for ease of reference only and shall not affect the interpretation of this Agreement;

All interest, if applicable and payable under this Agreement, shall accrue from day to day and be calculated on the basis of a year of three hundred and sixty-five (365) days;

The words “hereof” or “herein”, if and when used in this Agreement shall mean a reference to this Agreement;

The terms “including” or “including without limitation” shall mean that any list of examples following such term shall in no way restrict or limit the generality of the word or provision in respect of which such examples are provided;

This Agreement and other documents such as Request for Proposal Documents, Guidelines including subsequent clarifications, amendments, and further clarifications in regard to the tender shall be read in conjunction with each other and interpreted in harmonious manner. However, in case of any mismatch/contradiction between provisions of different documents, the Battery Energy Storage System Agreement (BESSA) shall supersede the RFP Document & Letter of Intent (LOI).

General Conditions of Contract

1. General Instructions

BESSD is expected to examine all instructions, forms, terms & conditions, and specifications as mentioned in the BESSA.

Notwithstanding anything to the contrary contained in this Agreement, in the event of any inconsistency, conflict, or contradiction between the provisions of the BESSA and the provisions of the Guidelines for Procurement and Utilization of Battery Energy Storage Systems as part of Generation, Transmission and Distribution Assets, along with Ancillary Services, the provisions of the Guidelines shall prevail and shall be binding upon the Parties to the extent of such inconsistency, conflict, or contradiction.

2. Term of Agreement

2.1 Effective Date

2.1.1 Effective Date of the Agreement shall be either (i) the date of signing of this Agreement; or (ii) the date of receipt of approval from the Appropriate Commission of the Capacity Charges/ Tariff for the Project; or (iii) the date when land is made available to BESSD by Buying Utility at Grid Substation, whichever occurs later, provided that there shall be no liability of any nature whatsoever on the Buying Utility for delay if any in the grant of approval by the Appropriate Commission

2.2 Term of Agreement

2.1.2 Subject to Article 2.3 and 2.4 of this Agreement, this Agreement shall be valid for a period of 12 years from COD. The BESSD would be required to demonstrate the operational residue BESS capacity of not less than 70% of the total Project capacity (115 MWh) before the end of contract period i.e., 12th contract year and at least within 90 days prior to the Expiry Date and duly transfer the entire Project to Buying Utility at INR 1.0 and free from any encumbrances or liability. Such capacity demonstration shall be made by the BESSD as per the procedure for capacity demonstration detailed under RFP BESSA and shall be witnessed by Buying Utility's representatives. The date of transfer of the Project shall be regarded as the Expiry Date for this BESSA.

2.1.3 In case BESSD fails to demonstrate operational residue capacity of 70%, BESSD at its own risk and cost shall augment the BESS capacity to not less than 70% of the Project Capacity within 90 days of demonstration made as per Article 2.2.1. above, failing which cost estimated by the Buying Utility through a competitive bidding process for such augmentation of BESS shall be recovered from the Performance Bank Guarantee. Moreover, in case of non-payment of any aforementioned balance dues / penalty, Buying Utility may debar the BESSD from participating for a period of 2 years in any of its Bidding Processes.

2.1.4 Without prejudice to the above clause, BESSD shall be liable if the batteries degrade quickly and unpredictably depending on usage (cycling) and temperature, or if the battery fails to meet guaranteed capacity thresholds, BESSD shall face as mentioned in clause 9 of special conditions of contract – Part B of this Agreement.

2.3 Early Termination

2.3.1. This Agreement shall terminate before the Expiry Date if either Buying Utility or BESSD terminates the Agreement, pursuant to Article 7 (Events of Default and Termination) of the General Conditions of Contract.

2.3.2. **Decommissioning Liability:** BESSD shall be solely responsible for decommissioning and recycling including the costs involved in the event of termination on expiry or early termination of this Agreement.

2.4 Survival

2.4.1. The expiry or termination of this Agreement shall not affect any accrued rights, obligations and liabilities of the Parties under this Agreement, including the right to receive penalty as per the terms of this Agreement, nor shall it affect the survival of any continuing obligations for which this Agreement provides, either expressly or by necessary implication, which are to survive after the Expiry Date or termination including those under General Conditions of Contract - Article 3 (Force Majeure), Article 7 (Events of Default and Termination), Article 8 (Liability and

Indemnification), Article 10 (Governing Law and Dispute Resolution), Article 11 (Miscellaneous Provisions), and other Articles and Schedules of the General/ Specific Conditions of Contract which expressly or by their nature survive the Term or termination of this Agreement shall continue and survive any expiry or termination of this Agreement.

3. Force Majeure

3.1. General

A 'Force Majeure' (FM) would mean one or more of the following acts, events or circumstances or a combination of acts, events or circumstances or the consequence(s) thereof, that wholly or partly prevents or unavoidably delays the performance by the Party (the Affected Party) of its obligations under the relevant BESSA, but only if and to the extent that such events or circumstances are not within the reasonable control, directly or indirectly, of the Affected Party and could not have been avoided if the Affected Party had taken reasonable care or complied with Prudent Utility Practices:

i) Act of God, including, but not limited to lightning, fire, and explosion (to the extent originating from a source external to the site), earthquake, volcanic eruption, landslide, flood, pandemic, cyclone, typhoon, or tornado if it is declared / notified by the competent state / central authority / agency (as applicable), or verified to the satisfaction of Buying Utility.
ii) Radioactive contamination or ionising radiation originating from a source in India or resulting from another Force Majeure Event mentioned above excluding circumstances where the source or cause of contamination or radiation is brought or has been brought into or near the BESS by the Affected Party or those employed or engaged by the Affected Party.
iii) The discovery of geological conditions, toxic contamination or archaeological remains on the Project land that could not reasonably have been expected to be discovered through an inspection of the Project land and/or as per prudent industry practices.
iv) Exceptionally adverse weather condition which are in excess of the statistical measure of the last hundred (100) years.
v) Any act of war (whether declared or undeclared), invasion, armed conflict or act of foreign enemy, blockade, embargo, revolution, riot, insurrection, terrorist or military action, or Industry-wide strikes and labour disturbances, having a nationwide impact in India.
vi) Nationalisation or any compulsory acquisition by any Indian Governmental Instrumentality/ State Government in national interest or expropriation of any material Project assets or rights of the BESSD, as a result of which the BESSD or its shareholders are deprived (wholly or partly) of their rights or entitlements under the BESSA. Provided that such action does not constitute remedies or sanctions lawfully exercised by the Buying Utility or any other Government

Authority as a result of any breach of any of the Applicable Laws or the Applicable Permits by the BESSD or BESSD related parties.

3.2. Force Majeure Exclusions

Force Majeure shall not include (i) any event or circumstance which is within the reasonable control of the Parties and (ii) the following conditions, except to the extent that they are consequences of an event of Force Majeure:

i) Unavailability, late delivery, or changes in cost of the plant, machinery, equipment, materials, spare parts, or consumables for the BESS;
ii) Delay in the performance of BESSD, sub-contractor, or their agents;
iii) Non-performance resulting from normal wear and tear typically experienced in power generation materials and equipment;
iv) Strikes or labour disturbances at the facilities of the Affected Party;
v) Insufficiency of finances or funds or the Agreement becoming onerous to perform; and
vi) Non-performance caused by, or connected with, the Affected Party's: (i) Negligent or intentional acts, errors or omissions, or lack of due diligence expected from any prudent and rational human being; (ii) Failure to comply with an Indian Law; or (iii) Breach of, or default under this Agreement.

3.3. Notification of Force Majeure Event

i) The Affected Party shall give notice to the other Party of any event of Force Majeure as soon as reasonably practicable, but not later than fifteen (15) days after the date on which such Party knew or should reasonably have known of the commencement of the event of Force Majeure. If an event of Force Majeure results in a breakdown of communications rendering it unreasonable to give notice within the applicable time limit specified herein, then the Party claiming Force Majeure shall give such notice as soon as reasonably practicable after reinstatement of communications, but not later than one (1) day after such reinstatement. The Party who receives the Force Majeure Notification, shall take a decision on the claim of occurrence of Force Majeure Event, within 30 days of the receipt of the intimation, accompanied with supporting documents available with the Affected Party

ii) Provided that such notice shall be a pre-condition to the Affected Party's entitlement to claim relief under the BESSA. Such notice shall include full particulars of the event of Force Majeure, its effects on the Party claiming relief and the remedial measures proposed. The Affected Party shall give the other Party regular (and not less than weekly) reports on the progress of those remedial measures and such other information as the other Party may reasonably request about the Force Majeure Event

iii) The Affected Party shall give notice to the other Party of (i) the cessation of the relevant event of Force Majeure; and (ii) the cessation of the effects of such event of Force Majeure on the performance of its rights or obligations under the BESSA, as soon as practicable after becoming aware of each of these cessations.

3.4. Performance Excused

i) The Affected Party, to the extent rendered unable to perform its obligations or part of the obligation thereof under the BESSA as a consequence of the Force Majeure Event, shall be excused from performance of the obligations, provided that the period shall not exceed 180 (one hundred and eighty) days from the date of issuance of the FM Notice, or any extended period as mutually agreed. The Parties may mutually agree to extend the period for which performance is excused due to a Force Majeure Event. However, in case of the FM continuing up to a period of 180 days or any extended period as mutually agreed, either Party has the right to terminate the BESSA

ii) For the time period, as mutually agreed by the Parties, during which the performance shall be excused, the BESSD shall be entitled for a day-to-day extension of the period provided for Financial Closure or Scheduled Commissioning Period or the BESSA period, as the case may be. The Term of the BESSA will be suitably extended as per the above extension

iii) Provided always that a Party shall be excused from performance only to the extent reasonably warranted by the Force Majeure Event

iv) Provided further that, nothing shall absolve the Affected Party from any payment obligations accrued prior to the occurrence of the underlying Force Majeure Event.

3.5. No Liability for Other Losses

Save as otherwise provided in this Agreement, no Party shall be liable in any manner, whatsoever, to the other Parties in respect of any Loss relating to or arising out of the occurrence or existence of any Force Majeure Event.

3.6. Resumption of Performance

During the period that a Force Majeure Event is subsisting, the Affected Party shall, in consultation with the other Parties, make all reasonable efforts to limit or mitigate the effects of such Force Majeure Event on the performance of its obligations under the BESSA. The Affected Party shall also make efforts to resume performance of its obligations under this Agreement as soon as possible and upon resumption, shall notify other Parties of the same in writing. The other Party shall afford all reasonable assistance to the Affected Party in this regard

3.7. Termination Due to Force Majeure Event

i) If, prior to the completion of the 180-day period (or any extended period) for a Force Majeure Event commencing from the date of issuance of the Force Majeure Notice, the Parties are of the reasonable view that a Force Majeure Event is likely to continue beyond such 180-day period or any extended period agreed in pursuance of Clause 3.5 above (Performance Excused); or that it is uneconomic or impractical to restore the affected Unit, then the Parties may mutually decide to terminate the BESSA, and the termination shall take effect from the date on which such decision is taken

ii) Without prejudice to the provisions of Clause 3.8 (i) above, the Affected Party shall, after the expiry of the period of 180 days or any other mutually extended period, be entitled to forthwith terminate the BESSA in its sole discretion by issuing a notice to that effect.

iii) On termination of the BESSA pursuant to Clause 3.8 (ii):

a. In case of termination on account of an event listed as Force Majeure as per Clauses 3.1 (i), (ii), (iii), or (iv) above, no Termination Compensation shall be payable to the BESSD. The BESSD shall be liable to remove the assets from the premises and vacate the land at the earliest.

b. In case of termination at the instance of the BESSD, on account of an event listed as Force Majeure as per Clauses 3.1 (v) and (vi) above, the Buying Utility will have the option to (but will not be obliged to) take-over the BESS by paying the Debt Due. In case the Buying Utility chooses not to exercise the above option, and the same is not agreed to by the BESSD, it will result in a dispute under this BESSA.

c. The parties to BESSA shall be eligible for undisputed payments under outstanding Monthly Bill(s) before the occurrence of Force Majeure Event.

4. **Metering**

4.1. For installation of ABT Meters, Meter testing, Meter calibration and Meter reading and all matters incidental thereto, the BESSD and the Buying Utility shall follow and be bound by the Central Electricity Authority (Installation and Operation of Meters) Regulations, 2006, the Grid Code, as amended and revised from time to time.

4.2. The BESSD shall bear all costs pertaining to installation, testing, calibration, maintenance, renewal, and repair of meters at BESSD side of Delivery Points for injection and drawl of power from the Grid during discharging and charging of BESS.

4.3. In addition to ensuring compliance of the applicable codes, the BESSD shall install Main & Check meters at the Delivery Points for both Charging and Discharging, along with Stand-by meter(s) as per the applicable Central/State regulations.

4.4. Online arrangement would have to be made by the BESSD for real time monitoring and submission of metering data regularly for the entire period of BESSA to the SLDC, Buying Utility and the concerned Ministry or concerned agency as per applicable regulation/ directions.

4.5. Reports on metering parameters on monthly basis, and/or as required by regulation / Guidelines, shall be submitted by the BESSD to Buying Utility / Grid India/ SLDC or any other authority through Buying Utility for entire Term of the BESSA.

5. Insurances

5.1. Insurance

5.1.1. The BESSD shall, at its own cost and expense, procure and maintain in full force and effect throughout the duration of this Agreement a valid and enforceable Commercial General Liability (CGL) Insurance Policy, underwritten by a reputable insurer acceptable to the principal, with the following minimum limits:

a. Limit of Liability: Not less than INR 10 Crores per occurrence and in the aggregate.
b. Coverage to include:

(i) Bodily injury (including death),
(ii) Property damage (including loss of use),
(iii) Products and completed operations liability,
(iv) Cross liability or severability of interest clause, and
(v) Extension to cover liability arising from acts, errors, or omissions of subcontractors (if applicable).

5.1.2. Additional Insured: The principal, its affiliates, officers, employees, and agents shall be included as Additional Insureds under the policy.

5.1.3. Certificate of Insurance: The Service Provider shall provide a valid certificate of insurance and a copy of the policy (or endorsement) evidencing the above coverage prior to commencement of services and upon each renewal.

5.1.4. Notice of Cancellation: The policy shall include a clause that the insurer shall provide at least 30 (thirty) days' prior written notice to the Principal in the event of cancellation or material change in the policy.

5.1.5. **Waiver of Subrogation**: To the fullest extent permitted by law, the Service Provider hereby waives all rights of subrogation against the principal, its affiliates, directors, officers, and employees for any claims, losses, or damages covered or required to be covered by insurance maintained pursuant to this Agreement.

5.1.6. Each insurance policy required under this Agreement shall contain an endorsement providing that the insurer waives all rights of subrogation against the principal and such affiliated parties, and the Service Provider shall furnish evidence of such endorsement upon request.

5A. Financial Closure

5A.1 The BESSD shall attain Financial Closure within on or before COD.

5A.2 Failing the aforesaid, Buying Utility shall encash the PBG/POI unless the delay is on account of Force Majeure event. An extension for attainment of the financial closure can however be considered by the Buying Utility, on the sole request of the BESSD, on payment of extension charges of Rs. 1,000 per MW per day of delay in financial closure. This extension will not have any impact on the SCD. Any extension charge paid so, shall be returned to the BESSD without any interest on achievement of successful commissioning of full Project capacity within the SCD.

6. **Change in Law**

6.1. Definitions

6.1.1. The term ‘Change in Law’ shall refer to the occurrence of any of the following events, after the last date of the bid submission, which have a direct effect on the Project, leading to corresponding changes in the cost requiring change in tariff, and includes(i) a change in interpretation of any law by a competent court; or (ii) the enactment of any new law; or (iii) a change in any domestic tax, including duty, levy, cess, charge or surcharge by the Central Government, State Government or Union Territory administration leading to corresponding changes in the cost; or; (iv) a change in any condition of an approval or license obtained or to be obtained for purchase, supply or transmission of electricity, unless specifically excluded in the Agreement for the purchase, supply or transmission of electricity, which results in any change in the cost;. However, Change in Law/ Regulation shall not include (i) any change in taxes on corporate income or any change in any withholding tax on income or dividends, or (ii) change in respect of deviation settlement charges or frequency intervals by an Appropriate Commission. The term “law” in this provision, includes any Act, Ordinance, order, bye-law, rule, regulation, notification, for the time being in force, in the territory of India.

6.2. Relief for Change in Law

6.2.1. The aggrieved Party shall be required to approach the Appropriate Commission for seeking approval of Change in Law and the charge adjustment to enable the affected party to restoration to the same economic position as would have been if the change in law had not happened.

6.2.2. The decision of the Appropriate Commission to acknowledge a Change in Law and the date from which it will become effective, provide relief for the same, shall be final and governing on both the Parties.

6.2.3. In case of Change in Law taking place prior to commissioning of the Project, the 90% of the compensation amount claimed by the BESSD will be passed through, automatically paid through the monthly energy billing subject to approval from Appropriate Commission. The pass through in this case shall be effective from date of commissioning of the Project

6.2.4. In case of Change in Law taking place subsequent to commissioning of the Project capacity, and changes in taxes / duties / cess etc. 90% of the claimed amount by the BESSD will be automatically passed on as appropriate increment/decrement in the tariff, and will be paid through monthly energy billing.

6.2.5 In the above two cases, the pass through will come into effect automatically after 60 days of submission of the all the necessary documents by the affected party to substantiate its claim for relief under such change in law event.

6.2.6 Truing up of the calculations on account of the above Change in Law events will be done by the Appropriate Commission. In the event of any decision by the Appropriate Commission which modifies or cancels any changes in the tariff, recovery/additional payment of the amount already paid until then, will be done suitably.

6.2.7 In case of Change in Law during the operational period of the Project, and where such change is not applicable as an automatic modification in the tariff, suitable compensation will be provided as decided by the Appropriate Commission.

6.2.8 In case a Change in Law results in delay in commissioning, where cause and effect between these two can be clearly established, the Buying Utility may provide suitable extension to financial closure and commissioning deadlines of the Project.

7. Events of Default and Termination

7.1. BESSD Event of Default

7.1.1. The occurrence and/or continuation of any of the following events, unless any such event occurs as a result of a Force Majeure Event or a breach by Buying Utility of

its obligations under this Agreement, and are not cured within a period of 60 days shall constitute a BESSD Event of Default:

7.1.2. BESSD to the extent rendered unable to perform its obligations or part of the obligation thereof under this Agreement as a consequence of the Force Majeure Event, shall be excused from performance of the obligations, provided that the period shall not exceed 180 (one hundred and eighty) days from the date of issuance of the FM Notice, or any extended period as mutually agreed. The Parties may mutually agree to extend the period for which performance is excused due to a Force Majeure Event. However, in case of the FM continuing up to a period of 180 days or any extended period as mutually agreed, either Party has the right to terminate this Agreement.

7.1.3. non-availability of facility/system by BESSD to the Buying Utility for a continuous period of 90 days or more;

7.1.4. if

i) BESSD assigns, mortgages or charges or purports to assign, mortgage or charge any of its assets or rights related to the Project without consent of Buying Utility in contravention of the provisions of this Agreement; or

ii) BESSD transfers or novates any of its rights and/ or obligations under this Agreement, in a manner contrary to the provisions of this Agreement; except where such transfer

a. is in pursuance of a Law; and does not affect the ability of the transferee to perform, and such transferee has the financial capability to perform, its obligations under this Agreement or

b. is to a transferee who assumes such obligations under this Agreement and the Agreement remains effective with respect to the transferee; or

c. effectuates a change in control or shareholding of its promoters in breach of the provisions of the BESSA,

7.1.5. if (a) BESSD becomes voluntarily or involuntarily the subject of any bankruptcy or insolvency or winding up proceedings and such proceedings remain uncontested for a period of thirty (30) days, or (b) any winding up or bankruptcy or insolvency order is passed against BESSD, or (c) BESSD goes into liquidation or dissolution or has a receiver or any similar officer appointed over all or substantially all of its assets or official liquidator is appointed to manage its affairs, pursuant to Law,

7.1.6. if BESSD repudiates this Agreement,

7.1.7. In the event the BESSD fails to supply power in terms of the BESSA, or

7.2. Procedure for cases of BESSD Event of Default

7.2.1. Upon the occurrence and continuation of any BESSD Event of Default under Article 7.1, Buying Utility shall have the right to deliver to the BESSD a notice, which shall specify in reasonable detail, the circumstances giving rise to the issue of such notice

7.2.2. Following the issue of Default Notice, the Consultation Period of Sixty days (60) days or such longer period as the Parties may agree, shall apply and it shall be the responsibility of the Parties to discuss as to what steps shall have to be taken with a view to mitigate the consequences of the relevant Event of Default having regard to all the circumstances.

7.2.3. During the Consultation Period, the Parties shall continue to perform their respective obligations under this Agreement.

7.2.4. After the expiry of the Consultation Period and unless the Parties shall have otherwise agreed to the contrary or BESSD Event of Default giving rise to the Consultation Period shall have ceased to exist or shall have been remedied, subject to the terms of this Agreement, BESSD shall be liable to pay to Buying Utility, liquidated damages, as provided in articles2.4.4 of Special Conditions of Contract – Part A –(Design, Supply, Testing, Installation & Commissioning of the BESSA) for failure to commission within stipulated time. For other cases, the BESSD shall be liable to pay to Buying Utility, damages equivalent to 6 (Six) months, as detailed in clause 5.1 of Applicable Tariff in Special Conditions of Contract – Part B – (Operations & Maintenance of this BESSA), or balance BESSA period whichever is less, of charges for its contracted capacity. Buying Utility shall have the right to recover the said damages by way of forfeiture of performance bank guarantee, if any, without prejudice to resorting to any other legal course or remedy.

7.2.5 In addition to the levy of damages as aforesaid, in the event of a default by the BESSD, following sequence of events will be followed:

i) Project lenders will have the first right of substitution of the BESSD, within 60 (sixty) days.
ii) In case the lender is unable to substitute the BESSD within the above specified timeline, the Buying Utility will have the right (but will not be obliged) to take over the Project assets, by paying to the BESSD, a compensation as mutually decided by the Buying Utility and the lender.
iii) In case the Buying Utility chooses not to exercise the above option, or the Buying Utility and the lender are unable to come to an agreement the lenders may liquidate the Project assets and recover their dues, as the last resort.

7.3. Buying Utility Event of Default

The occurrence and continuation of any of the following events, unless any such event occurs as a result of a Force Majeure Event, shall constitute a Buying Utility Event of Default:

7.3.1. Any invoice raised by the BESSD under the Monthly Bill remains outstanding beyond a period of one hundred and eighty (180) days after the Due Date and BESSD is unable to recover the amount outstanding from the Buying Utility through the Letter of Credit; or

7.3.2. Early termination of this Agreement or any other associated agreements for reasons attributable to Buying Utility, resulting BESSD to dismantle the Project before the Expiry Date.

7.3.3. Buying Utility repudiates this Agreement and does not rectify such breach within a period of thirty (30) days from a notice from BESSD in this regard; or

7.3.4. Except where due to BESSD's failure to comply with its material obligations, Buying Utility is in breach of any of its material obligations pursuant to this Agreement, and such material breach is not rectified by Buying Utility within thirty (30) days of receipt of first notice in this regard given by BESSD.

7.3.5. Occurrence of any other event which is specified in this Agreement to be a material breach/ default of the Buying Utility.

7.4. Procedure for cases of Buying Utility Event of Default

7.4.1. Upon the occurrence and continuation of Buying Utility Event of Default under Article 7.3, BESSD shall have the right to deliver to Buying Utility a notice, stating its intention to terminate this Agreement (BESSD Preliminary Default Notice), which shall specify in reasonable detail, the circumstances giving rise to the issue of such notice.

7.4.2. Following the issue of BESSD Preliminary Default Notice, the Consultation Period of sixty (60) days or such longer period as the Parties may agree, shall apply and it shall be the responsibility of the Parties to discuss as to what steps shall have to be taken with a view to mitigate the consequences of the relevant Event of Default having regard to all the circumstances.

7.4.3. During the Consultation Period, the Parties shall, save as otherwise provided in this Agreement, continue to perform their respective obligations under this Agreement.

After following the expiry of the Consultation Period and unless the Parties shall have otherwise agreed to the contrary or Buying Utility Event of Default giving rise to the Consultation Period shall have ceased to exist or shall have been remedied,

Buying Utility under intimation and prior consent to BESSD shall, novate its part of the BESSA to any third party, including its Affiliates within 60 (sixty) days:

a) In this case, the Buying Utility shall pay amount equivalent to 3 (three) months of energy billing based on the declared availability, or balance BESSA period, whichever is less, for its contracted capacity, with the Project assets being retained by the BESSD, and exit from the BESSA. In case of direct procurement by the Buying Utility from the BESSD, the above payment will be made by the Buying Utility to the BESSD.

b) In the event the novation of the BESSA is not acceptable to the BESSD, or if no offer of novation of BESSA is made by the defaulting the Buying Utility within 60 (sixty) days, then the BESSD may terminate the BESSA and choose to either continue operating the Project by itself finding an alternate Buying Utility or to discontinue the operation of the Project. If the BESSD chooses to continue operating the Project, the Buying Utility will pay to the BESSD, 'termination compensation' equivalent to 6 (six) months of energy billing corresponding to the declared availability, or balance BESSA period whichever is less, for its contracted capacity.

c) If the BESSD decides to discontinue the operation of the Project, it may require the defaulting Buying Utility to make a payment of the 'termination compensation' which will be equivalent to the amount of the Debt Due and 110% (one hundred and ten per cent) of the Adjusted Equity, less Insurance Cover if any.

Note: In all cases, the lenders may also step in where appropriate as provided in the financing documents. Further, in all cases, the defaulting Party will be required to pay the applicable compensation within 3 months from the due date of such payment, subsequent to which, the defaulting Party will be required to pay a monthly interest @1% of the compensation.

7.5. Termination

7.5.1. In case of Termination under clause 3.8 i.e., Force Majeure, the process specified therein shall be followed.

7.5.2. That Agreement can also be terminated at an early occasion, if any, including revocation of any of the permits, approval, or clearances for reasons not attributable to BESSD and reasons not attributable to Buying Utility, resulting BESSD to dismantle the Project before the Expiry Date.

7.5.3. if (a) the Buying Utility becomes voluntarily or involuntarily the subject of any bankruptcy or insolvency or winding up proceedings and such proceedings remain uncontested for a period of thirty (30) days, or (b) any winding up or bankruptcy or insolvency order is passed against the Buying Utility, or (c) the Buying Utility goes into liquidation or dissolution or has a receiver or any similar officer appointed over

all or substantially all of its assets or official liquidator is appointed to manage its affairs, pursuant to Law, the same shall attract the termination of the Agreement.

Provided that a dissolution or liquidation of Buying Utility will not attract termination, if such dissolution or liquidation is for the purpose of a merger, consolidation, or reorganization and where the resulting company retains credit worthiness similar to Buying Utility and expressly assumes all obligations of Buying Utility under this Agreement and is in a position to perform them

7.5.4. No termination compensation shall be made by either of the Parties due to Termination for the reasons mentioned above in 7.5.1, 7.5.2 and 7.5.3.

8. Liability and Indemnification

8.1. Indemnity

8.1.1. The BESSD shall indemnify, defend, and hold Buying Utility harmless against:

i) any and all third-party claims against Buying Utility for any loss of or damage to property of such third party, or death or injury to such third party, arising out of a breach by the BESSD of any of its obligations under this Agreement; and

ii) any and all losses, damages, costs, and expenses including legal costs, fines, penalties, and interest actually suffered or incurred by Buying Utility from third party claims arising by reason of a breach by the BESSD of any of its obligations under this Agreement, (provided that this Article shall be in addition to such breaches by the BESSD, for which specific remedies have been provided for under this Agreement).

8.1.2. Buying Utility shall indemnify, defend, and hold the BESSD harmless against:

i) any and all third-party claims against the BESSD, for any loss of or damage to property of such third party, or death or injury to such third party, arising out of a breach by Buying Utility of any of their obligations under this Agreement; and

ii) any and all losses, damages, costs, and expenses including legal costs, fines, penalties, and interest ('Indemnifiable Losses') actually suffered or incurred by the BESSD from third party claims arising by reason of a breach by Buying Utility of any of its obligations.

8.2. Procedure for claiming Indemnity

Third party claims

8.2.1. Where the Indemnified Party is entitled to indemnification from the Indemnifying Party pursuant to Article 8.1.1(i) or 8.1.2(i), the Indemnified Party shall promptly

notify the Indemnifying Party of such claim referred to in Article 8.1.1 or 8.1.2in respect of which it is entitled to be indemnified.

Such notice shall be given as soon as reasonably practicable after the Indemnified Party becomes aware of such claim. The Indemnifying Party shall be liable to settle the indemnification claim within thirty (30) days of receipt of the above notice.

Provided however that, if:

i) the Parties choose to refer the dispute in accordance with Article 10; and

ii) third party claim shall be subject to the outcome of the dispute between the parties herein, unless otherwise directed by the Judicial and Quasi-Judicial Authority, then the Indemnifying Party shall become liable to pay the claim amount to the Indemnified Party or to the third party, as the case may be, promptly following the resolution of the Dispute if such Dispute is not settled in favour of the Indemnified Party.

8.2.2. The Indemnified Party may contest the claim by referring to the Appropriate Commission for which it is entitled to be Indemnified under Article 8.1.1 or 8.1.2and the Indemnifying Party shall reimburse to the Indemnified Party all reasonable costs and expenses incurred by the Indemnified party. However, such Indemnified Party shall not settle or compromise such claim raised by third parties without first getting the consent of the Indemnifying Party, which consent shall not be unreasonably withheld or delayed.

An Indemnifying Party may, at its own expense, assume control of the defence of any proceedings brought against the Indemnified Party if it acknowledges its obligation to indemnify such Indemnified Party, gives such Indemnified Party prompt notice of its intention to assume control of the defence, and employs an independent legal counsel at its own cost that is reasonably satisfactory to the Indemnified Party.

8.3. Indemnifiable Losses

8.3.1. Where an Indemnified Party is entitled to Indemnifiable Losses from the Indemnifying Party pursuant to Article 8.1.1 or 8.1.2, the Indemnified Party shall promptly notify the Indemnifying Party of the Indemnifiable Losses actually incurred by the Indemnified Party. The Indemnifiable Losses shall be reimbursed by the Indemnifying Party within thirty (30) days of receipt of the notice seeking Indemnifiable Losses by the Indemnified Party. In case of non-payment of such losses after a valid notice under this Article 8.3, unless the right to approach judicial resolution has been involved, such event shall constitute a payment default under Article 8 (Events of Default and Termination).

8.4. Limitation on Liability

8.4.1. Except as expressly provided in this Agreement, neither the BESSD nor Buying Utility nor its/ their respective officers, directors, agents, employees or affiliates (or their officers, directors, agents or employees), shall be liable or responsible to the other Party or its affiliates, officers, directors, agents, employees, successors or permitted assigns or their respective insurers for incidental, indirect or consequential damages, connected with or resulting from performance or non-performance of this Agreement, or anything done in connection herewith, including claims in the nature of lost revenues, income or profits (other than payments expressly required and properly due under this Agreement), any increased expense of, reduction in or loss of power generation or equipment used therefore, other than such claims based upon breach of warranty, tort (including negligence, whether of Buying Utility, the BESSD or others), strict liability, contract, breach of statutory duty, operation of law or otherwise.

8.4.2. Buying Utility shall have no recourse against any officer, director, or shareholder of the BESSD or any Affiliate of the BESSD or any of its officers, directors or shareholders for such claims excluded under Article 8. The BESSD shall have no recourse against any officer, director, or shareholder of Buying Utility, or any affiliate or any of its officers, directors or shareholders for such claims excluded under Article 8.

8.5. Duty to Mitigate

8.5.1. The Parties shall endeavour to take all reasonable steps so as mitigate any loss or damage which has occurred under Article 8.

9. Assignments and Charges

9.1. Assignments

This Agreement shall be binding upon and inure to the benefit of the Parties and their respective successors and permitted assigns. This Agreement shall not be assigned by any Party, except to the Project Lenders or Lender's Representative as security for their debt under the Financing Agreements, other than by mutual consent between the Parties to be evidenced in writing. Such assignment shall be agreed to by Buying Utility subject to the compliance of provisions contained in this Agreement. In no case, such assignment shall be permissible prior to the declaration of COD.

Provided that, Buying Utility shall permit assignment of any of BESSD's rights and obligations under this Agreement in favour of the lenders to the BESSD, if required under the Financing Agreements.

Provided that, such consent shall not be withheld if Buying Utility seeks to transfer to any transferee all of its rights and obligations under this Agreement.

The enforcement of the rights and obligation between the BESSD and Buying Utility provided in this Agreement and in the BESSA shall not be treated as an assignment, but an enforcement of the terms agreed under this Agreement. Provided further that any successor(s) or permitted assign(s) identified after mutual agreement between the Parties may be required to execute a new agreement on the same terms and conditions as are included in this Agreement.

9.2. Permitted Charges

Neither Party shall create or permit to subsist any encumbrance over all or any of its rights and benefits under this Agreement.

10. Governing Law and Dispute Resolution

10.1. Governing Law

10.1.1. This Agreement shall be governed by and construed in accordance with the Laws of India. Any claims or disputes under this Agreement shall be under the jurisdiction of Appropriate Commission. Either Party is entitled to raise any claim, dispute or difference of whatever nature arising under, out of or in connection with this Agreement ("Dispute") by giving a written notice (Dispute Notice) to the other Party, which shall contain:

a) a description of the Dispute;
b) the grounds for such Dispute; and
c) all written material in support of its claim.

10.1.2. The other Party shall, within thirty (30) days of issue of Dispute Notice issued under Article 10.2.1, furnish:

a) counter-claim and defences, if any, regarding the Dispute; and
b) all written material in support of its defences and counter-claim.

10.1.3. Within thirty (30) days of issue of Dispute Notice by any Party pursuant to this article

a) if the other Party does not furnish any counter claim or defence under this article
b) or thirty (30) days from the date of furnishing counter claims or defence by the other Party, both the Parties to the Dispute shall meet to settle such Dispute amicably. If the Parties fail to resolve the Dispute amicably within thirty (30) days from the later of the dates mentioned in Article 10.2.1.
c) the Dispute shall be referred for dispute resolution in accordance with Article 10.3.

10.2. Dispute Resolution

10.2.1. Where any Dispute or differences arises in relation to this Agreement of any nature whatsoever including the construction, interpretation or implementation of the provisions of this Agreement as well as claim made by any Party for any change in or determination of the Tariff or any matter related to Tariff or claims made by any Party which partly or wholly relate to any change in the Tariff or determination of any of such claims could result in change in the Tariff, and relates to any matter agreed to be referred to the Appropriate Commission, shall be submitted to adjudication by the Appropriate Commission. Appeal against the decisions of the Appropriate Commission shall be made only as per the provisions of the Electricity Act, 2003, as amended from time to time. All other issues shall be adjudicated by the courts of Delhi.

10.3. Parties to Perform Obligations

Notwithstanding the existence of any Dispute and difference referred to the Appropriate Commission and save as the Appropriate Commission may otherwise direct by a final or interim order, the Parties hereto shall continue to perform their respective obligations (which are not in dispute) under this Agreement.

11. Miscellaneous Provisions

11.1. Amendment

This Agreement may only be amended or supplemented by a written agreement between the Parties.

11.2. Third Party Beneficiaries

This Agreement is solely for the benefit of the Parties and their respective successors and permitted assignees and shall not be construed as creating any duty, standard of care or any liability to, any person not a party to this Agreement

11.3. Waiver

11.3.1. No waiver by either Party of any default or breach by the other Party in the performance of any of the provisions of this Agreement shall be effective unless in writing duly executed by an authorised representative of such Party.

11.3.2. Neither the failure by either Party to insist on any occasion upon the performance of the terms, conditions, and provisions of this Agreement nor time or other indulgence granted by one Party to the other Parties shall act as a waiver of such breach or acceptance of any variation or the relinquishment of any such right or any other right under this Agreement, which shall remain in full force and effect.

11.4. Confidentiality

11.4.1. The Parties undertake to hold in confidence this Agreement and not to disclose such confidential information to third parties, except:

a) to their professional advisors;
b) to their officers, contractors, employees, agents or representatives, financiers, who need to have access to such information for the proper performance of their activities; or
c) disclosures required under Law, without the prior written consent of the other Party.

11.4.2. The aforesaid restrictions does not apply to any information or data which (a) is obtained from another source without restriction, (b) is in the possession of, or was known to the receiving Party prior to its receipt, without an obligation to maintain confidentiality, (c) is or becomes generally known to the public without violation of this Agreement, (d) is independently developed by the receiving Party without the use of confidential Information, (e) required to be provided under any law, or process of law.

11.4.3. If any receiving Party determines that it is required by law or court order to disclose any Confidential Information it shall, at a reasonable time before making any such disclosure or filing, consult with the disclosing Party regarding such disclosure or filing and seek confidential treatment for such portions of the disclosure or filing as may be requested by the disclosing Party, or provide reasonable assistance to the disclosing Party so that the disclosing Party can contest the same.

11.4.4. No clause under this Agreement shall grant any rights to either Party in Intellectual Property Rights or in the Confidential Information of the other Party.

11.4.5. The Confidentiality obligation under this Agreement shall survive for a period of twelve years i.e., Expiry Date or till the date of termination of BESSA.

11.4.6. Both, BESSD and Buying Utility, shall be responsible for maintaining absolute secrecy and security with respect to BESS application as well as any other confidential information shared between the Parties.

11.5. Severability

11.5.1. The invalidity or unenforceability, for any reason, of any part of this Agreement shall not prejudice or affect the validity or enforceability of the remainder of this Agreement, unless the part held invalid or unenforceable is fundamental to this Agreement.

11.6. Notices

11.6.1. All notices or other communications which are required to be given under this Agreement shall be in writing and in the English language.

11.6.2. If to the BESSD, all notices or other communications which are required must be delivered personally or by registered post or facsimile or any other method duly acknowledged to the addresses below:

Address :
Attention :
Email :
Fax. No. :
Telephone No.: If to Buying Utility, all notices or communications must be delivered personally orby registered post or facsimile, or any other mode duly acknowledged to the address(es) below:

Address: BSES Bhawan, BSES Rajdhani Power Limited, Nehru Place, New Delhi - 110019
Attention:
Email:
Telephone No.:

11.6.3. All notices or communications shall be confirmed by sending a copy of the same via post office in an envelope properly addressed to the appropriate Party for delivery by registered mail. All notices shall be deemed validly delivered upon receipt evidenced by an acknowledgement of the recipient, unless the Party delivering the notice can prove in case of delivery through the registered post that the recipient refused to acknowledge the receipt of the notice despite efforts of the postal authorities.

11.6.4. Any Party may by notice of at least fifteen (15) days to the other Party change the address and/or addresses to which such notices and communications to it are to be delivered or mailed.

11.7. Language

11.7.1. All agreements, correspondence and communications between the Parties relating to this Agreement and all other documentation to be prepared and supplied under the Agreement shall be written in English, and the Agreement shall be construed and interpreted in accordance with English language.

11.7.2. If any of the agreements, correspondence, communications, or documents are prepared in any language other than English, the English translation of such agreements, correspondence, communications, or documents shall prevail in matters of interpretation.

11.8. Restriction of Shareholders / Owners' Liability

11.8.1. Parties expressly agree and acknowledge that none of the shareholders of the Parties hereto shall be liable to the other Parties for any of the contractual obligations of the concerned Party under this Agreement. Further, the financial liabilities of the shareholder/s of each Party to this Agreement, shall be restricted to the extent provided in the Indian Companies Act, 2013.

11.9. Taxes and Duties

11.9.1. The BESSD shall bear and promptly pay all statutory taxes, duties, levies, and cess, assessed/ levied on the BESSD, contractors or their employees that are required to be paid by the BESSD as per the Law in relation to the execution of the Agreement and for supplying power as per the terms of this Agreement.

11.9.2. Buying Utility shall be indemnified and held harmless by the BESSD against any claims that may be made in relation to the matters set out in Article11.9.1.

11.9.3. Buying Utility shall not be liable for any payment of, taxes, duties, levies, cess whatsoever for discharging any obligation of the BESSD by Buying Utility on behalf of BESSD.

11.10. Independent Entity

11.10.1. Buying Utility and BESSD shall be independent entities performing their obligations pursuant to the BESSA.

11.10.2. Subject to the provisions of the BESSA, the BESSD shall be solely responsible for the manner in which its obligations under this Agreement are to be performed. All employees and representatives of the BESSD or contractors engaged by the BESSD in connection with the performance of the Agreement shall be under the complete control of the BESSD and shall not be deemed to be employees, representatives, contractors of Buying Utility and nothing contained in the Agreement or in any agreement or contract awarded by the BESSD shall be construed to create any contractual relationship between any such employees, representatives, or contractors and Buying Utility.

11.11. Compliance with Law

11.11.1. Despite anything contained in this Agreement but without prejudice to Article 11, if any provision of this Agreement shall be in deviation or inconsistent with or repugnant to the provisions contained in the Electricity Act, 2003, or any rules and regulations made there under, such provision of this Agreement shall be

deemed to be amended to the extent required to bring it into compliance with the aforesaid relevant provisions as amended from time to time.

11.12. No Consequential or Indirect Losses

The liability of Buying Utility and the BESSD shall be limited to that explicitly provided in this Agreement. Provided that notwithstanding anything contained in this Agreement, under no event shall BESSD or the Buying Utility claim from one another any indirect or consequential losses or damages.

11.13. Order of priority in application

In case of inconsistencies between the Agreement(s) executed between the Parties, applicable Law including rules and regulations framed there under, the order of priority as between them shall be the order in which they are placed below:

i) applicable Law, rules and regulations framed thereunder;
ii) the terms and conditions of this Agreement.

IN WITNESS WHEREOF the Parties have caused the Agreement to be executed through their duly authorized representatives as of the date and place set forth above.

For and on behalf of	For and on behalf of
BSES Rajdhani Power Limited	_____
Name, Designation and Address	Name, Designation and Address
Signature with seal	Signature with seal
Witness:	Witness:
1.	1.
2.	2.

Special Conditions of Contract – Part A - Design, Supply, Testing, Installation & Commissioning of BESS

1. Performance Bank Guarantee

1.1. Performance Bank Guarantee/ Payment on Order Instrument

The Performance Bank Guarantee (PBG) shall be valid from the Effective Date and shall be valid for a period of 15 months from the Commercial Operation Date (COD). The PBG must be submitted for a value equal to 5% of the Project cost as submitted by the successful BESSD. The PBG shall guarantee the timely commencement of the supply (injection/drawl) of power / energy up to the Project Capacity within the time specified in this Agreement, and for the continued performance during operations of the BESS.

Taking into due consideration the notifications/Government. Resolutions notified by the Appropriate Government, in the form of:

i. Bank Guarantee(s);

OR

ii. "Payment on Order instrument" / Letter of Undertaking to pay in case situation of default of BESSD in terms of Battery Energy Storage System Agreement (BESSA) arises, from any agency as notified by the Government of India or State Governments from time to time for this purpose.

1.1.1. As an alternative to submission of PBG, the Bidder also has an option to submit a letter of undertaking issued by either of the following three organizations, viz. (i) Indian Renewable Energy Development Agency Limited (IREDA) or (ii) Power Finance Corporation Limited or (iii) REC Limited. This Letter of Undertaking shall be issued as “Payment on Order Instrument” (POI), wherein the POI issuing organization undertakes to pay in all scenarios under which the PBG would be liable to be encashed by Buying utility within the provisions of BESSA.

In addition to the other remedies, the PBG can be encashed to recover any damages/dues of the BESSD in terms of the BESSA. It is hereby clarified that the damages/dues recovered by the by encashing the PBG, upon the default of the BESSD under the BESSA, shall be credited to the Payment Security Fund to be maintained by the Buying Utility. PBG would be returned after deducting liquidated damages (if any), to the BESSD after expiry of validity ie 15 months from COD. In case of part commissioning, PBG/Payment on Order Instrument corresponding to the part capacity commissioned, should also be released after deducting liquidated damages (if any),within the time period mentioned above. As an alternative to encashment of PBG/Payment on Order Instrument, the BESSD may furnish the requisite amount to the Buying Utility through DD/electronic payment, against

release of the PBG/Payment on Order Instrument concerned without any encashments.

1.1.2. The failure on the part of the BESSD to furnish and maintain the Performance Bank Guarantee shall be a material breach of the term of this Agreement on the part of the BESSD.

1.1.3. If the BESSD fails to commence supply of power from the Scheduled Commissioning Date specified in Article 2.4.1 of the Special Conditions of Contract Part-A or any further extension thereof granted by Buying Utility, subject to conditions mentioned in Article 2.3 of the Special Conditions of Contract Part-A, Buying Utility shall encash the Performance Bank Guarantee equivalent to the amount calculated as per liquidated damages applicable as on the date of encashment without prejudice to the other rights of Buying Utility under this Agreement.

1.2. Return of Performance Bank Guarantee/ Payment on Order Instrument

1.2.1. The return/ release of the Performance Bank Guarantee/ Payment on Order Instrument shall be without prejudice to other rights of Buying Utility under this Agreement.

1.2.2 In case of part commissioning, PBG/Payment on Order Instrument corresponding to the part capacity commissioned, should also be released after deducting liquidated damages (if any),.

1.2.3 Buying Utility may release the Bank Guarantees submitted by BESSD as PBG, if the BESSD is able to replace the same with Payment on Order instrument, to pay in case situation of default of the BESSD in terms of BESSA arises. BESSD can seek such Letters(s) by offering due security to the notified agencies for seeking replacement of their Bank Guarantees already pledged with the Buying Utility.

2. Construction & Development of the Project

2.1. BESSD's Obligations

The BESSD undertakes to be responsible, at BESSD's own cost and risk, for the following:

2.1.1. Establishment of the BESS at the Buying Utility substation identified as Project Location.

2.1.2. The Buying Utility's obligations shall be limited to Clauses 3 and 4 of the Special Conditions of Contract – Part A. Beyond these, the BESSD shall be responsible and make arrangements for associated infrastructure for development of the Project and

for Connectivity till Delivery Point/Interconnection/Metering point for confirming the evacuation of power by the COD and all clearances related thereto. Connectivity beyond the Delivery Point/Interconnection/Metering point has been assured to be provided to the BESSD by the Buying Utility. All the requisite costs associated including fees with obtaining connectivity shall be borne by the BESSD.

2.1.3. Obtaining all Consents, Clearances and Permits as required and maintaining all Consents, Clearances and Permits in full force and effect during the Term of this Agreement. The Buying Utility's obligations shall be limited to Clauses 3 and 4 of the Special Conditions of Contract – Part A. Beyond this, the BESSD shall, on his own, obtain permissions/ sanctions from Government authorities, if any required for establishing and operating the Project. Any steps that may be taken by Buying Utility in regard to grant of such consents and permits or any other approval to be taken by the BESSD shall only be a voluntary endeavour with no intention of being bound by any legal or binding obligation.

2.1.4. Designing, constructing, erecting, commissioning, completing, and testing the Project in accordance with the applicable Law, the CERC Indian Grid Code Regulations 2023, the terms and conditions of this BESSA, Tender documents, RFP, and Prudent Utility Practices.

2.1.5. The commencement of supply of power / energy up to the Contracted Capacity to Buying Utility no later than the Scheduled Commissioning Date and continuance of the supply of power throughout the Term of the Agreement;

2.1.6. The BESSD shall make adequate arrangements to connect the BESS with the Interconnection Facilities at Interconnection / Metering / Delivery Point.

2.1.7. Owning the BESS throughout the Term of BESSA free and clear of encumbrances, except those expressly permitted under the Article regarding Assignments and Charges.

2.1.8. Maintaining its controlling shareholding in the Project as per provisions of the RFP Document.

2.1.9. Fulfilling all other obligations required to be undertaken by the BESSD under this Agreement for development of Project in Build, Own, Operate and Transfer basis and supply of BESS Capacity during Term of this Agreement and as per provisions of this Agreement, RFP, and LOA.

2.1.10. The BESSD shall fulfil the technical requirements according to criteria mentioned under Annexure 1 of this BESSA.

2.1.11. Further, the Project being implemented under this Agreement shall fulfil the criteria as per Central Electricity Authority (Technical Standards for Connectivity to the Grid) Regulations, 2007, and subsequent amendments and clarifications thereof,

2.1.12. The BESSD is expected to operate the BESS in a manner that meets the requirements of Buying Utility, as informed through the schedules developed by the bidder, and approved by Buying Utility. As part of scheduling of power / energy from / to the Project for discharging / charging, the BESSD will be required to punch-in their declared capacity / respective schedules and subsequent revisions as per the procedure defined by the Buying Utility. Buying Utility may facilitate in identification of any discrepancy and assist the BESSD for its early rectification without any liability on Buying Utility. The BESSD shall be solely responsible for discrepancy identification and its rectification to avoid any rejection/less payment of invoices / penalty.

2.1.13. The BESSD is also expected to operate the BESS in a manner that meets the requirements of Buying Utility on demand basis for instantaneous discharge of BESS up to contracted capacity, Reactive power support, to meet the critical demand requirement up to contracted capacity during power outage condition, Participation in ancillary services as per CERC Ancillary Services Regulations (2022) as amended and revised from time to time, as informed by Buying Utility. Buying Utility may facilitate in identification of any discrepancy and assist the BESSD for its early rectification without any liability on Buying Utility. The BESSD shall be solely responsible for discrepancy identification and its rectification to avoid any rejection/less payment of invoices / penalty.

2.1.14. BESS as connected with the Grid, must install necessary equipment to continuously record the Project's performance. In this regard, they shall also mandatorily grant access to the Buying Utility and MNRE/SLDC/NLDC or any other designated agency, to the remote monitoring portal of the BESS on a 24×7 basis. Geo-tagging of the Projects shall be mandatory.

2.1.15 The firewall shall have a minimum fire resistance of 3 hours. The partitions, which are made to reduce the noise level of the BESS, shall have the same fire resistance where the partitions are also used as firewalls. The walls of the building, which are used as firewalls, shall also have a minimum fire resistance of 3 hours.

2.1.16 It shall be BESSD's liability for cyber breaches, intellectual property leaks, and mandatory compliance with local grid cybersecurity laws.

2.2. Information regarding Interconnection Facilities

2.2.1. The BESSD shall be required to obtain all information from Buying Utility with regard to the Interconnection Facilities as is reasonably necessary to enable it to design, install and operate all interconnection facilities on the BESSD's side of the Delivery

Points to enable injection / drawl of electricity at the Delivery Points. The transmission of power/ energy to / from BESS up to the point of interconnection where the metering is done for energy accounting shall be the responsibility of the BESSD at its own cost.

2.2.2. Penalties, fines, and charges under any statute or regulation in relation to delay in commissioning of Project shall be payable by the BESSD to the extent the delay is attributable to the BESSD.

2.2.3. The responsibility of getting connectivity from the BESS up to the Interconnection Point, will lie with the BESSD. The power evacuation from BESS up to the interconnection/metering/delivery point including metering system as per clause 5 of BESSA shall be the responsibility of the BESSD at his own cost. The maintenance of power evacuation system up to the interconnection/metering/delivery point including metering system as per the applicable terms and conditions shall be the responsibility of the BESSD. All costs, charges, and losses up to and including at the Interconnection metering/delivery Point associated with this arrangement will also be borne by the BESSD.

2.3. Extensions of Time

2.3.1. In the event that the BESSD is prevented from performing its obligations under Article 2.1 of Special Conditions of Contract – Part A by the Scheduled Commissioning Date due to:

i) Any Buying Utility Event of Default; or
ii) Force Majeure Events affecting Buying Utility, or
iii) Force Majeure Events affecting the BESSD,

the Scheduled Commissioning Date and the Expiry Date shall be deferred for a reasonable period but not less than 'day for day' basis, to permit the BESSD/ Buying Utility through the use of due diligence, to overcome the effects of the Force Majeure Events affecting the BESSD/ Buying Utility, or till such time such Event of Default is rectified.

2.3.2. In the event, the issuance of tariff adoption order by Appropriate Commission is delayed then the BESSD shall be entitled to corresponding extension in the Scheduled Commissioning Date. Such extension of Scheduled Commissioning Date shall be equal to the number of days for which the issuance of tariff adoption order has exceeded the date of signing of this Agreement.

2.3.3. In case of extension due to reasons specified in Article 2.3.1(ii) and (iii), and if such Force Majeure Event continues even after a maximum period of 180 days from the date of the Force Majeure Notice, any of the Parties may choose to terminate the

Agreement as per the provisions of Article regarding Force Majeure. In case neither party terminates the Agreement under this clause, the Agreement shall stand terminated on the expiry of twelve (12) months of the continuation of the Force Majeure event unless the parties mutually agree to extend the Agreement for the further period.

2.3.4. If the Parties have not agreed within thirty (30) days after the affected Party's performance has ceased to be affected by the relevant circumstance, on the time period by which the Scheduled Commissioning Date or the Expiry Date should be deferred, any Party may raise the Dispute to be resolved in accordance with Article11.

2.3.5. As a result of such extension on account of Article 2.3.1 or Article 2.3.2 or Article 2.4.1, the newly determined Scheduled Commissioning Date and newly determined Expiry Date shall be deemed to be the Scheduled Commissioning Date and the Expiry Date for the purposes of this Agreement.

2.3.6. Delay in commissioning of the Project beyond the scheduled commissioning date for reasons other than those specified in Article 2.3.1 & Article 2.3.2 shall be an event of default on part of the BESSD and shall be subject to the consequences specified in the Article 2.4

2.4. Liquidated Damages not amounting to penalty for delay in Commissioning

2.4.1. The Parties agree and acknowledge that time is of the essence under this Agreement. The Scheduled Commissioning Date (SCD) for commissioning of the full capacity of the Project shall be within **Seven (7) months from the Effective Date under this Agreement.** The SCD may be extended by a **maximum of one (1) month** if the BESSD provides suitable justification and such justification is accepted by the Buying Utility. The BESSD is expected to complete Delivery, Installation, Testing, and Commercial Operations before the SCD.

2.4.2. The systems will be deemed commissioned only after successful trial run of the system for seven (7) days from the date of commissioning and submission of relevant test reports. **The Commissioning Committee shall then issue the commissioning certificate, and this date will be regarded as the Commercial Operation Date (COD). The Power which will be scheduled for Charging and Discharging of BESS during trial run/start-up power for a period of 7 days are of the account of Buying Utility and same will not be considered as auxiliary consumption or construction power.**

2.4.3. The maximum time period allowed for commissioning of the full Project Capacity with applicable liquidated damages, shall be limited to the date as on 6 months from the SCD.

2.4.4. In case of delay in commissioning of the Project beyond the SCD until the date as per Clause 2.4.2 above, as part of the liquidated damages, the total PBG amount for the Project shall be encashed on per-day-basis. For example, in case of a Project Capacity of 57.5 MW capacity, if commissioning of 57.5 MW capacity is delayed by 18 days beyond the SCD, then the liquidated damages shall be: PBG amount X (18/180). For the purpose of calculations of the liquidated damages, 'month' shall be considered consisting of 30 days.

a) Delay beyond the Scheduled Commissioning Date upto 6 months (and including) the date of commissioning, as part of the liquidated damages, the total PBG / POI amount for the Project shall be encashed on per-day basis. For the purpose of calculations of the liquidated damages, 'month' shall be considered consisting of 30 days. As an alternative to the above encashment of PBG / POI, the BESSD may choose to make a payment of the amount corresponding to the liquidated damages, directly to Buying Utility. The BESSD shall intimate to Buying Utility, its chosen alternative out of the two options, within 3 business days of intimation of the liquidated damages to the Developer, as calculated by Buying Utility. In case no response is received from the BESSD until the lapse of the above deadline, Buying Utility shall encash the PBG / POI for the amount as per the liquidated damages. In case the Developer chooses to make necessary payments in lieu of the liquidated damages, the said payment shall be credited to Buying Utility's account through NEFT payment, no later than 5 business days from the above intimation by the BESSD. In case of non-payment by the developer within the above deadline, the PBG / POI will be encashed by Buying Utility on the next business day.

b) For delay in commissioning beyond 6 months after SCD, Contracted Capacity shall be reduced to the Project capacity commissioned upto 6 months after SCD, the entire Performance Guarantee will be encashed by the Buying Utility and the BESSA for the Project shall stand terminated for the balance un-commissioned capacity.

2.4.5. The BESSD further acknowledges and accepts that the amount of the liquidated damages as specified above is a fixed, genuine, and reasonable pre-estimate of the damages that may be suffered by Buying Utility.

2.5. Acceptance/Performance Test

2.5.1. Prior to synchronization of the BESS, the BESSD shall be required to get the BESS certified for the requisite test including for safety as may be laid down by Central Electricity Authority or an agency identified by the central government to carry out testing and certification for the Battery Energy Storage projects. Further, BESSD shall ensure that all technical, acceptance and performance criteria as specified in RFP Documents and Guidelines are also complied and maintained. Safety and

Hazard Risks are entirely to the account of the BESSD. BESSD shall be responsible for any improper handling, manufacturing defects, or natural disasters (floods, earthquakes) leading to toxic chemical leaks, potentially resulting in soil/water contamination and environmental fines. There shall be no liability whatsoever on the Buying Utility on this score.

2.6. Third Party Verification

2.6.1. The BESSD shall be further required to provide entry to the site of the Project free of all encumbrances at all times during the Term of the Agreement to Buying Utility or their authorized representatives for inspection and verification of the works being carried out by the BESSD at the site of the Project. The BESSD shall provide full support to Buying Utility and/or the third party in this regard.

2.6.2. The third party may verify the construction works/operation of the Project being carried out by the BESSD and if it is found that the construction works/operation of the Project is not as per the Prudent Utility Practices, it may seek clarifications from BESSD or require the works to be stopped or to comply with the instructions of such third party.

2.7. Not in Use

2.7.1. Not in use

3. Buying Utility's Obligations

3.1. Obligation of Buying Utility

a. Provide land at the Project Location for setting up of the BESS
b. Make payment of the Monthly Bill/Supplementary Bill by the Due Date
c. Fulfil all the obligations undertaken by Buying Utility under this BESSA

3.2. Losses

Buying Utility shall be liable to bear all the losses including transmission losses in respect of the power evacuated beyond the Delivery Point to its receiving substation(s). BESSD shall be liable to bear all the losses from the BESS up to Interconnection/Delivery/ Metering Point.

4. Synchronisation, Commissioning and Commercial Operation

4.1. The BESSD shall give the concerned Buying Utility at least sixty (60) days' advanced preliminary written notice and at least thirty (30) days' advanced final written notice of the date on which it intends to synchronize the BESS to the Grid System.

4.2. Subject to Article 4.1, the BESS shall be synchronized by the BESSD to the Grid System when it meets all the connection conditions prescribed in applicable Grid Code then in effect and otherwise meets all other Indian legal requirements for synchronization to the Grid System.

4.3. The synchronization equipment and all necessary arrangements / equipment including RTU/ EMS any other equipment for charge and discharge of power from the Project and transmission of data to the concerned authority as per applicable regulation shall be installed by the BESSD at its facility of the Project at its own cost. The BESSD shall synchronize its system with the Grid System only after the approval of synchronization scheme is granted by the head of the concerned substation/Grid System and checking/verification is made by the concerned authorities of the Grid System.

4.4. The BESSD shall immediately after each synchronization/tripping of system, inform the sub-station of the Grid System to which the Project is electrically connected in accordance with applicable Grid Code under intimation to Buying Utility. In addition, the BESSD at its own risk and cost, will be required to arrange for the charging and discharging of power for carrying to carry out operational/ functional test prior to Trial run of 7 days as well as for commissioning of the Project. For avoidance of doubt, it is clarified that Synchronization / Connectivity of the Project with the grid shall not to be considered as Commissioning of the Project.

4.5. The BESSD shall commission the Project by the Scheduled Commissioning Date (SCD) for commissioning of the full capacity of the Project as specified under clause 2.4.1 of the Special Conditions of Contract – Part A. The systems will be deemed commissioned only after successful trial run of the system for seven (7) days from the date of commissioning and submission of relevant test reports. This date will be regarded as the **Commercial Operation Date (COD)**.

4.6. The Parties agree that for the purpose of commencement of the BESS capacity by the BESSD to Buying Utility, liquidated damages for delay etc., the Scheduled Commissioning Date (or extended Scheduled Commissioning Date) as defined in this Agreement shall be the relevant date.

4.7. It may be noted that commissioning/ part-commissioning of the Project will not be declared until the BESSD submits documents/ Lease Agreement to establish possession/ right to use of the required land, corresponding to full/ part capacity being commissioned, in the name of the BESSD for a period not less than the complete term of the BESSA, on or before the date of such full / part commissioning.

4.8. Early Commissioning

The BESSD shall be permitted for full commissioning as well as part commissioning of the Project even prior to the SCD. In cases of early part commissioning, till SCD, the BESSD will be free to sell the electricity generated / battery capacity, to any entity other than the Buying Utility, provided that the first right of refusal will be vested with the Buying Utility. The Buying Utility shall provide refusal within 15 (fifteen) days from the receipt of the request, beyond which it would be considered as deemed refusal. In cases of early commissioning of full Project capacity prior to SCD, in case the Buying Utility agrees to purchase such early commissioned power, the Buying Utility shall purchase the generation at BESSA tariff, as applicable.

Special Conditions of Contract – Part B – Operations & Maintenance

1. Buying Utility has agreed to purchase BESS Capacity from the BESSD under the RFP No. ---------- dated ---------- and accordingly, BESSD has agreed to sign Battery Energy Storage System Agreements (BESSA) with Buying Utility for sale of 57.5 MW/ 115 MWh BESS Capacity for a period of 12 years.

2. Pursuant to the aforesaid objective, the Parties are desirous of entering into a Battery Energy Storage System Agreement ("BESSA") i.e., a definitive agreement, regarding purchase of BESS Capacity from the Project. Pending execution of the necessary agreements and other relevant documents in relation to the transaction contemplated herein, the Parties wish to execute this BESSA setting out the respective obligations of the Parties and the steps necessary to complete the transactions contemplated herein.

   The Parties have accordingly agreed to enter into this BESSA to record their understanding and agreement with regard to the purchase of BESS Capacity to be generated from the Project and in respect to the matters incidental or ancillary thereto, upon the terms and conditions set out herein below.

   In consideration of the premises and mutual agreements, covenants and conditions set forth herein, it is hereby agreed by and between the parties as follows:

   1. This Agreement shall come into effect from the Effective Date for the purpose of this Agreement.

   2. The expiry date of this Agreement shall be 12 years from the COD.

   3. Subject to the terms and conditions contained herein, the BESSD hereby agrees to sell and make available the BESS Capacity from the 57.5 MW/ 115 MWh Project to be set up by the BESSD at Project Location 66/11 kV Grid substation in New Delhi.

   4. The parties hereby agree that the BESSD shall be liable to pay compensation for any shortfall in performance requirement of BESS Capacity provided from the contracted capacity. The amount of such compensation shall be as determined as per the manner and methodology specified in the BESSA. In case Buying Utility does not avail the remittance of such compensation within sixty (60) days of the end of corresponding Contract Year, Buying Utility shall have a right to recover the same from the amount payable by Buying Utility against Monthly Invoices.

   5. Buying Utility shall be responsible for directly coordinating and dealing with the BESSD, Regional Load Dispatch Centres, Regional Power Committees,

and other authorities in all respects in regard to declaration of availability, scheduling and despatch of Charging & Discharging of Energy from the BESS Capacity and due compliance with deviation and settlement mechanism and the applicable Grid code Regulations, acknowledging that Buying Utility is the Grid connected entity. This is subject to the penalty clauses for non-performance of the BESSD.

6. Multiple energy injection points in grid may be permitted, subject to provisions in the tender document. In case of multiple injection points, the capacity of Connectivity and Open Access for each individual energy injection point will be granted as per extant regulations as amended from time to time. Further, for a single Project with multiple injection points, scheduling and settlement as per Deviation Settlement Mechanism will be carried out for each injection point separately. In such cases, obligation of the Buying Utility will be to procure power from all or any of the points of injection, cumulatively up to the Contracted Capacity as per the BESSA, and connectivity granted at each injection point.

3. Applicable Tariff

3.1 The Tariff applicable for the sale of BESS Capacity by the BESSD to Buying Utility under this Agreement shall be the capacity-based Tariff as approved by the Appropriate Commission, which will be fixed for entire term of agreement at delivery point. As a capacity-based contract, the payment will be applicable regardless of actual utilisation of the BESS by the Buying Utility and will be subject the availability of the BESS as duly certified by the Buying Utility as per the provisions of Article 6 of this Agreement. For Illustration, the availability certificate issued for the month will be used for adjustment bill as per Article 6.2.

3.2 As per provisions of the BESSA, the BESSD is permitted for full commissioning of the BESS even prior to the Scheduled Commissioning Date (SCD). In case of early commissioning of the Project(s) prior to the SCD, Buying Utility may purchase the BESS Capacity at Applicable tariff as per the BESSA.

3.3 The capacity-based Tariff for the entire term of the Agreement shall be fixed at INR ---------- per MW per year plus applicable Taxes (GST) and will be billed by BESSD to Buying Utility on monthly basis.

4. Invoicing and Settlement schedule

From the commencement of availability of BESS Capacity by the BESSD, Buying Utility shall pay to the BESSD the monthly Tariff Payments, on or before the Due Date i.e. 45 days from date of submission of each invoice e.g. Monthly Bills, Final Adjustment Monthly Bills etc, in accordance with Tariff as specified above. All Tariff Payments by Buying Utility shall be in Indian Rupees.

4.1 The BESSD shall issue to Buying Utility a signed Monthly Bill on the first business day of the next month and shall also include the following:

i) The Monthly Bill shall be raised on the basis of provisional monthly system availability calculated as per the formula stated below in Clause 6.1.

Final adjustment monthly bill, if any, shall be raised based on the monthly system availability certified by representative of Procurer & BESSD based on the monthly system availability formula stated below in clause 6.1 along with Monthly Bill for next month. For Illustration, BSSED shall raise provisional invoice for June month, on 1st working day of next month i.e. July, based on the Provisional Monthly System Availability calculated i.e. 95% leading to recovery of 100 % of applicable tariff for June. However, based on Monthly System Availability Certified by representative of Procurer & BESSD the actual availability is 90% for the month of June, in the such case the invoice of next month there would be a final adjustment bill for June, such that BESSD would provide credit to the procurer on a pro-rata basis of availability below 95% i.e. (Tariff for June = 90% / 95% *Monthly Applicable Tariff).

ii) Adjustments bill against the Provisional Bill based on availability of BESS Capacity in the preceding month. For Illustration, if the actual monthly availability of April month of a Contract Year is 90%, then the invoice for April month would be for 100 % of applicable tariff assuming provisional availability of 95% for April. However, in the invoice of next month (May) there would be an adjustment bill for April, such that BESSD would be paid tariff on a pro-rata basis of availability below 95% i.e. (Tariff for April = 90% / 95% *Monthly Applicable Tariff).

Monthly System Availability = Mean of the System availabilities of all time-blocks during the month in which the Buying Utility has scheduled power for charging/discharging the BESS.

$$\text{System Availability in a time block}_i = \frac{\sum \text{Declared Capacity in MW in charging / discharging slots(A)}}{\sum \text{Contracted Capacity in MW in charging / discharging slots(B)}}$$

Note- Only those slots will be considered for monthly system availability where Buying Utility has requested for charging/discharging of BESS. Illustration of Availability calculation is as below:

Illustration of Daily Availability Calculation for 1 MW System					
Hrs	Contracted Capacity	Declared Capacity	Requirement of Charging as per Buying Utility	Requirement of Discharging as per Buying Utility	System Availability required for Buying Utility
	(A)	(B)	(C)	(D)	(E) =
			"1" in case of Charging	"1" in case of Discharging	C+D
1	1	1			0
2	1	1			0
3	1	1	1		1
4	1	1	1		1
5	1	1			0
6	1	0.6		1	1
7	1	1		1	1
8	1	1			0
9	1	0.9			0
10	1	1			0
11	1	1			0
12	1	0.8			0
13	1	1			0
14	1	1			0
15	1	1			0
16	1	0.85			0
17	1	1	1		1
18	1	1	1		1
19	1	1			0
20	1	1		1	1
21	1	1		1	1
22	1	1			0
23	1	0.6			0
24	1	1			0
Total MWh for selected Slots	8	∑ (B*E) = 7.6			
System Availability %	(7.6/8) *100 = 95%				

iii) Amount payable on account of shortfall in performance requirement as per BESSA. For shortfall in RTE, liquidated damages shall be applicable on monthly basis. For shortfall in Availability, since the Liquidated Damages are calculated based on Annual Availability of the system, the same would be calculated at the end of last month of the Contract Year i.e. March of each financial year except for the last Contract Year.

iv) Late Payment Surcharge if any

v) Taxes, duties Levies etc. as applicable

4.1. Payment of Monthly Bills

4.2. Buying Utility shall pay the amount payable under the Monthly Bill on or before the Due Date i.e., within 45 days of presentation of bill within official hours, to such account of the BESSD, as shall have been previously notified to Buying Utility in accordance with Article 6.2.2 below.

4.2.1. The BESSD shall open a bank account ("Designated Account") for all Tariff Payments, and notify Buying Utility of the details of such account at least ninety (90) Days before the dispatch of the first Monthly Bill. Buying Utility shall also designate a bank account at New Delhi. Buying Utility shall inform the BESSD the details of such account ninety (90) Days before the dispatch of the first Monthly Bill. The BESSD and Buying Utility shall instruct their respective bankers to make all payments under this Agreement to Buying Utility's Designated Account or the BESSD's Designated Account, as the case may be, and shall notify either Party of such instructions on the same day.

4.2.2. The BESSD shall open a bank account ("Designated Account") for all Tariff Payments, and notify Buying Utility of the details of such account at least ninety (90) Days before the dispatch of the first Monthly Bill. Buying Utility shall also designate a bank account at New Delhi. Buying Utility shall inform the BESSD the details of such account ninety (90) Days before the dispatch of the first Monthly Bill. The BESSD and Buying Utility shall instruct their respective bankers to make all payments under this Agreement to Buying Utility's Designated Account or the BESSD's Designated Account, as the case may be, and shall notify either Party of such instructions on the same day.

4.4 Late Payment Surcharge

Late Payment Surcharge, will be as per Late Payment Surcharge and Related Matters) Rules-2022, notified by MoP on 3 June 2022 and applicable for subsequent amendment if any

i) Late Payment Surcharge shall be payable on the payment outstanding after the Due Date at the base rate of Late Payment Surcharge applicable for the period for the first month of default.

ii) The base rate of Late Payment Surcharge means the marginal cost of funds based on lending rate for one year of the State Bank of India, as applicable on the 1st April of the financial year in which the period lies, plus five per cent and in the absence of marginal cost of funds-based lending rate, any other arrangement that substitutes it, which the Central Government may, by notification, in the Official Gazette, specify

iii) The rate of Late Payment Surcharge for the successive months of default shall increase by 0.5 per cent for every month of delay provided that the Late Payment Surcharge shall not be more than three percent higher than the base rate at any time.

4.5 Rebate

For payment of any Bill on or before Due Date, the following Rebate shall be paid by the BESSD to Buying Utility in the following manner

a) A Rebate of 1.5% shall be payable to Buying Utility for the payments made within a period of five (5) days of presentation of bills through email.

b) Any payments made beyond a period of 5 days from the date of presentation of bill through email up to and including 30 days, shall be allowed a rebate of 1%.

c) No Rebate shall be payable on the Bills raised on account of Change in Law relating to taxes, duties, cess etc. and Late Payment Surcharge.

4.6 Payment Security Mechanism

Buying Utility shall provide payment security to the BESSD through:

4.6.1 **Revolving Letter of Credit (LC)** of an amount not less than 1 (one) months' average billing from the Project under consideration. Buying Utility shall provide to the BESSD, in respect of payment of its Monthly Bills, a single, unconditional, revolving, and irrevocable letter of credit ("Letter of Credit"), opened and maintained by Buying Utility, which may be drawn upon by the BESSD in accordance with this Article. Buying Utility shall provide the BESSD draft of the Letter of Credit proposed to be provided to the BESSD two (2) months before the Scheduled Commissioning Date.

AND

4.6.2 **Payment Security Fund (PSF)**, which shall be suitable to support payment for **at** least 3 (three) months' billing of the BESS

4.6.3 As a combination of the above two mechanisms, Buying Utility shall provide a total payment security for a total of 4 (four) months' energy billing, out of which, Revolving LC should be provided for a minimum period of 1 month's energy billing

4.6.4 The BESSD shall not draw upon such Letter of Credit prior to the Due Date of the relevant Monthly Bill and shall not make more than one drawl in a Month if there are no outstanding dues.

4.6.5 Provided further that if at any time, such Letter of Credit/ Payment Security Fund amount falls short of the amount specified in Article 6.5.3 due to any reason whatsoever, Buying Utility shall restore such shortfall within seven (7) days.

4.6.6 Buying Utility shall cause the scheduled bank issuing the Letter of Credit to intimate the BESSD, in writing regarding establishing of such irrevocable Letter of Credit and any of the changes therein.

4.6.7 Buying Utility shall ensure that the Letter of Credit shall be renewed not later than its expiry.

4.6.8 All costs relating to opening, maintenance of the Letter of Credit shall be borne by Buying Utility.

4.6.9 If Buying Utility fails to pay a Monthly Bill or part thereof within and including the Due Date, then, subject to Article 6.5.4, the BESSD may draw upon the Letter of Credit, and accordingly the bank shall pay without any reference or instructions from Buying Utility, an amount equal to such Monthly Bill or part thereof, by presenting to the scheduled bank issuing the Letter of Credit, the following documents:

i) a copy of the Monthly Bill which has remained unpaid by Buying Utility;
ii) a certificate from the BESSD to the effect that the bill at item (i) above, or specified part thereof, is in accordance with the Agreement and has remained unpaid beyond the Due Date;

4.7 Disputed Bill

4.7.1 If the Buying Utility does not dispute a Monthly Bill raised by the other Party within fifteen (15) days of receiving, such Bill shall be taken as conclusive and binding.

4.7.2 If the Buying Utility disputes the amount payable under a Monthly Bill, it shall pay undisputed amount of the invoice amount and it shall within fifteen (15) days of receiving such Bill, issue a notice (the "Bill Dispute Notice") to the invoicing Party setting out:

i) the details of the disputed amount;
ii) its estimate of what the correct amount should be; and
iii) All written material in support of its claim.

4.7.3 If the BESSD agrees to the claim raised in the Bill Dispute Notice issued pursuant to Article 6.6.2, the BESSD shall make appropriate adjustment in the next Monthly Bill.

In such a case excess amount shall be refunded along with interest at the same rate as Late Payment Surcharge, which shall be applied from the date on which such excess payment was made by Buying Utility and up to and including the date on which such payment has been received as refund.

4.7.4 If the BESSD does not agree to the claim raised in the Bill Dispute Notice issued pursuant to Article 6.6.2 it shall, within fifteen (15) days of receiving the Bill Dispute Notice, furnish a notice (Bill Disagreement Notice) to the disputing Party providing:

i) reasons for its disagreement;
ii) its estimate of what the correct amount should be; and
iii) All written material in support of its counter-claim.

4.7.5 Upon receipt of the Bill Disagreement Notice by the Buying Utility under Article 2.6.4, authorized representative(s) or a director of the board of directors/ member of board of Buying Utility and the BESSD shall meet and make best endeavours to amicably resolve such dispute within fifteen (15) days of receipt of the Bill Disagreement Notice.

4.7.6 If the Parties do not amicably resolve the Dispute within fifteen (15) days of receipt of Bill Disagreement Notice pursuant to Article 6.6.5, the matter shall be referred to Dispute resolution in accordance with governing Laws and Dispute resolution in BESSA.

4.7.7 For the avoidance of doubt, it is clarified that despite a Dispute regarding an Invoice, Buying Utility shall, without prejudice to its right to Dispute, be under an obligation to make payment of 50% of the invoice amount in the Monthly Bill.

4.8 Quarterly and Annual Reconciliation

4.8.1 The Parties acknowledge that all payments made against Monthly Bills shall be subject to quarterly reconciliation and adjustment, if any, within thirty (30) days of the end of the quarter of each Contract Year and annual reconciliation and adjustment, if any, at the end of each Contract Year within thirty (30) days thereof to take into account the Energy Accounts, Tariff adjustment payments, Tariff

Rebate, Late Payment Surcharge, or any other reasonable circumstance provided under this Agreement.

4.8.2 The Parties, therefore, agree that as soon as all such data in respect of any quarter of a Contract Year or a full Contract Year as the case may be, has been finally verified and adjusted, Buying Utility and the BESSD shall jointly sign such reconciliation statement. After signing of a reconciliation statement, the BESSD shall make appropriate adjustments in the following Monthly Bill, with Surcharge/Interest, as applicable. Except for the Tariff adjustment made during the period from commencement of supply to commissioning of the cumulative awarded capacity/accepted cumulative capacity by the BESSD, Late Payment Surcharge/ interest shall be payable in such a case from the date on which such payment had been made to the invoicing Party or the date on which any payment was originally due, as may be applicable. Any Dispute with regard to the above reconciliation shall be dealt with in accordance with the provisions of Dispute resolution in BESSA.

5 Usage of Contracted Capacity

5.1 In terms of this BESSA, the BESSD shall, with in the timelines provided in the RFP and this BESSA:

5.1.1 Provide Contract Performance Bank Guarantee amount equivalent to 5% (five percent) of the Project cost as per final offer submitted on ----------, after issuance of LOI and not later than Effective Date. The Performance Bank Guarantee would be applicable for Design, Supply, Testing, Installation & Commissioning, and Operations & Maintenance of BESS and should be effective from the Effective Date under this Agreement. EMD will be forfeited in case PBG is not submitted on time. On submission of PBG, EMD shall be released.

5.1.2 Perform its obligations as per the Scope of Work as provided in Annexure 1 of this BESSA

5.2 Scope of services

5.2.1 This Agreement shall govern the provision of the professional services, listed here under and more fully described in Annexure 1 of this BESSA (Clauses from Volume 1 of the RFP), in conformance with the SLA

5.2.2 The BESSD shall implement the BESS Project and then operate and maintain it for the Term or until termination of this Agreement, commencing from the date of installation or when the acceptance is complete as per the Acceptance Criteria, whichever is later.

5.2.3 To meet the aforesaid objectives the BESSD will provide the Service Levels in accordance with the technical specifications as described in this BESSA, from the

Effective Date and shall, unless terminated earlier in accordance with its terms or unless otherwise agreed by the Parties, expire on the date on which this BESSA expires or terminates for any reason, which shall be till the end of the Term of the Agreement as mentioned below.

5.2.4 Contract period shall commence from the COD of the Project and shall remain valid for 12 years from the COD of the Project.

5.2.5 If the delay occurs due to a Force Majeure event, a reasonable extension of time shall be granted by the Buying Utility.

5.2.6 Approvals and required consents

5.2.6.1 The Parties shall cooperate to procure, maintain, and observe all relevant and regulatory and governmental licenses, clearances, and applicable approvals (hereinafter the “Approvals”) necessary for the BESSD to provide the Services

5.2.7 Access to BESSD or its Nominated Agencies to Project Location

5.2.7.1 For so long as the BESSD provides Services on a non-permanent basis and to the extent necessary for the BESSD to provide the Services and at no cost to the BESSD, the buying utility, shall, subject to compliance by the BESSD with all safety and security guidelines which may be notified by the purchase to the BESSD in writing and provide the BESSD with access to the Project location

5.2.7.2 Provided that, the BESSD has duly intimated the Buying Utility regarding its requirement of accessing any other buying utility’s location at least seven (7) days prior to the date of visit

5.2.7.3 Locations and items shall be made available to the BESSD on an “as is, where is” basis by the Buying Utility. The BESSD agrees to ensure that its employees, agents, and Partners use the location specifically for the purpose for which the access to location was sought by the BESSD and do not use the location, services and items for the transmission of any material which is defamatory, offensive or abusive or of an obscene or menacing character; and in a manner which constitutes a violation or infringement of the rights of any person, firm or company (including but not limited to intellectual property rights or confidentiality).

5.2.8 System Maintenance

5.2.8.1 The BESSD shall create and maintain a rolling maintenance schedule with regard to the BESS system used in performing the Services. Such maintenance schedule shall be discussed and updated in collaboration with the Buying Utility

6 Performance criteria and monitoring

6.1 Performance Monitoring

As part of the performance monitoring, the following shall be carried out:

6.1.1 The BESSD must install necessary equipment to continuously measure BESS operating parameters (voltage, current, ambient condition, etc.) as well as energy input into and energy output from the BESS along with Metering arrangement in accordance with extant regulations. This list of parameters is not exhaustive, and Buying Utility may specify any other operational parameter during detailed planning/ engineering prior to commencement of design of dashboard. The BESSD will be required to submit this data to Buying Utility and/ or concessional lenders online and/or through a report on regular basis every month for the entire duration of contract.

6.1.2 The BESSD shall provide access to Buying Utility or their authorized representatives for installing any additional monitoring equipment to facilitate online transfer of data.

6.1.3 All data shall be made available as mentioned above for the entire duration of the BESSA.

6.1.4 The BESS EMS should be IEC-104 compliant, as per technical specifications and requirements defined in Annexure 1 of this BESSA. All data should be accessible for providing real time online data (BESS parameters) to the concerned authorities/organisations. This time series data shall be available from the EMS to facilitate monitoring and should include among others as stated before, parameters to facilitate daily, monthly, and annual report for performance monitoring.

6.1.5 Web-based and app-based monitoring should be available, which should not be machine dependent. The monitoring should provide the same screens as available in the EMS at Buying Utility's SCADA Centre, Balaji, Delhi. Also, it should be possible to download reports from a remote web-client in PDF or Excel format and as per the clauses in Annexure 1 of this BESSA.

6.2 Service Level Agreements (SLAs)

6.2.1 Service Level Agreements (SLAs) within this BESSA reflect the measurements to be used to track and report overall progress, system performance and performance of BESSD's services on a regular basis.

6.2.2 These SLAs shall operate as a legally binding services agreement specifying terms which apply to the parties and to the provision of the services by the BESSD to Buying Utility under this SLA

6.3 **Project performance parameters**

6.3.1 The Contracted Capacity of the Project shall be in terms of "MW". The agreed installed contracted Capacity to Buying Utility for Battery Energy Storage System shall be 57.5MW/115MWh.

6.3.2 The Accordingly, for the Contracted Capacity of 57.5 MW, the BESSA shall entitle the Buying Utility to schedule discharge up to 115 MWh of energy from the BESS in each cycle, subject to the following:

6.3.2.1 Buying Utility will schedule input energy which will be inclusive of losses of BESS (determined from the guaranteed Round-Trip Efficiency (RtE) of the system as specified below).

Illustration: For a Contracted Capacity of 57.5MW/115MWh, assuming an RtE of 87%, Buying Utility shall supply charging power to the tune of 132.18 MWh, to expect a discharge of 115 MWh as per the desired schedule.

6.3.2.2 Maximum energy scheduled for discharge in a given cycle during a year shall not be more than the Max. Dispatchable Energy Capacity at the End of Year as specified elsewhere under in this Clause.

6.3.3 Power rating of a 115 MWh (57.5 MW x 2 hrs) BESS will be 57.5 MW, i.e., the maximum value of the active Output and Input Power at the Delivery Point. The Energy rating of 115 MWh of the system will be the dispatchable capacity at COD of the system, as measured at the Metering Point. Terms and definitions of terminologies related to BESS shall be as defined in IEC 62933-2-1.

6.3.4 BESSD shall make the BESS available for 8,760 operational cycles over the operational period of 12 years. Following provisions shall be applicable on the Contracted Capacity to be off take by Buying Utility:

6.3.4.1 The number of operational cycles refers to the number of times per contract term Buyer may fully charge and discharge the Storage Facility each year. A full charge will be deemed to have occurred when the cumulative amount of energy added to the Storage Facility over the course of a calendar month equals the Maximum Storage Level. This could occur in one continuous charge or over multiple charges, even if some energy is discharged in between. The inverse is true for a full discharge.

6.3.4.2 The procurement shall be in power (MW) terms in intervals of 15-minute / 5 minutes timeslots or real time. The BESSD shall install, operate, and maintain the BESS to offer facility to Buying Utility to charge and discharge the BESS on an "on demand" basis. The BESSD shall guarantee a minimum system availability of 95% on annual basis at the POC level. The BESSD shall pay the liquidated damages for such shortfall and shall duly pay such damages to Buying Utility under BESSA. Amount of such liquidated damages shall be 150 percent of the Capacity Charges for the capacity not made available.

6.3.4.3 Availability of the Project shall mean the ability of the BESS to execute a function i.e., charging or discharging, when called upon to do so, as per the schedule or signal provided by the Buying Utility, subject to the minimum system ratings specified herein. In addition, the BESSD shall also demonstrate, on monthly basis,100% of the minimum dispatchable Capacity of the BESS as required under Clause 8.4 below.

6.4 SLA – System Availability

For a given BESSA, the monthly availability shall be calculated for Monthly and adjustment bill purpose whereas Annual availability guarantee shall commence from the date of commissioning of the system and shall be calculated as below:

Monthly System Availability = Mean of the System availabilities of all time-blocks during the year in which the Buying Utility has scheduled power for charging/discharging the BESS.

$$\text{System Availability in a time block}_i = \frac{\sum \text{Declared Capacity in MW in charging / discharging slots (A)}}{\sum \text{Contracted Capacity in MW in charging / discharging slots(B)}}$$

Note- Only those slots will be considered for system availability where Buying Utility has requested for charging/discharging of BESS.

Taking into consideration capacity degradation, the minimum dispatchable energy to be made available by the BESSD at the end of a given year shall be as follows:

Year	Min. Dispatchable Capacity at the end of Year (as a % of 115 MWh)
1	97.5%
2	95.0%
3	92.5%
4	90.0%
5	87.5%

6	85.0%
7	82.5%
8	80.0%
9	77.5%
10	75.0%
11	72.5%
12	70.0%

i. Any shortfall in the minimum dispatchable capacity will be considered as reduction in availability.

ii. The nameplate ratings shall be achievable during discharge for the full range of environmental conditions at the Project site when the battery is fully charged. In any case, the BESS shall be capable of being discharged at reduced power levels from that specified above. However, the energy discharged from the battery shall not require to be greater than the nameplate watt-hour rating specified herein.

iii. Buying Utility shall, in accordance with Applicable Laws and Regulations thereunder, issue instructions to the BESSD for despatch of electricity to the Grid during such period and in such volume as it may specify in its instructions.

iv. Operational Window: Operational Window shall mean the expected hours/duration of system (capacity) availability on each day during the term of the Contract, excluding:

a. Grid Outages when buying utility shall be unable to take the power from BESS (duly certified to this effect by the Buying Utility). Since System shall be capable to meet the critical load up to contracted capacity hence black out condition shall not be excluded from operational window.

b. Planned Maintenance Outage duly informed by the BESSD to the Buying Utility with at least one month's prior notice, subject to total no. of planned outage period being not more than 200 hours in the year.

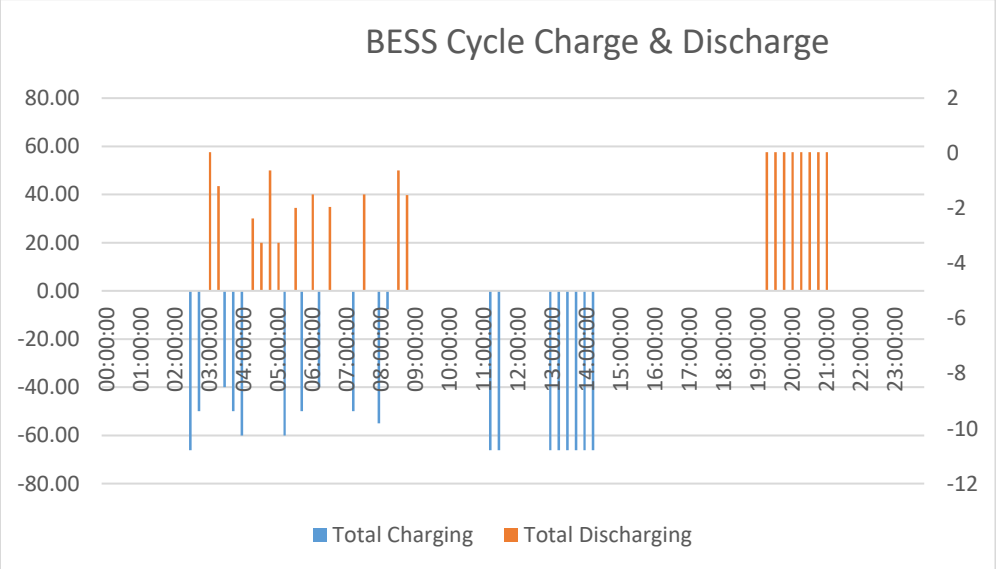
For operational purposes, Operational Window shall be closed for the day when charging and discharging cumulative energy equivalent to two cycles completed. Planned Maintenance Outages shall be preferably during non-peak months and during non-peak hours.

Buying utility may schedule the BESS Charging and discharging quantum maximum up to the contracted capacity with any duration of the day (within 24 Hrs) and cumulative charging and discharging energy shall be equivalent to two cycles.

Illustration of 57.5 MW /115 MWh BESS operation: Time	Total Charging	Total Discharging
00:00:00	0.00	0.00
00:15:00	0.00	0.00
00:30:00	0.00	0.00
00:45:00	0.00	0.00
01:00:00	0.00	0.00
01:15:00	0.00	0.00
01:30:00	0.00	0.00
01:45:00	0.00	0.00
02:00:00	0.00	0.00
02:15:00	0.00	0.00
02:30:00	-66.10	0.00
02:45:00	-50.00	0.00
03:00:00	0.00	57.50
03:15:00	0.00	43.50
03:30:00	-40.00	0.00
03:45:00	-50.00	0.00
04:00:00	-60.00	0.00
04:15:00	0.00	30.00
04:30:00	0.00	20.00
04:45:00	0.00	50.00
05:00:00	0.00	20.00
05:15:00	-60.00	0.00
05:30:00	0.00	34.50
05:45:00	-50.00	0.00
06:00:00	0.00	40.00
06:15:00	-40.00	0.00
06:30:00	0.00	34.80
06:45:00	0.00	0.00
07:00:00	0.00	0.00
07:15:00	-50.00	0.00
07:30:00	0.00	40.00
07:45:00	0.00	0.00
08:00:00	-55.00	0.00
08:15:00	-7.70	0.00
08:30:00	0.00	50.00
08:45:00	0.00	39.70
09:00:00	0.00	0.00
09:15:00	0.00	0.00

Illustration of 57.5 MW /115 MWh BESS operation: Time	Total Charging	Total Discharging
09:30:00	0.00	0.00
09:45:00	0.00	0.00
10:00:00	0.00	0.00
10:15:00	0.00	0.00
10:30:00	0.00	0.00
10:45:00	0.00	0.00
11:00:00	0.00	0.00
11:15:00	-66.10	0.00
11:30:00	-66.10	0.00
11:45:00	0.00	0.00
12:00:00	0.00	0.00
12:15:00	0.00	0.00
12:30:00	0.00	0.00
12:45:00	0.00	0.00
13:00:00	-66.10	0.00
13:15:00	-66.10	0.00
13:30:00	-66.10	0.00
13:45:00	-66.10	0.00
14:00:00	-66.10	0.00
14:15:00	-66.10	0.00
14:30:00	0.00	0.00
14:45:00	0.00	0.00
15:00:00	0.00	0.00
15:15:00	0.00	0.00
15:30:00	0.00	0.00
15:45:00	0.00	0.00
16:00:00	0.00	0.00
16:15:00	0.00	0.00
16:30:00	0.00	0.00
16:45:00	0.00	0.00
17:00:00	0.00	0.00
17:15:00	0.00	0.00
17:30:00	0.00	0.00
17:45:00	0.00	0.00
18:00:00	0.00	0.00
18:15:00	0.00	0.00
18:30:00	0.00	0.00
18:45:00	0.00	0.00
19:00:00	0.00	0.00

Illustration of 57.5 MW /115 MWh BESS operation: Time	Total Charging	Total Discharging
19:15:00	0.00	57.50
19:30:00	0.00	57.50
19:45:00	0.00	57.50
20:00:00	0.00	57.50
20:15:00	0.00	57.50
20:30:00	0.00	57.50
20:45:00	0.00	57.50
21:00:00	0.00	57.50
21:15:00	0.00	0.00
21:30:00	0.00	0.00
21:45:00	0.00	0.00
22:00:00	0.00	0.00
22:15:00	0.00	0.00
22:30:00	0.00	0.00
22:45:00	0.00	0.00
23:00:00	0.00	0.00
23:15:00	0.00	0.00
23:30:00	0.00	0.00
23:45:00	0.00	0.00



v. In addition to above, the BESSD shall also submit Available energy Test Report as per IEC 62933-2-1 on Annual basis to Buying Utility.

vi. It shall be the responsibility of the BESSD to make periodic replacements/replenishments of system capacities (to ensure annual guaranteed system ratings), if and when required, up to the Term of the

Contract. Outage time as a result of replacement will also be counted as an "Accountable BESS Outage" for the purpose of computing BESS Availability.

Pursuant to the provisions above, the BESSD shall plan the despatch of electricity and convey its availability for scheduling thereof as per the Buying Utility's requirement, as the case may be, and shall supply electricity in accordance with the provisions of the Grid Code and the Electricity Act, 2003. The BESSD shall adhere to all the technical requirements as brought out in Annexure 1 of this BESSA. The BESS shall conform to all the applicable CEA and CERC Standards for connectivity, metering, communication with the grid operators, etc.

7 Shortfall in meeting Performance Criteria

Following provisions shall be applicable on the Contracted Capacity scheduled by Buying Utility:

Subsequent to COD of full Project Capacity, in case the annual Availability demonstrated by the BESSD is less than the minimum as specified above, such shortfall in performance shall make the BESSD liable to pay the liquidated damages provided in the BESSA to Buying Utility.

Liquidated damages on account of shortfall in meeting the performance criteria will be computed as follows:

$$\textbf{Liquidated Damages} = (\mathbf{A} - \mathbf{B}) \times \mathbf{C} \times \mathbf{D} \times \mathbf{n} \times \mathbf{1.5}$$

where,
A is Guaranteed Annual Availability as per Clause 8.3.4.iii above;
B is as calculated as per Clause 8.4 above;
C is BESS Power Rating, as per Clause 8.3.3above;
D is the Capacity Charges/MW/month in INR, i.e., the approved tariff
n is the no. of months.

9.1. SLA – Round Trip Efficiency

In case the BESSD fails to meet the monthly RtE demonstration as per Clause 8.3.4.iii and 8.4 above, additional Liquidated Damages for the unavailability of the required minimum RtE shall be applicable for the entire month. However, this damage shall not be applicable in events of Force Majeure identified under the BESSA with Buying Utility, affecting the availability of the system.

The BESSD shall guarantee AC to AC roundtrip efficiency (RtE) of system on monthly basis. The guaranteed RtE for the month should be greater than the

minimum RtE (RtEm). The below table specifies the minimum round-trip efficiency to be fulfilled by the BESS in each year.

Year	Min. Round-trip efficiency at the end of Year
1	86.78%
2	86.56%
3	86.34%
4	86.12%
5	85.90%
6	85.68%
7	85.46%
8	85.24%
9	85.02%
10	85.80%
11	85.58%
12	85.36%

The minimum monthly RTE in a year RTE_m is defined as:

$$\mathrm{RtE_m} = \left(\mathrm{mRtE_{n-1}} - (\mathrm{mRtE_{n-1}} - \mathrm{mRtE_n}) \cdot \frac{\mathrm{m}}{12}\right)$$

Where

m refers to the m^{th} month in a year;
n refers to the nth year;
mRtEn refers to the minimum RtE at the end of year n
The BESSD shall be liable for Liquidated Damages to the Buying Utility, if any, on account of excess conversion losses, based on the following conditions:

a) For RtE<70%, there shall be a liquidated damage @ the Average Power Purchase Cost of the Buying Utility for the previous financial year for the excess conversion losses considering system RtE = RtE_m. Further, tariff payment for the corresponding month shall not be made to the BESSD;

b) For 70% ≤ RtE<RtE_m, there shall be a liquidated damage @ the Average Power Purchase Cost of the Buying Utility for the previous financial year for the excess conversion losses considering system RtE = RtE_m.

$$\text{System Roundtrip Efficiency} = \frac{\text{Sum Total of Actual Injection/Discharging}_j \text{ in a month (C)}}{\text{Sum Total of Actual Drawal/Charging}_j \text{ in a month (D)}}$$

Where,

jrefers to the j^{th}month in a year;

$D \neq 0$;

$D \leq 2 \times E_{BESS} \times (MD_{n-1} - (MD_{n-1} - MD_n) \times \frac{j}{12}) / RtE_g$;

E_{BESS}refers to Energy Rating specified above (25 MWh);

MD_{n-1}refers to minimum guaranteed dispatchable energy at the end of the previous year (as a % of Capacity at the COD specified in Clause 8.4 above);

MD_nrefers to minimum guaranteed dispatchable energy at the end of the current year;

RtE_grefers to the guaranteed Round-Trip Efficiency under the BESSA;

C and D shall be as per the measurement at the Main ABT Meter at the Point of Interconnection.

9.2. **SLA – Dispatch and scheduling of power**

9.2.1. The BESSD, in consultation with Buying Utility, shall be required to charge/ discharge the Battery System as per the applicable regulations / requirements / guidelines of CERC/ DERC/SLDC/ RLDC or any other competent agency and same being recognized by the SLDC or any other competent authority / agency as per applicable regulation/ law/ direction and maintain compliance to the applicable Codes/ Grid Code requirements and directions, if any, as specified by concerned SLDC/RLDC from time to time. Any deviation from the Schedule will attract the provisions of applicable regulation / guidelines / directions and any financial implication on account of this shall be on the account of the BESSD.

9.2.2. The BESSD shall be responsible for any deviation from scheduling during charging and discharging for reasons not attributable to Buying Utility and for any resultant liabilities on account of charges for such deviation as per applicable regulations. UI charges on this account shall be directly paid by the BESSD.

9.2.3. During a Day, Buying Utility shall not ask to for/ schedule any BESS capacity / Energy in excess of 2 cycles of charge and discharge. For an example, in a charging cycle to the rated capacity is permitted which could be a single stretch of 2 hours or multiple stretches with cumulative energy should not exceeding the rated energy capacity. Similarly, for a discharge cycle, there could be a single stretch of 2 hours or multiple stretches with cumulative energy should not exceed the rated energy capacity.

9.2.4. **Auxiliary Consumption:** The bidder will need to take a separate non-Domestic connection for auxiliary consumption as per specified norms and will be charged on a monthly basis for the actual consumption recording in the meter. The consumption will be charged at the rate approved by the Commission.

BESSD Should take all preventive measures to protect the BESS and Its auxiliary systems from the auxiliary supply voltage surge and phase reversal.

10. Statutory and Other Responsibilities of the BESSD

10.1. The BESSD shall exercise control/supervision of his employees in the day-to-day work. The BESSD shall deploy supervisor to act as an interface between the BESSD and the Engineer-in-charge of Buying Utility for effective discharge of services envisaged under the contract and shall be available in the office premises as per requirement. Buying Utility will not retain any control, supervision or the manner of discharge/dismissal or retrenchment or re-employment of the employees engaged/employed by the BESSD.

10.2. The BESSD shall maintain all the records such as Name, Father's name, Photograph, Age, Sex, Educational qualifications, present and permanent addresses along with proof of age and details of the dependent family members as required under various provisions of labour laws and acts for the persons deployed by them in the Buying Utility's premises. BESSD has to produce these records as and when required by Buying Utility or the concerned statutory authorities for inspection. In case it is found that BESSD has not complied with any statutory requirement under various Labour Laws/Acts, Buying Utility being the principal Owner shall make the payment and will recover the same with penalty/surcharge from the due payment of the BESSD.

10.3. The BESSD shall also before the actual deployment of personnel, submit a certificate from a Registered Medical Practitioner certifying that the person deployed is physically, mentally fit (free from any kind of infectious disease in case of those deployed in Catering services). Such certificate shall be submitted for each person deployed once in a year.

10.4. The BESSD shall make arrangement to issue Identity cards to each of the manpower deployed, for entry into the premises which shall have name of employee, place of work, name of the BESSD and photograph verified by the BESSD. The Identity Cards shall be issued by the BESSD at his own cost. Security Staff of Buying Utility premises shall be at liberty to exercise check on any of the Employees while entering, search them in the premises, during the work and while leaving from the premises.

10.5. Uniform: Decent Formal dress. Safety shoes/ Personal Protection Equipment.

10.5.1. The BESSD shall make his own arrangement for providing all facilities like lodging & boarding etc. for his workers, while on outstation assignments whenever/ wherever required.

10.5.2. BESSD shall also make out an Attendance card/wage card with endorsement of Time-in and Time-out for each employee deployed with Buying Utility.

10.5.3. The BESSD shall have the sole discretion of employing and terminating the services etc. of their employees. In case of termination of the services of the employee, the BESSD shall ensure that wages and other dues payable is made within 48 hours of the termination. In case it is felt by the Engineer-in-charge or the authorized representative that any personnel of the BESSD is not suitable for carrying out the job, then the BESSD has to take the necessary action immediately on receiving official communication from Buying Utility.

10.5.4. The BESSD shall be responsible for good conduct of his employees. In case of misconduct, BESSD shall take prompt disciplinary action on the advice of Engineer-in-charge of the Buying Utility.

10.6. Labour Law Provision

10.6.1. BESSD shall keep Buying Utility indemnified against all claims/ liability whatsoever on account of statutory payments, costs, damages, and charges arising out of personal injury / disability or death of BESSD's employees caused by any reason whatsoever. Buying Utility will not be responsible for any injury, damage etc. caused to any of the Employee put on the job by the BESSD directly or indirectly. In the event of any claim BESSD will be solely responsible to meet such claims and Buying Utility will not entertain any claim whatsoever in this regard.

10.6.2. The BESSD shall pay to the personnel employed by him the wages not less than current Minimum wages as notified by the concerned Regional Labour Commissioner (Central) from time to time or the State Government whichever is higher in the presence of Buying Utility authorized representative. Documentary proof of payment of minimum wages having signature of BESSD or his authorized representative, Buying Utility representative and concerned workers must be kept in records. BESSD has to ensure the payment to his labours latest by seventh of every month in presence of Buying Utility representative, irrespective of payments from Buying Utility towards bill raised, failing which payments can be made directly from the bill and suitable action can be taken against the BESSD.

10.6.3. During continuance of the contract, the BESSD shall abide at all times by all applicable existing labour enactments and rules made thereunder, regulations, notifications and byelaws of the State or Central Government or local authority and any other labour law (including rules), regulations, bye laws that may be passed or notification that may be issued under any labour law in future either by the State or the Central Government or the local authority or any other law being implemented in Buying Utility or any modifications thereof or any other law relating thereto and rules made thereunder from time to time. The employees of the BESSD in no case shall be treated as the employees of the Owner at any point of time.

10.6.4. The BESSD shall keep the Buying Utility indemnified in case any action is taken against the Buying Utility by the competent authority on account of contravention of any of the provisions of any Act or rules made there under, regulations or notifications including amendments.

10.6.5. If the Buying Utility is caused to pay under any law as Principal Owner such amount as may be necessary to cause or observe, or for non-observance of the provisions stipulated in the Notifications / Byelaws / Acts / Rules / Regulations including amendments, if any, on the part of the BESSD, the Owner shall have the right to deduct any money due to the BESSD under this contract or any other contract with the Buying Utility including his amount of performance security for adjusting the aforesaid payment. The Buying Utility shall also have right to recover from the BESSD any sum required or estimated to be required for making good the loss or damage suffered by the Buying Utility.

10.6.6. The BESSD shall in respect of manpower employed by him comply with all labour laws applicable to the personnel engaged by him for carrying out work and Buying Utility shall bear no liability whatsoever towards any violation by the SI in this regard. The SI shall have the sole discretion of employing and terminating the services etc. of their manpower. In case of termination of the services of the manpower, the SI shall comply of some major laws by the SI are given as under. However, the SI is bound to comply with all the provisions of applicable labour laws even though not expressly mentioned herein.

10.7. Insurance Under Workmen's Compensation Act and Other Liabilities:

10.7.1. Workmen compensation Insurance policy shall be taken by the BESSD in the joint name with Buying Utility as Principal Owner and shall be Project/ site specific. The cost to be incurred on workmen compensation insurance shall be considered to be included in the bid price (overhead charges/service charges quoted by the Bidder).

10.7.2. The BESSD at his cost shall arrange, secure and maintain all insurance as may be pertinent to the works and obligatory in terms of law against all perils and the responsibility to maintain adequate insurance coverage at all times during the period of contract shall be of the BESSD alone. The BESSD's failure in this regard shall not relieve him of any of his contractual responsibilities and obligations.

10.7.3. The BESSD shall also be responsible for compliance of all the provisions under workmen compensation act and will take necessary insurance for all the persons to be deployed under the contract and will furnish copy of the insurance policy to Buying Utility before commencement of work. BESSD shall be responsible for any compensation what so ever to their workers in case of any omissions on the parts of the workers and Buying Utility shall not be held responsible for such omissions of workers.

10.7.4. The perils required to be covered under the insurance shall include all risks, but not limited to fire and allied risks, miscellaneous accidents, personnel compensation risks, loss or damage in transit, theft, pilferage, riot and strikes and malicious damages, civil commotions, weather conditions, accidents of all kinds etc. The BESSD shall be responsible for the safety and security of the employees of the BESSD & his Sub-contractors throughout execution of the works.

10.7.5. Insurance such as third party &personnel insurance, or any other insurance shall be arranged by the BESSD at his cost and expense.

10.7.6. In the event of there being any increase of personnel's compensation insurance premium under any law or any additional or new liability under the Employees laws being imposed on the BESSD after the date of submission of the tender, the additional expenditure incurred by the BESSD shall be borne by him and no claims shall be entertained by Buying Utility on any account.

10.7.7. All costs on account of insurance liabilities covered under the Contract will be on BESSD's account and will be included in tariff.

10.7.8. In absence of valid Workmen compensation Insurance policy, compensation as decided by the labour commissioner/authority shall be payable by the BESSD in case of any accidental death/ injury. Buying Utility shall not be liable for any such payments.

10.7.9. In the event of failure on the part of the BESSD to deposit the compensation with the concerned labour authorities, within the stipulated period of one month from the date of accident (If any), Buying Utility shall take necessary action to deposit the same with the concerned authorities and shall recover/ adjust the amount deposited from the bills submitted by the BESSD anywhere in Buying Utility.

10.8. Safety Aspects/ Employees Welfare:

10.8.1. Personal Protective Equipment's (PPEs): BESSD shall provide Personal protective equipment's (PPEs) as per requirement of the work.

10.8.2. BESSD will take all safety measures and ensure that personal protective devices are being used by his workers at the time of work.

10.8.3. The BESSD shall also be responsible for safety of all workmen employed by them and they shall be responsible for payment of any compensation that may arise out of any accident, injury, or death of workers during the execution of contract. Buying Utility shall bear no liability whatsoever towards any violations by the BESSD in this regard.

10.8.4. In case of any accident during the work, it will be BESSD's responsibility to lodge FIR at Police Station immediately with written information to Buying Utility and make available best treatment to the injured including lodging of insurance claim.

10.8.5. Compensation for death/ injury in case of accident: In case of any accident during performance of work, BESSD shall be responsible for (i) payment of medical expenses as per actual in case of injury and (ii) Payment of funeral expenses@ Rs. 15,000/- plus expenditure towards sending the dead body to the home town of the deceased or the actual place of cremation.

10.8.6. The amount mentioned above shall be in addition to the compensation payable under the relevant provision of the Workmen's Compensation Act and rules framed thereunder or any other applicable laws as applicable from time to time. In case the BESSD does not pay it the above-mentioned amount, such amount shall be recovered by Buying Utility from any monies due or becoming due to the BESSD under the contract or any other on-going contract and passed on to the affected personnel.

10.8.7. Failure to comply with rules for Employees Welfare, Safety Code or the provisions relating to report on accidents and to grant of maternity benefits to female Employees shall make the BESSD liable to pay to the corporation as damages an amount as fixed by Engineer-in-charge for each default or materially incorrect statement. The decision of the Engineer-in-charge in such matters based on reports from the Inspecting Officers as defined in the BESSD's Employees Regulation to these conditions shall be final and binding and deductions for recovery of' such damages may be made from any amount payable to the BESSD.

10.9. Theft/Damage by BESSD's Employees:

10.9.1. If the damage/theft is caused to the Buying Utility asset/property/office equipment/ Tools and plants by the technicians/ fitters deployed by the BESSD, then the BESSD shall bear the cost of repair or replacement as per direction of Engineer-in-Charge.

10.9.2. Utmost care has to be taken in operation and maintenance of Firefighting system equipment and its associated T&Ps/ materials including tools & tackles etc. Any loss or damage arising out of mishandling of the T&P/ materials, negligence and/ or because of carelessness or lack of knowledge of BESSD's employees shall be to SI's account. Buying Utility shall be at liberty to recover such damages from the BESSD out of outstanding dues, Contract Performance Guarantee, or any other means available with the Buying Utility.

10.10. Conduct & discipline:

10.10.1. The employees deployed by the BESSD shall not at any time do, cause, or permit any nuisance in area of work in Buying Utility office and/or actual work site or do nothing which shall cause unnecessary disturbance or inconvenience to owners, tenants, or occupants of other properties near the work area and to the public generally. If any employee is found creating any nuisance, then necessary action as deemed fit shall be taken by the BESSD, immediately on receipt of such information from the Engineer-in-charge of Buying Utility or his authorized representative.

10.10.2. BESSD shall be responsible in case any of his employees or ex-employees creates unwanted situation unwanted shouting, raises slogans against anybody within the office premises or actual work site at any time during the currency of the Contract. This act shall be considered as breach of the Contract and shall be dealt with accordingly.

10.11. Risk and Cost:

During the period of contract, if the BESSD fails to perform and/or rectify any defect pointed out to him the same shall be got done by Buying Utility at the risk and cost of BESSD and recovered from the Security Deposit or any other amount payable to the BESSD.

10.12. Environmental Management

The BESSD shall stand comply with all requirements of “Environmental management system” i.e., ISO 14001:2015 and maintain the necessary records.

Note: Scope of Work is defined in Volume-III shall be considered as an integral part of the BESSA.

Volume III: Scope of Work and Technical specifications

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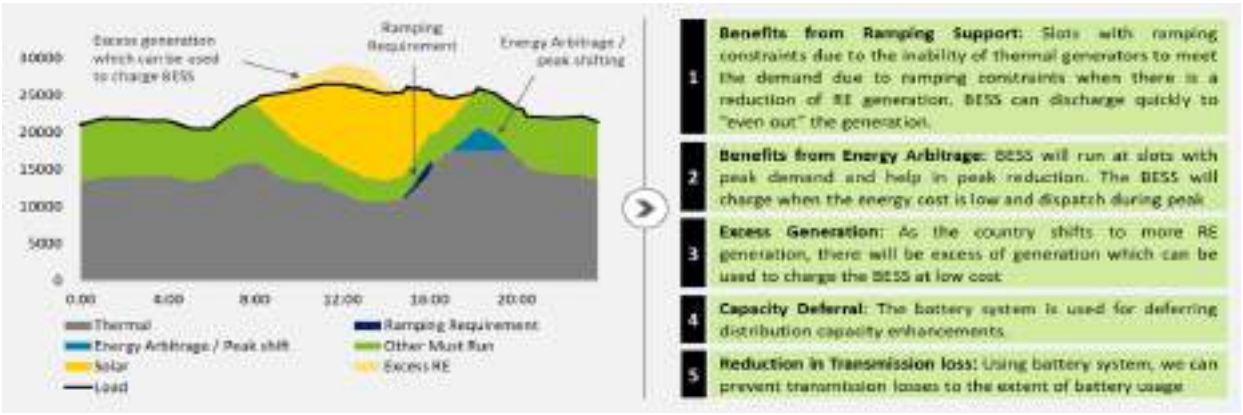
Project Context

As illustrated, a single BESS can provide ramping support, energy arbitrage benefits, CAPEX deferral, ramping support. frequency support (ancillary services- TRAS and SRAS), resource adequacy, backup supply to critical loads (e.g., black start) and reactive power support and minimize energy loss for a distribution utility. While each of these individual use cases may not provide adequate revenue streams to justify investment in BESS, the benefits together can demonstrate the commercial viability of BESS adoption.

.Figure 1: The value stacking of benefits for a distribution utility from the same energy storage asset



Objective: The applications envisaged for the BESS is Energy time-shift (arbitrage), ramping support. frequency support (ancillary services - TRAS and SRAS), capacity upgrade deferral, resource adequacy, backup supply to critical loads (e.g., black start) and reactive power support

The site wise capacities are as below.

S.No.	Grid Station	Dispatchable Capacity (MW)	Dispatchable Capacity (MWh)
1	66/11 kV G4 Dwarka	5	10
2	66/11 kV G3 PPK Bindapur	15	30
3	66/11 kV Hari Nagar	7.5	15
4	66/11 kV Sagarpur	30	60
	Grand Total	57.5	115

Table 1: Site-wise capacities

The key site conditions where the BESS is to be installed are described below:

S No.	Particulars	Details
1	Max Ambient Temperature	50 °C
2	Max Daily average ambient temp	40 °C
3	Min Ambient Temp	0 °C
4	Humidity range	10% to 95%
5	Maximum annual rainfall	750 mm
6	Average Rainy days per year	60
7	Rainy months	June to October
8	Altitude	300 m
9	Seismic zone	IV
10	Wind speed	170 km/ hr
11	Location	66/11 kV Grid Stations
14	Site location (indoor / outdoor)	Outdoor– Residential
15	Noise Level	Less than 55 db

Scope of Work:

Under this RFP, the BESSD shall be required to set up, operate, and maintain a Battery Energy Storage System (BESS), with the primary objective of making the energy storage facility available to Buying Utility for charging/discharging of the BESS, on an “on demand” basis. The scope of work is detailed in the following sections of this Volume 1, and the criteria for performance are elaborated in Volume 3 of the RFP.

BRPL has shortlisted project locations within their licensed area in Delhi. The application envisaged is Energy time-shift (arbitrage), ramping support. frequency support (ancillary services-TRAS & SRAS), capacity upgrade deferral, resource adequacy, backup supply to critical loads (e.g., black start) and Reactive power Support (Voltage Support).

Setting up of the BESS, interconnection of the BESS with the distribution grid at the Project Location, and operations and maintenance of the BESS will be under the scope of the BESSD. For the capacity under contract, charging and discharging of the system will be carried out by the Developer as per requirements of the Buying Utility. After the expiry of the Term of the BESSA, the Project will be transferred to Buying Utility in working condition with defined energy throughput at the end of the term on a “as is where is” basis, in line with the provisions of the BESSA.

It is anticipated that the Selected Bidder(s) shall perform the following tasks as part of the Scope of Work, in relation to installation of BESS.

1. Use Cases & Applications

a) **Energy Arbitrage / Energy Time-shifting**: Energy is stored during periods of low demand (or low price) and discharged during periods of high demand (or high price). In other words, operation where the battery energy storage system charges from the grid during periods of low electricity prices or excess generation and discharges during periods of high prices or higher demand, thereby capturing economic benefits through price differentials.

b) **Peak Shaving**: Energy is discharged during periods when connected grid asset/transformer crosses its threshold capacity, thereby reducing the maximum power drawn from the grid and minimizing peak demand charges or infrastructure stress/tripping and outages. In other words, the discharge will be carried out on real-time transformer/line loading, the threshold can be configurable say when loading is at 70% of the transformer rated capacity and charging to be carried out when loading is at 50% of the transformer rated capacity.

c) **Participation in Ancillary Service Market**: It involves managing charging and discharging (interchange flows) with other control areas to match closely the scheduled interchange flows and momentary variations in demand within the control area. BESS is expected to follow the Automated Generation control (AGC) command as per the SRAS/TRAS CERC (Ancillary Service Regulations, 2022) and subsequent amendment if any. The details of the SRAS/TRAS are attached as Annexure 1.

d) **Reactive Power and Voltage Support**: It is used to generate reactive power (expressed in MVAr) to offset reactance in the grid. PCS of the storage systems will be used for voltage support and must be capable of operating at a non-unity power factor, to source and sink reactive power. It should be able to operate at 0.95 lead/lag without curtailing the active power.

e) **Black Start / Back-up support**: A black start refers to the process of discharging a power up to contracted capacity to meet the critical demand without relying on the connected grid power. The inverter/PCS must mimic the inherent support structure (voltage and frequency) that traditional synchronous machines provide. In the event of any outages, the BESS must be able to deliver power almost instantaneously and thus reduce downtime during outages.

2. Erection and Commissioning

A. Site survey, planning, design, engineering, procurement, transportation and supply at site, insurance, un-loading, handling, storage, required site area grading, construction and civil work, installation, integration, testing, commissioning for acceptance of all equipment/ materials and miscellaneous item required to complete the BESS installation, which includes, but is not limited to the following:

a) Battery packs, Power conditioning system, Air conditioning (AC) system, UPS, system hardware, measurement & control device, and other associated items necessary for trouble free operation and maintenance of whole system.
b) BESS shall be planned in clusters to be connected with more than 1 no. of 11kV bus at the grid station
c) Energy Management System compatible for integration with existing BRPL's EMS and with SCADA (IEC 104) and all associated hardware and software including internet connectivity up to the monitoring and control system which will be placed in BRPL Control room/ building. The control/ monitoring system shall be cyber security compliant as it will be connected to BRPL SCADA system.
d) Containers, structures, earthing design, and battery modules inter-connection.
e) Power Conditioning Units (PCU) with monitoring & control related equipment such as actuators, sensors, transducers etc.
f) Appropriate protection and safety features.
g) Mandatory spares, maintenance tools and tackles
h) Interconnection with the grid including HT panels. The detail of work is as provided in the Annexure 4-7.

S. No.	Grid Station	Dispatchable Capacity (MW)	Dispatchable Capacity (MWh)	Details of Work
1.	66/11 kV G4 Dwarka	5	10	Annexure 4
2.	66/11 kV G3 PPK Bindapur	15	30	Annexure 5
3.	66/11 kV Hari Nagar	7	14	Annexure 6
4.	66/11 kV Sagarpur	30	60	Annexure 7
	Grand Total	**57.5**	**115**	

i) Integration with BRPL SCADA System for all the HT panels including materials. Technical details will be shared during detail engineering.

j) Civil activity for panel installation and shifting of existing panels and construction of Panel Room where needed.

k) The firewall shall have a minimum fire resistance of 3 hours. The partitions, which are made to reduce the noise level of the BESS, shall have the same fire resistance where the partitions are also used as firewalls. The walls of the building, which are used as firewalls, shall also have a minimum fire resistance of 3 hours.

l) BESS as connected with the Grid, must install necessary equipment to continuously record the Project's performance. The BESSD will be required to submit this data to Authorities / Agencies as specified in the RfS Document or else whenever required, online for the entire duration of BESSA. In this regard, they shall also mandatorily grant access to the Buying Utility and MNRE/SLDC/NLDC or any other designated agency, to the remote monitoring portal of the BESS on a 24×7 basis. Geo-tagging of the Projects shall be mandatory.

m) It shall be BESSD's liability for cyber breaches, intellectual property leaks, and mandatory compliance with local grid cybersecurity laws.

n) Project Management including adherence to all requisite safety practices. A dedicated project manager for single point-of-contact and communications during the project execution and commissioning. A list of team members with roles and responsibilities shall be shared for

i) Overall Project Coordination
- o Provide comprehensive oversight and coordination across Project phases, including planning, execution, commissioning, and operations during contract period.
- o Ensure adherence to timelines, quality standards, and regulatory requirements.

ii) Scheduling and Timeline Management
- o Develop, maintain, and regularly update the detailed Project schedule, identifying critical path items, key milestones, and dependencies.
- o Daily, Weekly and Monthly Project Progress Report with Gantt Chart
- o Proactively identify schedule risks and implement mitigation measures.

iii) Risk Management
- o Conduct regular risk assessments, identify Project risks, and maintain a dynamic risk register.

- Develop, implement, and monitor mitigation strategies to minimize Project uncertainties.

iv) Quality Assurance and Quality Control
- Establish comprehensive QA/QC protocols and oversee compliance throughout design, procurement, installation, and commissioning phases.
- Coordinate independent testing, inspections, and validation processes. Inform the Buying Utility for the joint inspections for FAT and SAT for PCS, Battery Container, Transformer and Switchgear including meters.

v) Stakeholder Coordination and Communication
- Maintain clear, consistent, and regular communication among stakeholders, including internal teams, contractors, and buying utility.
- Facilitate timely issue resolution and decision-making through structured reporting and meetings.
- Schedule weekly meetings at site and make presentations about the Project progress.
- Ensure that all coordination and review is done before the weekly meetings.

vi) Documentation and Reporting
- Maintain comprehensive Project documentation approved by Buying Utility including technical specifications, drawings, progress reports, inspection records, and commissioning documentation.
- Prepare regular Project status reports and executive summaries for management and stakeholders.

vii) Health, Safety, and Environment (HSE) Management
- Enforce strict adherence to HSE standards, ensuring safety procedures are rigorously followed throughout the Project lifecycle.
- Conduct safety audits and training programs for Project personnel and contractors.

viii) Project Close-Out and Handover
- Oversee final commissioning, acceptance tests, and certification processes.
- Ensure effective handover, including transfer of Project documentation, training materials, operation manuals, warranties (including warranties from the sub-contractors), and spare parts inventory.

o) Automated Fire and Smoke detection and Fire suppression system for all deliverables under the scope of work including but not limited to Battery container, PCS, and Transformers, Switchgear rooms
p) Factory acceptance test (FAT) and site acceptance test (SAT)
q) CCTV video surveillance with 360-degree night vision with live feed output on mobile app and EMS screen, Operational Desk at SCADA and archival in DVR including any other required hardware, software, and internet connectivity

An analysis of the functional and performance requirements of this specification and / or site surveys, design and engineering may lead the bidders to conclude that additional items are required that are not specifically mentioned in this specification. The bid/ proposal should include all equipment, services and associated costs required to ultimately commission a viable and fully functional BESS that meets or exceeds the capacity and performance requirements specified. Such materials shall be considered to be within the scope of the contract.

The offered items shall be designed to operate as per the site conditions. Adequate measures meeting the relevant standards shall be taken to provide protection against contaminants, pollutants, water & moisture, lightning & short circuit, vibration & electro-magnetic interference, etc.

The bidders are advised to visit sites (at their own expense), prior to the submission of the bid, and make surveys and assessments as deemed necessary for bid submission.

B. **Installation and Commissioning of BESS that includes**:

a) Special care to be taken while designing the system to cater to heavy rainfall, strong winds, temperature variations, and earthquakes, Delhi/NCR pollution control action plan– GRAP phases that may be prevalent in the area.
b) The Selected Bidder shall provide all related electrical and civil drawings, documents, and reports to relevant IS/ IEC/UL/IEEE/NFPA standards approved by certified structural engineers.
c) Documentation - A document management system (DMS) to be setup that will provide a central repository for all engineering documents and for approvals from Buying Utility. The documents shall be submitted for

approvals using a DMS. It should be easy to use and seamless for document download, analysis and approvals.

d) Training to Buying Utility's officials and other stakeholders like CEA, DERC, Delhi Fire Services in terms of System Working philosophy and Operations and Management, Safety and Emergency Response Plan.

e) Undertake Pre-commissioning and Commissioning tests of all supplied equipment with calibrated measuring and measurement tools. Calibration certificates to be submitted before carrying out the tests. BESSD to strictly ensure the availability of required tools and equipment before the tests and integration with 11KV. A list of equipment and tools to be provided along with calibration certificate.

1.1 Test running of the grid-connected BESS facility including battery operation trials at Site, prior to handover.

1.2 Installation of appropriate measurement and control devices at required location, with submission of drawings - approved prior to commencement of work on Site.

1.3 Test and commissioning certificate from relevant authorities and buying utilities for the equipment and BESS

1.4 Statutory compliance certificate from relevant authorities

C. General Instructions

a) Security and safety of all materials at sites shall be the responsibility of the Selected Bidder.

b) Expenses for any other works, supply of material, and providing services including re-testing of any equipment/component during FAT required for the successful commissioning and operation of the plant, but not specifically mentioned in this document shall be borne by selected bidder.

c) Safety has to be strictly complied with by the Selected Bidder(s) throughout implementation activity.

d) All local labour, employment, and other issues shall be handled independently by the Selected Bidder.

e) The entire responsibility and risk relating towards the manpower working at the Site, and compliance of different statutory regulations (like Workman Compensation Act, Employees State Insurance Corporation (ESIC), Factory Act. 1948, Contract Labour Regulation, and Abolition Act 1970, Shop and Establishment Act. 1948, and other Statutory regulatory bodies, etc.) shall solely lie with the Selected Bidder. The Selected Bidder shall also be solely responsible for payment of wages, provident fund, bonus,

retrenchment compensation leaves, etc. applicable as per various statutory regulations to their entire workforce and keep the Buying Utility indemnified in this regard against any Claim.

D. Delivery, installation, and Commercial Operation Date (COD)

Delivery of materials, installation, testing, and commissioning of the Project should be completed within twenty-eight (28) weeks from the Effective Date of BESSA. This shall be the Scheduled Commissioning Date (SCD). Transit insurance and storage insurance till the handing over of all materials will be within the scope of work. The systems will be deemed commissioned only after successful trial run of the system for seven (7) days from the date of commissioning including all civil and miscellaneous works and submission of relevant test reports. The Commissioning Committee shall then issue the commissioning certificate, and this date will be regarded as the **Commercial Operation Date (COD)**.

3. Operation and Maintenance

a) The operation & maintenance of the BESS would include operating the BESS as per control logic mentioned by Buying Utility and separate module needs to be integrated with EMS for optimal despatch, wear & tear, overhauling, insurance, and replacement of defective cells, invertors, PCUs, spares, consumables & other parts for a services period of twelve years.

b) Insurance shall include BESS components as well as the other equipment or property loss at site. The detailed list of equipment shall be provided during the planning and engineering phase.

c) The use cases for which the BESS would be operated as per Use Cases/Applications defined in this RfP.

d) The BESS system shall include energy management system (EMS), battery management system (BMS) and dashboard to display key operational parameters such as voltage, current, battery SoC, frequency etc. Final list of parameters will be decided during detailed engineering.

e) Monitoring of BESS performance as per IEC 62933-3 and parameters decided during detailed engineering and supply of all technical, production/operation data and information and making it available as and when required would be the responsibility of the BESSD.

f) The BESSD shall be responsible to carry out routine and preventive maintenance and replacement of each and every component / equipment of the BESS in case of any failure and bidder shall provide all labour,

material, consumables etc. for routine and preventive maintenance at their own cost. BESSD shall be responsible to keep consumables and spares at their own store.

g) The BESSD shall carry out preventive maintenance of each and every component of the BESS and shall provide the required manpower, materials, consumables, components, or equipment etc. at regular intervals as per the discretion of Buying Utility.

h) The BESSD shall carry out maintenance activities as a result of sudden failure/breakdown of any particular component or equipment. Bidder / BESSD shall be responsible to carry out breakdown maintenance of each and every component of the BESS and shall provide the required manpower, materials, consumables, components, or equipment etc. for breakdown maintenance at his own cost irrespective of the reasons of the breakdown/failure.

i) The BESSD shall make available to undertake a visit to the site on call basis to provide maintenance services within 12 hours of lodging of complaint by the Buying utility through Telephone/ E-mail or, any form of written communication. The BESSD shall provide dedicated trained contact/ personnel for troubleshooting and complaint lodging

j) An Operation, Instruction and Maintenance Manual in English or Hindi language as per the requirement should be issued enclosing the following aspects:

1) Basic principles of BESS operation.
2) A small site-specific write-up (with a block diagram) on the BESS – its components, battery packs, inverter, junction boxes and expected performance shall be provided.
3) Type of battery technology finalized, Make & Model number, Voltage & capacity of inverter and cells, used in the BESS.
4) Technical characteristics of the entire component.
5) Clear instructions on regular maintenance and trouble shooting.
6) Contact details of relevant official of the Bidder / BESSD

k) Bidder shall maintain stock of mandatory spares required for warranty and AMC period for any emergency troubleshooting. In any case system should be in running condition within 12 hours of break-down.

l) Sub-Contracting: No sub-contracting of work in full or in part is allowed unless approved by the Buying Utility in writing. The BESSD shall ensure that any sub-contract is in line with the provisions of the RfP. The Buying

Utility shall have the right to review the sub-contracts executed by the BESSD, upon request.

An analysis of the functional and performance requirements of this specification and / or site surveys, design and engineering may lead the bidders to conclude that additional items are required that are not specifically mentioned in this specification. The bid/ proposal should include all costs required to ultimately commission a viable and fully functional BESS that meets or exceeds the capacity and performance requirements specified. Such materials shall be considered to be within the scope of the contract. To the extent possible, the bidders shall identify and include all such items in their bid.

4. Technical Parameters of BESS, BESS Characterization and Performance Parameters

An analysis of the functional and performance requirements of this specification and / or site surveys, design and engineering may lead the bidders to conclude that additional items are required that are not specifically mentioned in this specification. The bid/ proposal should include all costs required to ultimately commission a viable and fully functional BESS that meets or exceeds the capacity and performance requirements specified. Such materials shall be considered to be within the scope of the contract. To the extent possible, the bidders shall identify and include all such items in theirbid.

4.1 Technical Parameters of BESS

4.1.1 Battery Sub System

The cells shall be supplied as group of cells combined into modules and inter-connection of cells, and the modules should be designed properly to prevent the damage during transportation. The cells & modules should be able to absorb the anticipated vibration/shock associated with the transportation and shall resist deterioration due to vibrations. External connections to the cells, including inter-cells or inter-module connections shall also be designed to prevent failure during transportation. Protective covers / insulation shall be provided at battery terminals to prevent accidental contact with live electrical connections.

The cell chemistry shall be Lithium-ion preferably $LiFePO_4$ (LFP) and shall be selected considering safety, cycle life, thermal stability, and application requirements. The offered cell type shall have a field performance in similar grid-scale or stationary storage

applications. Preferably, Tier-1 lithium-ion cell manufacturers will be more suitable for the Project.

Tier-1 manufacturers are defined as:

- Manufacturers who are listed by Bloomberg NEF (BNEF) or equivalent global agency as Tier-1 battery cell suppliers; and
- OEMs with annual cell production capacity ≥ 2 GWh, and proven supply record of at least 100 MWh of deployed containerized/building BESS systems in grid-connected, EV and stationary storage applications; and
- Manufacturers having independent third-party certifications (UL 1642 / IEC 62619 / BIS IS 17092) and ISO 9001 / 14001 / 45001 management systems.

Lithium-ion battery cells shall be used in the energy storage system. It should not require any memory /scheduled cycling for effective operation. Different chemistries are allowed so far as the following technical specifications for rated useful capacity of BESS are provided as in the table.

S. No.	Parameters	Unit	Details
BESS Plant			
3	Life cycles	Nos	2 daily cycles, for at least 12 years from date of commissioning
4	Round trip efficiency (RTE) (AC-to-AC, Excluding auxiliary consumption)	%	>87
5	Service life	Years	At least 12 years from date of commissioning
6	PCS efficiency with/ without Isolation Transformer as per BESSD design	%	>95%
7	System availability at PCS level	%	>95%

Taking into consideration capacity degradation, the minimum dispatchable energy to be made available by the BESS developer at the end of a given year shall be as follows:

Year	Min. Dispatchable Capacity at the end of Year (as a % of 115 MWh)
1	97.5%
2	95.0%
3	92.5%
4	90.0%
5	87.5%
6	85.0%
7	82.5%
8	80.0%
9	77.5%
10	75.0%
11	72.5%
12	70.0%

4.1.2 Battery Energy Management System (EMS)

The BESS will be primarily designed for Energy time-shift (arbitrage), ramping support. frequency support (ancillary services- TRAS and SRAS), capacity upgrade deferral, resource adequacy, backup supply to critical loads (e.g., black start) and reactive power support (Voltage Support)

Details	Particulars
Application (main)	Energy time-shift (arbitrage), ramping support, ancillary services, blackout support and reactive Power support (Voltage Support)
No of cycles per day	2
Charging/ Discharging condition	Informed by the Buying Utility as per operating protocol
Response time	Less than 1 second

The Energy Management System (EMS) architecture shall comply with following requirements. However, an analysis of the functional and performance requirements of this specification and / or site surveys, design and engineering may lead the bidders to conclude that additional items are required that are not specifically mentioned in this specification. The bid/ proposal should include all costs required to ultimately commission a viable and fully functional BESS that meets or exceeds the capacity and performance requirements specified:

i) Energy management system shall comprise of hardware and software including internet connectivity for managing the power/ energy flow through BESS for specific application.

ii) Energy Management System proposed should have experience in working with Distribution connected Energy Storage systems along with integration with Distribution SCADAs for remote optimisation and control

iii) EMS shall have the capability to tune BESS for Energy time shift/arbitrage, Peak shaving, Frequency support (ancillary services), Ramping support, Reactive power support.

iv) System should have capability to take and accept analog / digital data from other BESS of similar / different size and with different technology. The EMS may also be a cloud-based service, on the cloud approved by MEITY. Interoperable and integrated with utility's existing EMS/ DERMS and SCADA over IEC-104 / OPC-UA / Rest APIs / Modbus TCP / IEC 61850.

v) BESS should have the capability to monitor and control the operational parameters (Grid V & I, P, Q, f, battery V & I, SoC, relay/actuator command etc.) remotely in SCADA system through communication interface. In-addition, BESS operation shall be controlled either through EMS frontend or utility's SCADA screen.

vi) The EMS shall include monitoring, data acquisition and control system to provide continuous visualization or display of key operational parameters, as well as permanent archival of all measured parameters at the Buying Utility's SCADA control centre at Balaji. The archived data shall be readily and made available at any point throughout the term of the BESSA as per the Buying Utility's requirement. For monitoring & control, sensors, transducers, wiring, signal isolation, conditioning circuitry and data acquisition and analysis hardware and software shall be installed. The system shall record values of all operational parameters Including, but not limited to, cell level voltages, string / rack level currents and soc, cell / module level temperatures, AC side current, voltage, frequency, power and energy parameters, auxiliary power data, HVAC, fire activation and suppression of all components, CCTV live feed parameters. It shall be capable of making all monitored data and events available and shall allow the display of current values and recent historical trend (such as past 24 hours).

vii) The sampling time for measurement/monitoring of key electrical parameters shall be adjustable up to 1 second. The real time analogue data such as grid voltage and current, battery voltage and current, SoC, frequency etc. at 10 second intervals and digital data such as alarm, events will be stored for 30 days.

viii) Human machine interface (HMI) shall display the single line diagram of whole system with colour display and alarms & events shall be displayed in the form of list. The operation of HMI should be user friendly.

ix) It should have feature to control the BESS operation both in automatic and manual mode (set/reference point can also be defined manually as well).

x) Cell-level, Module-level, Rack level and Block level battery management system shall be provided to take care of battery module's, racks and block parameters (voltage, SoC and temperature) within specified range as per the applicable technical and industry standards of battery technology.

xi) The control features in Energy Management System (EMS) shall be customizable and shall have feature to update the algorithm and control philosophies from time to time till tenure of BESSA. The updates should be over the air (OTA) and without system downtime.

xii) EMS of BESS shall be designed in such a way that it could be interfaced with existing SCADA system of the utility. The field status of key operational parameters must be communicated to SCADA system of the distribution utility through Modbus communication, and it shall have feature to control the system from SCADA centre. In addition, the bidder shall also create local control station to monitor & control the system operation locally from an industrial computer/ PC as well as through a smart phone application based on android or IOS.

xiii) EMS shall be extendable in case additional battery storage systems get installed in future at other locations or existing battery energy storage system gets replaced with a newer technology and/or of different size. EMS shall be interoperable and scalable with any other EMS or Distributed Energy Resources Management System (DERMS) and with SCADA through IEC 60870-5-104 protocol. The EMS so supplied should be supporting open protocols capable of integrating multiple battery energy storage systems at different locations in future as well. The communication between the EMS (which is to be located at the Buying utility's Central SCADA Control Centre at Balaji) and the location of BESS needs to be established by the bidder through dedicated fibre optic covering hardware, software and including internet connection.

xiv) BESS operation should be controlled by one operator at a time, positioned either locally at site or remotely at SCADA centre, Balaji and thus it must have suitable interlock features. However, BESSD's operator shall be available at SCADA centre, Balaji for operation of BESS for 24x7 hours till tenure of BESSA. Monitoring & control system shall be accessible through web-based interface for remote monitoring. Utility should be able to set threshold values for changing operating conditions. Required infrastructure for operator like computer system desktop PC, Screen, Table, Chair or any other necessary furniture or accessories.

xv) BESSD shall provide a module as part of EMS for uploading the schedule by buying utility, basis which charging and discharging of BESS shall be carried by BESSD. In addition, a forecasting module of day-ahead and real-time market prices shall be developed and shall be integrated in EMS for optimal charging and discharging for

the purpose of envisaged application of Energy Arbitrage and/or participation in Ancillary market, with an over-riding facility to the operator after due approval from buying utility.

xvi) Software interlocking should be provided to ensure that inadvertent incorrect operation of switchgear causing damage and accidents in case of false operation does not take place.

xvii) A restricted access to monitor the operating parameters through web/ online portal as well as mobile app shall be provided to the Buying utility.

xviii) Change management to be approved by Buying Utility.

xix) Secure integration to be deployed such as SSL VPN Secure ports.

xx) Deployment architecture for Network connectivity shall be submitted to Buying Utility for its approval. BESSD to provide list of Inventory as part of documentation and update from time to time and provide to Buying Utility.

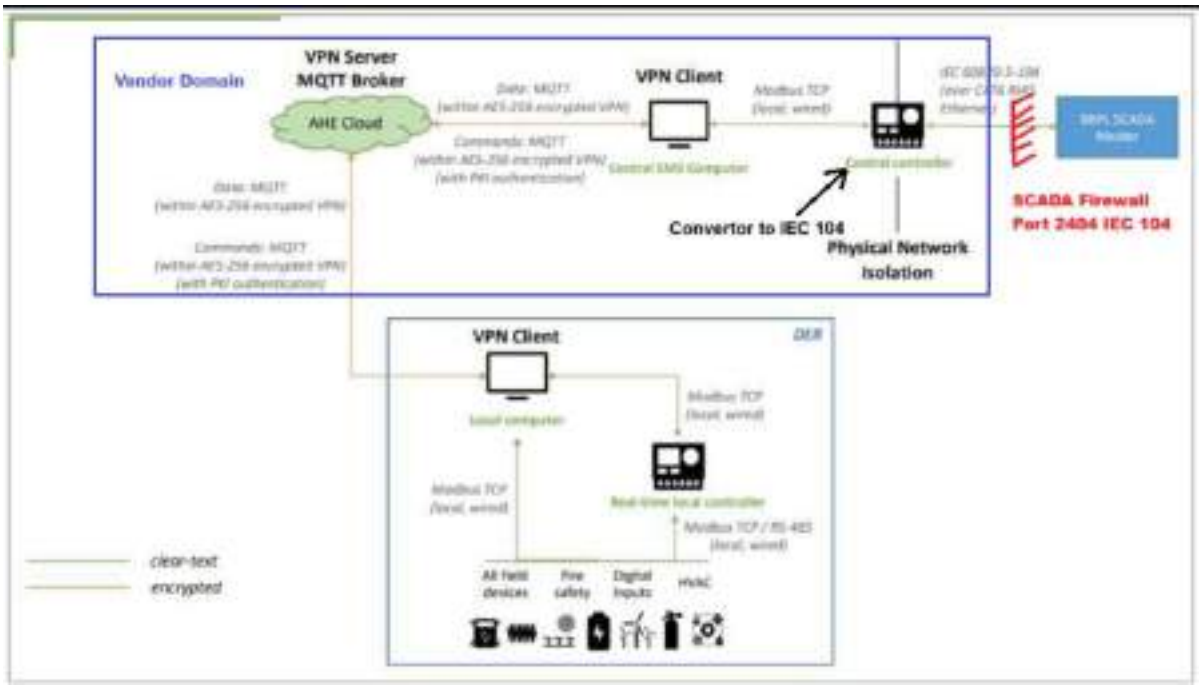
xxi) BESSD shall not procure any components/connected devices of OR involve any consultant from countries sharing boundaries with India viz (Pakistan, China, etc)as per the MoP/CEA Guidelines. BESSD shall adhere to MOP Order No. 25-11/6/2018-PG dated 2nd July 2020 and MOP Order No. 25-4/1/2019-PG-Part (1) dated 11th August 2020.

xxii) Two firewalls in active-passive mode against central controller for VPN termination and SCADA connectivity.

xxiii) BESSD shall be solely responsible for patch management of IT & OT devices. Security testing must be conducted by certified Buying Utility's empanelled vendor.

xxiv) BESSD shall be responsible to integrate the EMS controller with nearby NLDC grid station. The EMS controller to be a dedicated controller for SRAS Ancillary Services. The mode of communication shall be Optical fiber cable with redundancy as mentioned in the CERC (Ancillary Services, 2022).

xxv) The data flow architecture is as below. The firewall to be installed if LAN internet connectivity is used.



Following parameters are to be displayed at the control centre:

4.1.3 Monitoring

i) Operating Mode:

a) Grid connected/ Standalone mode
b) Automatic/ Manual mode
c) Charge/discharge

ii) Application mode (as described above for different category)
iii) Measurements (V, I, P, Q, SoC, charge/discharge rate freq., energy export/import)
iv) Events and alarms
v) Breaker position/operation
vi) Status: Health of each battery, Air-conditioning system, Fire protection system
vii) Charge / Discharge: No of cycles, State of charge, estimated time for charging, estimated discharge time at ongoing discharge, etc.
viii) Any other parameter as mutually agreed during detailed engineering

4.1.4 Control

i) Operation: Open / close breakers, change of operating modes, change control logic for applications, charging control, change of local / remote control

ii) Protection: Protection relay parameter setting, battery over / under voltage alarm / tripping, battery over current alarm / tripping, temperature rise alarm / tripping, Temperature delta / voltage delta alarms. Rate of change of temperature alarm

4.1.5 System Hardware Requirements

Monitoring & control centre shall include workstation, keyboard, mouse, LAN cable and all associated items. Local LCD display shall be provided to monitor various functions and parameters locally viz. Charge, discharge, current, voltage, power, alarms etc.

The system shall preferably be based on computer technology with a Linux operating system. Other system architectures are acceptable, but regardless of system architecture, the system shall, at a minimum, provide remote data inquiry from personal computer-based platform and data file export capabilities in ASCII format or, independent media (such as universal serial bus drive) that are readable on personal computer-based systems.

The system shall comply with all relevant cyber security regulations and guidelines issued by relevant authorities from time to time.

The system shall provide unsolicited message capability for reporting critical alarms and indication locally and remotely to the Buying utility's SCADA system.

Processor, RAM, and storage should be selected in such a way that it should not use more than 50% of the disk space.

There should be CCTV surveillances for installations at each site with real-time recordings.

4.1.6 Battery Management System (BMS)& Power Conversion System (PCS)

Power Conversion system (PCS) shall supply rated power to the grid / battery for rated duration without violating the temperature rise limits. PCS shall consist of solid-state devices compatible to specified battery technology and shall be equipped with Isolation Transformer (Isolation transformer can be provided separately). PCS shall have at AC and DC side CB control and SPD (Type 1+2). PCS Shall be also have adequate protection against earth leakage faults. Internal Surge Protection Device (SPD – Type 1+2) as per

test classification of IEC 61643 11:2011 / National Building Code of India 2016 and must be certified from competent Authority and shall be provided in the PCS on both DC and AC side. Technical details will be shared during detail engineering. Modular type PCS will be an added advantage. PCS shall have control of active and reactive power separately and should be able to provide power in all quadrants. It should have operational capability for both standalone and grid-connected mode. It should have capability to provide black-start support. It shall contain adequate inbuilt filter bank, harmonic filters, etc. for its operation. It shall contain adequate inbuilt filter bank, harmonic filters, etc. for its operation without deteriorating the quality of power in terms of power factor, harmonics, transients, flicker, etc. Power quality parameters of PCS shall comply with relevant IEC/IEEE standards. It shall have following additional features:

S. No.	Feature	Details
1	**Monitoring**	BMS and EMS shall monitor utility side parameters such as voltage, charge/discharge current, power quality parameters, protection system readings / status or any other parameter essential for monitoring health of battery. It shall also monitor parameters like charging / discharging current, power quality parameters, voltage, and protection system, etc. on the utility side of PCS
2	**Charge control**	BMS shall monitor voltage, temperature and charging status of each cell of BESS. It shall be able to control charging of cells based upon these information and power / energy requirements. It should charge the module in CC/CV mode as per requirement of battery sub-system design. PCS shall regulate the float / boost voltage in case of prescribed temperature rise of battery as per manufacturer's recommendation to avoid thermal runaway. The minimum C-rate for charging 0.5C and discharging 0.5C.
3	**Active / Reactive power control**	PCS shall have the capability to provide active / reactive power as per the requirement limited to rated/contracted capacity of the system. PCS shall have 4-quadrant operation and complied to IEEE 1547 and IEEE 519. Similarly, change in charging current of batteries shall also be smoothly controllable PCS shall be able to provide 0.95 lead to 0.95 lag reactive power support without curtailing the active power.

S. No.	Feature	Details
4	**Operation Mode**	PCS shall be connected with the distribution grid and operate in grid connected mode. The grid connected mode shall be the default mode and shall be capable for standalone mode as well. Beyond the voltage limits, PCS shall disconnect itself from grid automatically. After normalization of voltage condition, it shall be able to restart / reconnect automatically.
5	**Auxiliary power supply**	BESSD to apply for a new and separate connection for Auxiliary loads of BESS. If sanctioned load for Auxiliary connection is more than 200kW, then infrastructure up to the metering point (HT level) shall be on 50:50 cost sharing basis as per DERC supply code regulations and tariff schedule. The remaining infrastructure including Transformer and LT system shall be in the SPD scope. If sanctioned load for Auxiliary connection is less than 200kW, then infrastructure shall be developed by Buying Utility up to LT ACB (downstream LT side of the transformer) as per DERC supply code regulations.
6	**Enclosure**	PCS should be placed in waterproof and dustproof enclosure rated to minimum IP-54 protection with provision to prevent moisture condensation, airborne dust rodents etc and compliant toIEC-60529 and NFPA 855. It shall be kept indoor (inside container/enclosure of BESS) floor-mounted, self-supporting sheet metal enclosed cubicle type. The BESS shall provide all associated items such as base frames, removable gland plates, copper lugs anchor bolts and hardware. Cubicle door should be earthed properly

4.1.7 Design and Construction Requirements

Following are the design and constructional requirements which are expected by the Buying Utility. An analysis of the requirements of this specification and / or site surveys, design and engineering may lead the bidders to conclude that additional design and construction items are required that are not specifically mentioned in this specification. The bid/ proposal should include all costs required to ultimately commission a viable and fully functional BESS that meets or exceeds the capacity and performance requirements specified:

1. **Battery container / cabinet:** The whole system (battery, PCS, auxiliary source, PMS, firefighting system etc.), shall be enclosed in a container or cabinet with IP-54 class of protection or as per national/ international standards (IEC-60529) and NFPA 855. The system must be placed in a container, and it should have feature for heat load management. The system's container shall meet all standard safety requirements. Further, the battery container material should have electro-chemical compatibility and resistant to acid & alkaline material. The container should be insulated, fire retardant, and it shall be able to withstand the tensile stress due to internal pressure of the cells or electrolyte in the worst operating condition. Cell / battery shall not show any deformity or bulge under all working conditions. Each Battery container should have early detection of thermal runaway system to protect the system against fire due to thermal runaway. Hydrogen, CO, CO2 sensors to be provided in the container.
2. **Cell covers:** The cell covers should be permanently fixed with the battery container and shall be capable to withstand internal pressure without bulging / cracking. It shall also be fire retardant. Fixing of pressure regulation valve (if provided) & terminal posts in the cover shall be such that seepage of electrolyte, gas escape, and entry of electrostatic spark are prevented.
3. **Separator:** The separators used in manufacturing of battery cells, shall be of suitable material with large porosity, low acid / alkaline solubility and good insulating properties depending on the type of technology used for battery. The design of separators shall ensure that there is no misalignment during normal operation and handling.
4. **Pressure Regulation valve:** Each cell should be provided with pressure regulated valve (if required as per battery technology). The valve should be self-re-sealable and fire resistant. The valve unit shall be such that it cannot be opened without a proper tool. The valve shall be capable to withstand the internal cell pressure specified by the manufacturer.
5. **Terminals:** Both the positive and negative terminals of the cells shall be capable of proper termination and shall ensure its consistency with the life of the battery. The surface of the terminal post extending above the cell cover including bolt hole shall be coated with an acid / alkaline resistant and corrosion retarding material. Terminal posts or any other metal part which is in contact with the electrolyte shall be made of the same alloy as that of the plates or of a proven material that does not have any harmful effect on cell performance. Both positive and negative posts shall be clearly and unambiguously identifiable. Terminal post seals shall not transmit stresses between the cover or container and posts.
6. **Connectors, Nuts and bolts, Heat Shrinkable sleeves:** Where it is not possible to bolt the cell terminals directly to assemble a battery, separate non-corroding lead or copper connectors of suitable size shall be provided to enable connection of the

cells. Copper connections shall be suitably coated to withstand corrosion due to acid / base at a very high rate of charge or discharge. Nuts and bolts for connecting the cells shall be made of copper, brass, or stainless steel, which shall be effectively coated to prevent corrosion. All inter cell connectors shall be protected with heat shrinkable silicon sleeves for reducing the environmental impact including a corrosive environment.

7. **Mounting:** All the batteries shall be mounted in a metallic stand/frame. The suitable isolation should be provided between base of frame and ground to avoid the grounding of frame.
8. **Battery Bank stand:** All batteries shall be mounted in a suitable metallic stand / frame. The frame shall be properly painted with the acid / base resistant paint. The battery stands shall be designed to withstand the wind speed and seismic design considerations.
9. All sensors, transducers, circuit boards, and test points in the System shall be easily and safely accessible for calibration and maintenance.
10. The additional items such as enclosures, junction boxes, grounding, instrumentation, wiring etc. required for fully functional system as per specification shall be provided / installed by BESSD.
11. External connection to the cells, including inter-cells or inter-module connections (such as cables/ straps etc.) shall also be designed to prevent failure during transportation.
12. BESS shall be provided with air conditioning system to manage the heat load of the system and rating of AC should be defined accordingly. It should be rugged, reliable and maintenance free and designed for long life time. It shall be designed for continuous operation. The system should be equipped with changeover feature to keep system healthy. Appropriate redundancy should also be provided such that operation is unaffected.
13. Energy meter of 0.5 class accuracy (as per IS-14697) shall be provided for recording export/import energy from/to BESS. CTs and PTs used in the energy meter will be under scope of BESSD.

4.1.8 General specifications

1. **Identification and Traceability:** Cells/Racks/Packs Assembly shall meet seismic requirement for the plant location of the BESS. Labelling of cells/batteries shall include manufacturer's name, cell type, name-plate rating, date of manufacture and date of expiry of parts and labour warranty
2. **Other Sub-systems/Components:** Other subsystems/components used in the BESS must also conform to the relevant international/national Standards for

Electrical Safety besides that for Quality required for ensuring Expected Service Life and Weather Resistance.

3. **Fire Protection:** Adequate fire protection should be provided to tackle any fire incident likely to arise in battery energy storage system as per the international standard IEC 62897 (for Li-ion) or NFPA 72.A or NFPA 855. The BESSD shall design and install a fire protection system that conforms to national and local codes. The fire protection system design and associated alarms shall take into account that the BESS will be unattended at most times. For high energy density technologies, the BESSD shall also obtain thermal runaway characterization of the battery storage systems.
4. **Authorized Test Centres:** Batteries/ Power Conditioning Units deployed in the power plants must have valid test certificates for their qualification as per above specified IEC/ BIS Standards by one of the ILAC member signatory accredited laboratories. In case of module types/ BESS/equipment for which such Test facilities may not exist in India at present, test certificates from reputed ILAC Member body accredited Labs abroad will be acceptable.
5. **Warranty:** BESSD shall procure performance guarantees to ensure minimum performance levels as per the terms of the RFP for 12 years from the Commercial Operation Date (COD). The Warranty shall clearly indicate life expectancy given discharge profiles provided for the application.
6. **Safe Disposal of unit Batteries from the BESS:** The BESSD will comply with the requirements under Hazardous & other Waste (Management and Transboundary Movement) Rules, 2016, as amended from time to time, as applicable. The BESSD shall ensure that all Unit Battery modules from the plant after their 'end of life' (when they become defective/ non-operational/ non-repairable) are disposed in accordance with the "e-waste (Management and Handling) Rules, 2022" and Battery Waste Management Rules, 2022 as notified by the Government of India and as revised and amended from time to time. QR code to be provided on the battery containers which enables to access the battery passport.
7. **Noise Levels:** BESSD shall ensure that the design is such that it will reduce the noise levels and comply with the local norms. As per DPCC, Delhi Govt. Noise Standards, the minimum is 45db and Max is 55db for residential areas. The details can be accessed at https://www.dpcc.delhigovt.nic.in/noise_standards#gsc.tab=0
8. **Safety Audits:** A third-party safety audit to be carried out for the safety design and fire-fighting establishment for the BESS. The safety audit shall be periodically conducted on annual basis preferably through UL (Underwriter's Lab).
9. **Branding:** BESSD to take approvals from Buying Utility for physical location and design for branding at site. This shall include any company logos, signages, hoardings, boards, colours, and taglines.

10. **Personal Protection Equipment (PPE):** BESSD shall ensure that all personnel engaged at site strictly use appropriate Personal Protective Equipment (PPE) at all times during execution of works. PPE shall include, but not be limited to, safety helmets, safety shoes, high-visibility jackets, gloves, safety goggles, ear protection, and fall-protection harnesses, as applicable to the nature of work. The PPE shall conform to relevant IS / IEC / EN standards and be maintained in good working condition. The Buying Utility reserves the right to stop any work or deny site entry to any person not equipped with adequate PPE.
11. **Measuring Instruments and Tools:** BESSD to ensure availability of all measuring instruments, test kits, and tools used for testing and commissioning. Quality verification shall be properly maintained, periodically calibrated, and traceable to national or international standards like National Accreditation Board for Testing and Calibration Laboratories (NABL) and National Physical Laboratory (NPL) traceability. BESSD shall maintain a calibration register indicating instrument ID, make/model, last calibration date, next due date, and calibration certificate reference. Instruments found with expired or invalid calibration certificates shall not be used for any measurement, testing, or acceptance activity. The Buying Utility shall have the right to verify calibration certificates and reject any readings obtained using non-calibrated instruments.
12. **Test Reports and Certifications:** BESSD shall furnish test certificates and test reports for all equipment, materials, and components supplied before the installation and commissioning or SAT (Site Acceptance Test). All such certificates shall confirm that the items have been successfully tested and found to comply with the relevant Indian Standards (IS), IEC standards, UL and the technical specifications of this tender. BESSD shall submit valid Type Test Certificates as per specified IEC/ BIS Standards from a NABL-accredited / Government-recognized / ILAC member signatory laboratory for all major equipment and components before FAT (Factory Acceptance Test). In case of module types / BESS / equipment for which such Test facilities may not exist in India at present, test certificates from reputed ILAC Member body accredited Labs abroad will be acceptable. Type tests shall have been conducted within the last 5 years from the date of bid submission, unless otherwise specified. Copies of type test reports shall include details of the testing authority, report number, date, and standard reference (IS/IEC). In case valid type test certificates are not available, the Employer reserves the right to witness fresh type testing at the BESSD's cost. The Buying Utility shall have the right to review, verify, and approve with or without any third-party consultant all the test certificates and reports, or any other documentation prior to dispatch or installation. Any component found non-compliant or lacking valid certification shall be liable for rejection or replacement at the BESSD's cost, without affecting delivery timelines. The Buying Utility reserves the right to conduct third-

party testing/consultation at an NABL-accredited laboratory at the BESSD's cost, if any doubt arises regarding authenticity or conformity of supplied materials. All approved test reports and certificates shall form part of the Final Quality Dossier / Project Completion Documents, to be submitted in both hard copy and soft copy (PDF) formats before project commissioning.

5. BESS Safety Standards

1. Safety of Li-Ion cell shall be ensured as per IEC-62281 and UL 1642 or UL 1973, Appendix E (cell) or IEC 62619 (cell) + IEC 63056 (cell), UL 9540 and UL 9540A. The container should have IP-54 class of protection.
2. Each cell shall be equipped with a flame arrestor to defuse any flammable gas escaped during charge and discharge. In addition to the fire suppression system, the flame arrester is required to prevent the fire from one cell to the adjacent cells and needs to be provided from the perspective of safety as per relevant standards.
3. The safety for whole BESS system shall also be ensured as per UL-9540or IEC/TS 62933-5-1 + IEC/TS 62933-5-2). FAT and SAT to also cover the tests mentioned in the Table 5 – Overview of validation and testing for BESS as per IEC 62933-5-2.
4. Suitable earthing system should be designed and provided for BESS.
5. PCS shall have adequate safety features for complete isolation from grid in case of any malfunctioning (Separate isolation transformer may be connected between grid and BESS, if required). In addition, there should be a provision for manual as well as automatic disconnection of BESS from distribution system.
6. Provision should be provided for AC/DC protection (over/under voltage, over/under current, earth fault protection, over/under frequency for AC, transient/surge protection, breaker failure protection etc.).
7. Emergency alarm system should be provided for any malfunctioning of BESS operation. Manual Shutdown with for complete system to be installed away from installation and at an accessible location.

In addition to above mentioned safety requirements, the BESS shall comply with the following Codes and Standards or equivalent Indian Standards, as applicable:

5.1 National/ International Standards for Battery Energy Storage System

Standard/ Code (or equivalent Indian Standards)	Description	Certification Requirements
UL 1642 or UL 1973, Appendix E (cell) or IEC 62619 (cell) + IEC 63056 (cell)	Secondary cells and batteries containing alkaline or other non-acid electrolytes - Safety requirements for secondary lithium cells and batteries, for use in industrial applications	Required for Cell
UL 1973 (battery) or (IEC 62619 (battery) + IEC 63056 (battery))	Batteries for Use in Stationary, Vehicle Auxiliary Power and Light Electric Rail (LER) Applications / Secondary cells and batteries containing alkaline or other non-acid electrolytes - Safety requirements for secondary lithium cells and batteries, for use in industrial applications	Either UL 1642 or UL1973 or (IEC 62619 + IEC 63056) for the Battery level
IEC 62281 / UN 38.3	Safety of primary and secondary lithium cells and batteries during transport: Applicable for storage systems using Lithium-Ion chemistries	Required for both Battery and Cell.
IEC 61850/ DNP3	Communications networks and management systems. (BESS control system communication)	
IEC 61508	Functional Safety of Electrical/ Electronic/ Programmable Electronic Safety-related Systems: Applicable for all Battery Energy Storage Systems	Required for EMS/ OS and BMS
UL 9540 + UL 9540A (IEC TS 62933-5-1 + IEC 62933-5-2) IS 17092	Electrical energy storage (EES) systems – Part 5-1: Safety considerations for grid-integrated EES systems – General specification / Standard for	UL 9540 + UL 9540A, (IEC 62933-5-1 + IEC 62933-5-2) is required for

Standard/ Code (or equivalent Indian Standards)	Description	Certification Requirements
	Energy Storage Systems and Equipment Part 5-2: Safety requirements for grid-integrated EES systems - Electrochemical-based systems IS 17092: Electrical Energy Storage System Safety Requirements	BESS system level
IEC 62933-2-1	Electrical energy storage (EES) systems - Part 21: Unit Parameters and testing methods - General Specification	Tests for Class B applications: Duty Cycle Round Trip Efficiency Test Equipment and Basic Function test Available Energy test Insulation test
IEC 62933-3	Planning and performance assessment of electrical energy storage systems - Additional requirements for power intensive and renewable energy sources integration related applications	
IEC/TS 62933-4	EES Systems - Electrical energy storage (EES) systems - Part 4-1: Guidance on environmental issues - General specification	
IEC/TS 62933-5	Electrical energy storage (EES) systems - Part 5-2: Safety requirements for grid-integrated EES systems - Electrochemical-based systems	

Standard/ Code (or equivalent Indian Standards)	Description	Certification Requirements
IEEE 2030.2.1-2019	IEEE Guide for Design, Operation, and Maintenance of Battery Energy Storage Systems	
IS 17387	General Safety and Performance Requirement of Battery Management System	
NFPA 855	Standard for the Installation of Stationary Energy Storage Systems	
IEC-60529	Ingress Protection Testing for Enclosures	
CEA (Measures Relating to Safety and Electric Supply), Regulations 2025	Safety requirements for Battery Energy Storage System	
CERC (Ancillary Services) Regulations 2022	Mechanisms for procurement, through administered as well as market-based mechanisms, deployment and payment of Ancillary Services at the regional and national level for maintaining the grid frequency close to 50 Hz	

* The Bidder shall submit all applicable Type Test Certificates and corresponding Test Reports for the offered equipment at the time of bid submission. In the event of any design modification or change in the offered equipment after bid submission/award that necessitates fresh type testing, the Bidder shall submit the revised Type Test Certificates and Test Reports (15) fifteen days prior to the Factory Acceptance Test (FAT).

5.2 National/ International Standards for Power Conditioning System / Power Conditioning Unit

Power Conditioning Unit Standards for BESS	
IEEE 519-1992/2003 or IEC 61727	Power Quality Parameters

IEEE 1547	Standard for interconnecting distributed resources with electrical power systems
IEC 62909-1 or IEC 62477-1	Bi-directional grid connected power converters - Part 1: General requirements
IEC 62909-2 (if applicable) or IEC 62477	Bi-directional grid-connected power converters - Part 2: Interface of GCPC and distributed energy resources
IEC 61683 Ed.1	Photovoltaic systems - Power conditioners - Procedure for measuring efficiency
IEC 61000-6-2 Ed. 2	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity standard for industrial environments
IEC 61000-6-4 Ed. 2.1	Electromagnetic compatibility (EMC) - Part 6-4: Generic standards -Emission standard for industrial environments
IEC 62116 Ed. 2	Utility-interconnected photovoltaic inverters - Test procedure of islanding prevention measures
IEC 60068-2-1:2007	Environmental testing - Part 2-1: Tests - Test A: Cold
IEC 60068-2-2:2007	Environmental testing - Part 2-2: Tests - Test B: Dry heat
IEC 60068-2-14:2009	Environmental testing - Part 2-14: Tests - Test N: Change of temperature
IEC 60068-2-30:2005	Environmental testing - Part 2-30: Tests - Test Db: Damp heat, cyclic (12 h+ 12 h cycle)
UL 1741	Standard for Static Inverters and Charge Controllers

* he Bidder shall submit all applicable Type Test Certificates and corresponding Test Reports for the offered equipment at the time of bid submission. In the event of any design modification or change in the offered equipment after bid submission/award that necessitates fresh type testing, the Bidder shall submit the revised Type Test Certificates and Test Reports (15) fifteen days prior to the Factory Acceptance Test (FAT).

5.3 National/ International Standards for Transformer and Switch Gear

Transformer and Switchgear Unit Standards for BESS	
IEC 60076-1 / IS2026	Power Transformer
IEC 61439	Low Voltage Switchgear and Control Assemblies

* The Bidder shall submit all applicable Type Test Certificates and corresponding Test Reports for the offered equipment at the time of bid submission. In the event of any design modification or change in the offered equipment after bid submission/award that necessitates fresh type testing, the Bidder shall submit the revised Type Test Certificates and Test Reports (15) fifteen days prior to the Factory Acceptance Test (FAT).

5.4 National/ International Standards for Civil Activity

IS875 (Part 1 to Part 5): Indian Standard Code of Practice for Design Loads (other than earthquake) for Buildings and Structures

6. Protection System

Protection system must be capable of monitoring all the operating parameters and sensing all abnormal conditions to isolate the faulty circuit or component without damaging other parts of the system. Adequate indications/ alarms should also be provided locally as well as at remote control system for identification of faults and taking preventive / corrective actions.

The protection system shall work on following principles:

i) The fault should be identified as internal / external fault. The internal fault is associated with battery system whereas external fault is for distribution system. In the external fault, the system shall recover automatically from fault condition when healthy condition detected.
ii) The protective device closest to fault location shall clear the fault without damaging other part of the system.
iii) Lightning arrestor shall be installed to protect the whole system from damaging effect of lightning.
iv) Adequate fire protection system should be provided for whole system (cells, modules, PCS etc.).
v) Temperature rise protection system should be provided for battery and PCS.
vi) Emergency shutdown: Provision shall be given for automatic as well as manual disconnection of the BESS from distribution system if:

a. Protection system fail is detected during self-diagnostic, control healthy check
b. Breaker trip coil or interruptive device fails
c. DC supply is lost

Protection system supplied by BESSD shall include all the required components such as relay, contactor, and switches, for operation of BESS, which may not be specified in this tender specification.

The requirements of AC/DC protection system are listed in table below:

AC protection	DC protection
AC under/over voltage	DC under/over voltage
Over current protection	DC over current relay
Earth fault protection	Ground fault protection
Breaker failure protection	Breaker failure protection
Transient/surge protection	Transient/surge protection
Synchronization check for relay	Synchronization check for relay if any
Loss of phase	
Frequency of over/ under current	

6.1 Protection for PCS

The PCS shall be protected against thermal overload, over-current and over-voltage. Insulating monitoring ground fault detection shall be provided. The following protective functions shall be provided:

- DC over-voltage
- DC under-voltage
- DC over-current
- AC over-voltage
- AC under-voltage
- AC over-current
- Anti-Islanding
- Battery protection
- Internal fault (over temperature, logic failure, etc.)
- The electrical shield cable shall be adopted for the signal and control cable. The surge absorber shall be connected on both sides.
- EMC requirement shall meet IEC 61000 or equivalent standard.
- Neutral point high resister grounding type (DC side) for ground fault alarm shall be provided

6.2 Protection for Battery

The following protections shall be provided:

- Over/Under-charge protection
- Over-discharge protection
- Over/Under-temperature protection
- Over/Under-current protection
- Over/Under Voltage protection
- Ground-fault detection
- Internal battery fault detection
- Cell balancing
- Protective devices should include for DC-side protection:
- Battery fuse for each battery cell and module (preferred)
- DC contactor for each battery rack
- Grounding over current

6.3 Protection for Temperature Rise

The BESSD shall design a protection system for temperature rise in the battery modules/cells, PCS, or any other component of the BESS, due to short circuit in any part of the system, failure in temperature controller or sensors or any other internal/ external fault.

6.4 Emergency Stop

A manual disconnection of the BESS is to be provided.The system should also automatically disconnect the BESS from distribution system if and not limited to following conditions:

- Protection system failure is detected
- Breaker trip coils or interrupting device fails
- DC supply is lost

Emergency Stop

6.4.1 Summary of Protection System: list of protection but not limited to

Sr. No	System	Description
1	BMS	Over-charge protection
2	BMS	Under-charge protection
3	BMS	Over-discharge protection
4	BMS	Over Voltage protection
5	BMS	Under Voltage protection
6	BMS	Voltage Imbalance
7	BMS	Cell Over Temperature
8	BMS	Cell Under Temperature
9	BMS	Cell Temperature Rate of increase too High
10	BMS	Temperature Imbalance
11	BMS	Overcurrent protection
12	BMS	Ground-fault detection
13	BMS	Communication Error
14	Battery Container	Protective devices should include for DC-side protection:
15	Battery Container	Battery fuse for each battery cell and module (preferred)
17	Battery Container	DC contactor for each battery rack
18	PCS	DC Over voltage
19	PCS	DC under voltage
20	PCS	DC over Current
21	PCS	AC Over voltage
22	PCS	AC under voltage
23	PCS	AC over Current
24	PCS	PCS Communication Time Out
25	PCS	Phase sequence Error
26	PCS	Grid Abnormal/ Sync Failure
27	PCS	PCS Over Current
28	PCS	PCS Over temperature
29	PCS	Fan Fault
30	PCS	Emergency Stop
31	PCS	Anti Islanding
32	HVAC	High Temperature
33	HVAC	Low Temperature
34	HVAC	Temperature Sensor Fault
35	Fire Protection System	Fire / Smoke Detected

Sr. No	System	Description
36	Fire Protection System	Water Leakage detected
37	Fire Protection System	Manual Release Switch Operated
38	Fire Protection System	Manual Abort Switch Operated
39	Fire Protection System	Gas Discharged
40	EMS	Door Open
41	EMS	Control Supply Failure

***Further Site-Specific Alarm**

7. Transportation and Storage at site

The BESSD shall be responsible to survey, select and verify the route, mode of transportation and make all necessary arrangements with the appropriate authorities for the transportation of the equipment. It shall be the responsibility of the BESSD to coordinate the arrangement for transportation of the BESS for all the stages from the manufacturer's work to the site and ensure transit insurance and storage insurance for materials within the scope of work.

The BESSD shall dispatch the battery system in a way so as to avoid any accident either due to road conditions, environmental conditions and any other conditions which may arise due to transportation.

BESSD shall follow all the rules, regulations, and standards applicable for transport of batteries in India as well as in country of origin.

8. Civil and Structural Works

All civil works shall be carried out as per design / drawing / specifications as approved by the buying utility. The civil work includes levelling, area grading, site clearing (Tree and stump removal as per applicable law, clearing and grubbing, along with demolition of any obstructions or facilities),soil investigation and design as per site conditions. All materials used for construction should be of superior quality confirming to relevant Standards and Codes. The BESSD shall make necessary provisions for construction of foundation, cable

trenches, excavation, etc. All materials including cement, reinforcement steel and structural steel, etc. shall be arranged by the BESSD and will be in the scope of BESSD.

The bidder shall fully apprise himself of the prevailing conditions at the proposed sites. Climatic conditions including monsoon patterns, local conditions and site-specific parameters, soil parameters, availability of construction material, etc. shall be taken care of by BESSD which may not have been explicitly mentioned in the RFP. The technical specifications are provided in Annexure 2.

Site Specific Civil Work for Interconnection: 11 KV Switchgear Room to be extended or new 11KV Switchgear room to be constructed bt BESSD to accommodate the Interconnecting HT panel and Auxiliary Supply HT panel. Cable trench work inside the Switchgear room to be extended accordingly. The details of site specific work are in the Annexure 3-7.

9. System Testing, Commissioning, and Operations

All testing including but not limited to Type Tests, Factory Acceptance Test (FAT) and Site Acceptance Test (SAT) must be conducted as per the specifications and the BESS Safety Standards listed above and approved by the Buying Utility. The BESSD shall submit final formats to be approved by Buying Utility. The Project shall then be commissioned as per commissioning criteria and procedures specified by the CEA, if any.

10. Factory Acceptance Test

BESSD shall also submit a comprehensive plan for factory acceptance test (FAT) including test certificates and reports to Buying Utility for approvals and shall carry out FAT at sub system and module level as per the FAT plan approved by Buying Utility. it shall include for all components to the extent possible. The BESSD shall arrange the FAT for Battery and Battery Containers, PCS, Transformers (IDTs) and switchgear and carry out FAT in presence of Buying Utility representatives. It shall include following test:

- Visual Inspection of equipment including dimension and overall design
- Verification of sensors, metering, and alarms
- Verification of all control function including remote control, monitoring and communication interface
- Verification of system performance at full/ partial Energy/ Power ratings
- Verification of maintenance and replacement features for unit batteries and other components

During the FAT, system shall be operated as specified and designed in all the operating states, use cases and duty cycles. It shall meet power / energy requirements and shall be demonstrated to meet the safety requirements.

Operation of all control, protective relaying and instrumentation circuits shall be demonstrated by direct tests, if feasible, or by simulating operating states for all parameters that cannot be directly tested. Automatic, local, and remote operation of the controls shall be demonstrated.

BESS shall be verified for operation at temperature extremes defined in specification. For this, if it is not possible for the full system, then independent laboratory certification of operation of critical components and subsystems shall be submitted at the time of FAT.

During FAT, if there is some malfunction, then FAT shall be suspended and resumed after rectification of the problem. The system shall not be accepted for shipment until all FATs have been successfully completed.

11. Site Acceptance Test

BESSD shall submit a comprehensive plan for site acceptance test to Buying Utility for approval. SAT plan shall include procedures to test correct system responses to system disturbances and operating scenarios described in the specification.

The test shall include, as a minimum, following procedure:

- Verification of sensors, metering, and alarms
- Verification of all control functions including automatic, local, and remote control
- Verification of the performance criteria
- Demonstration of all the intended applications
- Demonstration of grid interface protection & control system
- Verification of power quality parameters

12. Training

BESSD shall provide training in India to manpower identified by the Buying utility. Training shall be comprehensive and cover all aspects of BESS needed for proper operation & maintenance of the system. The BESSD shall be responsible for determination of content & duration of training sessions.

13. Documentation

To ensure that the proposed system conforms to the specific provisions and general intent of the specification, the BESSD shall submit a comprehensive list of the documents applicable for the offered system to the Buying utility for review and approval before the commissioning of the Project. The flow of documents for approval from Buying Utility shall strictly meet the time schedule and Project schedule shared by BESSD. Further, the BESSD shall also submit the drawings / documents for all the hardware & software required for site installation, testing and commissioning and thereafter the operation of the system.

The BESSD shall submit three hard copies and one soft copy with each submission. The documentation shall be in English. Review and acceptance of the documents does not encumber the utility with responsibility for the adequacy and safety of the BESSD's design. The documents are to be approved by BESSD before the implementation. At a minimum, the documentation shall cover but not limited to:

- System description document (overview)
- Functional description document
- System configuration document
- Construction and installation drawings including civil layout, electrical layout, communication architecture, EMS hardware configuration (PLC layout)
- Auto-cad drawings
- Battery Sizing
- Equipment drawings and specifications
- Wiring diagrams including electrical and communication
- Conduit diagrams
- Bill of material
- Assembly drawing
- O&M manual
- Maintenance schedule
- Project implementation schedule = weekly progress reports
- Master test plan & procedures
- Quality Assurance manual
- Software documentation
- UL/IEC certifications supported by valid Test Reports
- FAT formats and FAT reports
- SAT procedure and Reports
- Relay & control settings

- Progress reports during installation and commissioning
- Training manuals
- As-built drawings
- List of connected devices – EMS and entire system
- Troubleshooting manual
- Civil drawings approved by certified structural engineers
- Asset Register covering Make, Model No., Description, Country of Origin and Type of Device (Passive or Active)
- BESSD has to submit following documents / Planned activities Grantt Chart but not limited to :

Milestones Chart		
Sr. No	**Key Milestones**	**Day Considering Bid Submission date is Zero Date**
1	**Design and Engineering Approval**	
1.1	Plant Layout	
1.2	BESS Single Line Diagram	
1.3	Drawing of Earthing of Electrodes / Mats	
1.4	Earthing calculation Report	
1.5	Civil Foundation of Battery Container	
1.6	Civil Foundation of PCS	
1.7	Civil Foundation of Transformer	
1.8	Civil Drawing of Switchgear panel Room	
1.9	Civil Foundation of BESS Auxiliary System Main Panel	
1.10	Civil Foundation Drawing of Fire Wall	
1.11	Structural Design report of Firewall	
1.12	Civil Foundation of EMS	
1.13	Civil foundation Drawing of HVWS tank	
1.14	Civil Drawing of Civil Drawing of Gate and fencing	
1.15	Civil Drawing of Road and drainage system plan layout	
1.16	Studio Video of Visitor Room/ Architectural drawing of MCR building	
1.17	Power and control Cable, Cable Trench, Trench Sectional Drawing	

Sr. No	Milestones Chart Key Milestones	Day Considering Bid Submission date is Zero Date
1.18	Cable schedule	
1.19	Auxiliary System Single Line Diagram	
1.20	Plant Level BOM	
1.21	BESS Foundation Marking Layout	
1.22	Layout of HVWS	
1.23	Fire Fighting Safety Philosophy and Manual of Fire Protection System	
1.24	Lighting Layout and CCTV	
1.25	Battery Datasheet and GTP	
1.26	General Arrangement of Battery	
1.27	Battery disposal plan at the end of life	
1.28	Battery and container Type Test-UL 9540 + UL 9540A and (IEC TS 62933-5-1 + IEC 62933-5-2) IS 17092	
1.29	Battery and container Type Test-UL 1973 (battery) or (IEC 62619 (battery)+ IEC 63056 (battery))	
1.30	Battery and container Type Test-UL1642 or UL 1973, Appendix E (cell) or IEC 62619 (cell) + IEC 63056 (cell)	
1.31	Battery and container Type Test-IEC62281/ UN38.3	
1.32	Battery and container Type Test-IEC61850/DNP3	
1.33	Battery and container Type Test-IEC61508	
1.34	Battery and container Type Test-IEC62933-5-4	
1.35	Battery and container Type Test-IEC62933-2-1	
1.36	Battery and container Type Test-IEC62933-3	
1.37	Battery and container Type Test-IEC62933-4	

Sr. No	Milestones Chart Key Milestones	Day Considering Bid Submission date is Zero Date
1.38	Battery and container Type Test-IEC / TS 62933-5	
1.39	Battery and container Type Test-IEEE2030.2.1-2019	
1.40	Battery and container Type Test-IS17387	
1.41	Battery and container Type Test-NFPA855	
1.42	Battery and container Type Test-IEC60529	
1.43	PCS Datasheet and GTP	
1.44	General Arrangement of PCS	
1.45	Installation and Operation Manual	
1.46	PCS Type Test-IEC60529	
1.47	PCS Type Test-IEC61000-6-2	
1.48	PCS Type Test-IEC61000-6-4	
1.49	PCS Type Test-IEC62116	
1.50	PCS Type Test-IEC 62477	
1.51	PCS Type Test-IEEE519 / CEA Report	
1.52	PCS Type Test-IEEE1547	
1.53	PCS Type Test- IEC62909-1/ Equivalent IEC62477 and IEC 61727	
1.54	PCS Type Test- IEC62909-2	
1.55	PCS Type Test- IEC61683	
1.56	PCS Type Test- IEC60068-2-1	
1.57	PCS Type Test- IEC60068-2-2	
1.58	PCS Type Test- IEC60068-2-14	
1.59	PCS Type Test- IEC60068-2-30	
1.60	PCS Type Test- UL1741	
1.61	GTP of Power Transformer	
1.62	General Arrangement of Power Transformer	
1.63	Power Transformer Type Test-IEC 60076-1	
1.64	GTP of Switchgear Panel	

Sr. No	Milestones Chart Key Milestones	Day Considering Bid Submission date is Zero Date
1.65	General Arrangement of Switchgear Panel	
1.66	Schematic drawings of Switchgear Panel	
1.67	Switchgear Panel Type Test- IEC61439	
1.68	GTP of BESS Auxiliary System Main Panel	
1.69	General Arrangement of BESS Auxiliary System Main Panel	
1.70	GTP of BESS Auxiliary System Cluster Panel	
1.71	General Arrangement of BESS Auxiliary System Cluster Panel	
1.72	GTP of EMS Panel (Architecture)	
1.73	General Arrangement of EMS Panel	
1.74	BESS Network Architecture	
1.75	EMS manual including troubleshooting and SOP	
1.76	GTP of UPS	
1.77	General Arrangement of UPS	
1.78	GTP of Hydrant Pre-Fab Tank	
1.79	DBR of Fire Protection System	
1.80	Factory Acceptance Test of Auxiliary Subsystem	
1.81	Factory Acceptance Test of EMS Panel	
1.82	Factory Acceptance Test of Earthing	
1.83	Factory Acceptance Test of PCS	
1.84	Factory Acceptance Test of Transformer	
1.85	Factory Acceptance Test of cable	
1.86	Factory Acceptance Test of Switchgear Panel	
1.87	Factory Acceptance Test of Battery	
1.88	Factory Acceptance Test of UPS	
1.89	Operation Philosophy of BESS	
1.90	11kV Switchgear Protection Philosophy	

Sr. No	Milestones Chart Key Milestones	Day Considering Bid Submission date is Zero Date
1.91	Trip matrix for 11kV switchgear	
1.92	Performance report format	
1.93	O&M Manual for BESS including Maintenance schedule	
1.94	System description and configuration	
1.95	Training Manual	
1.96	List of Statutory Compliances: security assessment done from Cert-in empanelled auditor	
1.97	Battery disposal plan at the end of life	
1.98	Asset Register	
1.99	List of Inventory and Spares	
2	**Procurement (PO Placement)**	
2.1	Battery Order Finalisation	
2.2	PCS Order Finalisation	
2.3	Inverter Duty Transformer Order Finalisation	
2.4	AC Distribution Board Order Finalisation	
2.5	Switchgear Panel Order Finalisation	
2.6	EMS Panel Order Finalisation	
2.7	HVWS Order Finalisation- Working on Design	
2.8	UPS Order Finalisation- Fuji	
2.9	Cable Order Finalisation	
2.10	Lighting and Lightning Mast Order Finalisation- Wipro	
2.11	Earthing Order Finalisation	
2.12	11 KV Interconnecting Panel	
3	**Procurement (Material Delivery)**	
3.1	AC Distribution Board Delivery:	
3.2	UPS Delivery	
3.3	PCS Delivery	
3.4	Inverter Duty Transformer Delivery	
3.5	Earthing Delivery	

Sr. No	Milestones Chart Key Milestones	Day Considering Bid Submission date is Zero Date
3.6	Switchgear Panel Delivery	
3.7	11 KV Interconnecting Panel	
3.8	EMS Panel Delivery	
3.9	Cable Delivery	
3.10	HVWS Delivery	
3.11	Lighting and Lightning Mast Delivery	
3.12	Battery Delivery	
4	**Civil Work**	
4.1	Foundation for PCS	
4.2	Foundation for Battery Container	
4.3	Foundation for Transformer	
4.4	Foundation for Transformer Electrical Panel Room (11 KV)	
4.5	Construction of Fire Wall	
4.6	Foundation for Metering Room for Permanent Connection	
4.7	Shifting of 11 KV cables	
4.8	Completion of Metering Room for Permanent Connection	
4.9	Construction of wall of Electrical Panel Room (11KV)	
4.10	Construction of roof /slab of Electrical Panel Room (11KV)	
4.11	Construction of Visitor Gallery	
4.12	Construction of Water Tank for fire-fighting system	
4.13	Site Levelling and Gravel Spreading - Fab'25	
4.14	Repair of Boundary Wall	
4.15	Construction of Gate and Fencing	
5	**Installation of Equipment**	
5.1	Installation of Transformer and switchgear for permanent connection	
5.2	Installation of Aux. Sub System	

Sr. No	Milestones Chart Key Milestones	Day Considering Bid Submission date is Zero Date
5.3	Installation of EMS Panel	
5.4	Installation of PCS	
5.5	Installation of Switchgear Panel	
5.6	Installation of UPS	
5.7	Completion of Earthing Grid	
5.8	Installation of interconnecting 11KV Panel	
5.9	Installation of Inverter Duty Transformer-	
5.10	Completion of Lighting and Lightning Mast	
5.11	Completion of HVWS	
5.12	Power and control Cable laying	
5.13	Installation of Battery Container	
6	**Pre Commissioning and commissioning**	
6.1	Site Acceptance Test of Auxiliary Subsystem	
6.2	Site Acceptance Test of UPS	
6.3	Site Acceptance Test of Earthing Grid	
6.4	Site Acceptance Test of Transformer	
6.5	Site Acceptance Test of Power and control Cable	
6.6	Site Acceptance Test of Switchgear Panel	
6.7	Site Acceptance Test of Lighting and Lighting Mask	
6.8	Site Acceptance Test of Power Transformer	
6.9	Site Acceptance Test of PCS	
6.10	Site Acceptance Test of Battery	
6.11	Site Acceptance Test of HVWS	
6.12	Site Acceptance Test Certification	
6.14	Team Matrix	
6.15	Emergency Preparedness procedure and SOP	
6.16	Report regarding communication between DC BESS, PCS and EMS and	

Sr. No	Milestones Chart Key Milestones	Day Considering Bid Submission date is Zero Date
	Communication with Grid (Supporting documents as per IEC and UL standards)	
6.17	Report of Functional Safety at System level (Supporting documents as per IEC and UL standards)	
6.18	Risk Assessment Report for technical & project management	

14. Performance monitoring

As part of the performance monitoring, the following shall be carried out:

14.1 The BESSD must install necessary equipment to continuously measure BESS operating parameters (including but not limited to voltage, current, ambient conditions etc.) as well as energy input into and energy output from the BESS along with Metering arrangement in accordance with extant regulations. They will be required to submit this data to the concerned authorities/organizations on line and/or through a report on regular basis every month for the entire duration of contract.

14.2 The BESSD shall provide access to the concerned authorities/organisations or their authorized representatives for installing any additional monitoring equipment to facilitate on-line transfer of data.

14.3 All data shall be made available as mentioned above for the entire duration of the Contract.

14.4 The plant SCADA should be OPC version 2.0a (or a later version including OPC UA) compliant and implement appropriate OPC-DA server as per the specification of OPC Foundation. All data should be accessible through this OPC server for providing real time online data (BESS parameters) to the concerned authorities/organisations. This time series data shall be available from the Project SCADA system to facilitate monitoring and should include among others as stated before, parameters to facilitate daily, monthly, and annual report for performance monitoring.

14.5 Web-based monitoring should be available, which should not be machine dependent. The web-based monitoring should provide the same screens as available in the plant. Also, it should be possible to download reports from a remote web-client in PDF or Excel format.

14.6 BESSD shall provide weekly, fortnightly, monthly, and annual reports as per the requirements on the performance parameters as per IEC 62933-3 and parameters approved by Buying Utility. BESSD shall submit monitoring report to Buying Utility briefly assessing the overall performance of the BESS and its associated components along-side the technical performance of battery cells/modules promised at the time of bidding for the term of the agreement. For example, throughput consumed & throughput remaining, C-rate assessment (maximum, minimum and average), degradation curve, down-time assessment, depth of discharge assessment (maximum, minimum and average), auxiliary consumption assessment, round-trip efficiency, PCS efficiency, battery module-wise health parameters, etc.

15. Service Level Agreement (SLA)

Service Level Agreements (SLAs) reflect the measurements to be used to track and report overall progress, system performance and performance of BESSD's services on a regular basis. Detailed SLAs are defined in Volume 3of this RFP. These shall operate as a legally binding services agreement specifying terms which apply to the parties and to the provision of the services by the BESSD to Buying Utility under the Battery Energy Storage Service Agreement (BESSA).

Annexure 1: CERC (Ancillary Services) Regulations, 2022

CENTRAL ELECTRICITY REGULATORY COMMISSION, NEW DELHI

New Delhi, 31st January, 2022

PREAMBLE

Whereas it is necessary to provide for a regulatory mechanism for ancillary services in the interest of reliability, safety and security of the grid, it is hereby specified as follows:

NOTIFICATION

No. RA-14026(11)/3/2019-CERC. - In exercise of the powers conferred under Section 178 read with clauses (h) and (i) of sub-section (1) of Section 79 of the Electricity Act, 2003 (36 of 2003), and all other powers enabling it in this behalf, and after previous publication, the Central Electricity Regulatory Commission hereby makes the following regulations, namely:

1. Short title and commencement

(1) These regulations may be called the Central Electricity Regulatory Commission (Ancillary Services) Regulations, 2022.

(2) These regulations shall come into force with effect from such date as may be notified by the Commission.

2. Objective

While it is desirable in the interest of grid security that adequate reserves are maintained locally at the State level for each state control area as per the Grid Code or the State Grid Code as the case may be, these regulations aim to provide mechanisms for procurement, through administered as well as market-based mechanisms, deployment and payment of Ancillary Services at the regional and national level for maintaining the grid frequency close to 50 Hz, and restoring the grid frequency within the allowable band as specified in the Grid Code and for relieving congestion in the transmission network, to ensure smooth operation of the power system, and safety and security of the grid.

3. Definitions and Interpretation

(1) In these regulations, unless the context otherwise requires,

(a) "Act" means the Electricity Act, 2003 (36 of 2003);

(b) "AGC signal" means automated signal generated from the Nodal Agency through which the generation of an SRAS Provider is adjusted;

(c) "Ancillary Service" or "AS" in relation to power system operation, means the service necessary to support the grid operation in maintaining power quality, reliability and security of the grid and includes Primary Reserve Ancillary Service, Secondary Reserve Ancillary Service, Tertiary Reserve Ancillary Service, active power support for load following, reactive power support, black start and such other services as defined in the Grid Code;

(d) "Area Control Error" or "ACE" means the instantaneous difference between a control area's net actual interchange and net scheduled interchange, taking into account the effects of frequency bias and correction of measurement errors;

(e) "AS capacity obligation" is the capacity signaled for dispatch by the Nodal Agency under SRAS or the capacity procured by the Nodal Agency under TRAS;

(f) "Automatic Generation Control" or "AGC" means a mechanism through which the generation of the SRAS Provider in a control area is automatically adjusted in response to the Secondary Control Signal;

(g) "Commission" means the Central Electricity Regulatory Commission referred to in sub-section (1) of Section 76 of the Act;

(h) "Commitment charge" means the amount payable to the TRAS Provider for the quantum of TRAS-Up cleared in the Day Ahead AS Market or the Real Time AS Market, as the case may be, but not instructed for dispatch.

(i) "Compensation charge" means the price declared by an SRAS Provider other than a generating station whose tariff is determined under Section 62 of the Act for participation in SRAS;

(j) "Demand Response" means variation in electricity consumption by end consumers or drawl by a control area, on standalone or aggregated basis, as per system the requirement identified by the Nodal Agency;

(k) "Deviation and Ancillary Service Pool Account" means the Regional Deviation Pool Account Fund referred to in the DSM Regulations, or any such Account as may be specified by the Commission;

(l) "DSM Regulations" means the Central Electricity Regulatory Commission (Deviation Settlement Mechanism and related matters) Regulations, 2014;

(m) "Energy-Down bid" means the bid in Rs. /MWh for the offered quantum submitted by the TRAS-Down Provider to pay to the concerned Deviation and Ancillary Service Pool Account;

(n) "Energy Storage" in relation to the electricity system, means a facility where electrical energy is converted into any form of energy which can be stored, and subsequently reconverted into electrical energy;

(o) "Energy-Up bid" means the bid in Rs. /MWh for the offered quantum submitted by the TRAS-Up Provider;

(p) "Flat frequency control" means a mechanism of correcting ACE by factoring in only the frequency deviation, and ignoring the deviation of net actual interchange from net scheduled interchange at regional level;

(q) "Flat tie-line control" means a mechanism of correcting ACE by factoring in only the deviation of net actual interchange from net scheduled interchange at regional level, and ignoring frequency deviation;

(r) "Frequency Response Characteristics" means automatic, sustained change in the power consumption by load or output of the generators that occurs immediately after a change in the load-generation balance of a control area and which is in a direction to oppose a change in frequency;

(s) "Grid Code" means the Grid Code specified by the Commission under clause (h) of sub-section (1) of Section 79 of the Act;

(t) "Nodal Agency" means the National Load Dispatch Centre which shall be responsible for implementation of the Ancillary Services at the inter-State level through the Regional Load Dispatch Centers;

(u) "Primary Reserve Ancillary Service" or "PRAS" means the Ancillary Service which immediately comes into service through governor action of the generator or through any other resource in the event of sudden change in frequency;

(v) "Secondary Control Signal" means automated signal generated from the Nodal Agency through which injection or drawl or consumption of an SRAS provider is adjusted, and includes AGC signal;

(w) "Secondary Reserve Ancillary Service" or "SRAS" means the Ancillary Service comprising SRAS-Up and SRAS-Down, which is activated and deployed through secondary control signal;

(x) "Secondary Reserve Ancillary Service Provider" or "SRAS Provider" means an entity which provides SRAS-Up or SRAS-Down in accordance with these regulations;

(y) "SRAS-Down" means an SRAS that reduces active power injection or increases drawl or consumption, as the case may be, in response to secondary control signal from the Nodal Agency;

(z) "SRAS-Up" means an SRAS that increases active power injection or decreases drawl or consumption, as the case may be, in response to secondary control signal from the Nodal Agency;

(aa) "Tariff Regulations" mean the Regulations specified by the Commission from time to time under Section 178 read with Section 61 of the Act;

(bb) "Tertiary Reserve Ancillary Service" or "TRAS" means the Ancillary Service comprising TRAS-Up and TRAS-Down and consists of spinning reserve or non-spinning reserve, which responds to dispatch instructions from the Nodal Agency;

(cc) "Tie-line bias control" means a mechanism of correcting ACE by factoring in deviation of net actual interchange from net scheduled interchange at regional level as well as frequency deviation;

(dd) "TRAS-Down" means a TRAS that reduces active power injection or increases drawl or consumption, as the case may be, in response to dispatch instructions of the Nodal Agency;

(ee) "TRAS-Down Provider" means an entity which provides TRAS-Down in accordance with these regulations;

(ff) "TRAS-Up" means a TRAS that increases active power injection or decreases drawl or consumption, as the case may be, in response to dispatch instructions of the Nodal Agency;

(gg) "TRAS-Up Provider" means an entity which provides TRAS-Up in accordance with these regulations;

(hh) "Un-Requisitioned Surplus" or "URS" means the capacity in a generating station that has not been requisitioned and is available for dispatch, and is computed as the difference between the declared capacity or maximum possible generation (Pmax), as the case maybe, of the generating station and its total schedule.

(2) Save as aforesaid and unless repugnant to the context or the subject-matter otherwise requires, words and expressions used in these regulations and not defined, but defined in the Act, or the Grid Code or any other regulation of the Commission shall have the meaning assigned to them respectively in the Act or the Grid Code or such other regulation.

(3) Reference to any Act, Rules and Regulations shall include amendments or consolidation or re-enactment thereof.

4. Scope

These regulations shall be applicable to regional entities, including entities having energy storage resources and entities capable of providing demand response qualified to provide Ancillary Services and other entities as provided in these regulations.

5. Types of Ancillary Services

(1) There shall be the following types of Ancillary Services, namely:

(a) Primary Reserve Ancillary Service (PRAS);
(b) Secondary Reserve Ancillary Service (SRAS);
(c) Tertiary Reserve Ancillary Service (TRAS); and
(d) Such other Ancillary Services, including but not limited to Voltage Control Ancillary Services and Black Start Ancillary Services, as specified in the Grid Code

(2) The mechanism of procurement, deployment and payment of SRAS and TRAS as referred to in sub-clauses (b) and (c) of clause (1) of this Regulation shall be as specified in these regulations.

(3) The mechanism of procurement, deployment and payment of Ancillary Services, referred to in sub-clause (a) of clause(1) of this Regulation, including for resources such as energy storage and demand response, and in sub-clause (d) of clause (1) of this Regulation, shall be as specified in the Grid Code or under these regulations to be notified separately, as the case may be.

6. Estimation of Reserves by the Nodal Agency

(1) The Nodal Agency shall, in coordination with RLDCs and SLDCs, estimate the quantum of requirement of SRAS and TRAS at the regional level after factoring in the reserves for each state control area, for such period and based on such methodology as specified in the Grid Code and publish the same on its website:

Provided that until specific provisions in this regard are specified in the Grid Code, the Nodal Agency shall propose an interim methodology for estimation of reserves for approval of the Commission, within two months from the date of notification of these regulations.

(2) The Nodal Agency shall re-assess the quantum of requirement of SRAS and TRAS on day- ahead basis and incremental requirement, if any, on real time basis and update the same on its website.

(3) The requirement of SRAS shall be estimated on regional basis.

Part I: Secondary Reserve Ancillary Service (SRAS)

7. Eligibility for an SRAS Provider

A generating station or an entity having energy storage resource or an entity capable of providing demand response, on standalone or aggregated basis, connected to inter-State transmission system or intra-State transmission system, shall be eligible to provide Secondary Reserve Ancillary Service, as an SRAS Provider, if it

(a) has bi-directional communication system with RLDC, as per the requirements stipulated in the Detailed Procedure by the Nodal Agency:

Provided that till such bi-directional communication system with RLDC is fully established, communication system with NLDC shall be considered for eligibility;

(b) is AGC-enabled, in case of a generating station;
(c) can provide minimum response of1 MW;
(d) has metering and SCADA telemetry in place for monitoring and measurement of energy delivered under SRAS, as stipulated in the Detailed Procedure by the Nodal Agency;
(e) is capable of responding to SRAS signal within 30 seconds and providing the entire SRAS capacity obligation within fifteen (15) minutes and sustaining at least for the next thirty (30) minutes;

8. Activation and Deployment of SRAS

(1) SRAS shall be activated and deployed by the Nodal Agency on account of the following events to maintain or restore grid frequency within the allowable band as specified in the Grid Code or replenish primary reserves:

(a) Considering a region as control area, Area Control Error (ACE) of the region, going beyond the minimum threshold limit of ±10 MW or such other limit as may be notified by the Commission based on review of performance of SRAS;
(b) Such other events as specified in the Grid Code.

(2) The Area Control Error (ACE) for each region would be auto-calculated at the control center of the Nodal Agency based on tele-metered values, and the external

inputs referred to in clauses (3) and (4) of this regulation, as per the following formula:

ACE = (Ia-Is)-10*Bf*(Fa-Fs) +Offset

Were,

Ia = Actual net interchange in MW (positive value for export)

Is=Scheduled net interchange in MW (positive value for export) Bf= Frequency Bias Coefficient in MW/0.1 Hz (negative value) Fa= Actual system frequency in Hz

Fs=Schedule system frequency in Hz

Offset = Provision for compensating for measurement error

(3) Frequency Bias Coefficient (Bf) shall be assessed and declared by the Nodal Agency as per the Detailed Procedure and it shall normally be based on median Frequency Response Characteristic during previous financial year of each region and refined from time to time.

(4) Offset shall be used to account for measurement errors and shall be decided by the Nodal Agency for the respective region.

(5) Nodal Agency may operate SRAS in any of the three control modes namely, tie-line bias control mode, flat frequency control mode or flat tie-line control mode depending on grid requirements.

9. Procurement of SRAS

(1) SRAS shall be procured on regional basis by the Nodal Agency through the mechanism as specified in this Regulation:

Provided that the Commission based on review of the operation of SRAS, may direct procurement of SRAS through market-based bidding mechanism to be specified separately.

(2) An SRAS Provider willing to participate in SRAS shall be required to provide standing consent to the Nodal Agency for participation, which shall remain valid till it is modified or withdrawn:

Provided that standing consent except in case of forced outage cannot be modified or withdrawn without giving notice of at least forty-eight hours.

(3) The SRAS Providers that are generating stations, shall be required to declare in such time interval as may be stipulated in the Detailed Procedure, the technical parameters as required by the Nodal Agency, including but not limited to installed capacity, declared capacity, maximum possible generation (Pmax), schedule, Technical Minimum, Ramp up and Ramp down capability.

(4) The SRAS Providers other than the generating stations shall be required to declare the technical requirements as may be stipulated in the Detailed Procedure.

(5) The SRAS Providers that are generating stations whose tariff is determined undersection 62 of the Act, shall declare their energy charge upfront on monthly basis in the manner as stipulated in the Detailed Procedure.

(6) The SRAS Providers other than those covered under clause (5) of this Regulation, shall be required to declare the compensation charges upfront on monthly basis in the manner as stipulated in the Detailed Procedure.

(7) The Nodal Agency, based on the estimate of the SRAS requirement as per Regulation 6 of these regulations, shall ascertain availability of adequate SRAS capacity by factoring in the declarations made by the SRAS Providers under this Regulation, on day-ahead basis and on real- time basis before the gate closure of the Real Time Market:

Provided that the capacity so ascertained shall be considered for SRAS based on actual availability of such capacity after the declaration of the RTM results.

(8) In case of the generating stations whose tariff is determined by the Commission under Section 62 of the Act, the Nodal Agency shall identify the generating stations for providing SRAS,

(a) on day-ahead basis, based on the capacity available after the schedule has been communicated at 2300 hrs for the next day; and

(b) onreal-timebasisbeforethegateclosureforincrementalSRASrequirement:

Provided that the capacity so identified shall be considered for SRAS based on actual availability of such capacity after the declaration of the RTM results.

(9) There shall not be any commitment charge for the SRAS providers for the capacity ascertained under clause (7) or identified under clause (8) of this Regulation, but not signaled for SRAS:

Provided that the Commission based on review of the availability and performance of SRAS, may provide for a mechanism for the SRAS Providers to commit SRAS capacity in advance, and also for appropriate compensation for such committed SRAS capacity.

10. Selection of SRAS Providers and Despatch of SRAS

(1) SRAS Provider shall be selected on regional basis by the Nodal Agency for providing SRAS-Up or SRAS-Down based on the Custom Participation Factor.

(2) The Custom Participation Factor for each SRAS Provider shall be determined by the Nodal Agency based on the following criteria:

(a) Rate Participation Factor (Ramping capability in MW/min);and
(b) Cost Factor (energy charge or compensation charge, as the case maybe).

(3) The Custom Participation Factor for SRAS-Up shall be directly proportional to the normalized Rate Participation Factor and inversely proportional to the normalized Cost Factor. The Custom Participation Factor for SRAS-Down shall be directly proportional to the product of the normalized Rate Participation Factor and normalized Cost Factor.

(4) Based on the methodology as provided in clauses (2) and (3) of this Regulation, Custom Participation Factor shall be calculated which shall be normalized to determine the participation of each SRAS Provider.

(5) SRAS signal shall be allocated among the SRAS Providers on regional basis to meet the SRAS requirement of the system based on the normalized Custom Participation Factor subject to the ramp limited resources available with the SRAS Provider(s).

(6) The details of Custom Participation Factor based on the principles provided in this Regulation shall be stipulated in the Detail Procedure.

(7) SRAS shall be dispatched on regional basis through secondary control signals by the Nodal Agency.

(8) Secondary control signal for SRAS-Up and SRAS-Down shall be sent to the control center of the SRAS Provider every 4 seconds by the Nodal agency. SRAS Provider shall allow its control center to follow the secondary control signal for SRAS-Up or SRAS-Down automatically without manual intervention.

(9) The SRAS Provider shall increase or decrease active power injection or increase or decrease drawl or consumption, as the case may be, as per the automatic signal from the Nodal Agency.

(10) The SRAS Provider shall share real-time data with NLDC and the concerned RLDCs as stipulated in the Detailed Procedure.

(11) Average of SRAS-Up and SRAS-Down MW data shall be calculated by the Nodal Agency for every 5 minutes in absolute terms using archived SCADA data at the Nodal Agency and reconciled with the data received at the control center of the SRAS Provider and shall be used for payment of incentive as per Regulation 12 of these regulations.

(12) Average of SRAS-Up and SRAS-Down MW data shall be calculated for every 15 minutes time block in MWh for every SRAS Provider by the Nodal Agency using the archived SCADA data at the Nodal Agency and reconciled with the data received at control center of the SRAS Provider and shall be used for payment of energy charge or compensation charge, as the case may be, to the SRAS Provider as per Regulation 11 of these regulations.

11. Payment for SRAS

(1) SRAS Provider shall be paid from the Deviation and Ancillary Service Pool Account, at the rate of their energy charge or compensation charge, as declared by the SRAS Provider, as the case may be, for the SRAS-Up MW quantum dispatched for every 15 minutes time block, calculated as per clause (12) of Regulation 10 of these regulations.

(2) SRAS Provider shall pay back to the Deviation and Ancillary Service Pool Account, at the rate of their energy charge or compensation charge, as the case may be, for

the SRAS-Down MW quantum dispatched for every 15 minutes time block, calculated as per clause (12) of Regulation 10 of these regulations.

(3) SRAS Provider shall be eligible for incentive based on performance as per Regulation 12 of these regulations.

(4) Methodology of computation under clauses (1) to (3) of this Regulation shall be stipulated in the Detailed Procedure.

12. Performance of SRAS Provider and incentive

(1) The actual response of SRAS Provider against the secondary control signals from the Nodal Agency to the control center of the SRAS Provider shall be monitored by the Nodal Agency, as per the procedure stipulated in the Detailed Procedure.

(2) All measurements of secondary control signals from the Nodal Agency to the control center of the SRAS Provider and actual response of SRAS Provider shall be carried out on post-facto basis using SCADA data. Performance of the SRAS Provider shall be measured by the Nodal Agency by comparing the actual response against these secondary control signals for SRAS-Up and SRAS-Down sent every 4 seconds to the control center of the SRAS Provider measured using 5-minute average data. The methodology for measurement of performance of SRAS Provider based on this Regulation shall be stipulated in the Detailed Procedure.

(3) SRAS Provider shall be eligible for incentive based on the performance measured as per clause (2) of this Regulation and the 5-minute MWh data calculated for SRAS-Up and SRAS-Down as per clause (11) of Regulation 10 of these regulations and aggregated over a day, as under:

Actual performance vis-à-vis secondary control signal for an SRAS Provider	Incentive Rate (paise/kWh)
95%andabove	(+) 50
75%tobelow95%	(+) 40
60%tobelow75%	(+) 30
50%tobelow 60%	(+) 20
20%tobelow50%	(+) 10
Below20%	0

(4) Incentive payments shall be calculated

(a) For each SRAS Provider, being a generating station, for energy supplied for a day as follows:
Incentive for SRAS Provider=Actual Response (MWh)x(1-NAC) x Incentive Rate

(b) For each SRAS Provider being an entity other than generating station as follows:
Incentive for SRAS Provider = Actual Response (MWh) x Incentive Rate Where,
'Actual Response' is the actual energy output (in MWh) of the SRAS Provider communicated to the Nodal Agency aggregated over 5 minutes in absolute terms and then summed for a day.
'NAC' is percentage Normative Auxiliary Energy Consumption for similar class of generating stations, as specified in the Tariff Regulations.
'Incentive Rate' in Paise/kWh is the incentive rate applicable based on the performance assessment of SRAS Provider.

13. Failure in performance of SRAS Provider

1) Performance below 20% for two consecutive days by an SRAS Provider shall make the SRAS Provider liable for disqualification for participation in SRAS for a week by the Nodal Agency.

2) Violation of directions of the Nodal Agency for SRAS under these Regulations shall make the SRAS Providers liable for penalties as per the provision of the Act.

Part II: Tertiary Reserves Ancillary Services (TRAS)

14. Eligibility for a TRAS Provider

A generating station or an entity having energy storage resource or an entity capable of providing demand response, on standalone or aggregated basis, connected to inter-State transmission system or intra-State transmission system shall be eligible for participation as TRAS Provider, if

(a) It is capable of varying its active power output or drawl or consumption, as the case may be, on receipt of despatch instructions from the Nodal Agency; and

(b) It is capable of providing TRAS within 15 minutes and sustaining the service for atleast next 60 minutes.

15. Activation and Deployment of TRAS

TRAS shall be activate and deployed by the Nodal Agency on account of the following events:

(a) In case the secondary reserve has been deployed continuously in one direction for fifteen (15) minutes for more than100MW, in order to replenish the secondary reserve;

(b) Such other events as specified in the Grid Code.

16. Procurement of TRAS

(1) Procurement of TRAS through Day Ahead AS Market and Real Time AS Market shall be undertaken in accordance with the bidding timelines specified in the Grid Code:

Provided that until specific provisions in this regard are specified in the Grid Code, the bidding timelines for Day Ahead AS Market and Real Time AS Market shall be the same as those of the Day Ahead Market for energy and Real Time Market for energy respectively.

(2) TRAS Requirement: The Nodal Agency shall communicate to the power exchange(s), the quantum of requirement of TRAS-Up and TRAS-Down on day-ahead basis before commencement of the Day Ahead Market and incremental requirement, if any, over and above the procurement in the Day Ahead Market, on real-time basis, before the commencement of the Real Time Market:

Provided that the quantum of requirement on day-ahead basis shall be communicated after considering the TRAS resources likely to be available on real-time basis.

(3) Sell Bid: The TRAS Providers shall submit bids in the following manner:

(a) Bids for TRAS-Up and TRAS-Down shall be submitted for each time block or for a minimum of two consecutive time blocks in the Day Ahead AS Market or in the Real Time AS Market.

(b) For TRAS-Up, Energy-Up bid in Rs./MWh shall be submitted for the offer volume in MW.

(c) For TRAS-Down, Energy-Down bid in Rs./MWh shall be submitted for the offer volume in MW.

(4) The capacity offered, as a sell bid for energy and for TRAS from a resource in the same time-block, shall be separate and non-overlapping.

(5) The capacity offered, as a sell bid in power exchange(s) for providing TRAS-Up or TRAS- Down from a resource in the same time-block, shall be separate and non-overlapping.

(6) TRAS Provider cleared in the Day Ahead AS Market may place incremental bids in the Real Time AS Market. TRAS Provider not cleared in the Day Ahead AS Market or which has not participated in the Day Ahead AS Market, may also place bids in the Real Time AS Market.

(7) The power exchanges shall collect the bids for TRAS-Up and TRAS-Down and share the same with the Nodal agency for price discovery in terms of Regulation 17 of these regulations.

The Nodal Agency shall stipulate details regarding the protocol for exchange of information between the Nodal Agency and the power exchanges in the Detailed Procedure.

17. Price Discovery of TRAS

Price Discovery for TRAS-Up

(1) The price discovery for TRAS-Up shall be based on the principle of Uniform Market Clearing Price, subject to market splitting in case of congestion.

(2) The highest Energy-Up bid corresponding to the requirement for TRAS-Up as intimated under clause (1) of Regulation 16 of these regulations, shall be the Market Clearing price for Energy-Up in the Day Ahead Ancillary Service Market (MCP-Energy-Up-AS-DAM) or in the Real Time Ancillary Service Market (MCP-Energy-Up-AS-RTM), as the case may be.

Price Discovery for TRAS-Down

(3) ThepricediscoveryforTRAS-DownshallbebasedontheprincipleofPay-as-bid.

(4) The Energy-Down bids shall be stacked in a descending order from the highest Energy- Down bid to the lowest Energy-Down bid and the Nodal Agency shall select the TRAS-Down Providers to meet the estimated TRAS requirement in that order.

(5) The Commission may, if considered necessary, provide for a price cap for TRAS.

18. Scheduling and Dispatch of TRAS

(1) Scheduling and dispatch of TRAS shall be according to the provisions of the Grid Code.

(2) Information in respect of the TRAS-Up and TRAS-Down cleared for the Day Ahead Ancillary Service Market and the Real Time Ancillary Service Market shall be published on the website of the Nodal Agency, and shall be simultaneously communicated to the concerned power exchanges for onward communication to the selected TRAS providers.

(3) The schedule for TRAS shall become effective from the time block starting 15 minutes after issue of the dispatch instruction by the Nodal Agency:

Provided that the Nodal Agency may issue dispatch instruction from any time block after the above-mentioned time block, if required, based on the anticipated system conditions.

(4) The Nodal Agency shall deploy the cleared TRAS-Up as under:

(a) In case the actual requirement for deployment of TRAS-Up is equal to the total TRAS- Up cleared in the AS market, the Nodal Agency shall issue despatch instructions to all such TRAS-Up Providers.

(b) In case the actual requirement for deployment of TRAS-Up is less than the total TRAS- Up cleared in the AS market, the Nodal Agency shall issue despatch instructions to the TRAS Providers in the following manner:

(i) In the event of the MCP-Energy-Up-DAM being equal to the MCP-Energy-Up- RTM, TRAS-Up shall be despatched on pro-rata basis;

(ii) In event of the MCP-Energy-Up-DAM and MCP-Energy-Up-RTM not being equal, TRAS-Up with lower MCP-Energy-Up shall be despatched first followed by the TRAS-Up with higher MCP-Energy-Up:

Provided that if the actual requirement of deployment of TRAS-Up is less than the cleared volume in the AS market with lower MCP-Energy-Up, TRAS-Up cleared in the said market shall be despatched on pro-rata basis:

Provided further that if the actual requirement of deployment of TRAS-Up is more than the cleared volume in the AS market with lower MCP-Energy-Up, TRAS-Up cleared in the AS market with lower MCP-Energy-Up shall be despatched in full and the TRAS-Up cleared in the market with higher MCP-Energy-Up shall be despatched on pro-rata basis.

(5) The Nodal Agency shall deploy the cleared TRAS-Down as under:

(a) In case the actual requirement for deployment of TRAS-Down is equal to the total TRAS-Down cleared in the AS market, the Nodal Agency shall issue despatch instructions to all such TRAS-Down Providers.

(b) In case the actual requirement for deployment of TRAS-Down is less than the total TRAS-Down cleared in the AS market, the Nodal Agency shall issue despatch instructions to the TRAS-Down Providers in the descending order of their Energy-Down bids, so that the selected TRAS-Down Provider with the highest Energy-Down bid shall be despatched first, followed by the TRAS-Down Provider with the next highest Energy-Down bid and so on.

19. Payment for TRAS

(1) TRAS-Up Provider shall receive MCP-Energy-Up, as discovered in the Day Ahead AS Market or the Real Time AS Market, as the case may be, for the quantum of energy instructed to be despatched by the Nodal Agency.

(2) TRAS-Up Provider shall receive commitment charges at the rate of ten percent of the MCP- Energy-Up-AS-DAM or the MCP-Energy-Up-AS-RTM, as the case may be, subject to the ceiling of 20 paise/kWh for the quantum of TRAS-Up cleared in the Day Ahead AS Market or the Real Time AS Market as the case may be, but not instructed to be despatched by the Nodal Agency.

(3) The TRAS-Down Provider shall pay back to the Deviation and Ancillary Service Pool Account at the rate of their Energy-Down bid in the Day Ahead AS Market or the Real Time AS Market, as the case may be, for the capacity instructed to be despatched by the Nodal Agency.

(4) In case of forced outage of a generating station or a unit of a TRAS Provider, being a generating station, which has been cleared in the Day Ahead AS Market, such TRAS Provider shall promptly inform the same to the Nodal Agency and the Nodal agency shall procure the corresponding TRAS quantum of power in Real Time AS Market, if required:

Provided that such TRAS Provider shall receive no payment in case of forced outage of a complete station; or receive payments based on the reduced quantum of power in case of forced outage of a unit, as the case may be.

Part III: Shortfall in Procurement of SRAS and TRAS or Emergency Conditions

20. Shortfall in Procurement of SRAS and TRAS or Emergency Conditions

Incase of shortfall

(1) All generating stations, whose tariff is determined by the Commission under Section 62 of the Act including those having URS power after declaration of the RTM results, shall be deemed to be available for use by the Nodal Agency for SRAS or TRAS or both, subject to technical constraints of such generating stations.

(2) The generating stations as referred to in clause (1) of this Regulation, whose URS is despatched as SRAS-Up shall be paid their energy charge in terms of clause (1) of Regulation 11 and incentive in terms of Regulation 12 of these regulations.

(3) The generating stations as referred to in clause (1) of this Regulation, if despatched as SRAS-Down shall payback to the Deviation and Ancillary Service Pool Account in terms of clause (2) of Regulation11 and shall be paid incentive in terms of Regulation12 of these regulations.

(4) The generating stations as referred to in clause (1) of this Regulation, whose URS is despatched for TRAS-Up, in the event of short-fall in procurement of TRAS-Up through the Market, shall be paid at the rate of 110% of their energy charges for the quantum of TRAS-Up despatched.

(5) The generating stations as referred to in clause (1) of this Regulation, if despatched for TRAS-Down, in the event of short-fall in procurement of TRAS-Down through the Market, shall pay back at the rate of90% of their energy charges, corresponding to the quantum of TRAS-Down despatched.

In case of emergency conditions

1) In case the Nodal Agency requires any generating station to provide Ancillary Services to meet the emergency conditions for reasons of grid security as per the provisions of the Grid Code, such generating station shall be compensated at the rate of the energy charge as determined under Section 62 of the Act or adopted

under Section 63 of the Act, or at the rate of the compensation charge declared by the AS provider, as the case may be.

Part IV: Accounting and Settlement of SRAS and TRAS

21. Accounting and Settlement of SRAS and TRAS

(1) Accounting of SRAS shall be done by the Regional Power Committee on a weekly basis, based on SCADA data.

(2) Accounting of TRAS shall be done by the Regional Power Committee on a weekly basis Based on interface meter data and schedules.

(3) Deviation of AS Provider in every 15 minutes time block shall be calculated as under and settled as per the procedure of DSM Regulations:

MWh Deviation for AS Provider= (Actual MWh of AS Provide r) − (Scheduled MWh of AS Provider including TRAS MWh despatched) − (SRAS MWh of AS Provider despatched)

(4) The Deviation and Ancillary Service Pool Account shall be charged for:

(a) the full cost of despatched SRAS-Up including the energy charge or the compensation charge, as the case maybe, for every time block on a regional basis as well as the incentive for SRAS, payable to the concerned SRAS Provider;
(b) the compensation as referred to in the proviso to clause (9) of Regulation (9) of these regulations.
(c) the full cost towards TRAS-Up including the charges for the quantum cleared and despatched and the commitment charge for the quantum cleared but not despatched.

(5) The Deviation and Ancillary Service Pool Account shall receive credits for:

(a) Payments made by SRAS Provider for the SRAS-Down despatched; and
(b) Payments made by TRAS Provider for the TRAS-Down despatched.

(6) The net of the charges and the credits under clauses (4) and (5) of this Regulation shall be settled through the charges collected under the DSM Regulations.

(7) Settlement of payment liabilities in respect of the AS providers shall be done directly by the Nodal Agency on a weekly basis based on the accounts prepared by the Regional Power Committee.

(8) In case of deficit in the Deviation and Ancillary Service Pool Account for payment to SRAS Providers and TRAS Providers, surplus amount available in other Deviation and Ancillary Service Pool Account shall be used for such payment, as per the methodology stipulated in the Detailed Procedure.

(9) No retrospective settlement of energy charge or compensation charge, as the case may be, shall be undertaken.

(10) The Nodal Agency shall publish information on its website about SRAS and TRAS procured, scheduled and dispatched on weekly basis and submit monthly detailed feedback reports to the Commission.

22. Transmission charges and losses for SRAS Provider and TRAS Provider

No transmission charges or transmission losses or transmission deviation charges shall be payable for SRAS and TRAS.

Part V: Miscellaneous

23. Detailed Procedure

(1) The Nodal Agency shall issue the Detailed Procedure after stakeholders' consultation within a period of 3 months of notification of these regulations and submit the same for information to the Commission.

(2) The Detailed Procedure shall contain the operational aspects of SRAS and TRAS including, but not limited to,

(a) bi-directional communication system as referred to in sub-clause (a) of clause (1) of Regulation 7 of these regulations;
(b) metering and SCADA telemetry for monitoring and measurement of energy delivered under SRAS as referred to in sub-clause (d) of clause (1) of Regulation 7 of these regulations;
(c) details regarding declaration of technical parameters as referred to in clause (3) of Regulation 9 of these regulations;

(d) technical requirements for SRAS provider as referred to in clause (4) of Regulation 9 of these regulations;

(e) manner of declaration of the energy charge and the compensation charge, respectively as referred to in clauses (5) and (6) of Regulation 9 of these regulations;

(f) details of Custom Participation Factor for allocation of SRAS signal among SRAS Providers as referred to in clause (6) of Regulation 10 of these regulations;

(g) methodology of sharing of real time data as referred to in clause (10) of Regulation 10 of these regulations;

(h) methodology of computation for SRAS as referred to in clause (4) of Regulation 11 of these regulations;

(i) details regarding monitoring of actual response of SRAS providers as referred to in clause (1) of Regulation 12 of these regulations

(j) details of the methodology for measurement of performance of SRAS Provider as referred to in clause (2) of Regulation 12 of these regulation;

(k) details regarding the protocol for exchange of information between the Nodal Agency and the power exchanges as referred to in clause (8) of Regulation 16 of this regulation;

(l) details of information in respect of the TRAS cleared in the market as referred in clause (2) of Regulation (18) of these regulations, and such other information as may be directed by the Commission;

(m) methodology of payment to SRAS and TRAS providers in case of deficit in the concerned Deviation and Ancillary Service Pool Account as referred to in clause (8) of Regulation 21 of these regulations;

(n) other related and incidental matters.

24. Power to Relax

The Commission may by general or special order, for reasons to be recorded in writing, and after giving an opportunity of hearing to the parties likely to be affected, may relax any of the provisions of these regulations on its own motion or on an application made before it by an interested person.

25. Power to issue directions and Removal of Difficulties

If any difficulty arises in giving effect to these regulations, the Commission may on its own motion or on an application filed by any affected party, issue any general or specific directions as may be considered necessary in furtherance of the objective and purpose of these regulations.

26. Repeal and Savings

(1) Save as otherwise provided in these regulations, Central Electricity Regulatory Commission (Ancillary Services Operations) Regulations, 2015 and all subsequent amendments there of shall stand repealed from the date of commencement of these Regulations.

(2) Notwithstanding such repeal, anything done or any action taken or purported to have been done or taken including any procedure, minutes, reports, confirmation or declaration of any instrument executed under the repealed regulations shall be deemed to have been done or taken under the relevant provisions of these regulations.

Sd/- (Sanoj Kumar Jha)
Secretary

Annexure 2: Civil Technical Specifications

GENERAL REQUIREMENT

1.1. This chapter includes the technical requirements for Establishment of BESS including associated design and preparation of all civil & structural drawings and execution of all associated civil works. This chapter deals mainly with technical specifications for the design, supervision and construction of complete civil works including structural and finishing works.

1.2. The specifications are intended for general description of work, quality and workmanship. The specifications are not however exhaustive to cover minute details and the work shall be executed according to relevant latest Indian Standards/IRC specifications/CPWD specifications. In the absence of the above, the work shall be executed according to the best prevailing practices in the trade, recommendations of relevant American or British Standards or to the instructions of Engineer. The IS standards/IRC specifications/CPWD specifications to be followed are mentioned in the technical specifications attached hereto. They shall be latest edition/version of the same issued 15 days prior to the date of opening of this tender. The Contractor is expected to get himself clarified on any doubts about the specifications etc. before bidding and the discussions recorded in writing with the Owner in respect of interpretation of any portion of this document.

1.3. The work shall be carried out according to the design / drawings to be developed by the Contractor and approved by the Owner based on Tender Drawings supplied to the Contractor by the Owner. For all buildings, structures, foundations etc. necessary layout and details shall be developed by the Contractor keeping in view the functional requirement of the Sub-Station facilities and providing enough space and access for operation, use and maintenance based on the input provided by the Owner. Certain minimum requirements are indicated in this specification for guidance purposes only. However, the Contractor shall quote according to the complete requirements.

1.4. The Contractor shall take all necessary precautions to protect all the existing equipment, structures, facilities & buildings etc. from damage. In case any damage occurs due to the activities of the Contractor on account of negligence, ignorance, accidental or any other reason whatsoever, the damage shall be made good by the Contractor at his own cost to the satisfaction of the Engineer. The Contractor shall also take all necessary safety measures, at his own cost, to avoid any harm / injury to his workers and staff from the equipment & facilities of the power station.

1.5. During the progress of work, the Engineer will exercise supervision of the work to ensure that the technical provisions of the contract are being followed and the work is being executed accurately and properly. However, such supervision shall in no way relieve the Contractor of the responsibility for executing the work in accordance with the specifications.

1.6. Before submitting the bid, the Contractor shall inspect and examine the site and its surroundings and shall satisfy himself as to the nature of the ground and subsoil, the availability of materials necessary for completion of the work, means of access to site and in general shall himself obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect his offer. No extra claim consequent on any misunderstanding or otherwise shall be allowed.

1.7. During execution, if any additional requirement arises for successful commissioning of grid, then same shall be in scope of vendor by considering all safety and quality standards in all aspects

2.0 GEOTECHNICAL INVESTIGATION

The Owner will carry out Geo Technical Investigation and Topographical Survey for the entire Sub-Station plot including switchyard. The copy of the report will be given as an input to bidder for Civil Design & estimation work. In case of any further detailed study is required, same shall be in scope of bidder.

3.0 SITE PREPARATION

3.1. Scope

3.1.1. This clause covers the design and execution of the work for site preparation, such as clearing of the site, the supply and compaction of fill material, excavation and compaction of backfill for foundation, road construction, drainage, trenches and final topping by stone (broken hard stone). This work shall also include disposal of any non-essential/excess soil or malba.

3.2. General

3.2.1. The layout and levels of all structures, etc shall be made by the Contractor at his own cost from the general grids of the plot and benchmarks finalized / approved by the Owner. (The required filling up to formation level shall be in the scope of Vendor). The Contractor shall

give all help in instruments, materials and personnel to the Owner for checking the detailed layout and shall be solely responsible for the correctness of the layout and levels.

3.2.2. The Contractor shall have to make good to all the damages to the boundary wall and gates during work execution.

3.2.3. Contractor shall develop a building layout and other layouts so that the trees inside the plot shall be avoided from cutting. In extreme conditions, if the tree cutting is unavoidable, necessary liaison for permission shall be on part of Contractor from respective Govt. Agency. Requisite formalities shall be carried out by Owner. Fee shall be borne by the Owner. Compensatory plantation shall be done (if required) by vendor; BRPL shall provide space for the same.

3.2.4. The Contractor shall develop the site area to meet the requirements of the intended purpose. The site preparation shall confirm to the requirements of relevant sections of this specification or as per stipulations of standard specifications.

3.2.5. If fill material is required, the fill material shall be suitable for the above requirement. The fill shall be such a material and the site so designed as to prevent the erosion by wind and water of material from its final compacted position or the in-situ position of undisturbed soil.

3.2.6. Material unsuitable for filling works shall be removed and replaced by suitable fill material and to be approved by the Owner.

3.2.7. Backfill material around foundations or other works shall be suitable for the purpose for which it is used and shall be compacted to the density described under Compaction. Excavated material not suitable or not required for backfill shall be disposed off by the contractor in areas as directed by Owner upto a maximum lead of 5 km. Backfill material if found having mix of earth and fly ash should not be used for top 30 cm of formation level and should be supplemented with earth at the cost of contractor.The old / existing foundations if not required shall be dismantled by the contractor.

3.3. Excavation and Backfill

3.3.1. Excavation and backfill for foundations shall be in accordance with the relevant code.

3.3.2. Whenever water level is met during the excavation, it shall be dewatered and water level shall be maintained below the bottom of the excavation level during excavation, concreting and backfilling. Nothing extra shall be payable by the owner on this account.

3.3.3. When embankments are to be constructed on slopes of 15% or greater, benches or steps with horizontal and vertical faces shall be cut in the original slope prior to placement of embankment material. Vertical face shall measure not more than 1 m in height.

3.3.4. Embankments adjacent to abutments, culverts, retaining walls and similar structures shall be constructed by compacting of the material in successive uniform horizontal layers not exceeding 15 cm in thickness (of loose material before compaction). Each layer shall be compacted as required by means of mechanical tampers approved by the Owner. Rocks larger than 10cm in any direction shall not be placed in embankment adjacent to structures.

3.3.5. Earth embankments of roadways and site areas adjacent to buildings shall be placed in successive uniform horizontal layers not exceeding 20 cm in thickness in loose stage measurement and compacted to the full width specified. The upper surface of the embankment shall be shaped so as to provide complete drainage of surface water at all times.

3.4. Compaction

3.4.1. The density to which fill materials shall be compacted shall be as per, relevant IS and as per direction of Owner. All compacted sand filling shall be confined as far as possible. Backfilled earth shall be compacted to minimum 95% of the Standard Proctor's density at OMC. The sub grade for the roads and embankment filling shall be compacted to minimum 95% of the Standard Proctor's density at OMC. Cohesion less material sub grade shall be compacted to 70% relative density (minimum).

3.4.2. At all times unfinished construction shall have adequate drainage. Upon completion of the roads surface course, adjacent shoulders shall be given a final shaping, true alignment and grade.

3.4.3. Each layer of earth embankment when compacted shall be as close to optimum moisture content as practicable. Embankment material which does not contain sufficient moisture to obtain proper compaction shall be wetted. If the material contains any excess moisture, then it shall be allowed to dry before rolling. The rolling shall begin at the edges overlapping half the width of the roller each time and progress to the center of the road or towards the building as applicable. Rolling will also be required on rock fills. No compaction shall be carried out in rainy weather.

3.5. Requirement for fill material under foundation

3.5.1. The thickness of fill material under the foundations shall be such that the maximum

pressure from the footing, transferred through the fill material and distributed onto the original undisturbed soil will not exceed the allowable soil bearing pressure of the original undisturbed soil. For expansive soils the fill materials and other protections etc. to be used under the foundation has to be approved by the Owner.

4.0 CODES AND STANDARDS

All standards, specifications, acts and code of practice shall be followed. In case of conflict between this specification and those (IS standard/ IRC specification/CPWD Specification, etc.) referred to herein, the former shall prevail.

5.0 SUBMISSIONS

The following documents shall be submitted by the Contractor for approval of the BRPL prior to commencement of fabrication and erection / construction.

This list is not exhaustive but indicative only. Final list of drawings shall be prepared by successful bidder during detailed engineering. Bidder shall submit the qualification details of his licensed Architect & structural engineer (Approved by any Govt organization for detailed engineering/Structural design/approved by Institution of Engineers (India).

(i) Design calculation, general arrangement drawings, foundation drawing & detailed erection / construction drawings including R/F drawings for Sub-Station Control Room Building.
(ii) Foundation design and drawing of Cable Pot Head.
(iii) Foundation design & drawing of all equipment foundations.
(iv) Structural steel fabrication drawings for Cable Pot & equipment support structure.
(v) Site preparation, filling up to formation level, removal of trees, if any and site cleanliness
(vi) Foundation design & drawing of Power Transformer
(vii) Foundation design & drawing for lighting pole.
(viii) Complete fencing along with gate for the Sub-Station yard
(ix) Details of Indoor and Outdoor Cable Trenches with cable tray supports and trench covers
(x) Design & drawing of Rainwater Harvesting System, sewerage system including septic tank, water supply arrangement, landscaping, etc.
(xi) Design & drawing of roads and complete drainage system (with final connection to Rain Water Harvesting recharge pit) within Sub-Station including crossings.
(xii) Design & drawing Security room.

6.0 STORM WATER DRAINAGE FOR CONTROL ROOM BUILDING

The building drain shall be provided for the collection of storm water from the roofs. This water shall be collected in chambers and these chambers shall drain to the main drainage system of the station which shall in turn be connected to rain water harvesting recharge pits. Overflow of RWH Pits shall be connected to main drain G.I Pipes of 150 MM dia rain water down comers shall be provided to drain off the rain water from the roof.The number and size of down comers shall be governed by IS:1742 and IS:2527. Pipe will be covered by making suitable arrangement in structure and to be matched with external Finishes.

All external drains shall be covered with precast perforated RCC covers of suitable size and thickness.

For all buildings, suitable arrangement for draining out water collected from equipment blow down, leakages, floor washings fire fighting etc. shall be provided for each floor.

7.0 DEVELOPMENT OF YARD

7.1. Scope

7.1.1. The Contractor shall furnish all labour, equipment and materials required for complete performance of the work in accordance with the drawings, specifications and direction of the Owner.

7.1.2. Stone spreading shall be done in the Outdoor Sub-Station Yard area, Power Transformer, Capacitor Bank and wherever equipment and structures are to be provided under the present scope of work.

General Requirement: The material required for site surfacing / stone filling shall be free from all types of organic materials and shall be of standard quality and as approved by the Owner.

Test for aggregates should be as follows:

a) Sieve Analysis limits (Gradation)As per IS: 383-1970

The material to be used for stone filling / site surfacing shall be uncrushed / crushed / broken stone of 20 mm nominal size (ungraded single size) conforming to Table 2 of IS:383 - 1970.

Sieve Analysis (Gradation):
(IS: 383 - Table - 2)

Sieve size	% passing by weight
40mm	100
20mm	85-100
10mm	0 – 20
4.75mm	0-5

One test shall be conducted for every 50 cum.

b) Hardness:

Abrasion value (IS: 2386 Part-IV) - not more than 40%

Impact value (IS: 2386 Part-IV) - not more than 30% and frequency shall be one test per 50 cum with a minimum of one test per source

c) Flakiness Index

As per IS: 2386 Part I

7.1.3. Before taking up the final yard treatment, anti-weed treatment shall be applied in the switchyard area wherever yard treatment is to be done, and the area shall be thoroughly de-weeded including removal of roots. The recommendation of local agriculture or horticulture department shall be sought wherever feasible while choosing the type of chemical to be used. Nevertheless the effectiveness of the chemical shall be demonstrated by the contractor in a test area of 10M x 10M (approx.) and monitored over a period of two to three weeks by the Engineer-in-Charge. The final approval shall be given by Engineer-in-Charge and final approval given based on the results.

7.1.4. The anti-weed chemical shall be procured from reputed manufacturers. The dosage and application of chemical shall be strictly followed as per manufacturer's recommendation. The contractor shall be required to maintain the area free of weeds for a period of 1 year from the date of application of 1st dose of anti-weed chemicals

7.1.5. After all the structures/equipments are erected and anti-weed treatment is complete, the surface of the substation area shall be maintained, rolled/compacted to the lines and grades as decided by Engineer-in-Charge. De-weeding including removal of roots shall be

done before rolling is commenced. Engineer-in-Charge shall decide final formation level so as to ensure that the site appears uniform free from undulations. The final formation level shall however be very close to the formation level using manual or machine roller with suitable water sprinkling arrangement to form a smooth and compact surface.

7.1.6. After anti-weed treatment & compaction of earth, final yard treatment shall be carried out in the 4 layers as follows:

a. Providing and laying in position 75mm thick base layer of cement concrete 1:5:10 (1 cement: 5 coarse sand: 10 bricks aggregate 40mm nominal size).

b. Flat brick flooring with over burnt bricks /class designation 100 as per approval of BRPL on the bed of 12 mm thick cement mortar 1:6 (1 cement : 6 coarse sand) and filling the joints 12mm thick all around the bricks with same mortar.

c. Over the flat brick flooring a layer a final surface course of minimum 100 mm thickness of 20 mm nominal size (single size ungraded) broken stone shall be spread and uniformly levelled.

7.1.7. In areas that are considered by the Engineer-in-Charge to be too congested with foundations and structures for proper rolling of the site surfacing material by normal rolling equipment i.e., clear space between any 02 adjacent structures/foundation less than 01 meter, these adjoining structures/foundations shall be constructed as a monolithic structure.

7.1.8. The sub grade shall be in moist condition at the time the cement concrete is placed. If necessary, it should be saturated with water for not less than 6 hours but not exceeding 20 hours before placing of cement concrete. If it becomes dry prior to the actual placing of cement concrete, it shall be sprinkled with water and it shall be ensured that no pools of water or soft patches are formed on the surface.

8.0 CABLE TRENCHES

8.1. The cable trenches and precast removable RCC cover (with lifting arrangement) shall be constructed using RCC of minimum grade M25.

8.2. The RCC cable trench walls and raft shall not be less than 150 mm thick.

8.3. The cable trench wall shall be designed for the following loads.

- Dead load of 155 kg/m length of cable support + 75 Kg on one tier at the end. (Wall thickness Minimum-150 mm)
- Triangular earth pressure + uniform surcharge pressure of 2T/m2.

8.4. Cable trench covers shall be 50 mm thick. All trench covers/ drain covers shall have desired IRC Mesh of size 75x25mm (wire size 6 gauge/ 7.75 kg/m2) welded to M.S. frame of angle 50 x 50 x 6 mm all-round the cover. Size of covers shall be as per site requirement / direction of Engineer in Charge.

8.5. Size of covers shall be per site requirement / direction of Engineer In Charge.

8.6. All cable trenches inside the buildings shall have covers comprising of 6 mm thick chequered plates fixed on angle 40 x 40 x 5 mm frame with arrangement of MS holes for lifting of cover.

8.7. Cable trench crossing the road/rails shall be designed for class AA loading of IRC/relevant IS Code and should be checked for transformer/reactor loading.

8.8. Trenches shall be drained. Necessary sumps be constructed and submersible sump pumps with stand by arrangement shall be supplied/ installed. Cable trenches shall not be used as storm water drains.

8.9. The top of cable trench shall be such that the surface rain water does not enter the trench.

8.10. All metal parts inside the trench shall be connected to the earthing system.

8.11. The trench bed shall have a perpendicular to the run. Trench wall shall not foul with the foundation. Suitable clear gap shall be provided.

8.12. The trench bed shall have a slope of 1/500 along the run & 1/250 perpendicular to the run.

8.13. All the construction joints of cable trenches i.e. between base slab to base slab and the junction of vertical wall to base slab as well as from vertical wall to wall and all the expansion, joints shall be provided with approved quality PVC water stops of approx. 230 x 5 mm size for those sections where the ground water table is expected to rise above the junction of base slab and vertical wall of cable trenches.

8.14. Cable trenches shall be blocked at the ends if required with brick masonry in cement sand mortar 1:6 and plaster with 12mm/15mm thick 1:4 cement sand mortar.

9.0 DRAINAGE SYSTEM

Adequate site drainage system shall be provided by the Contractor. The Contractor shall design the storm water drainage system covering all culverts, ditches, drains, etc. The run off shall be calculated on the basis of maximum rainfall intensity that is likely to occur over the catchment area in one hour period on an average of once in ten years. The surface of the site shall be sloped to prevent the ponding of water. Outfall of drainage shall be suitably connected to rainwater harvesting recharge pits. While designing the drainage system following points shall be taken care of:

1. The maximum velocity for pipe drains and open drains shall be limited to 2.4m/sec and 1.8m/sec respectively. However, minimum non-silting velocity of 0.6m/sec shall be ensured. Longitudinal bed slope not milder than 1 in 1000 shall be provided.

2. For design of RCC pipes for drains and culverts, IS: 456 and IS: 783 shall be followed.

3. The Contractor shall ensure that water drains are away from the site area and shall prevent damage to adjacent property by this water. Adequate protection shall be given to site surfaces, roads, ditches, culverts, etc. to prevent erosion of material by water.

4. For pipe drains, concrete pipe of class NP3 shall be used. However, for road crossings etc. higher strength pipe of class NP4 shall be provided. For rail crossings, pipes conforming to railway loading standards or at least NP4 class shall be provided. Manholes shall be provided at every 30m interval, at connection points and at every change of alignment.

5. Pipe drains shall be connected through manholes at an interval of maximum 15mtrs. Effluents shall be suitably treated by the Contractor to meet all the prevalent statutory requirements and local pollution control norms and treated effluents shall be conveyed to the storm water drainage system at a suitable location for its final disposal.

6. All internal site drainage system, including the final connection/disposal to rainwater harvesting recharge pits shall be part of Contractor's scope including all required civil work, mechanical & electrical systems. The Contractor shall connect drain(s) at one or more points to rainwater harvesting recharge pits as feasible at

site. The drainage layout of the substation shall be approved by the Owner & all works shall be carried out by the Contractor.

7. The drainage scheme and associated drawings shall be got approved from the Owner.

10.0 ROAD

10.1. Inside substation roads to be provided for access along with car parking for at least three cars and two wheeler parking for three vehicles. Building, Roads and parking are in the scope of bidder. Layout of the roads shall be based on layout drawing for the substation. Parking areas shall be provided for Site personnel and visitors as per layout drawing. Adequate turning space for vehicles shall be provided and bend radius shall be set accordingly. It has to be connected suitably with roads.

10.2. All substation roads shall be constructed so as to permit transportation of all heavy equipment upto 60MT. The main approach roads upto Control Room Building and other relevant roads will be RCC/ Cement Concrete Roads. The other connecting roads and pathways shall be of Paver blocks/ CC Road as per site requirement. The pavers blocks used for the roads shall be minimum 80mm thick with compressive strength not less than 450Kg/cm2.

10.3. Road construction shall be as per IRC standard.

10.4. Adequate provision shall be made for road drainage.

10.5. All the culverts and its allied structure (required for road/rail, drain trench crossings etc.) shall be designed for class AA loading as per IRC standard/IS code.

11.0 DESIGN CONSIDERATION FOR FOUNDATION

11.1. General

11.1.1. Work covered under this Clause of the Specification comprises the design and construction of foundations and other RCC constructions for switchyard structures, equipment supports, trenches, drains, jacking pad, pulling block, control cubicles, bus supports, Power transformer/Reactors, marshalling kiosks and auxiliary equipments, tanks or for any other equipment or service and any other foundation required to complete the work. This clause is as well applicable to the other RCC constructions.

11.1.2. Concrete shall conform to the requirements mentioned in IS: 456 and all the tests shall be conducted as per relevant Indian Standard Codes as mentioned in Standard field quality plan appended with the specification. A minimum grade of M25 concrete shall be used for all structural/load bearing members as per latest IS: 456 (latest revision).

11.1.3. If the site is sloppy, the foundation height will be adjusted to maintain the exact level of the top of structures to compensate such slopes.

11.1.4. The switchyard foundation's plinths shall be minimum 300mm above finished yard level.

11.1.5. Minimum 100mm thick lean concrete (1:4:8) shall be provided below all underground structures, foundations, trenches etc. to provide a base for construction.

11.1.6. Concrete made with Ordinary Portland cement shall be carefully cured and special importance shall be given during the placing of concrete and removal of shuttering.

11.1.7. The design and detailing of foundations shall be done based on the approved soil data and sub-soil conditions as well as for all possible critical loads and the combinations thereof. The Spread footing or pile foundation as may be required based on soil/sub-soil conditions and superimposed loads shall be provided.

11.1.8. If pile foundations are adopted, the same shall be cast-in-situ driven/bored or precast or under reamed type as per relevant. parts of IS Code 2911. Only RCC piles shall be provided. Suitability of the adopted pile foundations shall be justified by way of full design calculations. Detailed design calculations shall be submitted by the bidder showing complete details of piles/pile groups proposed to be used. Necessary initial load test shall also be carried out by the bidder at their cost to establish the piles design capacity. Only after the design capacities of piles have been established, the Contractor shall take up the job of piling. Routine tests for the piles shall also be conducted. All the work (design & testing) shall be planned in such a way that these shall not cause any delay in Project completion. The contractor shall go for vertical load testing or lateral load testing. The contractor may choose static or dynamic load testing upon site condition and time constraint.

11.2. Design

11.2.1. All foundation shall be of reinforced cement concrete. The design and construction of RCC structures shall be carried out as per IS: 456 and minimum grade of concrete shall be M-25.

11.2.2. Limit state method of design shall be adopted unless specified otherwise in the specification.

11.2.3. For detailing of reinforcement IS: 2502 and SP: 16 shall be followed. TMT bars conforming to IS: 1786 shall be used as reinforcement. However, in specific areas mild steel (Grade I) conforming to IS: 432 can also be used. Two layers of reinforcement (on inner and outer face) shall be provided for wall & slab sections having thickness of 125 mm and above. For footings minimum cover shall be 50 mm.

11.2.4. RCC water retaining structures like storage tanks, etc. shall be designed as uncracked section in accordance with IS: 3370 (Part I to IV) by working stress method. However, water channels shall be designed as cracked section with limited steel stresses as per IS: 3370 (Part I to IV) by working stress method. Joints on each concrete lift shall be provided with approved quality PVC water stops of approx. 230 x 5 mm size to avoid water seepage through those joints

11.2.5. The procedure used for the design of the foundations shall be the most critical loading combination of the steel structure and or equipment and/or superstructure and other conditions, which produces the maximum stresses in the foundation or the foundation component and as per the relevant IS Codes of foundation design. Detailed design calculations shall be submitted by the bidder showing complete details of piles/pile groups proposed to be used.

11.2.6. Design shall consider any sub-soil water pressure that may be encountered following relevant standard strictly.

11.2.7. Necessary protection to the foundation work. If required shall be provided to take care of any special requirements for aggressive alkaline soil. Black cotton soil or any other type of soil which is detrimental / harmful to the concrete foundations.

11.2.8. RCC columns shall be provided with rigid connection at the base. All columns shall be interconnected with RCC beams at Footing Level from all possible Directions/Suitable size raft footing will be provided.

11.2.9. All sub-structures shall be checked for sliding and overturning stability during both construction and operating conditions for various combinations of loads. Factor of safety for these cases shall be taken as mentioned in relevant IS Codes as stipulated elsewhere in the Specifications. For checking against overturning, weight of soil vertically above footing shall be taken and inverted frustum of pyramid of earth on the foundation should not be considered.

11.2.10. Earth pressure for all underground structures shall be calculated using coefficient of earth pressure at rest. Co-efficient of active or passive earth pressure (whichever is applicable). However, for the design of substructures of any underground enclosures, earth pressure at rest shall be considered.

11.2.11. In addition to earth pressure and ground water pressure etc., a surcharge load of 2T/Sq.m shall also be considered for the design of all underground structures including channels, sumps, tanks, trenches, and substructure of any underground hollow enclosure etc, for the vehicular traffic in the vicinity of the structure.

11.2.12. Following conditions shall be considered for the design of water tank in pumps house, channels, sumps, trenches and other underground structures:

a) Full water pressure from inside and no earth pressure, ground water pressure & surcharge pressure from outside (application only to structures, which are liable to be filled up with water or any other liquid).

b) Full earth pressure, surcharge pressure and ground water pressure from outside and no water pressure from inside.

c) Design shall also be checked against buoyancy due to the ground water during construction and maintenance stages. Minimum factor of safety of 1.5 against buoyancy shall be ensured ignoring the superimposed loadings.

11.2.13. Base slab of any underground enclosure shall also be designed for empty condition during construction and maintenance stages with maximum groundwater table (GWT). Minimum factor of safety of 1.5 against buoyancy shall be ensured ignoring the super-imposed loadings.

11.2.14. Base slab of any underground enclosure like water storage tank shall also be designed for the condition of different combination of pump sumps being empty during maintenance stages with maximum GWT. Intermediate dividing piers of such enclosures shall be designed considering water in one pump sump only and the other pumps sump being empty for maintenance.

11.2.15. The foundations shall be proportioned so that the estimated total and differential movements of the foundations are not greater than the movements that the structure or equipment is designed to accommodate.

11.2.16. The foundations of transformer shall be of block type foundation. Minimum reinforcement shall be governed by IS: 2974 and IS: 456.

11.2.17. The equipment foundations shall be checked for a factor of safety of 2.2 for normal condition and 1.65 for short circuit condition against sliding, overturning and pullout. The same factors shall be used as partial safety factor over loads in limit state design also.

11.3. Admixture & Additives

11.3.1. Only approved admixtures shall be used in the concrete for the Works. When more than one admixture is to be used, each admixture shall be batched in its own batch and added to the mixing water separately before discharging into the mixer. Admixtures shall be delivered in suitably labeled containers to enable identification.

11.3.2. Admixtures in concrete shall conform to IS: 9103. The waterproofing cement additives shall conform to IS: 2645. Owner shall approve concrete Admixtures/ Additives.

11.3.3. The contractor may propose and the Owner may improve the use of a water-reducing set-retarding admixture in some of the concrete. The use of such an admixture will not be approved to overcome problems associated with inadequate concrete plant capacity or improperly planned placing operation sand shall only be approved as an aid to overcoming unusual circumstances and placing conditions.

11.3.4. The water-reducing set-retarding admixture shall be an approved brand of Ligno-sulphonate type admixture.

11.3.5. The waterproofing cement additives shall be used as required/advised by the Owner.

11.3.6. Water proofing treatment on roof shall be as per Item No 22.7.1 - DSR 2012.

12.0 FENCING OF SUB-STATION (LIVE PART) AREA

12.1. General

Fencing shall be designed for the most critical loading combination taking care of wind force, stability, tension on wires, minimum requirements as per this clause for are materials IS 8910 and fabrication IS 800 as per recommendations

12.2. Areas Requiring Fencing

12.3. Fencing shall be providing for the following areas:

12.3.1. Site fencing for the complete Outdoor substation Yard area including Power transformer area. Gates shall be provided for men and machine / equipment to be taken out of the substation.

12.3.2. The IRC weld mesh Panels fencing of Capacitor Bank with roof cover (as per approved BRPL pattern).

12.3.3. Fencing of Aux. Substation Transformer (as per approved BRPL pattern).

12.4. Product Material

12.4.1. The minimum requirements are as follows:

IRC Weld Mesh fencing in accordance to relevant IS Code

•	Size of IRC mesh	25X75mm
•	Nominal wire size	6 gauge/ 7.75 kg/m2
•	Width of fencing panel	2400mm
•	Height of fencing	2000mm
•	Fabrication of panel	40mm Nominal bore M.S. Pipe (medium duty). Providing elbow/bendat corners & 40 x 5 mm M.S. flats inbeading
•	Paint	Aluminium Paint

12.4.2. Posts

- Intermediate Straining Post: 65mm Nominal bore, M.S. Pipe (Medium duty)
- Base Plate : 12mm M.S. Plate with 4 nos of hole. Nuts & bolts of suitable diameter.
- Paint: shall be painted with a coat of approved steel primer and two coats of synthetic enamel paint

The IRC weld mesh Panels shall be fixed to the post at the top and bottom of the 65mm Nominal bore, M.S. Pipe by Nuts and bolts. The Intermediate straining Posts to be erected by using holding down bolts and nuts grouted in toe wall around the Yard (the height of Yard) Posts shall be set in 1:1.5:3 Reinforced cement concrete blocks of minimum dimension (340 mm x 340 mm x 750 mm deep) and Toe wall to be at least 450 mm below & 450 mm above the yard level and 340 mm wide matched with External facade of the building(Grit-wash).

12.5. Installation

12.5.1. Fence shall be installed along switchyard line.

12.5.2. Post holes shall be excavated by approved methods.

12.5.3. Intermediate posts shall be spaced 2.5 m apart measured parallel to ground surface.

12.5.4. Concrete work shall conform to relevant clause. Post shall be braced and held in plumb position and true alignment and elevation until concrete has set.

12.5.5. Fence fabric shall not be installed until concrete has cured a minimum of 7 days.

12.5.6. Bottom and top of the fence panels shall be fixed with post by MS flats of 50 mm x 6 mm (min).

12.5.7. Toe wall of Brick masonry, with notches over 100 mm thick PCC (1:4:8) shall be provided below all fencing and shall be minimum 450 mm above and 450 mm below finished ground level. All exposed surfaces of brick toe wall shall be finished with Grit plaster/Matched with Building façade.

12.6. M.S. Gate

12.6.1. M.S. Gate of 6.0 m wide x 2.3 m height (2 nos) and 1.55 m x 2.3 m height (1 no) shall be provided to provide access through the fencing to the yard. M.S. Gate of 6.0 m wide x 2.3 m height shall be made in two leaf and 1.55 m x 2.3 m height shall be made in one leaf with locking arrangements. The gate shall be made with outer frame of 40 NB (Medium) M. S. Pipe. Weld mesh of opening size 25 x 75 mm and nominal wire size of mesh is 6 gauge/ 7.75 kg/m2 (as per standard approved drawing of BSES).

12.6.2. Hinges, al-drops and other accessories shall be provided for effective working of the gate.

13.0 GATES (Not Applicable)

13.1. The gates shall be fabricated with welded joints to achieve rigid connections. The gate frames shall be painted with one or more coat of approved steel primmer and two coats of synthetic enamel paint.

13.2. Gates shall be fitted with approved quality iron hinges. Hinges shall permit gates to swing through 180 degree.

13.3. Gates shall be fitted with galvanized chain hook or gate hold back to hold gates open. Double gates shall be fitted with centre rest and drop bolt to secure gates in closed position.

13.4. Main Gate shall be at least 6m wide. Gates shall be installed in locations shown on drawings. Next to the main gate, a small gate (1.25 m wide, single leaf) within main gate shall also be provided as a wicket gate.

13.5. Bottom of main gates (both at entry and exit) shall be set approximately 40mm above ground surface with necessary guiding mechanism i.e., wheels at bottom along with a track allowing its smooth movement on floor shall be fitted as per site requirement.

13.6. The gates shall be provided with suitable locking arrangement.

14.0 MISCELLANEOUS GENERAL REQUIREMENTS

14.1. Dense concrete with controlled water cement ratio as per IS-code shall be used for all underground concrete structures such as pump-house, tanks, water retaining structures, cable and pipe trenches etc. for achieving water tightness.

14.2. All joints including construction and expansion joints for the water retaining structures shall be made water tight by using PVC ribbed water stops with central bulb. However, kicker type (externally placed) PVC water stops shall be used for the base slab and in other areas where it is required to facilitate concreting. The minimum thickness of PVC water stops shall be 5 mm and minimum width shall be 230 mm.

14.3. All mild steel parts used in the water retaining structures shall be hot-double dip galvanized. The minimum coating of the zinc shall be 610 gm/sqm. for galvanized structures and shall comply with IS:2629 and IS:2633. Galvanizing shall be checked and tested in accordance with IS:2633. The galvanizing shall be followed by the application of an etching primer and dipping in black bitumen in accordance with IS:3416.

14.4. A screed concrete layer not less than 100 mm thick and of grade not weaker than M10 conforming to IS: 456 shall be provided below all water retaining structures. A sliding layer of bitumen paper or craft paper shall be provided over the screed layer to destroy the bond between the screed and the base slab concrete of the water retaining structures.

14.5. Bricks having minimum 100 kg/cm2 compressive strength can only be used for masonry work. Contractor shall ascertain himself at site regarding the availability of bricks of minimum 100 kg/cm2 compressive strength before submitting his offer.

14.6. Doors and windows on external walls of the building (other than areas provided, with insulated metal claddings) shall be provided with RCC sunshade over the openings with 150 mm projection on either side of the openings. Projection of sunshade from the wall shall be minimum 600mm over window & door openings.

14.7. RCC staircase shall be provided for access to roof of the building. All stairs shall have maximum riser height of 150 mm and a minimum tread width of 300 mm Minimum width of stairs shall be 1500 mm. Steel doors shall be provided in the Mumty and height of Mumty should be at least 2.6m.

14.8. Angles 50x50x6 mm (minimum) with lugs shall be provided for edge protection all round cut outs/openings in floor slab, edges of drains supporting covers, edges of RCC cable/pipe trenches supporting covers, edges of manholes supporting covers, supporting edges of manhole precast cover and any other place where breakage of comers of concrete is expected.

14.9. Anti termite chemical treatment shall be given to column pits, wall trenches, foundations of buildings, filling below the floors etc. as per IS: 6313 and other relevant Indian Standards.

14.10. All reinforcement in RCC structures and structural steel members shall be of make TATA/ SAIL/Jindal or equivalent.

14.11. The railing of staircase shall be 0.9 m average height comprising of stainless steel (Grade 304) Jindal Make member minimum 3 mm thick made of Hollow tubes, channels, plates etc., including welding, grinding, buffing, polishing and making curvature (wherever required) and fitting the same with necessary stainless steel nuts and bolts complete, i/c fixing the railing with necessary accessories & stainless steel dash fasteners , stainless steel bolts etc., of required size, on the top of the floor or the side of waist slab with suitable arrangement as per approval of Engineer-in-charge.

14.12. Loading/Unloading Platform stainless steel (Grade 304) Jindal make Balcony Railing hollow pipe 80x40x3 mm hand rail, horizontal pipes 40x20x3 mm .

14.13. All underground water retaining concrete structures shall have water proofing cement additive conforming to IS: 2645 water proofing for walls and base slab of all underground concrete structures like basements pump houses etc. shall be by "Injection Method".

14.14. All buildings shall have 750mm wide plinth protection all round.

14.15. Monorails, Monorail girders and fixtures shall be provided by the Bidder wherever required.

14.16. All foundations embedment, inserts, blockouts required for equipments shall be provided by bidder.

14.17. 50mm thick DPC shall be provided before laying of masonry (item no. 4.11 & 4.13-DSR 2012).

14.18. BSES Display board is to be provided of required size (3.0mx1.20m) and as per approved pattern /drawing of BRPL with name of the grid- ACP sheet signage with reverse 2D matter with LED Module Light having Automatic Timer On & Off System.

14.19. Water and Sewer line connections to be done along with approval of CIVIC agency.

14.20. The details given in tender drawings shall be considered along with details available in this section of the specification while deciding various components of the building.

14.21. Balance Plot area should be covered with CC pavement/Pavers as per EIC Items/components of buildings not explicitly covered in the specification but required for completion of the Project shall be deemed to be included in the scope

15.0 INTERFACING

The proper coordination & execution of all interfacing civil works activities like fixing of conduits in roofs/walls/floors, fixing of lighting fixtures, fixing of supports/ embedment, provision of cutouts etc for indoor illumination, ventilation & Air conditioning shall be the sole responsibility of the Contractor. He shall plan all such activities in advance and execute in such a manner that interfacing activities do not become bottlenecks and dismantling, breakage etc. is reduced to minimum

16.0 FIELD QUALITY PLAN FOR CIVIL WORKS

The field quality plan for all civil works shall be in accordance with CPWD specification and other relevant Indian Standard Codes. All quality checks and procedures shall be followed as per relevant CPWD norms.

17.0 WATER SUPPLY

17.1. Water for construction work as well as drinking purpose shall be in the scope of Contractor.

17.2. The Contractor shall carry out all the plumbing/erection works required for supply of water in control room building.

17.3. A scheme shall be prepared by the Contractor indicating the layout and details of water supply which shall be got approved from the Owner before actual start of' work including all other incidental items not shown or specified but as may be required for complete performance of the works.

17.4. Either Bore-well or Connection from respective owners/DJB water source along with required pumps for water supply shall be in the scope of contractor. Although contractor shall provide an underground water reservoir, near the gate of minimum 20 M3 or sufficient capacity for refill of one fire Tanker. The water reservoir shall be provided with a high-pressure pump and single point fire hydrant outlet for refilling the fire tender in case of fire and emergency with proper waterproofing treatment & ceramic tiles finish on walls & Floor. Necessary valve shall be provided in the outlet.

17.5. The details of tanks, pipes, fittings, fixtures etc for water supply shall be approved by engineer in charge.

18.0 SEWERAGE SYSTEM

18.1. Sewerage system shall be provided for control room building.

18.2. The Contractor shall construct septic tank and soak pit suitable for 20 users or make connection with nearby existing sewerage system of Civic agencies/respective owners.

18.3. The system shall be designed as per relevant IS Codes.

18.4. External sewerage system including connection with internal services of building shall be within the scope of this contract. The connection and laying of sewer lines and manholes up to the point of connection with the sewer line of local civic agency if existing within 100m from any point of boundary of sub-station. If the sewer line of local civic agency does not exist in the area, then septic tank with soak pit shall be constructed for control room building (suitable for 20 users). Vendor shall obtain necessary approval from civic agency for laying of sewer lines as aforesaid and connection thereof. Any municipal charges for approval and connection shall be paid by BRPL directly to the local authorities.

19.0 RAIN WATER HARVESTING

(a) Providing two recharge structures with bore wells at different locations as per

approved drawing for rainwater harvesting system. The recharge structures shall be suitably located within the sub-station. Branch drains from the main drain carrying rainwater from entire switchyard, constructed in accordance with clause 9 & 10 shall be connected to the recharge structures.

(b) The internal dimensions of recharge shafts shall be 3.0 m X 2.5 m with 230mm thick lining of brick work up to a depth of 2.0 meter from Finished Ground level and 345mm thick brickwork below 2.0-meter depth. The brickwork shall be constructed with cement mortar 1:6 (1cement: 6 coarse sand). The overall depth of shaft shall be 3.0 meter below invert level of drain. The shaft shall be covered with RCC slab for a live load of 300 kg. per sqm. Two openings of size 0.7 x 0.7 meter shall be provided in the RCC cover slab. An iron cover made of 5mm thick chequered plate with hinges shall be provided on the openings. Galvanized M.S. rungs of 16mm diameter at spacing of 300 mm shall be provided in the wall of shaft below the opening in the RCC slab to facilitate cleaning of shaft.

(c) A 300 mm diameter bore well shall be drilled in the centre of the shaft. The depth of bore well shall be 5.0 meter more than the depth of sub soil water.

(d) A 100 mm diameter medium duty MS pipe conforming to IS: 1161 shall be lowered in the bore well keeping bail plug towards bottom of bore well. The pipe shall have 1.58mm holes for 4.0-meter length starting from 1.0 meter from bottom of bore well. Holes of 3.0mm diameter shall be provided for a length of 2.0 meter starting from the bottom level of coarse sand and down wards. The overall length of pipe shall be equal to total depth of bore well plus depth of shaft.

(e) Gravel of size 3mm to 6mm shall be filled around 100 diameter MS pipe in the bore well. The shaft shall be filled with 500 mm thick layers each from the bottom of shaft with boulders of size 50mm to 150mm, gravel of size 5mm to 10mm, coarse sand having particle size 1.5mm to 2.0mm and boulders of size not less than 200mm respectively.

(f) Drawing based on above details of recharge structure for rainwater harvesting has to be prepared by contractor and to be approved from engineer in charge.

20.0 STATUTORY RULES

20.1. Contractor shall comply with all the applicable statutory rules pertaining to factories act (as applicable far the State), Fire Safety Rules of Tariff Advisory Committee. Water Act for pollution control, Energy Conservation Act, etc.

20.2. Provisions for fire proof doors, no. of staircases, fire separation wall, plastering on structural members (in fire prone areas) etc. shall be made according to the recommendations of Tariff Advisory Committee.

20.3. Statutory clearance and norms of State Pollution Control Board shall be followed as per Water Act for effluent quality from plant.

20.4. Foundation system adopted by Bidder shall ensure that relative settlement and other criteria shall be as per provision in IS: 1904 and other Indian Standards.

20.5. All water retaining structures designed as uncracked section shall also be tested for water tightness at full water level in accordance with clause no. 10 of IS :3370 (Part-I).

20.6. Construction joints shall be as per IS: 456.

20.7. All underground concrete structures like basements, pumps houses, water retaining structures etc. shall have plasticizer cum water proofing cement additive conforming to 1S:9103. In addition, limit on permeability as given in 1S:2645 shall also be met with. The concrete surface of these structures in contact with earth shall also be provided with two coat of bituminous painting for water/damp proofing. In case of water leakage in the above structures, Injection Method shall be applied for repairing the leakage.

20.8. All building/construction materials shall conform to the best quality specified in CPWD specifications if not otherwise mentioned in this specification.

20.9. All tests as required in the standard field quality plans of CPWD or as per sound engineering practices have to be carried out.

20.10. The type and treatment of all foundation shall be as per recommendation of geo-technical investigation reports.

21.0 TESTS FOR MATERIAL / WORKMANSHIP

All tests required for various bought out items, materials, quality of workmanship or any other tests as desired by Project Manager and as specified in technical specification shall be carried out by the Bidder at his own cost in the presence of the authorized representative of the Engineer. The quality assurance check lists are given at the end of respective chapters / sections of these specifications. The Bidder shall submit comprehensive Quality Assurance plan for all materials, equipment, workmanship,

services etc. and get it approved from the Engineer. This shall include setting up a test laboratory at site. However, such check list shall in no way limit the liability and responsibility of the Bidder in regard to quality of workmanship as detailed out in the specifications. The sampling & testing of the construction materials shall be in accordance to latest CPWD Specifications related to all activities of the building and other civil construction works.

22.0 DRAWINGS

The successful Bidder shall first submit the structural design calculations along with general arrangement drawings for approval. After the approval of the design calculations by the owner detailed construction drawings shall be prepared and submitted for Employer's approval along with revised design calculations if required within 15 days. Required number of sets of design calculations, drawings and documents shall be submitted by the Bidder. BOQ, Calculations and other documents etc. shall be on A4 size paper. All the drawings shall be drawn to the scale as far as possible on A1 size or larger size paper and should be legible. The submission shall be:

- Three (03) Sets of approved and released for construction drawings/BOQ/Calculation for Owners reference.
- Six (06) Sets of final As-Built drawings, design, BOQ, Calculation & O&M manual for all equipments supplied.
- Soft copies of all drawings/Documents/calculation in Auto CAD and Microsoft office file format as applicable.

Drawings shall be treated as submitted, only if provided with BOQ (If applicable). Transmittal sheet shall be mandatory to attach with all the drawing and documents. Format for transmittal shall be provided to successful bidder for drawing approvals etc.

23.0 ALTERATION IN SPECIFICATION AND DESIGN

The Project Manager shall have the power to make any alteration and omissions from, additions to or substitution for the original specifications, drawings, designs and instructions that may appear to him to be necessary during the progress of the work and the Bidder shall carry out the work in accordance with any instruction which may be given to him in writing signed by the Project Manager and such alterations, omissions, additions or substitutions shall not invalidate the contract and any altered, added or substituted work which the Bidder may be directed to do in the manner above specified as part of the work shall be carried out by the Bidder on the same conditions in all respects on which the Bidder agreed to do the original contract work. The time for completion of work shall be altered in the proportion that

the altered, added or substituted work bears to the original contract work and the certificate of the Project Manager shall be conclusive as to such proportion. The rates for the altered items of work shall be worked out on the following basis and necessary alternations in the total amount shall be made on that basis:

(a) The rates to be reimbursed or recovered shall be taken as same as those given in CPWD-DSR (2021) for those items for which the rates are available in CPWD - DSR (2021).

(b) Rates for the items not covered under CPWD - DSR (2021) shall be derived from the rates of similar items of CPWD schedule of rates.

(c) In the event there is no similar class of work specified in the CPWD - DSR (2021), the Bidder shall work on a rate for such an item on the basis of the prevalent market rates for materials / men / machines and submit the same together with the detailed analysis to the Project Manager within 7 days. The Project Manager shall thereafter review the correctness and then conduct necessary negotiations with the Bidder to arrive at a mutually agreeable rate. Engineer's decision in regard to rates of such items shall be final and binding on the Bidder.

In case of conflict between this chapter and other Chapters of Technical Specifications, provisions given in this chapter shall govern.

Table 1- Finishing Schedule

No	Location	Flooring	Wall Internal	Ceiling	Doors, Windows, Ventilators
1	Control room	52 mm thick CC flooring with concrete hardener topping & Dust proof Epoxy Paint & False Flooring as per specification clause No-6.5.2	Plastic emulsion Paint on smooth surface applied with putty	Oil bound washable distemper on smooth surface applied with putty	Doors: 02 hours fire rated doors as per clause no. 6.10.b Windows & Ventilators: Aluminium Windows & Ventilators As per clause no. 6.10.c
2	Office rooms, maintenance room,	Granite Flooring	Oil bound washable distemper on smooth surface	Oil bound washable distemper on smooth	Doors: Steel door as per clause no. 6.10.a

No	Location	Flooring	Wall Internal	Ceiling	Doors, Windows, Ventilators
	Reception Lobby/ Passage, staircase area		applied with putty	surface applied with putty	Windows & Ventilators: Aluminium Windows & Ventilators As per clause no. 6.10.c
3	Toilet	Anti-skid Ceramic tiles with white cement.	Ceramic glazed tile toilet, for pantry above working platform up to 750 mm.	Oil bound washable distemper on smooth surface applied with putty	Doors, Windows & Ventilators: Aluminium Doors, Windows & Ventilators As per clause no. 6.10.c
4	Cellar	52 mm thick CC flooring with concrete hardener topping	Oil bound washable distemper on smooth surface applied with putty	Oil bound washable distemper on smooth surface applied with putty	Doors: Steel door as per clause no. 6.10.a Windows & Ventilators: Aluminium Windows & Ventilators As per clause no. 6.10.c
5	Other areas not specified	Double charged Vitrified tile of size 600x600mm of make Kajaria or equivalent	Oil bound washable distemper on smooth surface applied with putty	Oil bound washable distemper on smooth surface applied with putty	Doors: Steel door as per clause no. 6.10.a Windows & Ventilators: Aluminium Windows & Ventilators As per clause no. 6.10.c

No	Location	Flooring	Wall Internal	Ceiling	Doors, Windows, Ventilators
6	Switchgear Room/GIS Room	Self-levelling Epoxy flooring 2mm thick after application of 2mm thick screed over 52 mm thick CC flooring with concrete hardener topping	Oil bound washable distemper on smooth surface applied with putty	Oil bound washable distemper on smooth surface applied with putty	Doors: 02 hours fire rated doors as per clause no. 6.10.b Windows & Ventilators: Aluminium Windows & Ventilators As per clause no. 6.10.c
8	The External finishing of Control room building will be of Stone grit/ Wash Marble chip of approved cool and quality with color pigments using white / grey cement or combination of both.				
9	External finishing of the building on area other than the area of stone grit/ Wash Marble using Acrylic Smooth exterior paint (painting) shall be of Asian paints or equivalent. The paint shade as approved by BRPL				

24.0 FIRE PROTECTION WALLS

24.1. General

24.1.1. Fire protection walls shall be provided, wherever required, in accordance with Tariff Advisory Committee (TAC) and certifying all mandatory safety clearances.

24.2. Material

24.2.1. The firewall shall be made up of reinforced cement concrete (at least M-25 grade) as per the system requirements. Materials used must conform to the standards of the National Fire Prevention Association & TAC Norms.

24.3. Fire Resistance

24.3.1. The firewall shall have a minimum fire resistance of 3 hours. The partitions, which are made to reduce the noise level of the transformers, shall have the same fire resistance where the partitions are also used as firewalls. The walls of the building, which are used as firewalls, shall also have a minimum fire resistance of 3 hours.

24.3.2. The firewall shall be designed to protect against the effect of radiant heat and flying debris from an adjacent fire.

24.4. Dimensions

24.4.1. The barrier shall extend at least 500 mm above the transformer bushing and pressure relief vent and length wise 600 mm beyond the entire BESS establishment covering the entire premise transformer including any radiators and tap changer enclosure.

24.4.2. These dimensions might be reduced in special cases, as per the approval of owner where there is lack of space. A minimum of 2.0-meter clearance shall be provided between the equipments e.g. Autotransformer/Power transformer.

24.4.3. The building walls, which act as firewalls, shall extend at least 1 m above the roof in order to protect it. Building wall adjacent to transformer shall act as fire resistance wall and shall be made up of solid concrete blocks

24.5. Mechanical Resistance

24.5.1. The firewall shall have the mechanical resistance to withstand local atmosphere conditions. If this wall shall serve as a support for equipment such as insulators etc, it mechanical rigidity must be increased. Connecting the walls by steel or other structures which may produce a reversing torque if overheated shall be avoided.

Annexure 3: HT Indoor Switchgear (11KV VCB Panel)

1 SCOPE OF SUPPLY

a. This specification covers the design, manufacture, testing, supply, erection & commissioning of 11kV, Air Insulated, metal-enclosed and factory assembled switchgear.

b. This specification shall be used in conjunction with all specifications, switchgear data sheets, single line diagrams, and other drawings attached to the specification / purchase requisition.

2 CODES & STANDARDS

Materials, equipment and methods used in the manufacture of switchboards shall conform to the latest edition of following

2.1	Indian Electricity Rules 1956	Latest edition
2.2	Indian Electricity act 1910	Latest edition
2.3	Switchgear and control gear	IEC: 60694, IEC: 60298, IEC: 62271-200, IEC : 60529, IS: 3427, IS: 12729, IS: 12063, IS: 13947, IS:9046
2.4	Circuit breaker	IEC 62271 - 100, IS 13118, IS 2516
2.5	Isolators & earthing switches	IEC 62271 - 102
2.6	Current transformers	IS:2705, IEC:60185
2.7	Voltage transformer	IS:3156, IEC:60186,
2.8	Indicating Instruments	IS:1248
2.9	Energy meters	IS 13010
2.10	Relays	IS:8686, IS:3231, IS:3842
2.11	Control switches and push buttons	IS 6875
2.12	HV fuses	IS 9385
2.13	Arrangement of Switchgear bus bars, main connections and auxiliary wiring	IS:375

2.14	Code of practice for phosphating iron & steel	IS 6005
2.15	Colours for ready mixed paints	IS 5
2.16	Code of practice for installation and maintenance of switchgear	IS 3072

3 SERVICE CONDITION

3.1	Max Ambient Temperature	50 deg C
3.2	Max Daily average ambient temp	40 deg C
3.3	Min Ambient Temp	0 deg C
3.4	Maximum Humidity	95%
3.5	Minimum Humidity	10%
3.6	Maximum annual rainfall	750 mm
3.7	Average no of rainy days per annum	60
3.8	Rainy months	June to Oct
3.9	Altitude above MSL	300 M
3.10	Seismic Zone	IV

4 PANEL CONSTRUCTION

4.1	Enclosure Type	Free standing, Indoor, Fully compartmentalized, Metal clad, Vermin proof
4.2	Enclosure degree of protection	IP 4X for high voltage compartment IP 5X for low voltage compartment
4.3	Enclosure material	Pre-Galvanized CRCA steel
4.3.1	Load bearing members	2.5 mm thick
4.3.2	Doors and covers	2.0 mm thick
4.3.3	Gland plate	3.0 mm MS for multicore and 5. 0 mm Aluminum for single core cables. All gland plates should be detachable type with gasket

4.4	Dimension of Panel	Maximum 2700mm, Operating height maximum 1600mm. In case of Extension of Existing make panels, vendor shall match the dimension of existing panel.
4.5	Extensibility	On either side
4.6	Separate Compartments for	Bus bar, Circuit Breaker, HV incoming cable, HV outgoing cable, PT, LV instruments & relays
4.7	Transparent inspection window	For cable compartment at height of cable termination.
4.8	Bus end cable box	For direct cable feeder from bus
4.9	Rear Doors	Rear doors shall not be interlocked i.e. all door opening shall be independent to each other.

4.10	Breaker compartment door	Separate, with lockable handle (Design with breaker trolley as the front cover is not acceptable). Door of one panel should not cause hindrance for opening of adjacent panel.
4.11	Inter compartmental connections	
4.11.1	Breaker to bus bar compartment	Through seal-off bushings
4.11.2	Breaker to cable compartment	Through seal-off bushings
4.12	Nut Bolt	Shall be as less as possible for ease of opening of compartments
4.13	Pressure relief devices	To be provided for each HV compartment
4.14	Bus support insulator	Non-hygroscopic, track-resistant, high strength, Epoxy insulators (Calculation for validating dynamic force withstand capability to be submitted during detailed engineering)
4.15	Fixing arrangement	Doors - Concealed hinged, door greater than 500mm shall have minimum three sets of hinges Covers - SS bolts Gasket - Neoprene
4.16	Required HV cable termination height in the cable compartment	650 mm for 11 KV. 1000mm for 33 KV
4.17	Panel Base Frame	Steel Base frame as per manufacturer's standard.
4.18	Handle	Removable bolted covers with handle for cable chamber and busbar chamber. Panel no./identification to be provided on cable box cover also.

4.19	APFC	a. Controlling of Capacitor Banks' switching shall be done by APFC. Although APFC shall not be in bidder's scope, Space for cut out shall be provided in the Capacitor panel. Space requirement-150X150 mm^2 b. Wiring of Bus PT, Incomer CT and Capacitor CT Up to spare terminal for APFC shall also be provided in Capacitor Panel
4.20	Technical particulars	As per Appendix –B

5 CIRCUIT BREAKER

5.1	Type	Truck or cassette type
5.2	Mounting	On withdrawable truck or carriage, with locking facility in service position.
5.3	Switching duty	c. Transformer (oil filled and dry type) d. Motor (of small and large ratings – DOL starting with starting current 6 to 8 times the full load current & with a maximum of 3 starts per hour) e. Underground cable with length up to 10 km
5.4	Interrupting medium	Vacuum
5.5	Contact	Tulip contact shall be provided without any gap between contacts
5.6	Breaker operation	Three separate identical single pole units operated through the common shaft
5.7	Operating Mechanism	Re-strike free, Trip free, with electrical anti-pumping

		feature
5.7.1	Type	Motor wound, spring charged, stored energy type with manual charging facility
5.7.2	Operation on supply failure	One O-C-O operation possible after failure of power supply to the spring charging motor
5.8	Breaker indications & push buttons	
5.8.1	ON/ OFF / Emergency trip push button	a. Manual / mechanical. b. Emergency Off push button should be provided with a protective flap. c. Mechanical ON shall have padlocking facility.
5.8.2	Mechanical ON – OFF indication	On breaker trolley front
5.8.3	Operation counter	On breaker trolley front
5.8.4	Test-service position indicator	On breaker trolley front
5.8.5	Mechanism charge / discharge indicator	On breaker trolley front
5.9	Breaker positions	Service, Test and Isolated
5.10	Inter changeability	Possible, only with breaker of same rating
5.11	Breaker Control	On panel front only
5.12	Handle	Breaker shall be provided with handles for easy handling, rack in–out operation and manual spring charging as applicable.
5.13	Pin Sequence and Configuration of Pin of Adaptor Plug	(a) Pin sequence and No of Pins of Adaptor plug shall be same in Outgoing and Capacitor Panel (b) Pin sequence and No of Pins of Adaptor plug shall be same in Incoming and Bus Coupler Panel
5.14	Technical particulars	As per Appendix –B

6 FUNCTIONAL REQUIREMENTS

6.1	Interlocks	
6.1.1	Breaker compartment door opening	Opening of door and rack out to test/isolated position should be possible with breaker in OFF position only.
6.1.2	Breaker compartment door closing	Should be possible even when breaker is in isolated position
6.1.3	Racking mechanism safety interlock	Mechanical type
6.1.4	Racking in or out of breaker inhibited	When the breaker is closed
6.1.5	Racking in the circuit breaker inhibited	Unless the control plug is fully engaged
6.1.6	Disconnection of the control plug nhibited	As long as the breaker is in service position
6.1.7	Opening of cable compartment cover of Incomer Panels inhibited	As long as cable end is alive
6.2	Safety Devices	
6.2.1	Exposure to live parts	In case the breaker panel door is required to be opened during a contingency, the personnel should not be exposed to any live part. Suitable shrouds/barriers/insulating sleeves should be provided.
6.2.2	Breaker handing	In case the breaker is mounted on a carriage which does not naturally roll out on the floor, a trolley for handling the breaker is to be provided.
6.3	Operation of breaker	In either service or test position
6.3.1	Closing from local	Only when local/remote selector switch is in local position

6.3.2	Closing from remote	Only when local/remote selector switch is in remote position
6.3.3	Tripping from local	Only when local/remote selector switch is in local position
6.3.4	Tripping from remote	Only when local/remote selector switch is in remote position
6.3.5	Tripping from protective relays	Irrespective of position of local/remote switch
6.3.6	Testing of breaker	In test or isolated position keeping control plug connected
6.4	Safety shutters.	
6.4.1	Automatic safety shutter for female primary disconnects	To fully cover contacts when breaker is withdrawn to test. Independent operating mechanism for bus bar & cable side shutters, separately pad-lockable in closed position.
6.4.2	Label for identification	For Bus side and cable side shutters
6.4.3	Warning label on shutters of incoming and other connections	Clearly visible label "Isolate elsewhere before earthing" be provided
6.5	Breaker electrical operation features	
6.5.1	Trip circuit supervision	To be given for breaker close & open condition
6.5.2	Trip circuit supervision relay contact	For indication, alarm & to inhibit closing of breaker
6.5.3	Emergency trip push button contact	Wired directly to trip coil (wired to Master trip relay if second trip coil provided)
6.5.4	Emergency trip push button contact	Wired to inhibit closing of breaker
6.5.5	Master trip relay contact (if given)	Wired to inhibit closing of breaker

6.5.6	Tripping or opening of breaker through relay but not routed through Lockout (Example-SCADA Opening, Undervoltage, Overvoltage)	Wired to Contact multiplication Relay and then from CMR to tripping of breaker
6.5.7	Closing of breaker through relay	Wired to Contact multiplication Relay and then from CMR to closing of breaker
6.6	DC control supply bus in all panels	Fed by two DC incoming sources in Bus coupler panel with auto changeover facility
6.7	PT supply bus in all panels	Fed normally by bus PT with automatic changeover facility to incomer line PT
6.8	Flaps for Internal Arc Protection	Flaps shall not have any pores/ opening during normal operation

7 SURGE SUPPRESSOR

7.1	Provision	To be provided in all panels except bus coupler and BPT.
7.2	Type	Gapless, metal oxide type
7.3	Technical particulars	As per Appendix –B

8 CURRENT TRANSFORMER

8.1	Type	Shall be cast resin type with insulation class of E or better.
8.2	Rating and technical particulars	As per Appendix –B (Technical particulars) and SLD to be provided during detailed engineering
8.3	CBCT	If specified, bidder shall clearly mention his bid for mounting the same.

9 POTENTIAL TRANSFORMER

9.1	Type	Shall be cast resin type with insulation class of E or better.
9.2	Rating and technical particulars	As per Appendix –B (Technical particulars) and And SLD to be provided during detailed engineering
9.3	Mounting	It shall be mounted on a withdrawable carriage. Mounting of PT on the breaker truck is not acceptable. Mounting of PT on the panel top is also not acceptable. Primary PT fuse shall be easily accessible.
9.4	Neutral	The HV neutral connection to earth shall be easily accessible for disconnection during HV test.

10 FEEDER AND BUS EARTHING

10.1	Earthing arrangement	Through separate earthing truck for bus & feeder
10.2	Short time withstand capacity of earthing truck	Equal to rating of breaker. Refer technical parameters.
10.3	Operation from front	Mechanically operated by separate switch.
10.4	Interlocks and Alarm	To prevent inadvertent closing on live circuit, with padlocking arrangement to lock truck in close or open position.

11 EQUIPMENT EARTHING

11.1	Material of earthing bus	Aluminum
11.2	Earthing Bus Position	It shall run through whole switchgear passing nearer to Power Cable Position
11.3	Earth bus joints	All bolted joints in the bus should be made by connection of two bolts.
11.4	Rating	Sized for rated short circuit current for 3 seconds

11.5	Enclosure & non -current carrying part of the switchboard / components	Effectively bonded to the earth bus.
11.6	Hinged doors	Earthed through flexible copper braid
11.7	Circuit breaker frame /carriage	Earthed before the main circuit breaker contacts/ control circuit contacts are plugged in the associated stationary contacts
11.8	Metallic cases of relays, instruments and other LT panel mounted equipment	Connected to the earth bus by independent copper wires of size not less than 2.5 sq. mm with green color insulation. For this purpose, LT compartment should have a clear designated earth bus to which earth connections from all components are to be connected.
11.9	CT and PT neutral	Earthed at one place at the terminal blocks through links.

12 METERS

12.1	Mounting	Flush mounted
12.2	Multifunction Meter	
12.2.1	SCADA Interfacing	RS485 rear port suitable for integration on Modbus Protocol
12.2.2	Size	96x96 mm^2
12.2.3	Panels where to be provided	All panels except Bus PT Panel
12.2.4	Accuracy Class	0.2
12.2.5	Signal List	R-Ph Current, Y-Ph Current, B-Ph Current, Neutral Current, R-Y Ph Voltage, Y-B Ph Voltage, B-R Ph Voltage, Active Power, Active Energy, Reactive Power, Power Factor, Max Demand, Phase angle 1, Phase angle 2, Phase angle 3, THD Mean Current, THD Mean Voltage
12.2.6	Data Type	MFI

12.2.7	Compatibility with RTU	ABB 560
12.2.8	Programmability	CT secondary shall be programmable i.e for both 1 A and 5 A
12.2.9	Auxiliary Supply	a. 48 – 240VDC and AC i.e universal type. b. Although in Scheme, MFM must be wired up with DC only
12.3	Voltmeter	Digital type with programmable ratio
12.3.1	Size	96x96 mm^2
12.3.2	Panels where to be provided	Incomer and bus PT panel
12.3.3	Voltmeter switch	Inbuilt in meter
12.3.4	Accuracy Class	1.0
12.4	Energy meter provision	Energy meter is not in supplier's scope. Only space and CT/PT wiring is to be provided in all panels except bus coupler and bus PT. Space for Energy meter shall be 200(w) X 350(h) mm^2

13 INDICATION, ALARMS & ANNUNCIATION

13.1	Indications	Flush mounted, High intensity, clustered LED type
13.1.1	Breaker ON	Red
13.1.2	Breaker Off	Green
13.1.3	Spring Charged	Blue
13.1.4	DC control supply fail	Amber
13.1.5	AC control supply fail	Amber
13.1.6	Auto trip	Amber
13.1.7	Test Position	White
13.1.8	Service Position	White
13.1.9	Heater circuit healthy	Yellow (Indication with integrated push button for checking)
13.1.10	Trip circuit healthy	White
13.1.11	PT supply as applicable	R, Y B
13.2	Annunciator (For 33kV Panels only)	

13.2.1	Type	Static type along with alarm. Annunciations shall be repetitive type and shall be capable of registering the fleeting signal. Fascia test facility should also be provided.
13.2.2	Note	LED type indications may not be provided for alarm signals provided on annunciator.
13.2.3	Mounting	Flush mounted
13.2.4	Fascia	12 windows
13.2.5	Signals to provide on Fascia	Window 1 – Main Protection Operated (Distance /Differential) Window 2 – Backup O/C & E/F Protection Operated Window 3 – LBB operated Window 4 – CB Auto trip Window 5 – Trip Circuit Unhealthy Window 6 – DC Fail Window 7 – AC Fail Window 8 – VT Fuse Fail Window 9 – Protection Relay Faulty
13.2.6	Push Buttons	For test, accept and reset
13.2.7	Potential Free Contacts	To be provided for event logger
13.3	Alarm scheme with isolation switch	a. For DC fail, TC fail and CB auto trip in 11kV panels b. For all signals wired to annunciator in 33kV panels

Sequence of operation of the annunciator shall be as follows-

S No.	Alarm Condition	Fault Contact	Visual Annunciation	Audible Annunciation
a.	Normal	Open	Off	Off
b.	Abnormal	Close	Flashing	On
c.	Accept	Close	Steady on	Off
d.	Return to normal	Open	Steady On	Off
e.	Reset	Open	Off	Off
f.	Reset before return to normal	Close	Flashing	On

14 SELECTOR SWITCHES & PUSH BUTTONS

14.1	Selector switches	Flush mounted on LV compartment door, with shrouded terminals
14.1.1	TNC switch with pistol grip	Lockable, spring return to normal position
14.1.2	Local / SCADA selector switch	2 pole Lockable Switch
14.1.3	Rotary ON/OFF switches	For heater / illumination circuit
14.1.4	Rating	16 A
14.2	Push Button	Flush mounted on LV compartment door, with shrouded terminals
14.2.1	Emergency trip push button	Red color with stay put
14.2.2	Accept push buttons	Black color – Trip alarm / DC fail alarm
14.2.3	Reset push buttons	Yellow color – Trip alarm / DC fail alarm
14.2.4	Rating	10 A

15 INTERNAL WIRING

15.1	Internal wiring	1100 V grade, PVC insulated (FRLS) stranded flexible copper wire.
15.2	Size	2.5 sq mm for CT circuit, 1.5 sq mm for PT & control circuits
15.3	Colour code	

15.3.1	CT & PT	R Ph – Red Y Ph – Yellow B Ph – Blue Neutral – Black
15.3.2	Others	DC– grey, AC-black, Earth – green
15.4	Ferrules	At both ends of wire
15.5	Ferrule type	Interlocked type (one additional red colour ferrule for all wires in trip circuit)
15.6	Lugs	Tinned copper, pre-insulated, ring type, fork type and pin type as applicable. CT circuits should use ring type lugs only.
15.7	Spare contacts	Spare contacts of relays and contactors etc. should be wired up to the terminal block.
15.8	Wiring enclosure	Plastic channels, Inter panel wiring through PVC sleeves
15.9	Inter panel wiring	Wires with ferrule to be terminated in the adjacent shipping section should be supplied with one end terminated and the other end bunched and coiled.
15.10	Auxiliary supply	Auxiliary bus wiring for AC and DC supplies, voltage transformer circuits, annunciation circuits and other common services shall be provided on the same set of terminals in all the panels with proper segregation.

16 TERMINAL BLOCKS

16.1	Rating and Type	1100 V grade, moulded piece, stud type screw driver operated terminals complete with insulated barriers, washers, nuts and lock nuts.
16.2	Segregation	TBs shall be segregated.
16.3	Suitability	Terminal Block shall be Stud Type Screw Driver Operated suitable for 6sqmm control cable. Disconnecting facility shall be provided in CT and PT terminal. Shorting and Earthing facility shall be provided in CT
16.4	Marking and covers	White fiber markings strip with clear plastic, slip-on / clip-on terminal covers to be provided.
16.5	Disconnecting Facility	To be provided in CT and PT terminals
16.6	Shorting & Earthing Facility	To be provided in CT Terminals
16.7	Spare Terminals	20% in each TB row
16.8	Spare Terminal Block in Capacitor Bank Panel	Separate Terminal Block with 50 number terminals required (20 Numbers Disconnecting and 30 Number Non-Disconnecting type)
16.9	TB shrouds & separators	Moulded non- inflammable plastic material
16.10	Clearance between 2 sets of TB	100 mm min
16.11	Clearance with cable gland plate	250 mm min
16.12	Clearance between AC / DC set of TB	100 mm min
16.13	Test terminal blocks	Screw driver operated stud type for metering circuit

17 RELAYS

17.1	Protection Relays – General Features

17.1.1	Technology and Functionality	Numerical, microprocessor based with provision for multifunction protection, control, metering and monitoring
17.1.2	Mounting	Flush Mounting, IP5X
17.1.3	Architecture	Hardware and software architecture shall be modular and disconnectable to adapt the protection and control unit to the required level of complexity as per the application.
17.1.4	Programming and configuration	Relay shall utilize a user-friendly setting and operating multi-lingual software in windows environment with menus and icons for fast access to the data required. Programming software and communication cord for offered relays should be included in scope of supply.
17.1.5	Conformal Coating	a. Required on all cards and Components to protect against moisture, dust, chemicals, temperature extremes etc b. Testing shall be as per IEC 60068-2-60
17.1.6	SCADA Interface port	LC type Dual fibre optic port for interfacing with SCADA on IEC 61850 & PRP compatible. Through this port relays shall be connected to Ethernet switches.
17.1.7	Processing Indications	SCADA functions for monitoring shall be executed on SPI (Single Point Input) and DPI (Double Point Input). DPI shall only be used in case of Isolator and Circuit breaker “close” and “open” indication.

17.1.8	Command Processing	Functionality of command processing offered for SCADA interface shall include the processing of single and double commands i.e. SCO (Single Command Output) and DCO (Double object command Output). DCO shall only be used in case of Isolator and Circuit Breaker “close” and “open” command.
17.1.9	PC Interface port	Front port (preferably serial) for configuration/data downloads using PC. Cost of licensed software and communication cord, required for programming of offered protection relays shall be included in the cost of switchgear.
17.1.10	User Interface	An alphanumeric key pad and graphical LCD display with backlight indicating measurement values and operating messages. It should be possible to access and change all settings and parameters without the use of PC.
17.1.11	SCADA Interface	Relay shall communicate all measured & monitored parameters, analog signals, event record, fault record, DIs , DOs etc. to SCADA
17.1.12	Relay Characteristics	Relay shall integrate all necessary protections for different applications in accordance with IS and IEC. Relay shall provide wide setting ranges and choice of all IEC, IEEE and other tripping curves through a minimum of two setting groups.
17.1.13	GOOSE Messaging	Relays shall communicate all status signals, commands and events on GOOSE messaging.

17.1.14	Event and Fault records	Relay shall have the facility of recording of various parameters during event/fault with option to set the duration of record through settable pre fault and post fault time. Relay shall store records for last 10 events and 10 faults (minimum). It should be possible to download records locally to PC and remotely to SCADA.
17.1.15	Self-diagnosis	Relay shall be able to detect internal failures. A watchdog relay with changeover contact shall provide information about the failure.
17.1.16	Time synchronization	All relays shall be capable of being synchronized with the system clock using SCADA interface and PC.
17.1.17	Operation Indicators	LEDs with push button for resetting.
17.1.18	Test Facility	Inbuilt with necessary test plugs.
17.2	Protection Relays for 11kV Incomer panel	
17.2.1	Relay 1	3-phase Directional Overcurrent and Earth fault protection with IDMT, Definite time and instantaneous characteristics
		Undervoltage and overvoltage protection
		Trip Circuit Supervision
		Sync Check function
		PT supervision (fuse failure monitoring)
		Relay shall communicate all measured and monitored parameters like current, voltage, active power, reactive power, apparent power, power factor, phase angle, event record, fault record, DIs , DOs etc. to SCADA

17.2.2	Relay 2	Auto Re-closer (If Specified in Tender document)
		High Impedance Restricted Earth fault protection.
17.2.3	User Configurable DIs and Dos	Relay-1 & 2 should have a total of 16 Dis and 10 Dos (minimum). Each relay should have at least 2 Dis and 4 Dos
17.2.4	Note	Combining functions of Relay-1 and Relay-2 in single relay is not acceptable.
17.2.5	SLD	Will be shared during detailed engineering
17.3	Protection Relays for 11kV Bus Section panel	
17.3.1	Relay 1	3-phase Overcurrent and Earth fault protection with IDMT, Definite time and instantaneous characteristics
		Sync Check function
		Trip Circuit Supervision
		PT supervision (fuse failure monitoring)
		User Configurable 16 Dis and 8 Dos (minimum)
		Relay shall communicate all measured and monitored parameters like current, voltage, active power, reactive power, apparent power, power factor, phase angle, event record, fault record, DIs, DOs etc. to SCADA
		Auto Re-closer (If Specified in Tender document)
17.3.2	SLD	Will be shared during detailed engineering
17.4	Protection Relays for 11kV Outgoing panel	
17.4.1	Relay 1	3-phase Overcurrent and Earth fault protection with IDMT, Definite time and instantaneous characteristics
		Trip Circuit Supervision
		User Configurable 12 Dis and 6 Dos (minimum)

		Relay shall communicate all measured and monitored parameters like current, voltage, active
		power, reactive power, apparent power, power factor, phase angle, event record, fault record, DIs , DOs etc to SCADA
		Auto Re-closer (If Specified in Tender document)
17.4.2	SLD	Will be shared during detailed engineering
17.5	Protection Relays for 11kV Capacitor panel	
17.5.1	Relay 1	3-phase Overcurrent and Earth fault protection with IDMT, Definite time and instantaneous characteristics
		Under voltage and Over voltage protection (From Bus PT)
		Trip Circuit Supervision
		Neutral Unbalance protection (From RVT associated to Cap Bank)
		Timer for on time delay (minimum 600 seconds)
		User Configurable 12 DIs and 6 DOs (minimum)
		Relay shall communicate all measured and monitored parameters like current, voltage, active power, reactive power, apparent power, power
		factor, phase angle, event record, fault record, DIs ,DOs etc to SCADA
		Auto Re-closer (If Specified in Tender document)
17.5.2	SLD	Will be shared during detailed engineering
17.6	Protection Relays – SCADA Interfacing	

17.6.1	Configuration and wiring of DIs in Protection Relays (All panels) for routing status signals to SCADA	DI-1 – TC-1 Healthy DI-2 – TC-2 Healthy DI-3 – CB Autotrip (contact from lockout relay) DI-4 – CB Open DI-5 – CB Close DI-6 – CB in service DI-7 – C in test DI-8 – Spring Charged DI-9 – L/R switch Remote DI-10 – AC fail DI-11 – Adjacent Panel DC Fail/DC MCB Trip DI-12 – Adjacent Panel Protection Relay fail DI-13 – PT MCB trip (metering and protection, for incomer and capacitor panel only) Sequence of DIs should be strictly as mentioned above. Change in sequence of DIs will not be acceptable.
17.6.2	Configuration and wiring of	DO-1 – CB Open
	DOs in Protection relays (all panels) for execution of SCADA commands through SCADA interface port (refer clause 16.1.5).	DO-2 – CB close DO-3-Electrical Reset Sequence of DOs should be strictly as mentioned above. Change in sequence of DOs will not be acceptable.
17.6.3	Looping of numerical relays	All relays in the switchboard have to be looped to form a common bus for interfacing with SCADA.
17.6.4	Spare DIs and DOs	Should be wired up to terminal block for future use.

17.17	Auxiliary relays – Requirement	
17.17.1	Anti pumping (94), lockout (86),	a. For each breaker b. Lock Out Relay mounting shall be flush type on front side of Panel
17.17.2	PT selection relays	To be provided in bus coupler panel for selection between Bus PT and Line PT of respective sections.
17.17.3	Switchgear with two incomer & bus coupler	Lockout relay (86) contact of each incoming breakers to be wired in series in closing circuit of other incoming breakers & bus coupler.
17.17.4	Contact Multiplication Relay for Tripping and closing of Breaker	a. One for Tripping and one for closing with each breaker b. Current Rating shall be 30 percent more than closing and tripping coil current rating c. Shall be of closed type i.e. direct unauthorized access shall not be provided.
17.17.5	Auxiliary Relays, contact multiplication relays etc.	To effect interlocks and to exchange signals of status & control
17.17.6	General Requirements for all relays/contactors	Auxiliary supply will be 50/220VDC based on requirement. All relays/contactors shall be suitable for continuous operation at 15% overvoltage.

18 SYNCH CHECK PHILOSOPHY

18.1	Dead Bus – Live Line	a. Application - Required for Charging of Bus from Line Supply b. Logic - Sync check relay installed on line panel will check the line and bus voltage and derive that the line is live and bus is in dead condition i.e. bus has to be charged by the line breaker. Hence Sync check relay will allow the line breaker to close in this condition.

18.2	Dead Line – Live Bus	a. Application - Required for Charging of Line from Bus Supply b. Logic - Sync check relay installed on line panel will check line and bus voltage and derive that the line is dead and bus is in live condition i.e. line has to charged from bus. Hence Sync check relay will allow the line breaker to close in this condition.
18.3	Live Bus – Live Line	a. Application - Required for paralleling of bus and line supply b. Logic - Sync check relay installed on line panel will compare magnitude and phase sequence of line and bus voltages. If the variations are within the range set in the relay, sync check relay will allow the closing of line breaker.
18.4	Live Bus – Dead Bus	a. Application – Required for charging of dead bus through another live bus. b. Logic – Sync check relay installed on bus coupler/bus section panel will check voltage of both buses and derive that one bus is dead and other bus is live i.e. dead bus is being charged from live bus. Hence Sync check relay will allow the bus coupler/bus section breaker to close in this condition.
18.5	Live Bus – Live Bus	a. Application – Required for paralleling of two buses/bus sections. b. Logic – Sync check relay installed on bus coupler/bus section panel will compare the magnitude and phase sequence of voltage of both buses (or bus sections). If the variations are within the range set in the relay, sync check relay will allow the bus coupler/bus section breaker to close.

19 ETHERNET SWITCHES & FIBRE OPTICS

19.1	Ethernet Switch	
19.1.1	Numbers	Two at each site
19.1.2	FO Port	16 Nos
19.1.3	RJ 45 Port	4 Nos

19.1.4	Communication Protocol	IEC 61850
19.1.5	Network Protocol	PRP
19.1.6	Downlink Rate	100 MBPS
19.1.7	Uplink Rate	1 GBPS
19.1.8	Coating	Conformal
19.1.9	Power Supply Voltage	220 / 50 VDC as per site condition
19.1.10	Grade	Industrial
19.1.11	Certification required	KEMA, CE & FCC for IEC 61850 compliance
19.1.12	Operating Temperature	
19.1.13	Mounting	In Switchgear Panel
19.1.14	Blinking LED Indicators	On each RJ45 ports
19.1.15	Separate Maintenance/console Part	Required
19.1.16	Latency	Less than or equal to 10 ms
19.1.17	Fibre Optic Compatibility	Multimode, 1310 nm
19.1.18	Placement	Din Rail Arrangement Inside Switchgear
19.2	Fibre Optics (Patch Cord) and Ethernet cable	
19.2.1	Connection	From Relays, Meters to Ethernet Switch
19.2.2	Mode of Fibre Optics	Multimode
19.2.3	Wavelength	1310 nm
19.2.4	Ethernet Cable Type	CAT VI
19.2.5	Associated Connectors and Accessories	Required

20 SPACE HEATERS

20.1	Type	Thermostat controlled with switch for isolation
20.2	Location	In Breaker & HV cable compartment, mounted on an insulator. Heater position in cable compartment should be easily accessible after cable termination. Heater position in breaker chamber shall be accessible with breaker racked-in.

21 SOCKETS, SWITCHES, ILLUMINATION LAMPS & MCBs

21.1	Illumination lamp with switch	For LV & cable chamber
21.2	Universal type (5/15 A) Socket with Switch	In LV chamber
21.3	MCBs	a. MCBs of Proper rating may be provided. b. Although Main MCB shall be directly wired up to Trip Circuit, No other MCB shall be provided in between c. Rating of MCB shall be 300% of full load current of relevant circuit

22 NAMEPLATES AND MARKING

22.1	Nameplates	To be provided as per the following description
22.1.1	Equipment Nameplates	a. All equipment mounted on front side as well as equipment mounted inside the panels shall be provided with individual name plates with equipment designation engraved. b. All front mounted equipment shall be also provided at the rear with individual name plates engraved with tag numbers corresponding to the one shown in the panel internal wiring to facilitate easy tracing of the wiring.

22.1.2	Feeder Nameplates	a. Large and bold name plate carrying the feeder identification/ numbers shall be provided on the top of each panel on front as well as rear side. On rear side, nameplate should be provided on frame. b. Rear bottom of each panel shall have a nameplate clearly indicating the following: Customer Name – BSES Delhi; PO No. & date; Drawing Reference No. etc.
22.1.3	Rating Plate	Following details are to be provided on Panel rating plate: a. Customer Name – BSES Yamuna Power Limited b. PO No. & Date – c. Complete CT Rating plate details d. Complete PT Rating plate details e. Complete CB Rating Plate details f. Date of Manufacturing- g. Warranty Period- h. Customer care No- i. Control Voltage-
22.1.4	Material	Non-rusting metal or 3 ply lamicoid. Nameplates shall be black with white engraving lettering. Stickers are not allowed.
22.1.5	Fixing	All nameplates/rating plates shall be riveted to the panels at all four corners. Bolting/screwing is not acceptable.

22.2	Markings	Each switch shall bear clear inscription identifying its function. Similar inscription shall also be provided on each device whose function is not otherwise identified. If any switch or device does not bear this inscription separate nameplate giving its function shall be provided for it. Switch shall also have clear inscription for each position indicating e.g. Trip-Neutral close, ON-OFF etc.

23 SURFACE TREATMENT & PAINTING

23.1	Surface Treatment	Sand blasting or by seven tank process.
23.2	Paint type	Powder coated. Pure polyester base grade-A structure finish.
23.3	Paint shade	RAL 7032 for external & internal surface
23.4	Paint thickness	Minimum 50 microns

24 APPROVED MAKES OF COMPONENTS

24.1	Numerical Relays	Siprotec series of Siemens, Micom series of Schneider/Alstom. Numerical relays used in complete switchboard should be of same make. Use of two different makes of relays in a switchboard is not acceptable.
24.3	Electromechanical Relays	Alstom/Schneider/Siemens/ABB/ER
24.4	Aux Relays	ABB/Jyoti/Omran
24.5	Contactors	ABB/Siemens/Telemechanique
24.6	Instrument transformers	ECS/ Pragati/ Gemini/Schneider/CGL/Kappa/Narayan power tech
24.7	MCBs	Siemens/Schneider/Legrand/ABB
24.8	Control switches	Switron/Kaycee

24.9	Test terminal blocks	IMP/Schneider/Alstom
24.10	Terminal blocks	Elmex/Connectwell
24.11	Indicating lamps	Siemens/ Teknic/ Binay
24.12	Surge Suppressors	Oblum/Tyco
24.13	Meters	Rishabh(Rish delta Energy)/Conzerv
24.14	Ethernet Switch	Ruggedcom/Hirschman

25 INSPECTION, TESTING & QUALITY ASSURANCE

25.1	Type Tests	The product must be of type tested as per applicable Indian standards / IEC
25.1.1	Type test report validity period	Last five years from date of bid submission. Bidder with type test report more than 5 years old needs to re-conduct the tests without any commercial implication to BSES
25.1.2	Pressure relief device operation	Test certificate for panel to be submitted
25.2	Acceptance & Routine tests	As per the specification and relevant standards. Charges for these tests shall be deemed to be included in the equipment price. In addition to these tests, following tests have to be carried out as acceptance tests -
25.2.1	Primary injection test	To be carried out on panels selected for testing
25.2.2	Temperature rise test	One panel per Purchase order (PO with minimum 10 panels) without any commercial implication to BSES. In-house testing is acceptable.
25.2.3	Paint Thickness/ Peel off	To be carried out on panels selected for testing

25.3	Inspection	The purchaser/owner reserves the right to witness all the acceptance/routine tests during inspection.
25.4	Notice to purchaser for conducting type tests	At least three weeks in advance
25.5	Quality Assurance	
25.5.1	Vendor quality plan	To be submitted for purchaser approval
25.5.2	Inspection points	To be mutually identified & agreed in quality plan

26 PACKING

26.1	Packing Protection	Against corrosion, dampness, heavy rains, breakage and vibration. During transportation/ transit and storage, panels may be subjected to outdoor conditions. Hence, packing of each panel shall be weatherproof.
26.2	Packing for accessories and spares	Robust wooden non-returnable packing case with all the above protection & identification
26.3	Details of Packing Identification Label on each packing case	a. Individual serial number b. Purchaser's name c. PO number (along with SAP item code, if any) & date d. Equipment Tag no. (if any) e. Destination f. Project Details g. Manufacturer / Supplier's name h. Address of Manufacturer / Supplier / it's agent i. Description and Quantity j. Country of origin k. Month & year of Manufacturing l. Case measurements m. Gross and net weights in kilograms n. All necessary slinging and stacking instructions

27 SHIPPING

27.1	Shipping	The bidder shall ascertain at an early date and definitely before the commencement of manufacture, any transport limitations such as weights, dimensions, road culverts, Overhead lines, free access etc. from the Manufacturing plant to the project site. Bidder shall furnish the confirmation that the proposed Packages can be safely transported, as normal or oversize packages, up to the site. Any modifications required in the infrastructure and cost thereof in this connection shall be brought to the notice of the Purchaser.
		The seller shall be responsible for all transit damage due to improper packing.

28 HANDLING AND STORAGE

28.1	Handling and Storage	Manufacturer instruction shall be followed. Detail handling & storage instruction sheet / manual needs to be furnished before commencement of supply.

29 DEVIATION

29.1	Deviation	Deviations from this Specification shall be provided in excel sheet with tender by reference to the Specification clause/GTP/Drawing and a description of the alternative offer. In absence of such a statement, it will be assumed that the bidder complies fully with this specification.

30 ACCESSORIES & TOOLS

30.1	Type and Quantity	Bidder to indicate
30.2	Special tools & tackles required for erection, testing, commissioning and maintenance of the switchboard	The cost of these items shall be indicated separately in the bid as optional.
30.3	Suitable handling truck / trolley for lifting and moving the circuit breaker	To be supplied. (Two trolleys for each type/rating of breaker)

31 DRAWINGS & DATA SUBMISSION MATRIX

Drawing submission shall be as per the matrix given below. All documents/ drawing shall be provided on A3/A4 sheet (based on legibility) in box file with separators for each section. PDF shall also be provided of all documents via USB. Deviation sheet and GTP shall be provided in excel sheet. Language of the documents shall be English only. Deficient/ improper document/ drawing submission shall be liable for rejection.

S. No	Head	Bid	Drawing Approval During detailed engineering	Pre Dispatch	Pre Closure
31.1	Contact Person Name, Email ID and Mobile Number	Required			
31.2	Consolidated Deviation Sheet	Required	Required		
31.3	GTP	Required	Required		
31.4	Relevant Type Test as per IS/IEC	Required			
31.5	Power Cable and control cable Philosophy and Schedule		Required		

31.6	Manufacturer's quality assurance plan and certification for quality standards		Required		
31.7	Sizing Calculation of Associated Equipment		Required		
31.8	Recommended Spares Apart from spares stated in Spec(for five years of operation)		Required		
31.9	11 kV / 33 kV Switchgear drawing				
31.9.1	General Arrangement	Required	Required		
31.9.2	Sectional Layout		Required		
31.9.3	Door Layout		Required		
31.9.4	LV Box Internal Layout		Required		
31.9.5	SLD	Required	Required		
31.9.6	Schematic Circuit diagram and Scheme of Each type of Panel		Required		
31.9.7	Communication Architecture		Required		
31.9.8	Bus Bar Arrangement		Required		
31.9.9	QAP		Required		
31.9.10	Panel wise BOQ		Required		
31.9.11	Logic Operation Diagram		Required		
31.9.12	Plan		Required		
31.9.13	Synch Logic Diagram		Required		
31.9.14	Foundation Diagram		Required		

31.9.15	DI sheet		Required		
31.9.16	DO Sheet		Required		
31.9.17	TB Details		Required		
31.9.18	Make of all Component as per specification		Required		
31.10	Drawing of CT, PT and Surge Arrestor		Required		
31.11	Drawing of Substation Room		Required		
31.12	Ventilation detail requirement of GIS Room		Required		
31.13	Installation, erection and commissioning manual for switchgear		Required		
31.14	Inspection Reports			Required	
31.15	As manufacturing Drawings			Required	
31.16	Operation and Maintenance Manual			Required	Required
31.17	Trouble shooting manual			Required	Required
31.18	As built Drawings				Required
31.19	Test Report				Required
31.20	Weekly progress report				Required

Appendix - A - SCOPE OF SUPPLY

Scope of supply should include the following –

1.0 Design, manufacture, assembly, testing at manufacturer's works, properly packed for transport, supply and FOR delivery at site of following 11kV / 33kV Switchgears as per enclosed specification and single line diagram.

1.1 Base channel frame of the switchgears with hardware.

1.2 Two trolleys for breaker of each size are to be provided per switchboard.

1.3 Programming software and communication cord for numerical relays.

1.4 Unit price of 33kV Incomer with Distance relay as primary protection and 33kV Incomer with Line differential relay as primary protection should be mentioned separately in the bid. Primary protection to be used in Incomer panel will be finalized based on site requirement.

1.5 Unit price of Bus PT should be indicated separately in the bid to enable addition/deletion based on site requirement.

1.6 Bidder should indicate price of one set of special tools and tackles (if any) required for maintenance of switchgear and its components.

1.7 All relevant drawings, data and instruction manuals.

Appendix – B - TECHNICAL PARTICULARS

1.0	SWITCHGEAR		
1.1	Type	Metal clad, air insulated with VCB type circuit breaker	
1.2	Service	Indoor	
1.3	Mounting	Free standing, floor mounted	
1.4	System Voltage	11 KV	33kV
1.5	Voltage variation	+/- 10%	
1.6	Frequency	50 Hz +/- 5%	
1.7	Phase	3	
1.8	Rated voltage	12 KV	36 kV
1.9	Rated current	As per SLDs to be shared during detailed engineering	
1.10	Short time rating for 3 sec.	25kA	25kA
1.11	Internal arc classification and rating		
1.11.1	Classification	IAC – A - FLR	IAC – A - FLR
1.11.2	Rating	25kA for 1 second	25kA for 1 second.
1.12	Insulation level (PF rms / Impulse peak)	28 kV / 75 kV	70 kV/ 170 kV
1.13	System ground	Effectively earthed	Effectively earthed
1.14	Enclosure degree of protection	IP – 4X for high voltage compartment and IP – 5X for metering and protection compartment	
1.15	Bus bar - Main	Rating as per SLDs given in to be shared during detailed engineering, Short time rating as per clause 1.10.	
1.15.1	Material	Tinned Electrolytic copper	
1.15.2	Bus bar sleeve	Sleeved with shrouds on joints. Tape on joints is not acceptable.	

1.15.3	Bus identification	Colour coded	
1.15.4	Temperature rise	40 deg. C for conventional joints. 55 deg. C for silver plated joints	
1.16	Auxiliary bus bar	Electrolytic grade tinned copper	
1.17	Auxiliary DC Supply	220 V DC / 48 V DC	
1.18	Auxiliary AC supply	240 V AC 50 Hz	
1.19	Hardware	Stainless steel.	
1.20	Earth bus	Aluminum	
1.21	Bus duct entry	From top (where ever applicable)	
1.22	Power cable entry	From bottom and rear	
1.23	Control cable entry	From bottom and front (i.e breaker compartment)	
2.0	CIRCUIT BREAKER		
2.1	Voltage class, insulation level, short time rating	As specified for switchgear	
2.2	Rated current	As per SLDs to be shared during detailed engineering. Use of two breakers in parallel to meet the required current rating shall not be acceptable.	
2.3	Duty cycle	O – 0.3 sec – CO - 3min - CO	
2.4	Short circuit rating		
2.4.1	A.C sym. breaking current	25kA	25kA
2.4.2	Short circuit making current	62.5kA	62.5kA
2.5	Operation time		
2.5.1	Break time	Not more than 4 cycles	
2.5.2	Make time	Not more than 5 cycles	
2.6	Range of Auxiliary Voltage		
2.6.1	Closing	85% - 110%	
2.6.2	Tripping	70% - 110%	
2.6.3	Spring Charging	85% - 110%	

2.7	No. of spare aux. Contacts of Breaker, for Owner's use.	Minimum 6 NO + 6 NC
2.8	No. of spare contacts of Service and Test position limit switch	2 NO
3.0	CURRENT TRANSFORMERS	
3.1	Voltage class, insulation level and short time rating	As specified for switchgear
3.2	Type	Cast resin, window / bar primary type
3.3	Class of insulation	Class E or better
3.4	Ratio	As per SLDs to be shared during detailed engineering
3.5	Number of secondaries	As per SLDs to be shared during detailed engineering
3.6	Accuracy class	
3.6.1	Protection core	5P20
3.6.2	Protection (Diff. / REF)	PS
3.6.3	Metering	0.2s
3.6.4	Core balance CT	PS
3.7	Burden (VA)	Adequate for the protection & instruments offered
3.8	Excitation current of PS Class CTs	30 mA at Vk/4
3.8	Knee Point Voltage of PS Class CTs (Vk)	>= 40 (Rct + 4)
3.9	Primary operating current sensitivity of CBCTs	5A
4.0	VOLTAGE TRANSFORMERS	
4.1	Type	Cast resin, draw out type, single phase units

4.2	Rated Voltage		
4.2.1	Primary	11000/sq.rt.3	33000/sq.rt.3
4.2.2	Secondary	110V/sq.rt.3	
4.3	No. of phases	3	
4.4	No. of secondary windings	2	
4.5	Method of connection	Star/Star	
4.6	Rated voltage factor	1.2 continuous, 1.9 for 30 seconds	
4.7	Class of insulation	Class E or better	
4.8	Accuracy class		
4.8.1	Protection	3P	
4.8.2	Metering	0.2	
4.9	Primary and secondary fuses	HRC current limiting type, Primary fuse replacement shall be possible with VT in withdrawn position	
5.0	HV FUSES		
5.1	Voltage class	12kV	36kV
5.2	Rupturing capacity	50kA	
5.3	Rated current	As per application	
6.0	SURGE ARRESTORS	For 11kV switchgear	For 33kV switchgear
6.1	Rated Voltage	9kV	30kV
6.2	Maximum continuous operating voltage (MCOV)	7.65kV	25kV
6.3	Discharge current	10kA	10kA
6.4	Discharge class	3	3

Note - The auxiliary DC voltage shall be checked on a case-to-case basis by Purchaser

Switchgear Condition Monitoring

Thermal Monitoring

A thermal monitoring system shall be provided to detect abnormal temperatures due to faulty connections and to prevent equipment damage. The switchgear shall have temperature measurement sensors at critical points like medium voltage cable connection.

The temperature sensors installed on conductors shall:

- be installed with direct contact to hot point, to achieve accuracy of +/- 2°C
- be self-powered (no auxiliary supply, no battery)
- communicate wirelessly
- Operate from -25°C to 125 °C

The system shall allow 2 configurable thresholds (pre-alarm and alarm).
This system shall have integrated algorithms enabling to anticipate as early as possible and provide pre warning of an imminent failure/damage.

Circuit-breaker monitoring
The system shall monitor the condition of circuit-breaker to detect some abnormal behaviour, if any, and to provide ageing evaluation (% of wear).

System shall monitor:
- Opening time, Charging time
- Faults
- Ageing of mechanism (number of operation)
- Ageing of main contacts

A cloud based Condition Monitoring System, allowing predictive maintenance, shall be provided to achieve health assessment of electrical assets in substation:
- Reduction of unexpected downtime
- Reduction of fire risk
- Improvement of safety for operator and equipment
- Reduction of operational expenses (OPEX)

The system shall generate the analytics and detect abnormal conditions, well in advance before the fault occurs, to give time to Facility Manager to analyse and plan a maintenance to fix the abnormality.

The system shall be on line, 24/7/365, to immediately provide an alarm (with identification/location of the anomaly) to the operator on duty, anywhere.
A system where data is collected manually by operator on site is not acceptable.

<u>Local investigation & monitoring inside the electrical room – Can be made optional</u>

The switchgear shall embed a graphic HMI to help operator during local investigation and local monitoring. This HMI shall give access to the electrical monitoring data and alarms, while operator is inside the MV electrical room.

<u>Remote control & monitoring</u>

- Integration into Power Management software for remote control and monitoring. This

monitoring will cover only the routine electrical parameters like voltage, current, breaker status and online temperature measurement but not the condition monitoring of circuit breakers.

Subscription Services:

Minimum Three years subscription to be included for the cloud based predictive IoT service. During this period, leveraging asset data on manufacturer's cloud-based platform with advanced analytics enabling condition-based maintenance; and manufacturer's expertise to provide predictive insights and reports should be ensured. This service should provide guidance and proactive support to ensure critical equipment is maintained at its optimum and enhance safety and security of site. The notification of critical events & recommendation should be transmitted by mail or phone, Smart App to ensure fastest access.

QR code:

Only by scanning this QR code, which is pasted on switchgear, the authorized person can get the access of OEM's safe repository where the below documents are uploaded, related to the switchgear supplied from works.

- Single Line Diagram
- Routine Test Certificates
- General Arrangement Drawings
- Catalogue
- Operation and Maintenance manual

This will help to access all the above required documents any time without having hard copies available.

Annexure 4: G4 Scope of work

There is no space for further 11kV Switchgear Panel addition in existing 11kV Switchgear Rooms. So both existing Switchgear rooms of subject substation shall be extended by 1.5M towards 66kV switchyard. So, 1 No. 11kV Bulk Outgoing Panel (Incomer Size) can be added at the terminal of First and Fourth Switchboard each.

A. Procurement and Installation and Commissioning of 11kV HT Panels:

S.No.	**Type of 11kV SWGR Panel to be installed**	**UoM**	**Qty.**	**Details**
1	11kV Bulk OG Panel (Incomer sizes)	**Nos.**	**2**	**11kV, 2000A, Make : Schneider and Stelmec**

B. In addition to the 11 kV switchgear panel at the Utility end, the BESS Developer (BESSD) shall be responsible for the complete design, engineering, supply, installation, testing, commissioning, and successful integration of the 11 kV switchgear panel at the BESS end, including all associated equipment, protection, control, metering, and interconnecting works required for safe and reliable operation of the Battery Energy Storage System (BESS).

C. Extension of Switchgear room up to 1.5 m towards switchyard, finishing work and allied civil work

D. Power cable trench in switchgear room for new 11kV panels, finishing work and allied civil works

E. Procurement, Installation, Laying and Commissioning of 3 x 400sqmm 11kV XLPE Cable, HT 11 kV 3C x 150 sq.mm XLPE cable, Control Cable 10c x 2.5 sq. mm, Control Cable 6c x 2.5 sq. mm

F. Procurement, Installation and Interconnection with SCADA including cable laying and tagging , glands and termination, Ethernet switches , RS485

G. 2 nos. of Industrial Grid Firewall based router device to connect NRLDC location

H. 2 nos. of Communication Link - From BESS location to NRLDC location dual

I. 2 nos. of Communication Link - From BESS location to BRPL SCADA location

J. 2 nos. of layer 3 Switch for FO consolidation

K. Internet connectivity and connection

****Please note that HT panel technical specifications and other details will be shared during detail engineering**

Annexure 5: G3 PPK Bindapur Scope of Work

Extension of Switchgear room wall up to 2 meters towards switchboard 2 and 3 shall be done. 1 No. of normal outgoing panel shall be installed at the terminal of Switchboard-4 for BESS Power evacuation. 1 No. of bulk Outgoing Panel (Incomer Size) shall be installed at the terminal of switchboard 2 and 3 each. Gas based Fire Suppression System is available in switchgear panels. So it is necessary that aligned work shall be considered in the estimate. A wall mounted SCADA Panel is available towards end of Switchboard-3. So aligned shifting work shall be considered in the estimate.

A. Procurement and Installation and Commissioning of 11kV HT Panels:

S.No.	Type of 11kV SWGR Panel to be installed	UoM	Qty.	Details
1.	Bulk OG panel	Nos.	1	11kV, 800A, Make: L&T
2.	Bulk OG panel (Incomer size)	Nos.	2	11KV, 2000A, Make: ABB-VD4 , ABB-LGZN1

B. In addition to the 11 kV switchgear panel at the Utility end, the BESS Developer (BESSD) shall be responsible for the complete design, engineering, supply, installation, testing, commissioning, and successful integration of the 11 kV switchgear panel at the BESS end, including all associated equipment, protection, control, metering, and interconnecting works required for safe and reliable operation of the Battery Energy Storage System (BESS).

C. Extension of Switchgear room up to 2 m towards switchboard 2 and 3, finishing work and allied civil work

D. Extension of Power cable trench in switchgear room for new 11kV panels, finishing work and allied civil works

E. Procurement, Installation, Laying and Commissioning of 3x300sqmm 11kV XLPE Cable, HT 11 kV 3Cx150 sq.mm XLPE cable, Control Cable 10c x2.5 sq. mm, Control Cable 6c x2.5 sq. mm

F. Procurement, Installation and Interconnection with SCADA including cable laying and tagging (16 core, 1.5 mm2) and (2 core, 2.5 mm2), CAT-6 /FO Cables, glands and termination, Ethernet switches, RS485, cable dismantling with glands and connection

G. 2 nos. of Industrial Grid Firewall based router device to connect NRLDC location

H. 2 nos. of Communication Link - From BESS location to NRLDC location dual

I. 2 nos. of Communication Link - From BESS location to BRPL SCADA location

J. 2 nos. of layer 3 Switch for FO consolidation

K. Internet connectivity and connection

****Please note that HT panel technical specifications and other details will be shared during detail engineering**

Annexure 6: Harinagar Scope of Work

Inside 11kV switchgear room, 1 No. of bulk outgoing panel (Incomer Size) can be installed at the terminal of each of Bus-3 and Bus-4. 1 No. of normal outgoing panel can be installed at the terminal of Bus-2.

A. Procurement and Installation and Commissioning of 11kV HT Panels:

S. No.	Type of 11kV SWGR Panel to be installed	UoM	Qty.	Details
1	11kV Incoming Panel	Nos.	2	11KV, 2000A, Make: Areva- HWX and Stelmec
2	11kV Outgoing Panel	Nos.	1	11KV, 800A, Make: ABB VD4

B. In addition to the 11 kV switchgear panel at the Utility end, the BESS Developer (BESSD) shall be responsible for the complete design, engineering, supply, installation, testing, commissioning, and successful integration of the 11 kV switchgear panel at the BESS end, including all associated equipment, protection, control, metering, and interconnecting works required for safe and reliable operation of the Battery Energy Storage System (BESS).

C. Replacement of control room panels, finishing work and allied civil works
D. Procurement, Installation, Laying and Commissioning of 3x300sqmm 11kV XLPE Cable, HT 11 kV 3Cx150 sq.mm XLPE cable, Control Cable 10c x2.5 sq. mm, Control Cable 6c x2.5 sq. mm
E. Procurement, Installation and Interconnection with SCADA including cable laying and tagging (16 core, 1.5 mm2) and (2 core, 2.5 mm2), CAT-6 /FO Cables, glands and termination, Ethernet switches, RS485, cable dismantling with glands and connection
F. 2 nos. of Industrial Grid Firewall based router device to connect NRLDC location
G. 2 nos. of Communication Link - From BESS location to NRLDC location dual
H. 2 nos. of Communication Link - From BESS location to BRPL SCADA location
I. 2 nos. of layer 3 Switch for FO consolidation
J. Internet connectivity and connection

****Please note that HT panel technical specifications and other details will be shared during detail engineering**

Annexure 7: 66/11kV Sagarpur-DESU Colony Scope of Work

There is no space inside switchgear room of 66kV Grid Substation, Sagarpur for further 11kV panel addition. Extension of switchgear room is not possible. Space for BESS installation is also not available inside premises of Substation. The space inside DESU Colony across the grid station has been identified for BESS installation. In the vicinity of the same, a space of 55m x 55m has been identified for 66kV Grid Substation in which a new switchgear room shall be constructed for power evacuation of BESS by BESSD.

1 No. Terminal Outgoing Panel of each of Switchboard 2 and 3 shall be removed and installation of 1 No. of bulk outgoing panel (Incomer Size) at the terminal of each of Switchboard 2 & 3 for bus extension as sufficient lateral clearance will be there after removal of Outgoing Panels. 1 No. of outgoing panel of Switchboard-1 shall be made free and same panel shall be used for bus extension. Bus extension between switchgear room of Sagarpur and upcoming switchgear room inside DESU Colony shall be done through cables. Total 3 affected outgoing feeders of three switchboards shall be connected to the Outgoing panels installed in new switchgear room inside DESU Colony. After extension of all the three buses, 1 no. of bulk outgoing panel (Income Size) shall be provided on Bus 2 and 3 each for power evacuation of BESS and 1 No. of normal outgoing panel shall be provided on Bus-1 for Power evacuation of BESS.

A. Procurement and Installation and Commissioning of 11kV HT Panels:

S. No.	Type of 11kV SWGR Panel to be installed	UoM	Qty.	Details
1	11kV Incoming Panel	Nos.	6	11KV, 2000A
2	Bulk OG Panel (Incomer size)	Nos.	2	11KV, 2000A Make: SEIL and CG-JVAC
	OG Panel	Nos.	3	11KV, 800A
3	220V D.C. battery,150AH with Charger & all accessories (193 Nos. of battery with 1.14 V Each)	Set	1	220V, 150Ah
4	D.C. distribution Board with 1 incomer	No.	1	
5	"A.C. Distribution Board with 2 incomer & 14 outgoing feeder feeder66 kV Feeder (Line) Control & Relay Panel with LDR"	Set	1	415VAC
6	I/D Kits for termination of 11kv cables in Panel	No.	15	11KV, 3X400 sqmm.

B. In addition to the 11 kV switchgear panel at the Utility end, the BESS Developer (BESSD) shall be responsible for the complete design, engineering, supply, installation, testing, commissioning, and successful integration of the 11 kV switchgear panel at the BESS end,

including all associated equipment, protection, control, metering, and interconnecting works required for safe and reliable operation of the Battery Energy Storage System (BESS).

C. Construction of new switchgear building, and extension of trench in switchgear room, fabrication and erection of truss over drain at grid station

D. Procurement, Installation, Laying and Commissioning of 3x300sqmm 11kV XLPE Cable, HT 11 kV 3Cx150 sq.mm XLPE cable, Control Cable 10c x2.5 sq. mm, Control Cable 6c x2.5 sq. mm, 4C x 95sq.mm, 4C x 25 sq.mm

E. Procurement, Installation and Interconnection with SCADA including cable laying and tagging (16 core, 1.5 mm2) and (2 core, 2.5 mm2), CAT-6 /FO cables, glands and termination, Ethernet switches, RS485, cable dismantling with glands and connection. SCADA/ Automation Integration Charges complete with DC panel, Numerical relay cum Bay controller with other indicative/measuring instruments.

F. SCADA system communicates with C&R panels, 11kV switchgear panel, battery charger, ACDB etc. along with necessary hardware and software and fibre optic cable etc. with RTU

G. Access control and video surveillance system

H. 2 nos. of Industrial Grid Firewall based router device to connect NRLDC location

I. 2 nos. of Communication Link - From BESS location to NRLDC location dual

J. 2 nos. of Communication Link - From BESS location to BRPL SCADA location

K. 2 nos. of layer 3 Switch for FO consolidation

L. Internet connectivity and connection

****Please note that HT panel technical specifications and other details will be shared during detail engineering**