

The Tata Power Company Ltd		OPEN TENDER NOTIFICATION
Tender Reference: 4100044502/CC25ADO034		Document Date: 12 th March 2025

The Tata Power Company Limited Invites Tender through E-TENDER Two-Part Bidding Process from interested bidders for the following package: -

A. Summary of the tendered package:

Sr. No.	Description	Tender Reference no.	Bid Guarantee Fee / EMD (Rs.)	Tender Fee (Rs.)	Last Date and Time for Bid Submission
For the following package please send mail to Mr. Amey Oak (amey.oak@tatapower.com) with copy to Mr. Selva Ganesh (selva.ganesh@tatapower.com).					
1.	Outline Agreement (OLA) for 2 years for Design, Supply, Installation, Testing & Commissioning of Battery Energy Storage system at various locations in Mumbai Distribution with cumulative capacity of 100MW/200MWh having 100MWh energy storage for two hours.	4100044502/CC25ADO034	Rs. 50,00,000/-	2,000 /-	02 nd April 2025 1500 Hrs.

B. Tender Fee Payment Details

- Non-Refundable Tender Fee, as indicated in table above, to be submitted in the form of Direct deposit in the following bank account and submit the receipt along with a covering letter clearly indicating the Tender Reference number –

Beneficiary Name – The Tata Power Co. Ltd.

Bank Name – HDFC Bank Ltd.

Branch Name – Fort Branch, Mumbai

Address – Maneckji Wadia Building, Nanik Motwani Marg, Fort, Mumbai 400023.

Branch Code – 60

Bank & Branch Code – 400240015

Account No – 00600110000763

Account type – CC

IFSC Code – HDFC0000060

- Eligible and Interested Bidders to submit duly signed and stamped letter on Bidder's letterhead indicating

Tender Enquiry number

Name of authorized person

Contact number

e-mail id

Details of submission of Tender Participation Fee

The Tata Power Company Ltd		<i>OPEN TENDER NOTIFICATION</i>
<i>Tender Reference:</i> 4100044502/CC25ADO034		<i>Document Date: 12th March 2025</i>

E-mail with necessary attachment of 1 and 2 above to be send to amey.oak@tatapower.com with a copy to selva.ganesh@tatapower.com before Last date and time mentioned above

Interested bidders to submit Tender Participation Fee and Authorization Letter before Last date and time as indicated above. Bids of only those bidders will be accepted who have paid the tender fee and EMD. Link from Tata Power E-Tender system (Ariba) will be shared for further communication and bid submission.

Please note all future correspondence regarding the tender, bid submission, bid submission date extension, Pre-bid query etc. will happen only through Tata Power E-Tender system (Ariba).

No e-mail or verbal correspondence will be responded. All communication will be done strictly with the bidder who have done the above step to participate in the Tender.

Also it may be strictly noted that once date of "Last date and time for Payment of Tender Participation Fee" is lapsed no Bidder will be sent link from Tata Power E-Tender System (Ariba). Without this link vendor will not be able to participate in the tender. Any last moment request to participate in tender will not be entertained.

Any payment of Tender Participation Fee / EMD by Bidder who have not done the pre-requisite will not be refunded.

Also all future corrigendum's to the said tender will be informed on Tender section on website <https://www.tatapower.com> only.

The Tata Power Company Ltd		OPEN TENDER NOTIFICATION
Tender Reference: 4100044502/CC25ADO034		Document Date: 12 th March 2025

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FOR

Outline Agreement (OLA) for 2 years for Design, Supply, Installation, Testing & Commissioning of Battery Energy Storage system at various locations in Mumbai Distribution with cumulative capacity of 100MW/200MWh having 100MWh energy storage for two hours.

**The Tata Power Company Limited (Tata Power)
Smart Center of Procurement Excellence, 2nd Floor,
Sahar Receiving Station, Near Hotel Leela,
Sahar Airport Road, Andheri East, Mumbai-400059**

The Tata Power Company Ltd		<i>OPEN TENDER NOTIFICATION</i>
<i>Tender Reference: 4100044502/CC25ADO034</i>		<i>Document Date: 12th March 2025</i>

CONTENTS OF THE ENQUIRY

S. NO.	PARTICULARS
1.	Event Information
2.	Evaluation Criteria
3.	Submission of Bid Documents
4.	Bid Opening & Evaluation process
5.	Award Decision
6.	Order of Preference/Contradiction
7.	Ethics
8.	General Conditions of Contract
Annexures	
I.	Annexure I – Schedule of Items
II.	Annexure II – Technical Specifications/Scope of Work
III.	Annexure III – Schedule of Deviations
IV.	Annexure IV – Schedule of Commercial Specifications
V.	Annexure V – Document Check List
VI.	Annexure VI – Acceptance Form for Participation in Reverse Auction Event
VII.	Annexure VII – Inspection Test Plan
VIII.	Annexure VIII – General Conditions of Contract
IX.	Annexure IX – Special Conditions of Contract (SCC)
X.	Annexure X – Safety Terms & conditions and Safety Bid Format
XI.	Tata Code of Conduct
XII.	Health and Safety Policy
XIII.	Corporate Environment Policy
XIV.	Format for Earnest Money Deposit (EMD) Bank Guarantee
XV.	Format for Manufacturer Authorization form (MAF)

The Tata Power Company Ltd		<i>OPEN TENDER NOTIFICATION</i>
<i>Tender Reference:</i> 4100044502/CC25ADO034		<i>Document Date: 12th March 2025</i>

1. Event Information

1.1 Scope of work

Open Tenders are invited in e-tender bidding process from interested Bidders for entering into an Outline Agreement of 2 years as defined below:

Reference Number	4100044502/CC25ADO034
Description	Outline Agreement (OLA) for 2 years for Design, Supply, Installation, Testing & Commissioning of Battery Energy Storage system at various locations in Mumbai Distribution with cumulative capacity of 100MW/200MWh having 100MWh energy storage for two hours.
Type of Tender	Out Line Agreement (Rate Contract)
Estimated Period	Two Years
Tender Fee	Rs. Two Thousand Only (Rs. 2000/-)
Earnest Money Deposit (EMD)	Rs. Fifty Lakh Only (Rs. 50,00,000/-)
Price Basis	Firm Price Basis
Executive Handling this Tender*	Name: Mr. Amey Oak E-Mail ID: amey.oak@tatapower.com
Reporting Manager*	Name: Mr. Selva Ganesh E-Mail ID: selva.ganesh@tatapower.com
Technical Query *	Name: Mr. Ravindra Bhanage E-Mail ID: ravindra.bhanage@tatapower.com

*You may contact the above personnel from Monday to Friday during office hours only.

1.2 Availability of Tender Documents

Tender documents may be downloaded by interested eligible bidders from The Tata Power Company website www.tatapower.com with effect from 12.03.2025. In the event detailed tender documents are downloaded from The Tata Power Company website or are received through online tendering system ARIBA from The Tata Power Company, the Tender Fee shall be compulsorily submitted online through NEFT/ RTGS. Any such bid submitted without this Fee shall be rejected.

Bidders are requested to visit TPC website www.tatapower.com regularly for any modification/ clarification to the bid documents.

The Tata Power Company Ltd		OPEN TENDER NOTIFICATION
Tender Reference: 4100044502/CC25ADO034		Document Date: 12 th March 2025

1.3 Calendar of Events

(a)	Date of availability of tender documents on TPC Website	From 12.03.2025 to 02.04.2025, 15:00 Hrs.
(b)	Date & Time of Pre-Bid Meeting (If any)	Shall be intimated in advance.
(c)	Last Date of receipt of pre-bid queries, if any	18.03.2025 up to 15:00 Hours
(d)	Last Date of Posting Consolidated replies to all the pre-bid queries as received	24.03.2025 up to 17:00 Hours
(e)	Last date and time of receipt of Bids	02.04.2025 up to 15:00 Hrs
(f)	Date & Time of opening of Price of qualified bids	Will be notified to the successful bidders through our website / e-mail.

Note:- * These date and time are as planned and tentative. In case of change the same shall be intimated to Authorized Person of Interested Bidder through E-Tender System.

Please note post submission of Bids relevant communication will be done with Authorized Person of Interested Bidder through E-Tender System

1.4 Mandatory documents required along with the Bid.

- 1.4.1 Bid Guarantee Fee (EMD) of requisite value and validity. PLEASE NOTE THAT BID GUARANTEE ONLY IN FORM OF BANK GUARANTEE WILL BE ACCEPTED.
- 1.4.2 Requisite Documents to ascertain fulfilling of Technical and Commercial Pre-Qualification Requirement as detailed in Tender Enquiry.
- 1.4.3 Technical Submission including Drawings, Type Test details, data sheets etc. as detailed in Technical Specification.
- 1.4.4 Required Commercial Submission as detailed in Tender Document
- 1.4.5 Technical and Commercial Clarification and Deviations as per the format attached in the Tender Enquiry
- 1.4.6 Proper authorization letter to sign the tender and participate in Tata Power E-Tender system on the behalf of bidder.
- 1.4.7 **For vendor not registered with Tata Power, duly filled Vendor Registration form with all supporting documents is mandatory to participate in the Tender.**

Please note that in absence of any of the above documents, the bid submitted by a bidder shall be liable for rejection.

Also please note that whenever editable format are shared it is requested that data be filled in relevant cells. No formatting or addition / deletion of rows / columns to be done. Wherever editable Excel submission are requested the file should be free from references, macros etc.

1.5 Deviation from Tender

Normally, the deviations to tender terms are not admissible and the bids with deviation are liable for rejection. Hence, the bidders are advised to refrain from taking any deviations on this Tender. Still in case of any deviations, all such deviations shall be set out by the Bidders, clause by clause in the Query / Clarification / Deviation (QCD) Format. Deviations must be mandatorily submitted in editable Excel sheet.

Technical or Commercial Deviation should be mentioned in Deviation Format only. Deviation in any other document or Format will not be considered.

The Tata Power Company Ltd		<i>OPEN TENDER NOTIFICATION</i>
<i>Tender Reference: 4100044502/CC25ADO034</i>		<i>Document Date: 12th March 2025</i>

1.6 Right of Acceptance/Rejection

1.5.1 Bids are liable for rejection in absence of following: -

1.5.2 Mandatory Documents as listed in 1.3 above.

1.5.3 Price Bid as per the Price Schedule mentioned in Tender Document

1.5.4 Receipt of Bid and Response to queries within the due date and time

Tata Power reserves the right to accept/reject any or all the bids without assigning any reason thereof.

1.7 Qualification Criteria

Parameter	Tata Power Requirement	Documents to be submitted by the Bidder
Infrastructure	1) Bidder must be an OEM/system integrator of the specified Battery Energy Storage System (BESS) registered in India with operational BESS in India. 2) Bidder should have experience and infrastructure to carry out Routine and Breakdown maintenance during warranty and Comprehensive AMC duration.	Self-undertaking to be submitted in this regard. TATA Power reserves the right to inspect the said manufacturing facility as a proof of compliance to this parameter.
Supply and Experience	1) The bidder should have installed BESS, with similar technology, in last 5 years in India, for cumulative capacity of 30 MWH with 1 installation of 10 MWH or higher. 2) Out of the above, BESS installation of, at least 5 MWH must have been in successful operation for at least 1 year prior to the date of bid submission. 3) Indian Subsidiaries of global companies having operations in India are also eligible to bid if the qualification requirements stated above are met independently or in combination with the parent company. Declaration from parent company needs to be submitted. 4) Bidder to submit Manufacturer Authorisation form (MAF) for all the major bought-out items from the respective OEM. (Power conditioning System, Battery, BMS and EMS)	Supply List / Performance Certificates from the utilities / clients MAF in given to be shared on letter head of equipment OEM
Testing Facility	1) The bidder must have a rated power container level testing facility under sample basis for Factory Acceptance Testing (FAT) in India or Global. The facility should be capable of conducting comprehensive performance testing,	Details of testing facility such as type of tests that can be performed in the facility, location shall be shared. NABL / International Accreditation

The Tata Power Company Ltd		<i>OPEN TENDER NOTIFICATION</i>
<i>Tender Reference:</i> 4100044502/CC25ADO034		<i>Document Date: 12th March 2025</i>

	including safety and functional tests, to ensure compliance. Additionally, the testing facility should have provisions for simulating operation and generating detailed test reports.	details of the facility to be shared.
Commercial Capability	1) Bidder shall have an average annual turnover not less than Rs. 50 Cr. for last three financial years.	Copy of audited Balance Sheet and P&L Account to be submitted in this regard. UDIN No. shall be mandatorily mentioned on the audited documents.

1.8 Pre-Bid Queries

Pre-Bid Queries if any, must be sent through message in E-Tender System. Pre-Bid Query must be sent only in the Query / Clarification / Deviation (QCD) Format. Technical Pre-Bid Query and Commercial Pre-Bid Queries have to be submitted in Separate Editable Excel File in Prescribed Format. Pre-Bid Queries sent in any other format or send through any other communication channel will not be accepted and answered. Pre-Bid Queries have to be sent in the stipulated timeline as defined in the Tender Document. No Pre-Bid Query will be accepted after the due time and date as specified as "Last Date of receipt of pre-bid queries, if any."

1.9 Marketing Integrity

We have a fair and competitive marketplace. The rules for bidders are outlined in the General Condition of Contracts and other parts of Tender Documents. Bidders must agree to these rules prior to participating. In addition to other remedies available, Tata Power reserves 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 General Condition of Contracts or other part of the Tender Documents. A bidder who violates the marketplace rules or engages in behavior that disrupts the fair execution of the marketplace, may result in restriction of a bidder from further participation in the marketplace for a length of time, depending upon the seriousness of the violation. Examples of violations include, but are not limited to:

- Failure to honor prices submitted to the marketplace.
- Breach of terms as published in TENDER.
- Submit irrelevant documents or frequently cases of missing documents as part of compliance to Qualifying, Technical or Commercial Requirements causing unnecessary delay in Tender Evaluation.

1.10 Supplier Confidentiality

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

The Tata Power Company Ltd		OPEN TENDER NOTIFICATION
Tender Reference: 4100044502/CC25ADO034		Document Date: 12 th March 2025

2 Evaluation Criteria

- The bids will be evaluated technically on the compliance to tender terms and conditions.
- The bids will be evaluated commercially on overall all-inclusive lowest cost for the complete tender BOQ as calculated in Price Bid Format. Tata Power, however, reserves right to split the order line item wise and/or quantity wise among more than one Bidder. Hence all bidders are advised to quote their most competitive rates against each line item.
- Bidder must mandatorily quote against each item of Schedule of Items. Failing to do so, Tata Power may reject the bids.

NOTE: In case of a new bidder not registered with Tata Power, factory inspection and evaluation shall be carried out to ascertain bidder's manufacturing capability and quality procedures. However, Tata Power reserves the right to carry out factory inspection and evaluation for any bidder prior to technical qualification. In case a bidder is found as Disqualified in the factory evaluation, their bid shall not be evaluated any further and shall be summarily rejected. The decision of Tata Power shall be final and binding on the bidder in this regard.

2.7 Price Variation Clause and Cap: Not Applicable. The prices shall remain firm during the entire contract period.

3. Submission of Bid Documents

3.1 Bid Submission

Bidders are requested to submit their offer in line with this Tender document. Bids shall be submitted in 3 (three) parts:

FIRST PART: "EMD – BANK GUARANTEE" of Value detailed in 1.1 valid for 180 days from the due date of bid submission in the form of Bank Guarantee favoring 'The Tata Power Company Limited'. The EMD has to be strictly in the format as mentioned in Tender Document, failing which it shall not be accepted by Tata Power and the bid as submitted shall be liable for rejection.

Note: BG of 180 days and further claim period of 180 days is needed. In case the same cannot be issued by your bank then BG valid for 365 days can be provided.

Note: At times bidders have sought Tata Power bank details which is needed by them to make BG. Hence the same is reproduced below. These details are only provided to facilitate making of BG if needed

Tata Power's Bank Details for submitting EMD BG:
Bank Name & Address – ICICI Bank, 163 HT Marg,
Backbay Reclamation, Churchgate, Mumbai 400 020.
A/c no. - 000451000293
IFSC Code – ICIC0000393

The hard copy of EMD in a sealed envelope should be sent on address mentioned in Tender document.

First Part must be submitted in hard copy in Sealed Envelope.

SECOND PART: "TECHNICAL / UN-PRICED COMMERCIAL BID" shall contain the following documents:

The Tata Power Company Ltd		OPEN TENDER NOTIFICATION
Tender Reference: 4100044502/CC25ADO034		Document Date: 12 th March 2025

- Documentary evidence in support of Technical, Commercial qualifying criteria
- Technical literature/GTP/Type test report/Details of Qualified Manpower Available/ Testing Facility available etc. *(complete in all respect as desired and detailed in Technical Specification and Technical Requirement Section)*
- Duly filled Technical and Commercial Deviation Sheets, if applicable
- Duly filled formats like Authorization affidavit form
- Unpriced Commercial Bid*

The technical / un-priced commercial bid shall be properly indexed and is to be submitted in Soft Copy through E-Tender system of Tata Power. Hard Copy of Technical Bids need not be submitted.

Second Part has to be submitted through E-Tender System Only

THIRD PART: "PRICE BID" shall contain only the price details and strictly in Price Bid format along with explicit break up of basic prices and applicable GST. Basic price should include packaging forwarding, freight, transit insurance and any other cost envisaged by the bidder.

Third part must be submitted through E-Tender System. Hard Copy of Third Part, "Price Bid" need not be submitted.

FOR BIDS INVITED THROUGH E-TENDER SYSTEM (TECHNICAL, UN-PRICED COMMERCIAL BID and PRICE BID):

In response to advertisement Bidder must provide details of person authorized to Bid on behalf of the Bidder. An e-mail will be generated by E-Tender System and the authorized person can download the Tender Documents from the system.

SECOND and THIRD PART of the Bid must be submitted in E-Tender System.

Bidders must mandatorily submit SECOND PART and THIRD PART (Technical, Un-priced commercial Bid, and Price Bid) only through E-Tender system of Tata Power. Bids submitted through any other form/ route shall not be admissible.

FOR BIDS INVITED IN SEALED ENVELOPE PROCESS (FIRST PART):

First part of the bid shall be sealed in an envelope which shall be clearly marked as below:

EMD

"Please mention Tender Reference No"

Please mention our Tender Reference No on the Tender and drop the same in our Tender Box located at The Tata Power Company Limited (Tata Power), Corporate Contracts, Tata Power Sahar Receiving Station, T2 Airport Road, Sahar, Andheri-E, Mumbai 400 059.

The bids and the outer envelope shall be addressed to:

Head - Procurement
Corporate Contracts, Tata Power Sahar Receiving Station, T2 Airport Road, Sahar, Andheri-E,
Mumbai 400 059

The envelope shall also bear the Name and Address of the Bidder along with our Tender No. and subject.

The Tata Power Company Ltd		OPEN TENDER NOTIFICATION
Tender Reference: 4100044502/CC25ADO034		Document Date: 12 th March 2025

The Bid prepared by the Bidder, and all correspondence and documents relating to the Bid exchanged by the Bidder and Tata Power, 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.

Bids submitted by Email/Telex/Telegram /Fax will be rejected. No request from any Bidder to Tata Power to collect the proposals from Courier/Airlines/Cargo Agents etc. shall be entertained.

SIGNING OF BID DOCUMENTS:

The bid must contain the name, residence, and place of business of the person or persons making the bid and must be signed and sealed by the Bidder with his usual signature. The names of all persons signing should also be typed or printed below the signature.

The Bid being submitted must be signed by a person holding a Power of Attorney authorizing him to do so, certified copies of which shall be enclosed.

The Bid submitted on behalf of companies registered with the Indian Companies Act, for the time being in force, shall be signed by persons duly authorized to submit the Bid on behalf of the Company and shall be accompanied by certified true copies of the resolutions, extracts of Articles of Association, special or general Power of Attorney etc. to show clearly the title, authority and designation of persons signing the Bid on behalf of the Company. Satisfactory evidence of authority of the person signing on behalf of the Bidder shall be furnished with the bid.

A bid by a person who affixes to his signature the word 'President', 'Managing Director', 'Secretary', 'Agent' or other designation without disclosing his principal will be rejected.

The Bidder's name stated on the Proposal shall be the exact legal name of the firm.

3.2 Contact Information

Communication Details: Detailed in 1.1

3.3 Bid Prices

Bidders shall quote for the entire Scope of Supply/ work with a break-up of prices for individual items and Taxes & duties. The bidder shall complete the appropriate Price Schedules included herein, stating the Unit Price for each item & total price with taxes, duties & freight up to destination at various sites of Tata Power. The all-inclusive prices offered shall be inclusive of all costs as well as Duties, Taxes and Levies paid or payable during the execution of the supply work, breakup of price constituents.

The quantity break-up shown else-where other than Price Schedule is tentative. The bidder shall ascertain himself regarding material required for completeness of the entire work. Any items not indicated in the price schedule, but which are required to complete the job as per the Technical Specifications/ Scope of Work/ SLA mentioned in the tender, shall be deemed to be included in prices quoted.

3.4 Bid Currencies

Prices shall be quoted in Indian Rupees Only. It also may be noted that the denomination of Purchase Order / Outline Agreement / Rate Contract and associated Payment to Successful Bidder shall also be in Indian Rupees Only. In case Bidder intends to import any equipment, part etc. and supply to Tata

The Tata Power Company Ltd		OPEN TENDER NOTIFICATION
Tender Reference: 4100044502/CC25ADO034		Document Date: 12 th March 2025

Power then all liability and costs related to import will rest with the Bidder. All statutory compliances, payments, expenditure etc. related to importing of equipment will be responsibility of the bidder.

3.5 Period of Validity of Bids

Bids shall remain valid for 180 days from the due date of submission of the bid.

Notwithstanding clause above, Tata Power may solicit the Bidder's consent to an extension of the Period of Bid Validity. The request and responses thereto shall be made in writing.

3.6 Alternative Bids

Bidders shall submit Bids, which comply with the Bidding documents. Alternative bids will not be considered. The attention of Bidders is drawn to the provisions regarding the rejection of Bids in the terms and conditions, which are not substantially responsive to the requirements of the bidding documents.

3.7 Modifications and Withdrawal of Bids

The bidder is not allowed to modify or withdraw its bid after the Bid's submission. The EMD submitted along with the bid shall be liable for forfeiture in such event.

3.8 Earnest Money Deposit (EMD):

The bidder shall furnish, as part of its bid, an EMD amounting as specified in the tender. The EMD is required to protect the Tata Power against the risk of bidder's conduct which would warrant forfeiture.

The EMD shall be in following form:

- Bank Guarantee valid for 180 days after due date of submission.

The EMD shall be forfeited in case of:

- The bidder withdraws its bid during the period of specified bid validity.
- Or**
- In case of a successful bidder, if the Bidder, within 15 days, does not.
- accept the purchase order, or.
- furnish the required Contract Performance Bank Guarantee (CPBG).

Original Bank Guarantee submitted as EMD shall be returned only after completion of award process for unsuccessful bidders and issue of Contract Performance Bank Guarantee (CPBG) for successful bidder.

4. Bid Opening & Evaluation process

4.1 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 Tata Powers processing of Bids or award decisions may result in the rejection of the Bidder's Bid.

4.2 Technical Bid Opening

Bids will be opened at Corporate Office of Tata Power as per our standard Process. The bids shall be opened internally by Tata Power. Technical bid must not contain any cost information whatsoever.

The Tata Power Company Ltd		<i>OPEN TENDER NOTIFICATION</i>
<i>Tender Reference:</i> 4100044502/CC25ADO034		<i>Document Date: 12th March 2025</i>

First the envelope marked “EMD” will be opened. Bids without EMD of required amount/ validity in prescribed format, shall be rejected.

Next, the technical bid of the bidders who have furnished the requisite EMD will be opened in E-Tender system.

4.3 Preliminary Examination of Bids/Responsiveness

Tata Power will examine the Bids to determine whether they are complete, whether any computational errors have been made, whether required sureties have been furnished, whether the documents have been properly signed, and whether the Bids are generally in order. Tata Power may ask for submission of original documents in order to verify the documents submitted in support of qualification criteria.

Prior to the detailed evaluation, Tata Power will determine the substantial responsiveness of each Bid to the Bidding Documents including production capability and acceptable quality of the Goods offered. A substantially responsive Bid is one, which conforms to all the terms and conditions of the Bidding Documents without material deviation.

Bid determined as not substantially responsive will be rejected by the Tata Power and/or the Tata Power and may not subsequently be made responsive by the Bidder by correction of the non-conformity.

4.4 Techno Commercial Clarifications

Bidders need to ensure that the bids submitted by them are complete in all respects. To assist in the examination, evaluation and comparison of Bids, Tata Power may, at its discretion, ask the Bidder for a clarification on its Bid for any deviations with respect to the Tata Power specifications and attempt will be made to bring all bids on a common footing. 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 owing to any clarifications sought by Tata Power.

4.5 Price Bid Opening

The EMD of the bidder withdrawing or substantially altering his offer at any stage after the technical bid opening will be forfeited at the sole discretion of Tata Power without any further correspondence in this regard.

Arithmetical errors will be rectified on the following basis: If there is a discrepancy between the unit price and the total price per item that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price per item will be corrected. If there is a discrepancy between the Total Amount and the sum of the total price per item, the sum of the total price per item shall prevail and the Total Amount will be corrected.

4.6 Reverse Auction and Price Matching Option

Tata Power reserves the right to go for Reverse Auction (RA) for price negotiation and discover the most competitive price on ARIBA portal, Tata Power’s official e-tendering platform. This will be decided after techno-commercial evaluation of the bids. Bidders need to give their acceptance with the offer for participation in RA. Non-acceptance to participate in RA may result in non-consideration of their bids, in case Tata Power decides to go for RA.

The Tata Power Company Ltd		OPEN TENDER NOTIFICATION
Tender Reference: 4100044502/CC25ADO034		Document Date: 12 th March 2025

Only those bidders who are techno-commercially qualified shall be eligible to participate further in RA process. However, the original H1 bidder (whose price bid is the highest post techno-commercial evaluation) shall not be allowed to participate in further RA process provided minimum three techno-commercially qualified bids are available.

For case where more than one bidder has to be awarded (including Rate Contract / Outline Agreement) Price Matching Option will be exercised. Volume of job allocated to original competitive bidder will be more than bidder who is chosen through Price Matching Option. Tata Power decision regarding work sharing shall be final and no explanation OR clarification shall be given regarding the same.

5.0 Award Decision

Tata Power will award the contract to the successful bidder whose bid has been determined to be the lowest-evaluated responsive bid as per the Evaluation Criterion mentioned at Clause 2.0. The Cost for the said calculation shall be taken as the all-inclusive cost quoted by bidder in Priced Bid Format subject to any corrections required in line with Clause 4.3 above. The decision to place purchase order/Outline Agreement/ Rate Contract solely depends on Tata Power on the cost competitiveness across multiple lots, quality, delivery and bidder's capacity, in addition to other factors that Tata Power may deem relevant.

Tata Power reserves all the rights to award the contract to one or more bidders so as to meet the delivery requirement or nullify the award decision without assigning any reason thereof.

In case any supplier is found unsatisfactory during the delivery process, the award will be cancelled and Tata Power reserves the right to award other suppliers who are found fit.

In case of award, the Purchase Order shall be issued digitally through Ariba Commerce Automation portal. In all such cases, further transaction such as Order Acceptance, SES / GRN preparation, Invoicing etc. shall be conducted in the Ariba Commerce Automation system.

5.1 Rate Contract / Outline Agreement

Rate Contract / Outline Agreement does not guarantee any assured business volume in Rupees or Quantity. Quantities are only indicative and specified for the purpose of readiness as per the request from Purchaser. Supplies shall be only against Firm Purchase Orders placed as per the agreed terms and conditions of Rate Contract / Outline Agreement. Purchaser shall be entitled at its discretion to place firm order for such supplies on "As and When Required Basis" without minimum take-off guarantee.

Rate Contract / Outline Agreement will have list of Items with Unit Rate and applicable Taxes and Duties. There will be a cap on value for which order which can be placed against the Rate Contract / Outline Agreement. Actual quantity ordered for each line item may differ significantly from the tentative quantity indicated in the Tender Document. One / few / all items of Rate Contract / Outline Agreement can be ordered till the Cap Value is reached.

6.0 Order of Preference/Contradiction:

In case of contradiction in any part of various documents in tender, following shall prevail in order of preference:

1. Outline Agreement/Purchase Order (with Commercial conditions)

The Tata Power Company Ltd		<i>OPEN TENDER NOTIFICATION</i>
<i>Tender Reference:</i> 4100044502/CC25ADO034		<i>Document Date: 12th March 2025</i>

2. Special Terms and conditions (if applicable)
3. General Terms and conditions
4. Technical Specifications

In case there is a discrepancy in the BOQ mentioned in tender (to the extent modified through subsequent Corrigendum, if any) and the bid submitted by any bidder, the description as mentioned in the tender (to the extent modified through subsequent Corrigendum, if any) shall prevail.

7.0 Ethics

Tata Power is an ethical organization and as a policy Tata Power lays emphasis on ethical practices across its entire domain. Bidder should ensure that they should abide by all the ethical norms and in no form either directly or indirectly be involved in unethical practice.

Tata Power work practices are governed by the Tata Code of Conduct. Bidder is request to refer Tata Code of Conduct Clause in General Terms and Conditions.

8.0 General Condition of Contract and Special Condition of Contracts

Any condition not mentioned above shall be applicable as per General Terms and Conditions and Special Condition of Contracts attached along with this tender.

The Tata Power Company Ltd

Tender Reference:
4100044502/CC25ADO034



OPEN TENDER NOTIFICATION

Document Date: 12th March 2025

Annexure – 1 Schedule of Items

Sr. No.	Description	UoM	Est. Qty.	Unit Rate (Rs.)	GST (Rs.)	Unit Rate with GST (Rs.)	Basic Total (Rs.)	Total with Taxes (Rs.)
1	Survey, Layout Design, Civil work, Engineering Design, Supply, Installation, testing and commissioning and integration with cloud and SCADA of 5 MW BESS with all required accessories and auxiliary systems such as transformer, 11kV HT panels, battery container, BMS, PCS, local EMS, cloud EMS and communication devices etc. required for successful commissioning and Operation at any of locations. Rate should be inclusive of 12 years of Warranty post commissioning	Each	2					
2	Survey, layout Design, Civil work, engineering design, Supply, Installation, testing and commissioning and integration with cloud and SCADA of 10 MW BESS with all required accessories and auxiliary systems such as transformer, 11kV HT panels, battery container, BMS, PCS, local EMS, cloud EMS and communication devices etc. etc. Required for successful commissioning and Operation at any of locations. Rate should be inclusive of 12 years of Warranty post commissioning	Each	6					
3	Survey, layout Design, Civil work, engineering design, Supply, Installation, testing and commissioning and integration with cloud and SCADA of 10 MW BESS with all required accessories and auxiliary systems such as	Each	2					

The Tata Power Company Ltd



OPEN TENDER NOTIFICATION

Tender Reference:
4100044502/CC25ADO034

Document Date: 12th March 2025

	transformer, 22kV HT panels, battery container, BMS, PCS, local EMS, cloud EMS and communication devices etc. Required for successful commissioning and Operation at any of locations. Rate should be inclusive of 12 years of Warranty post commissioning							
4	Survey, layout Design, Civil work, engineering design, Supply, Installation, testing and commissioning and integration with cloud and SCADA of 20 MW BESS with all required accessories and auxiliary systems such as transformer, 33kV HT panels, battery container, BMS, PCS, local EMS, cloud EMS and communication devices etc. Required for successful commissioning and Operation at any of locations. Rate should be inclusive of 12 years of Warranty post commissioning	Each	2					
5	Central EMS with servicers and desired infra as per specification and communication architecture.	Each	1					
	Total							

NOTE: Bidder to provide cost break up of components for all line items as a separate annexure. In absence of the cost break up the bid is liable for rejection.

The bidders are advised to quote prices strictly in the above format and for all the line items as mentioned above. Failing to do so, bids are liable for rejection.

Mentioning "extra/inclusive" in any of the column may lead for rejection of the price bid. Please do not edit any other cell in the sheet

The Tata Power Company Ltd		OPEN TENDER NOTIFICATION
Tender Reference: 4100044502/CC25ADO034		Document Date: 12 th March 2025

ANNEXURE II

TECHNICAL SPECIFICATIONS

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00		Date of Issue: 11/03/2025

TECHNICAL SPECIFICATION

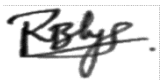
GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)

The Tata Power Company Ltd.
Engineering Services (ENSE),
Distribution Division, Senapati Bapat Marg,
Lower Parel, Mumbai – 400013 Maharashtra

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00		Date of Issue: 11/03/2025

Document No: ENSE-DS-2048-R00

Document Title: **Technical specifications for GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)**

00	For tender purpose (ENSE-DS-2048-R00)	11/03/205	YMM		AVP		RMB	
Rev No.	Remarks	Date	Initials	Sign	Initial	Sign	Initials	Sign
			Prepared By		Checked By		Approved and Issued By	

The Tata Power Company Ltd.
Engineering Services (ENSE),
Distribution Division, Senapati Bapat Marg,
Lower Parel, Mumbai – 400013 Maharashtra

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00		Date of Issue: 11/03/2025

CONTENTS

1. INTRODUCTION
2. SCOPE
3. GENERAL TERMS AND CONDITIONS
4. CLIMATIC CONDITIONS OF THE INSTALLATION
5. PROJECT MATRIX AND SCHEDULE
6. GENERAL DESIGN FEATURES OF BESS
7. CODES AND STANDARDS
8. BESS ELECTRICAL WORK
9. BATTERY PARTICULARS
10. BATTERY MANAGEMENT SYSTEM FUNCTIONS
11. POWER CONDITIONING SYSTEM (PCS)
12. MULTI WINDING POWER TRANSFORMERS
13. 33 kV GIS SWITCHGEAR SPECIFICATIONS
14. LT CABLES AND ACCESSORIES
15. EMS HARDWARE CONTROL PANEL AND COMMUNICATION FOR BESS SITE
16. RTU PANEL
17. BESS ENERGY MANAGEMENT SYSTEM (EMS) SOFTWARE
18. PROTECTION SYSTEM
19. FIRE DETECTION & SUPPRESSION SYSTEM (FSS)
20. HEATING VENTILATION AND AIR CONDITIONING (HAVC) SYSTEM FOR BESS
21. TEMPERATURE SCANNING SYSTEM
22. EARTHING AND LIGHTNING PROTECTION
23. RATING PLATES, NAME PLATES, COLOUR CODES AND LABELS

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The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00		Date of Issue: 11/03/2025

24. AUXILIARY POWER SYSTEM FOR BESS
25. SAFETY MANAGEMENT
26. EMS CONTROL ROOM INFRASTRUCTURE
27. GPS TIME SYNCHRONIZATION
28. ENERGY METERING
29. APPROVED MAKES FOR BESS AND ITS COMPONENTS
30. MANDATORY SPARES
31. TESTING
32. DOCUMENTATION (TO BE SUBMITTED ALONG WITH BID)
33. DOCUMENTATION (TO BE SUBMITTED AFTER AWARD OF CONTRACT)
34. TRAINING
35. WARRANTY AND SUPPORT TERMS AND CONDITIONS
36. ABBREVIATION
37. MANUFACTURING ACTIVITIES
38. GUARANTEED TECHNICAL PARTICULARS
39. SCHEDULE OF DEVIATIONS

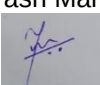
+ Annexure 1: Tentative Location and site specific requirement list

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The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00			Date of Issue: 11/03/2025
1.	INTRODUCTION	This document describes the specifications required to deploy Battery Energy Storage System at TPCL. TPCL intends to deploy BESS for cumulative 100 MW capacity with 100 MWh Energy for 2 hours with individual installations having installed capacity of 10 MW / 20 MWH and estimated delivery of 9 MW / 18 MWH in its licensed area for Power purchase optimization and Microgrid Use Cases. TPCL propose to deploy BESS interconnected to Grid at 33 kV or 22 kV or 11 KV Point. Bidder scope includes deployment of BESS 33 kV or 22 kV or 11 KV AIS Panel as per the list attached, Multiwinding Transformer, PCS and Battery Bank	
2.	SCOPE	The Bidder shall be responsible for deployment of individual installations having installed capacity of 10 MW / 20 MWH and estimated delivery of 9 MW / 18 MWH BESS at various locations (as per Annexure 1 Tentative Location and site specific requirement List) final site selection and sizing at particular location shall be done based on site survey report, total 100 MWH installation in TPCL. The scope comprising of Site Survey Feasibility study, design, engineering, planning, manufacturing, supply, packaging and forwarding, transportation, unloading, handling, storage of material, Construction/ installation, Erection, commissioning and testing (including labor and supervision) of BESS and its components, establish grid connectivity of BESS at 33 kV or 22 kV Grid Point, associated fabrication works, deployment of EMS system and its integration with TPCL SCADA System, supply of mandatory spares and Comprehensive Annual Technical Support of BESS for Contract period (12 Years) as per defined SLAs. The scope also includes installation of 33KV or 22KV or 11 KV AIS panel with adaptor panel as per Annexure 1. At Dharavi RSS, Mahalaxmi RSS, and SEEPZ DSS SITC along with building infrastructure. At Parel DSS, BARC DSS the SITC along with building infrastructure. The detailed scope mentioned below is illustrative. BESS shall comprise of Battery Modules & Connectors, Racks, Rack Control Boxes, Containers along with HVAC / Chiller, Fire Detection & Suppression System, Temperature Scanning System, BMS, EMS, PCS, AC & DC Cables, Earthing System, PCS, ACBs, Multi Winding Transformers, 33 kV or 22 kV or 11 KV AIS Panel, Protection System, Auxiliary Power Supply System, Battery Cooling System, Fire Detection & Suppression System, Temperature Scanning System, Communication System, Monitoring & Control System and all other associated materials and accessories necessary for trouble free operation and maintenance of BESS System. The configuration and internal layout of the BESS shall provide	

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The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00			Date of Issue: 11/03/2025
		suitable safe access to all equipment for installation, operation, maintenance and repair in all weather conditions. Bidder shall provide all necessary cables and control cables till the point of coupling. Bidder shall include in his proposal all the material and services needed for the completeness even if the same are not specifically appearing in these specifications. Detailed scope includes: Bidder shall be responsible for identifying and providing any and all the equipment, Components and services necessary for fully functional grid connected BESS. Equipment , materials and services required for satisfactory operation of BESS for 25 years (other than Battery) shall be deemed to be included in the scope of turnkey package work and shall not be limited to the following 1. Basic Engineering and Design philosophy BESS System 2. Design, engineering, planning of BESS based on available space at each location. Prepare Electrical layouts, engineering drawings, data, process calculation, single line diagrams, installation & Foundations drawings, Design calculation, and Test Procedures for review and approval of TPCL. 3. Submit drawings / Data sheets of bought out items, 4. Engineering - Relevant design. drawings and documents required for engineering of all facilities within the scope including but not limited to a) Design philosophy of whole System b) Detailed Battery & BMS Schemes, logic diagrams, Architecture c) EMS Control logic diagrams, schemes & Architecture d) Battery System calculation e) Earthing Design and calculations f) Project Document including drawings, features of BESS System & its components, System Configuration, System Architecture, Safety hazard to environment and personnel, Operation & Maintenance practices, O&M Manuals and procedure of safe disposal/handling etc	

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ENSE-DS-2048-R00			Date of Issue: 11/03/2025
		5. Built BESS Components, Equipment Plinth, Foundations, Partitions required on site or control room as per requirements at site 6. Scope also includes soil investigation, civil structural design, site survey, installation and structural design to accommodate maximum higher capacity in lesser footprint. The Bidder who offers highest capacity in lesser footprint will be given high preference in technical evaluation. 7. The scope includes providing centralized EMS software along with all server, hardware as specified in this document and interconnections cabling, communication hardware for proposed locations and which should at least support 25 BESS at different locations and can be augmented in future for additional BESS inclusion along with centralized EMS Software on Cloud and onprem at centralized location. 8. Packaging & Transportation from manufacturers works to the site including Site survey, route finalization, decide mode of transportation, requisite statutory coordination, custom clearances & Port clearance, port charges etc. Transit insurance and storage insurance till the handing over of BESS to TPCL. 9. Receive, Store, preserve the BESS Equipment, Components at the Site. Bidder Site Office and Security of Project material on Site. Realtime CCTV monitoring for site activity with link and log in to TPC project and services team. 10. Finalization of sub-vendors, Prepare quality assurance plans including manufacturing, execution and CATS quality plans. No sub-contracting of work in full or in part is allowed unless approved by the TPCL in writing. 11. Detailed design, engineering, Manufacturing, fabrication, Supply, transport, shipping, assembling, installation, erection, commissioning, testing (including pre commissioning and commissioning) of all the equipment and system. Warrant and make ready for service a fully functional battery energy storage system on turnkey basis. Including but not limited to a) Lithium ion Battery modules, Battery Racks, Containers, Rack Control Boxes, Battery module connectors, DC Cables along with cable trays / trenches, cable terminations and earthing system, b) Compatible Liquid Cooling System for BESS including indoor or Outdoor Units, Controllers, Ducts & Piping system	

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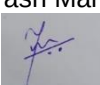
The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00			Date of Issue: 11/03/2025
		c) Compatible Electrical system (including protection) up to Point of Connect (33kV) comprising Power Conditioning System (PCS), Multiwinding Power Transformers (including Oil Pit, Fire Fighting / N2 injection System), 33 kV HT Panels, HT/LT AC/DC Cables (along with cable trays / trenches), Earthing System, 33 kV or 22 kV or 11 KV grid integration. d) Compatible Auxiliary Power Supply System comprising, Distribution Boards, Earthing system e) Compatible Fire Detection & Suppression System for BESS including smoke detectors, Gas Detectors, Gas Release Panel, Fire Dampers, NOVAC / AEROSOL Cylinder & piping, Manual Call Points, Fire Controller panel in Control Room, Abort & Emergency release switches, Panels, Cabling & integration along with Trays, Switches & Racks. Firefighting system shall be provided as per IEC 62897 or NFPA 72.A or NFPA 855 compliance. f) Compatible Temperature Scanning System for BESS including Temperature sensors , Temperature loggers, Controllers, Panels , Cabling & integration along with Trays, Switches & Racks g) Compatible EMS system for Monitoring & Control of 33 kV or 22 KV or 11 KV HT Panels, Multiwinding Transformers, PCS, ACB Panels, batteries, FSS, Cooling System, Auxiliary Power Supply System and any other system. Provide Local EMS System at each location and Centralised EMS System at TPCL. EMS system shall have standard protocol for communication on IEC 104 protocols and shall be communicable with DERMS. h) Metering in AC & DC System for energy accounting purpose at requisite points (HV breakers, ACDBs, PCS, Battery Containers etc) i) EMS Software (12 year licensing for Cloud services under SaaS model) – including managed services Cost (Web Applications, DR system, Yearly operation, FMS, Comprehensive Support services). j) BESS Local EMS HMI on panel and Centralized EMS with control room infrastructure comprising of Control Panel, network connectivity, network Racks, workstations, keyboard, mouse, LAN Cable and all associated items. Time master at each site for time synchronization. k) Supply of spares required during CATS contract period (12 Yrs), replenish of spares based on consumption trend during CATS	

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The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00			Date of Issue: 11/03/2025
		contract period (12 Yrs) of the matching quality, quantity and rating within shortest possible time. Bidder shall maintain the spares in his custody at the respective location. Bidder shall maintain spares for each type of BESS equipment / item / component as mentioned in this specification. l) Instrumentation & Communication cables, terminations and all other communication devices (hardware and services at both end) required for successful and cybersafe integration of BESS & its components with EMS System and integration of SCADA & EMS System and integration of Local EMS with centralized EMS System m) Use of Tools , tackles & testing Equipment and special equipment (hydra, forklift for handling the packs and equipment shall be in bidder scope, and Tata Power safety requirement is to be fulfilled) 12.Complete all Type, routine, and acceptance tests. Develop detailed test acceptance Plan. Perform FAT, SAT for BESS System & its components. 13.Successful trial run of BESS System for 7 days from date of commissioning and submission of relevant Test Reports. Carry out Reliability and functional guarantee tests after successful completion of trial Operation. 14.Ensure adequate warranty for the battery energy storage system and its constituent equipment / Components including bought out items to deliver Comprehensive Annual Maintenance services for CATS Contract period (12 Yrs). 15.BESS Comprehensive Support for Contract period (12 Years) - Scope includes: periodic maintenance/servicing of complete system including replace faulty equipment / items, preventive maintenance and providing all spare parts/ tools/ consumables for servicing as required as per good engineering practice, recommendation(s) of the respective equipment manufacturer(s) and instructions of engineer-in-charge and Maintain performance of BESS. 16.Earthing of AC and grounding of DC equipment as per Manufacturer recommendation and Electrical inspector requirements. TPC shall assist to get EI drawing and charging approvals, but any Electrical Inspector inputs have to be addressed by Bidder to get the final charging approval. Bidder to arrange for the plan drawing approval from local EI office	

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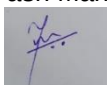
The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00			Date of Issue: 11/03/2025
		before start of site activity at any individual site, TPC shall assist to submit drawing and co-ordinate with EI. 17.24X7, Manning, Monitoring & Control for efficient Operation of BESS (Charging & Discharging) from TPCL centralized EMS System and provide BESS Support to Grid as per TPCL Requirement. 18.Training to TPCL team for 10 Mandays at Bidders facility, manufacturing plant, design office, site (Installation, Commissioning, testing, FAT and O&M). Expenses towards travel, lodging and other expenses of personnel will be borne by TPCL. 19.Providing project documents in English including O&M / instruction manuals, as built drawings, block diagrams, single line diagrams, Technical characteristics of equipment, Test Reports, features of BESS System & its components, System Configuration, System Architecture, Contact details of Bidder etc 20.Project Management including adherence to all requisite safety practices like L1, L2 training of all manpower at TPSDI etc. 21.Satisfactory completion of Contract within timelines defined in tender.	
3.	GENERAL TERMS AND CONDITIONS	1. Before submission of offer, TPCL suggests bidder to conduct site survey and satisfy himself regarding nature of work involved for Electrical works, material, services, quantity of work involved, means to access the site, tools & tackles required to complete the work , assess the risks, contingencies involved, nature of ground and subsoil, and other circumstances that may affect the offer. TPCL will not consider any extra claims on any misunderstanding or otherwise. 2. Bidder to study TPCL's existing SCADA system to assess the feasibility of the integration with the offered system. 3. Bidder shall include in his proposal all the Industrial Grade Hardware, Software, Panels, Power Supply, electronic items such as HMI, Gateway, Networking equipment and associated Cable etc. needed for the completeness even if the same are not specifically appearing in this specifications. 4. Conformal Coating:	

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		a) Conformal coating shall be provided for all field devices for protection against harsh environmental condition G3 as per ISA 71.04-1985 b) Conformal coating products shall be tested and approved by EIA 364- 65A c) Supplier shall comply the coating requirement as per following standard specification i. IPC –CCC-830 , Qualification and performance of electrical insulating compounds for printed board assemblies ii. UL 746E Polymeric materials – Industrial laminate, filament wound tubing, vulcanizing fiber, materials used in printed wiring boards iii. IEC 60664-3 .Insulation coordination for equipment within low voltage systems Part 3, Use of coatings to achieve insulation coordination of printed board assemblies 5. Considering the harsh, saline environment, Bidder shall also include the dehumidifiers, weather control, etc as required for improving the service life of equipment. 6. All surfaces shall be protected against abrasion, impact, discoloration and any other damages. All exposed threaded portions shall be suitably protected with either metallic or a nonmetallic protection device. The parts which are likely to get rusted, due to exposure to weather, should also be properly treated and protected in a suitable manner. All exposed metallic surfaces subject to corrosion shall be protected by shop application of suitable coatings. 7. Bidder shall be responsible for providing all material, equipment and services, specified or otherwise which are required to fulfill the intent of specification and ensuring availability, operability, maintainability and the reliability of the complete work covered under this specification 8. Bidders are requested to carefully examine and understand the specifications and seek clarifications, if required, to ensure that they have understood the specifications. Such clarifications should be sought within the time period as stipulated in section Information to Bidders (ITB). Bidder's offer should not carry any sections like clarifications, interpretations and/or assumptions. However, if the bidder feels that, in his opinion, certain features brought out in his offer	

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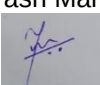
The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
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		are superior to what has been specified, these may be highlighted separately 9. All equipment furnished by the bidder shall be complete in every respect, with all mountings, fittings, fixtures and standard accessories normally provided with such equipment and/or those needed for erection, completion and safe operation & maintenance of the equipment and for the safety of the operating personnel, as required by applicable codes, though they may not have been specifically detailed in this specifications. 10. All local labour, employment, and other issues during project execution and CATS period shall be handled independently by the Selected Bidder 11. The material and services shall be conforming all aspects to high standard of engineering, design and workmanship and shall be capable of performing in continuous commercial operation in a manner acceptable to the TPCL, who will interpret the meaning of the specification and drawings and shall have a right to reject or accept any work or material which in his assessment is not complete to meet the requirements of this specification and/or applicable Indian / International standards mentioned in this specification. 12. Approvals - Bidder shall complete design and engineering, arrange / coordinate and conduct technical meetings with TPCL team, finalize drawings & documents and submit the same for approval of TPCL. Bidder shall also conduct submission, in proper shape and format, of all types of manuals, handbooks and documents to TPCL during different phases of the project as per TPCL requirement. 13. Failure of any equipment to meet the specified requirements of tests carried out at works or at site shall be sufficient cause for rejection of the equipment. Bidder shall not held rejection of any equipment as a valid reason for delay in completion of the works as per schedule. Bidder shall be responsible for removing all deficiencies and supplying the equipment that meet the requirement. 14. Bidder 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. Bidder shall follow all the rules, regulations, and standards applicable for transport of batteries in India.	

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ENSE-DS-2048-R00			Date of Issue: 11/03/2025
		15.All materials, components and equipment covered under this specification shall be procured, manufactured, erected, commissioned and tested at all the stages, as per a comprehensive work schedule, construction plan and Quality Assurance plan. Bidder shall submit work schedule, construction plan and Quality Assurance plan for each stage to TPCL for approval before commencement of any work. 16.Bidder shall make his own arrangement for water and electricity only for Project execution / Site and cost towards the same shall be part of the bid. 17.The bidder shall opt for Comprehensive Insurance Policy to cover the costs of all the equipment, compensation claims for injury sustained by labours, engineers, supervisors, guests, visitors to the site and shall be submitted to TPCL before start of works 18.Bidder to ensure full Time Safety and Quality Officer for the Site till handover of BESS to TPCL. 19.The bidder shall be solely responsible for the safety of the labours and their employees including payments of compensation in case of accidents or any mishaps etc. and safety of the public during the entire project period 20.Site shall be kept neat and clean every day. The material shall be stacked properly as per the requirement without obstructing the movement of persons, vehicles etc. No labors can stay at site. No labour camp is allowed at site. 21.The contractor shall be responsible for disposal of debris, waste material outside the premises with due fulfillment charges to statutory authorities. 22.Bidder shall keep his security personnel for watch and ward. TPCL will not be responsible for any kind of mishap or theft of construction material from site. 23.Bidder shall strictly adhere to the TPCL Safety and Environment Management policy and System. Bidder shall fulfill the entire requirement mentioned in the policy and its documents. Violation to the stipulated norms shall lead to heavy penalty in this regard. Any changes in the policy during the execution period and its fulfillment or compliance shall be binding on bidder and no extra amount shall be paid for the same by TPCL.	

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		24. Bidder shall develop the BESS strictly in accordance with the approved plan and the layout. No deviation in any case shall be entertained. 25. Lighting arrangement, necessary signal display, Project work in progress boards, barricading, safety, and security of labor and material cost shall be part of the bid proposal. No labor, supervisor, engineer is allowed to work without the safety devices (PPE) like helmet, safety shoes, safety rope and belt, safety jacket, gloves, goggles etc. Separate provision of helmets and jackets to be made to the TPCL staff visiting at site during progress of works. The bidder shall provide necessary facilities and assistance for proper inspection of the work at his own cost. 26. Bidder shall abide by all the necessary law viz., the Provident Fund Act, Minimum Wages Act, the Payment of Wages Act, ESIC, Bonus Act, Indian Contract Act, Sales Tax Act and all such other acts which may be applicable to bidder from time to time. In case of any liability raised by any of such authorities on TPCL in relation and in connection to our work including manpower, such liability if any shall be recovered from bidders payment. 27. Bidder shall comply all the requirements in case of PF and ESIC. Bidder shall maintain all the registers at site along with the file duly maintained with the statutory payments made to the respective government authorities. The bidder shall be responsible for the legal issues in the matter. 28. No material will be issued to the bidder as a free issue. 29. Bidder shall organize the project work through skilled and experience workmen who are qualified to do such skilled and specialized job. Bidder shall submit the Site organization chart for TPCL Approval. 30. Bidder shall submit No Demand Certificate and Indemnity bond in a prescribed format of TPCL during submission of final bill.	

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00		Date of Issue: 11/03/2025

4.	CLIMATIC CONDITIONS OF THE INSTALLATION	<table><tr><td>1</td><td>Maximum ambient temperature</td><td>50 °C</td></tr><tr><td>2</td><td>Max. Daily average ambient temp</td><td>40 °C</td></tr><tr><td>3</td><td>Min Ambient Temperature</td><td>0 °C</td></tr><tr><td>4</td><td>Maximum Humidity</td><td>100%</td></tr><tr><td>5</td><td>Minimum Humidity</td><td>10%</td></tr><tr><td>6</td><td>Average No. of thunderstorm per annum</td><td>50</td></tr><tr><td>7</td><td>Total Annual Rainfall</td><td>2386 mm</td></tr><tr><td>8</td><td>Average No. of rainy days per annum</td><td>115</td></tr><tr><td>9</td><td>Rainy months</td><td>June to Oct.</td></tr><tr><td>10</td><td>Altitude above MSL not exceeding</td><td>300m</td></tr><tr><td>11</td><td>Average Air Pressure</td><td>29.6-inch Hg</td></tr></table> The atmosphere is generally laden with mild acid and dust in suspension during the dry months and is subjected to fog in cold months. The design of equipment and accessories shall be suitable to withstand seismic forces corresponding to an acceleration of 0.3 g. For Mumbai the atmosphere is mainly humid across year.	1	Maximum ambient temperature	50 °C	2	Max. Daily average ambient temp	40 °C	3	Min Ambient Temperature	0 °C	4	Maximum Humidity	100%	5	Minimum Humidity	10%	6	Average No. of thunderstorm per annum	50	7	Total Annual Rainfall	2386 mm	8	Average No. of rainy days per annum	115	9	Rainy months	June to Oct.	10	Altitude above MSL not exceeding	300m	11	Average Air Pressure	29.6-inch Hg
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10	Altitude above MSL not exceeding	300m																																	
11	Average Air Pressure	29.6-inch Hg																																	
5.	PROJECT MATRIX AND SCHEDULE	Bidder to deploy BESS as per Project matrix mentioned below. The list of Electrical work items mentioned below is not complete and bidder to add additional work items required for completeness of BESS and sought scope clarification if any from TPCL. <table><tr><th>Sr.No</th><th>Description of Item</th><th>TPCL Scope</th><th>Bidder Scope</th><th>Remarks</th></tr><tr><td colspan="5">BESS electrical Work</td></tr><tr><td>1</td><td>Layouts / detailed engineering drawings</td><td></td><td>Yes</td><td>Design, Engineering, calculations, layouts, Drawings, diagrams, schemes, architectures of BESS System and its components to be prepared by bidder based on BESS Technology. TPCL will review and approve.</td></tr><tr><td>2</td><td>Battery System</td><td></td><td>Yes</td><td>Design, Supply, integration, Testing & Commissioning (DSITC) of Battery System comprising Battery Modules with BMS, Racks / Battery Containers, Rack / Battery Bank Level BMS, Battery module</td></tr></table>	Sr.No	Description of Item	TPCL Scope	Bidder Scope	Remarks	BESS electrical Work					1	Layouts / detailed engineering drawings		Yes	Design, Engineering, calculations, layouts, Drawings, diagrams, schemes, architectures of BESS System and its components to be prepared by bidder based on BESS Technology. TPCL will review and approve.	2	Battery System		Yes	Design, Supply, integration, Testing & Commissioning (DSITC) of Battery System comprising Battery Modules with BMS, Racks / Battery Containers, Rack / Battery Bank Level BMS, Battery module													
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Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd					TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)	
ENSE-DS-2048-R00					Date of Issue: 11/03/2025	
						connectors, Earthing & Grounding, Cable & Accessories with Tray/trenches, Battery module spares along with Racks, integration with EMS
		3	33 kV or 22 KV or 11 KV AIS Switchgear & Grid Connectivity		Yes	DSITC of 33kV or 22 KV or 11 KV BESS AIS Panel along with protection System, Earthing, protection system, integration with EMS and SCADA
		4	Power Conditioning System (PCS)		Yes	DSITC of Power conditioning system, establish connectivity with Battery System and Multiwinding Transformer cables and accessories with Tray/trenches, earthing, protection system, integration with EMS
		6	Multiwinding Transformers		Yes	DSITC of multiwinding transformers, protection system, Barrier walls, establish connectivity with PCS and BESS AIS switchgear using cables and accessories with Tray/trenches, earthing, integration with EMS
		7	HVAC , Liquid cooling system for Battery System, PCS (if required)		Yes	DSITC of Liquid Cooling System for Battery system and PCS including indoor or Outdoor Units, Controllers, Ducts, Precision cooling System, air blowers etc, redundant power supply to cooling system, earthing, integration with EMS
		8	Fire Detection & Suppression System (FSS)		Yes	DSITC of Fire Detection & Suppression System for BESS including smoke detectors, Gas Detectors, Gas Release Panel, Fire Dampers, NOVAC / AEROSOL Cylinder & piping, , Manual Call Points, Fire Controller panel, Abort & Emergency release switches, data Cabling along with Trays, Switches, controller & Racks, Power supply to Panels, earthing, integration with EMS

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
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Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd					TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)	
ENSE-DS-2048-R00					Date of Issue: 11/03/2025	
		10	EMS Hardware, Control Panel & Communication		Yes	DSITC of EMS Controllers, Control Panels, network racks, Firewalls, connectivity, data cables, OFC, switches, I/O Modules, Converters, Data Communication System, edge devices, touch screens, routers, Gateway, RTU, Nodes, TBs, cable trays, power supply system, earthing, protection system etc for integration of BESS Components (33 kV or 22 KV or 11 KV HT Panels, Multiwinding Transformers, PCS, batteries , TSS, FSS & Access control System, Cooling System, Auxiliary Power Supply System and any other BESS system) to EMS System
		11	Insulation Monitoring System& lightning Protection		Yes	DSITC of Insulation monitoring& Lightning protection system for BESS and its component
		12	AC Power cables, DC Power cables, Control Cables / Ethernet cable and their accessories		Yes	DSITC of AC & DC power cables along with Tray / trenches required, Control Cables / Ethernet cable , their accessories including Cable terminations, lugs, Ferrules etc and earthing
		13	Energy Metering excluding the tariff metering		Yes	DSITC of energy metering for BESS plant at strategic locations for data analysis and integration with EMS System
		14	Local EMS Control Cubicle (In coordination with package for selected Bidder & TPCL)		Yes	DSITC of Local EMS, HMI and Control Panel. firewalls, Gateways,
		BESS System level Work				
		15	BESS System Level		Yes	FAT,SAT of BESS and its components, Tools , tackles & testing Equipments required, Documentation, Training to TPCL team

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Date	11/03/2025	11/03/2025	11/3/2025

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ENSE-DS-2048-R00					Date of Issue: 11/03/2025	
			16	Integrated Comprehensive Annual Maintenance Contract (CATS) for 12 Years	Yes	Comprehensive Annual Maintenance Contract (CATS) of BESS for 12 years including Preventive & Breakdown Maintenance, achieve service level agreement (SLA), onsite and emergency support etc
			17	Centralized EMS Control Room with servers for data storage on prim	Yes	DSITC Centralized EMS Control Room Infra including EMS, Control Panel, network Racks ,firewalls, Gateways, local network Connectivity, data cables, Dedicated MPLS cloud connectivity, Master clock, , Desk, LCD Screen, etc
			18	Energy Management System	Yes	DSITC of EMS Software system at Local in panel & Centralized EMS software in Control room for Monitoring and control at local and central level. The software should have web based cloud application for monitoring with master two log in.
			* Bidder Scope (Design, Engineering, manufacture, Supply, Transport, installation, erection, commissioning & Testing). Above is overview and detailed specification and requirement are stated below in various clauses and EMS software details in separate specs.			

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The Tata Power Company Ltd				TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00				Date of Issue: 11/03/2025
		Sr.No.	Parameter	Remark
		1.	BESS Grid Connectivity Voltage	33 kV or 22 kV or 11 KV
		2.	Installed Power Capacity of Battery Bank and Container	5 MW / 10 MW / 20 MW / 40 MW as per site feasibility mentioned in annexure 1. Container of 5 MW in multiples to be used for achieving installed capacity
		3.	Useful Power Capacity at Grid Point (33 kV / 22 kV/11kV)	(Bidder to specify at 45 Deg C)
		4.	BESS Type	Outdoor
		5.	Battery Life	12 Years, 8000 cycles or better whichever is earlier with 95-100 % DOD.(Bidder to specify DOD in between 95-100%)
		6.	BESS Design Life excluding Battery container	25 Years from Date of Commissioning
		7.	Min. Battery Capacity at the end of 12th Year (after degradation) at each container level.	Compensation banks to be provided for any degradation greater than specified in this document throughout the 12 year. The location of new bank installation shall be as per TPC requirement. Bidder can consider solutions to extend the useful life of the Batteries through intelligent smart technology to isolate the faulty battery cells and optimize usefull life. Any Battery container should not degrade below 70 % of full capacity at the end of 12 th year.
		8.	Response Time for black start operation at inverter level	Within 1 Second

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Date	11/03/2025	11/03/2025	11/3/2025

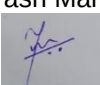
The Tata Power Company Ltd				TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00				Date of Issue: 11/03/2025
		9.	Power Factor at PCC	0.95 lead or lag in Four Quadrant Operation
		10.	Positive and Negative Ramp Rate	Bidder to specify ramp up rates. BESS Shall have suitable positive and negative ramp rate to support BESS Operation in Grid Connected and islanded mode.
			Equipment Efficiency	
		11.	Cell Level RTE	>94%
		12.	LV Cable efficiency between Battery to PCS, PCS to Transformer and PCS Transformer to Switchgear	>99.5%
		13.	PCS Efficiency	>98.5%
		14.	Transformer Efficiency	>98.9%
		15.	HV Cable efficiency between Transformer to 33 kV Switchgear & 33 kV Switchgear to Grid Point of Connect (PoC)	>99.8%
		16.	BESS Auxiliary Consumption(%) (Discharging)	>96.56%
		17.	RoundTrip Efficiency with Auxiliary Consumption	>83%
		18.	RoundTrip Efficiency with Auxiliary Consumption	>83%
		19.	Round Trip Efficiency without Auxiliary Consumption	> 86%
		20.	Environment Conditions	C5 corrosion resistance category
		21.	Ambient Temperature Range	0 to 50°C as per 11.11.1.2 of AIS 138 Part 1 / IEC-60068-2-14.
		22.	Ambient Humidity	5 to 95% as per AIS 138 Part 1 section 11.2 / IEC 60068-2-30

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Date	11/03/2025	11/03/2025	11/3/2025

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ENSE-DS-2048-R00				Date of Issue: 11/03/2025	
		23.	Ambient Pressure	86 kpa to 106 kpa as per AIS 138 Part 1 section 11.11.2.4 / IEC 60529.	
		24.	Average no of rainy days per annum	115 Days (Jun to October)	
		25.	Maximum annual rainfall	2380 mm	
		26.	Seismic Zone	III as per IS:1893-2002 (BIS, 2002)	
		27.	Maximum Altitude above MSL	300 Meters	
		28.	Wind Speed	44 km/Hour	
6.	GENERAL DESIGN FEATURES OF BESS	The Bidder shall be responsible for deployment of installed capacity of 10 MW / 20 MWH and estimated delivery of 9 MW / 18 MWH BESS at various locations in TPCL having following design features Vendors shall share assumptions considered while calculating the total battery capacity in terms of Battery Module capacity (kWh), No of Modules / Rack, Installed capacity/Rack, No of Battery Racks, total Installed capacity (MWh), One-way conversion efficiency considered, Battery Rack operating voltage (Vdc), Auxiliary power. Vendors shall also share 12 year (wise) Capacity availability calculations considering 100% DoD, Standard Operating Conditions @25 deg C & Full Load a. Year b. No.of Cycles c. Degradation in % d. SoH e. Rated / Installed MWh f. DC Usable MWh g. Available Capacity (MWh) at POC (33KV or 22KV or 11 KV bus) including Aux consumption h. Available Capacity (Mwh) at POC (33kv or 22KV or 11 KV bus) excluding Aux consumption			

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ENSE-DS-2048-R00			Date of Issue: 11/03/2025						
		Vendors shall also share. Auxiliary power consumption at plant level and container level tested during site acceptance test Cycle - Complete one charge cycle is used when an amount that equals 100 % of battery’s capacity is discharged — but not necessarily all from one charge. For instance, if 75 % of your battery’s capacity is used one day, then recharged it fully overnight. If 25 % capacity is used the next day, then total discharged 100 % capacity, and the two days will add up to one charge cycle							
7.	CODES AND STANDARDS	Material, equipment and methods used in the manufacturing of BESS and its components shall confirm to the latest edition of following standard. Bidders to submit the certifications / test reports required for below mentioned standards. All standards specifications and codes of practice referred to shall be the latest editions including all applicable official amendments and revisions as on date of opening of bid BESS Components proposed for deployment must have valid test certificates as per specified IEC / BIS standards by one of the ILAC member signatory accredited laboratories. Test Certificates from reputed ILAC member body accredited labs from outside India will be acceptable in case Test facilities are not exist in India at present. At least one set of complete BESS with partial or full capacity should be offered for inspection, verification of BESS functionalities as per relevant IEC/International standards. The test facility should be NABL approved Equipment should comply to standards listed below. Bidder shall share standard adopted along with salient features. In addition to the codes and standards specifically mentioned in the relevant technical specifications for the equipment / plant / system, all equipment parts, systems and works covered under this specification shall comply with all currently applicable statutory regulations and safety codes as well as of the locality where they will be installed. 1. National / International Standards for Battery Energy Storage System <table><tr><th>Standard</th><th>Title</th><th>Requirement</th></tr><tr><td colspan="3"> </td></tr></table>		Standard	Title	Requirement			
Standard	Title	Requirement							

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Date	11/03/2025	11/03/2025	11/3/2025

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ENSE-DS-2048-R00			Date of Issue: 11/03/2025	
		IEC 62619 or UL1642 or UL1973 (For Cell)	specifies requirements and tests for the safe operation of secondary lithium cells and batteries used in industrial applications including stationary applications	Compliance with Certification
		IEC 63056 or UL1642 or UL1973 (For Battery Level)	Secondary cells and batteries containing alkaline or other nonacid electrolytes - Safety requirements for secondary lithium cells and batteries for use in electrical energy storage systems	Compliance with Certification
		IEC 62620 (For Cell)	Marking, tests and requirements for lithium secondary cells and batteries used in industrial applications including stationary applications	Compliance with Certification
		IEC 62897 or NFPA 72.A or NFPA 855.	Stationary Energy Storage Systems with Lithium Batteries – Safety Requirements	Compliance
		IEC 62281 or UN38.3 (For battery & Cell)	Test methods and requirements for primary and secondary (rechargeable) lithium cells and batteries to ensure their safety during transport other than for recycling or disposal.	Compliance with Certification
		IEC 62933-5-1 + IEC 62933-5-2 or UL9540 and UL9540A (BESS Level) IS 17092	Electrical Energy Storage System Safety Requirements	Compliance with Certification
		UL 9540A	Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy	Compliance
		IEC/TS 62933-5	Electrical energy storage (EES) systems - Part 5-2: Safety requirements for grid-integrated EES systems - Electrochemical based systems	Compliance with Certification

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Date	11/03/2025	11/03/2025	11/3/2025

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		IEC 61850 / DNP3	Communications networks and management systems. (BESS control system communication)	Compliance			
		RoHS	Restriction of the use of certain hazardous substances in electrical & Electronic equipment	Compliance			
		UL 1642	Standard of Lithium Batteries (Safety of Lithium-Ion Batteries)	Compliance with Certification			
		IEC 61508 (For EMS / OS and BMS)	Functional Safety of Electrical/ Electronic/ Programmable Electronic Safety-related Systems: Applicable for all Battery Energy Storage Systems	BMS comply with IEC 60730			
		NFPA 855	Standard for the Installation of Stationary Energy Storage Systems	Compliance			
		IEC-60529	Ingress Protection Testing for Enclosures	Compliance, IP55			
		2. National / International Standards related to operation & safety of PCS, testing procedures and protection devices					
		IEC Certificates	Test Name				
		IEC 62477-1	Safety requirements for power electronic converter systems and equipment - Part 1: General				
		IEC60068-2-1:2007	Environmental testing – Part 2-1: Tests – Test A: Cold-35 C /72 Hour				
		IEC60068-2-2:2007	Environmental testing -Part 2-2: Tests – Test B: Dry heat : 60 C /72 Hours				
		IEC60068-2-14:2009	Environmental testing – Part 2-14: tests – Test N: Change of Temperature : -35 C / 60 C , 3 Hours / 2 Cycle				
		IEC60068-2-30:2005	Environmental testing Part 2 30: Tests – Test Db: Damp heat, 25 C /60 C 95 % RH 2 Cycle				
		IEC62116 Ed 2	Islanding prevention measures				
		IEC61000-6-2	EMC, Generic standards immunity for Industrial Environments				

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Date	11/03/2025	11/03/2025	11/3/2025

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ENSE-DS-2048-R00			Date of Issue: 11/03/2025						
		IEC61000-6-4	EMC, Generic standards immunity for Industrial Environments						
		IEC 60947-1:2020	Low-voltage switchgear and control-gear assemblies						
		IEC 61439	Low Voltage Switchgear and Control Assemblies						
		IEC61683	Procedure for Measuring Efficiency						
		IEEE 1547	Standard for interconnecting distributed resources with electrical power systems						
		UL 1741	Inverters and Interconnection System Equipment For Use With Distributed Energy Resources						
		IEC 62909 -1	Bi-directional grid connected power converters - Part 1 : General requirements						
		IEC 62909-2	Bi-directional grid- connected power converters - Part 2: Interface of GCPC and distributed energy resources						
		3. Other Standards							
		<table><tr><th>Standard Number</th><th>Title</th></tr><tr><td>Grid Connectivity</td><td>Relevant CEA 2019/2022 Regulations – CEA technical standards for connectivity to the Grid by RE generators-July 2022 and CEA technical standards for distributed generation resources Amd. Regulation-2019 (including LVRT / HVRT compliance) and Grid Code as amended and revised from time to time. The BESS shall remain connected to the grid as per Central Electricity Authority Technical (standards for connectivity to the grid) regulation 2007 with all latest amendments and its components shall be designed accordingly. BESS and its components shall conform to the CEA / CEIG and local statutory requirements for Commissioning, Testing and integration with Grid.</td></tr><tr><td>IEC 61180</td><td>High Voltage test techniques for LV equipment's</td></tr><tr><td>IEC 60076-1/</td><td>Power Transformer</td></tr></table>		Standard Number	Title	Grid Connectivity	Relevant CEA 2019/2022 Regulations – CEA technical standards for connectivity to the Grid by RE generators-July 2022 and CEA technical standards for distributed generation resources Amd. Regulation-2019 (including LVRT / HVRT compliance) and Grid Code as amended and revised from time to time. The BESS shall remain connected to the grid as per Central Electricity Authority Technical (standards for connectivity to the grid) regulation 2007 with all latest amendments and its components shall be designed accordingly. BESS and its components shall conform to the CEA / CEIG and local statutory requirements for Commissioning, Testing and integration with Grid.	IEC 61180	High Voltage test techniques for LV equipment's
Standard Number	Title								
Grid Connectivity	Relevant CEA 2019/2022 Regulations – CEA technical standards for connectivity to the Grid by RE generators-July 2022 and CEA technical standards for distributed generation resources Amd. Regulation-2019 (including LVRT / HVRT compliance) and Grid Code as amended and revised from time to time. The BESS shall remain connected to the grid as per Central Electricity Authority Technical (standards for connectivity to the grid) regulation 2007 with all latest amendments and its components shall be designed accordingly. BESS and its components shall conform to the CEA / CEIG and local statutory requirements for Commissioning, Testing and integration with Grid.								
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IEC 60076-1/	Power Transformer								

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		IS 2026															
		IEC 61439	Low Voltage Switchgear and Control Assemblies														
8.	BESS ELECTRICAL WORK	Bidders shall submit the proposal to refer annexure 1 (Tentative Location and site specific requirement list) BESS at TPCL location on turnkey basis. Bidder will carry out civil foundation / structure works as per selected bidders requirement. Bidders may propose the BESS Technology, its equipment / material based on space availability and at par or better than specification mentioned in this document. Bidder shall include all electrical material for completeness of BESS and its components and same will be finalized during detailed engineering.															
9.	BATTERY PARTICULARS	Lithium-ion battery cells with different chemistry are allowed so as far as the following technical specifications are met by bidder Technical parameters <table><tr><td>Parameters</td><td>Remark</td></tr><tr><td>Battery Cycles per day</td><td>Max 2 cycles per day</td></tr><tr><td>Battery Cycles per year</td><td>Max 600 cycles per year</td></tr><tr><td>Guaranteed complete charge and discharge cycles</td><td>8000 Cycles*</td></tr><tr><td>Battery Type</td><td>Lithium ion</td></tr><tr><td>Battery Chemistry</td><td>(LFP, Liquid Cooled)</td></tr></table>				Parameters	Remark	Battery Cycles per day	Max 2 cycles per day	Battery Cycles per year	Max 600 cycles per year	Guaranteed complete charge and discharge cycles	8000 Cycles*	Battery Type	Lithium ion	Battery Chemistry	(LFP, Liquid Cooled)
Parameters	Remark																
Battery Cycles per day	Max 2 cycles per day																
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Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
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Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)	
ENSE-DS-2048-R00			Date of Issue: 11/03/2025	
		Battery Life	12 Years from Date of Commissioning or 8000 cycles whichever is earlier	
		Min. Battery Energy at the end of 12th Year	70% of 1st Year Opening Installed Battery Capacity	
		Response Time	1 Second	
		Battery cell discharge efficiency	>96%	
		Gas Evolution from Battery	None	
		Battery Cooling Type	Liquid	
		Maximum permissible depth of discharge (DoD)	Bidder to specify within 95% to 100%	
		Battery Charging Rate	C/2	
		Battery Discharging Rate	C/2 Continuous, (0.75 C for 15 minutes)	
		Battery lifting/withdrawing arrangement	Suitable arrangement on Module / Battery Pack	
		Suitable Marking arrangement on Container	Marking will be done as per IEC 62619 and shall have following, a. PO Number and Date b. Customer Name- Tata Power Company Ltd, Mumbai c. Manufacturer name, d. Month & year of manufacturing e. Warranty Period f. Nominal voltage g. Rated kWh capacity h. Rated kW capacity i. Cell numbers j. C rate	

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00			Date of Issue: 11/03/2025
			k.Customer Care Number/ Emergency number l. Separate Tata Power Logo branding visible size min. 0.5mx0.5m on both sides
		Flame Arresters	Each module / pack / string / container shall be equipped with flame arrestor to diffuse any flammable gas escaped during charge/discharge
		Fire protection system at each level	Bidder to Specify
		Pressure Regulation Valve (PRV)	a. Each module / pack shall be provided with a pressure regulation valve. b. Valve shall be sealed and flame retardant.
		Terminal polarity marking	Positive and negative marked / embossed on Module / non interchangeable arrangement of connectors
		Insulating shrouds	Required for all battery terminals & shorting links
		Insulating pads for battery rack - required	At the bottom of rack supports, made from high impact material
		Memory /scheduled cycling for effective operation	NO
		Min. Battery Energy capacity at the end of 12th Year (% of installed Capacity / rating)	1st Year – 94% 2nd Year – 90% 3rd Year – 88% 4 th year – 86% 5th Year – 84% 6th year – 82% 7th Year – 80% 8th Year – 78% 9th Year – 76% 10th Year – 74% 11th year – 72%

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)		
ENSE-DS-2048-R00			Date of Issue: 11/03/2025		
			12th year – 70%		
		IP Rating for battery module / pack	IP67 or better		
		Self-Discharge per month	< 5%		
		Approved Battery Manufacturer (Bidder to validate that proposed Battery complies the IS/IEC.UL/IEEE standards before proposing it to TPCL)	1. Contemporary Amperex Technology Co., Limited. (CATL) 2. LG Energy Solution 3. Panasonic Corporation 4. BYD Company Ltd 5. SAMSUNG SDI CO., LTD 6. Gotion High tech Co Ltd 7. Shanghai Electric Gotion New Technology 8. Kore Power 9. EVE Energy Co. Ltd 10. Tianjin Lishen Battery Joint-Stock Co., Ltd 11. Xiamen Hithium Energy Storage Technology Co., Ltd.		
		Protections	1. Over and Under Discharge 2. Over and Under Temperature 3. Over and Under Current 4. Over and Under Voltage Ground Fault 5. Internal battery Fault Cell Balancing 6. Pack / Module level fuse 7. Module reverse polarity 8. DC Contactor for each Battery Rack 9. Failure of temperature controller		
1. The sizing calculations with detailed supporting documents					

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00			Date of Issue: 11/03/2025
		shall be submitted for approval during detailed engineering 2. Ramp up and Ramp Down – Bidder shall also submit battery selection technical parameters based on which battery is selected for BESS. Bidder shall also submit battery particulars such as C Rate, E rate, SoC, DoD, terminal voltage, nominal voltage, nominal capacity (Ah), nominal energy (Wh). Cycle life, Open-circuit voltage (V), Internal Resistance, Cut-off Voltage, Specific Energy (Wh/kg), Specific Power (W/kg), Energy Density (Wh/L), Power Density (W/L), Maximum Continuous Discharge Current, Maximum 30-sec Discharge Pulse Current, Charge Voltage, Float Voltage, (Recommended) Charge Current and (Maximum) Internal Resistance along with bid proposal. 3. Battery system shall have suitable positive and negative ramp rate to support BESS Operation in Grid Connected and islanded mode. Bidder shall study the load profile of DSS power Transformers (islanded Scenario) and propose the battery accordingly. Bidders shall consider highest ramp up/down load profile of power transformers while designing the BESS Solution. 4. Cell Covers - The cell covers 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. 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 / laser welding 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. All battery modules shall be supplied with terminal covers to avoid unintentional contact 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	

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
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Date	11/03/2025	11/03/2025	11/3/2025

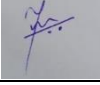
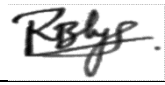
The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00			Date of Issue: 11/03/2025
		be suitably coated to withstand corrosion due to acid / base at a very high rate of charge or discharge. Nuts and bolts for connecting the cells shall be 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. 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 8. 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. 9. The Cell/module terminals and interconnects shall have adequate current carrying capacity. The Cells/modules, wiring, switch gear, and all DC electrical components shall be insulated for the maximum expected voltages plus a suitable factor of safety. The dc bus work and load-carrying cables within the storage subsystem shall have an enough margin for the actual load current. Also, all other components shall have enough margin for the actual load current according to applicable code and/or standard 10. Each electrically series-connected battery string shall include a means of disconnecting the string from the rest of the system and of providing over-current protection (during a fault). This protection shall be coordinated with the PCS capabilities and battery string protection, and shall take into account switching or other transients and the inductance/resistance (L/R) ratio at the relevant areas of the dc system. These disconnecting devices should be capable of operating with normal load current and provide physical interruption. 11. The battery system may be ungrounded or grounded. Grounded configurations may be centre or one-pole-grounded and/or solid or high resistance grounded. Bidder to deploy ground leakage current levels detection and alarm system with field adjustable detection / trip level for each container / bank or, if more than one electrical series string is installed in the container / bank, for each series string.	

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00			Date of Issue: 11/03/2025
		12. The DC voltage of battery system shall be selected by the Bidder to suit the PCS and efficient and safe operational requirement of BESS. 13. Material, equipment, safety requirements and methods used in the manufacturing of Lithium-Ion Battery (Cell, Module, Racks, Enclosure) of BESS shall conform to the relevant IEC / UL / IS latest edition of standards and Codes. 14. All cells/modules shall be traceable to the point of origin for purpose of addressing safety issues 15. Each Cell shall be integrated with BMS and each module shall be provided with Battery Management Unit, 16. Each rack comprising Battery Modules shall be supplied with Battery Control Box. Battery Control Box shall provide Manual switch to isolate Rack from Grid, lifting / withdrawing arrangement, LED Indications for status (Running, Alarm), Debugging port, Communication ports, and Auxiliary Power Supply connection arrangement, Contactor with PoS and Precharge status and Battery Control Unit. 17. Battery Cell, Modules and Rack system shall be compatible to conduct BMS Functions as mentioned in separate section in this specification. 18. Suitable ventilation liquid controlled in battery room / container must be maintained to minimize health hazards to any exposure to hazardous battery elements. 19. Bidder shall deploy safety measures such as Rubber mats, Convex mirrors, Fire extinguishers, Emergency Trip provisions, manual call points, Safety PPE etc	
10.	BATTERY MANAGEMENT SYSTEM FUNCTIONS	1. Bidders to deploy BMS at Battery bank/string level, Controllers, Battery Administration Unit, network & Communication Cables etc where Battery Modules & Battery Control Boxes will communicate with Battery Administration Unit (BAU). BMS of each battery bank / string shall be integrated with EMS over MODBUS TCP connection/ CAN. 2. BMS should be designed to provide for automatic, unattended operation of the battery storage system. BMS should provide the necessary monitoring and control to protect the battery	

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
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Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00			Date of Issue: 11/03/2025
		cells/module/string from out of tolerance ambient or unsafe operating conditions. 3. The BMS should automatically control the charge and discharge of the individual cells/module, balancing between cells/module to optimize energy consumption and range, monitor cell/module health and provide critical safeguards to protect the batteries from damage. 4. Bidder to supply the BMS system as per battery OEM recommendation & requirement and shall be in line with the application requirements. 5. BMS shall perform high level functionalities (illustrative list) a) Cell/module Monitoring: Each cell voltage, Module voltage, Rack Voltage, each cell, Module & Rack current, Rack Power, Cell /Module level Temperature. b) Cell/module Protection: Protecting the battery from out of tolerance operating conditions such as voltage, Temperature, Current etc. and BMS must provide full cell/module protection to cover almost any eventuality. The protection shall be inbuilt to avoid thermal runaway of Battery system at any condition. Isolate battery cell, Module, Rack in case of emergency. c) Charge control: BMS shall automatically control the charge and discharge of the individual cell/module along with PCS through EMS d) SOC Determination: BMS shall automatically determine the State of Charge (SOC) of the individual cell/module. e) SOH Determination: BMS shall automatically determine the State of Health (SOH) of the individual cell/module f) Cell Balancing: BMS shall automatically balance between cells/modules to optimize energy consumption, range and protect the battery g) History - (Logbook Function): Monitoring and storing the battery's parameters and communicating the same EMS. h) Alarm and fault generation and communicating the same to SCADA. i) Isolating the battery in cases of emergency. 6. Bidder shall develop multi-tiered framework that allows real time	

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Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00			Date of Issue: 11/03/2025
		monitoring and protection of the battery within the BESS not just at the cell level but at module, string and system level. The BMS shall constantly monitor the status of battery and use applications specific algorithms to analyze the data, control the battery environment and balance it.	
		7. Bidder should consider new technological solutions to extend the useful life of the batteries through intelligent smart technologies for cell monitoring, smart BMS with high state of health accuracy and smart analytics tools, etc through Intelligent new platform solutions.	
		8. BMS at Battery bank / Container level shall provide following features / information. Bidder shall include in his proposal all the BMS features needed for the completeness and trouble free operation even if the same are not specifically appearing in this specifications and unless otherwise specifically excluded.	
		9.	
		Features	Requirement
		language	English
		Date Time	Display Date Time. Synchronization with GPS Clock.
		RunTime	Display D:H:M:S from last outage
		Day	Display Day
		Firmware Version	Display Firmware Version
		Battery Bank Rackwise Status	Charging / Discharging – Status Voltage – Value
			Current – value SoC – Value SoH - Value
		Battery Control Unit (BCU)	Contactor PoS Status – Open / Close Contactor
Precharge Status – Open / Close			
Battery Bank Summary	Voltage – Value Current – Value SoC – Value SoH Value		
	Charging / Discharging - Statue		

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd				TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)	
ENSE-DS-2048-R00				Date of Issue: 11/03/2025	

			Bank overall Status - Normal / Abnormal Average Cell Volatge – value
			Average Temperature – Deg Cel Charging Current Limit – value Discharging Current Limit – Value
			Max Temp & Its Location - Value >> Rack >> Module >> Cell No.
			Min Temp & Its Location - Value >> Rack >> Module >> Cell No.
			Max Cell Voltage & Its Location - Value >> Rack
			>> Module >> Cell No
			Min Cell Voltage & Its Location - Value >> Rack
			>> Module >> Cell No.
		Rackwise Status	Max Cell Voltage & Its Location - Value >> Module >> Cell No.
			Min Cell Voltage & Its Location - Value >> Module >> Cell No.
			Max Temp & Its Location - Value >> Module >> Cell No.
			Min Temp & Its Location - Value >> Module >> Cell No.
			Charging / Discharging – Status Voltage – Value
			Current – Value Insulation – Value
			Positive Insulation – Value
			Negative Insulation – Value
			System Status - Normal / Abnormal
			Precharge Voltage – Value
Average Temperature – Value			
Average Voltage – Value			

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
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Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)	
ENSE-DS-2048-R00			Date of Issue: 11/03/2025	
				SoC – Value SoH – Value
				Positive Status - Open / Close
				Precharge Status – Open / Close
				Negative Status – Open / Close
				Disconnecter – Open Close
				Charging Current Limit – Value
				Discharging Current Limit – Value
			RackWise Alarms (Normal / Warning / Alarm / Critical)	Cell Voltage High
				Cell Voltage Low
				Total Voltage High
				Total Voltage Low
				Charging Overcurrent
				Discharging Overcurrent
				BMU Communication Fail
				BMU Fault
				HVB Temp High
				Charging Temp High
				Charging Temp Low
				Discharging Temp High
				Discharging Temp Low

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)	
ENSE-DS-2048-R00			Date of Issue: 11/03/2025	
			Insulation Low	
			Terminal Temp High	
			Contactor Faulty	
		Rackwise / Batterywise Cell Voltage	Module 1 to n >> Cell No 1 to n >> Voltage Value for each cell	
		Module Positive Point	Module 1 to n >> temp Value	
		Temperature		
		Rackwise Warning Limit / Alarm Limit and Critical Limit Setup	Total Voltage High	
			Total Voltage Low	
			Charging Overcurrent	
			Discharging Overcurrent	
			Insulation Low	
			Cell Voltage High	
			Cell Voltage Low	
			Charging Temp High	
			Charging Temp Low	
			Discharging Temp High	
			Discharging Temp	
			Low HVB	
			Temp High	
		Rackwise Alarm Info	Date>>Time>>Alarm	

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Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)	
ENSE-DS-2048-R00			Date of Issue: 11/03/2025	
				Values>>Alarm Description
			BCU Operation	Rack Connection Status - Connected / Disconnected
				Rack Status - Enable / Disable
				Operate Command - Disable / Enable
				Error Code - High Voltage Difference, Type 1 Fault, type 2 Fault, High Cell Voltage, Low Cell Voltage, System Status Stop
				Connection Operate - Command with Status Minimum Parallel Numbers of Rack - Value with Status
				Emergency Stop Electrical Status - Normal / Abnormal
				Configure Type 1 Fault
			Low Cell Voltage Alarm	
			Cell - High Temp Discharge Alarm, Cell Low Temp Discharge Alarm, Cell High Temp charge Alarm	
			Cell - Low Temp charge Alarm, Module terminal Over temperature Alarm	
			High Temp of BCU Power Connection	
			Configure Type 2 Fault	High Rack Voltage Alarm or Critical Alarm
				High Cell Voltage Critical Alarm
				Low Rack Voltage Alarm or Critical Alarm
				Low Cell Voltage Critical Alarm
				Cell High Temp Discharge Critical Alarm
				Cell low Temp Discharge Critical Alarm
				Cell High Temp charge Critical Alarm

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
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Date	11/03/2025	11/03/2025	11/3/2025

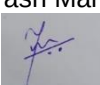
The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00			Date of Issue: 11/03/2025
			Cell Low Temp charge critical Alarm Charge Over current alarm or critical alarm Discharge Over current alarm or critical alarm Low insulation resistance alarm or critical alarm Module terminal Over temperature Critical Alarm High Temp of BCU Power Connection Critical BAU & EMS Communication failure BCU & BAU Communication failure BCU & BMU Communication failure BMU Hardware failure Contactor failure BCU Hardware failure BAU Hardware failure Current Sensor Failure Insulation sampling failure Isolation switch Off
11.	POWER CONDITIONING SYSTEM (PCS)	1. Bidder to specify the Size Limiting dimensions (L = 2260 mm, D=1350 mm and H=2125mm) of the PCS during bid submission. 2. Separate Tata Power Logo branding visible size min. 0.4mx0.5m on front and rear side 3. Bidders shall propose PCS capacity and Type (Indoor / Outdoor	

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Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00			Date of Issue: 11/03/2025
		as per site feasibility) after site survey and considering the harsh, saline environment at Site. 4. Bidder shall propose the PCS compatible to Battery & multi winding Transformers as far as the following technical specifications are met by bidder 5. PCS is interface between Battery (DC System) and AC Systems carrying out power conversion function i.e. AC to DC conversion during battery charging and DC to AC conversion during battery discharging. It may be a single unit or combination of parallel units. 6. The PCS, in conjunction with the control system, shall be capable of completely automatic, unattended operation, including self-protection, synchronizing and paralleling with the utility, and disconnect 7. Minimum power delivery Capacity of proposed PCS shall not be less than 2.4 MVA continuous (3.7 MVA for 15 minutes) Accordingly the design capacity to be provided by bidders. 8. Proposed PCS shall consist of solid-state devices, contactors, relays charge controller, associated controls and protection systems and compatible to proposed Battery & multiwinding Transformers technology. 9. PCS shall supply rated power to the grid / battery for rated duration without violating the temperature rise limits. 10. PCS shall supply rated power to the grid / battery for rated duration without any voltage derating. 11. PCS enclosure & Waste heat removal - PCS enclosure must be designed with C5M coating with base Alu Zinc Material suitable to withstand the harsh environmental conditions for complete designed life. The cooling necessary to maintain temperature of PCS within design limit will be in the Bidders scope. In air cooled system: Waste heat rejection shall be done to ambient air. Air handling system to have filters to stop entrance of dust inside PCS. In oil cooled system: Provision to monitor coolant leaks, alarming & protection. Weatherproof & dustproof enclosure/Container of IP-54 with provisions to prevent moisture condensation, water, airborne dust, rodents, insects etc. from air intake / exhaust ports and compliant to IEC-	

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Date	11/03/2025	11/03/2025	11/3/2025

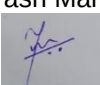
The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00			Date of Issue: 11/03/2025
		60529	12. Bidder shall include in his proposal all the Industrial Grade Hardware, Software, Panels, Power Supply, LCD, Networking equipment and associated Cable etc. needed for the completeness even if the same are not specifically appearing in this specifications. PCS PCBs shall have conformal coating, industrial grade Hardware to withstand the harsh environment 13. PCS 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. 14. PCS Flicker shall be as per IEC 61000. 15. PCS shall have suitable communication port for communication with EMS 16. PCS should conform to all applicable IEC / IS and UL standards and IEEE Guidelines 17. PCS Shall be also have adequate protection against earth leakage faults. Internal Surge Protection Device (SPD – Type 1+2) shall be provided in the PCS on both DC and AC side. It shall consist of MOV Type arrestor. The discharge capability of the SPD shall be at least 10kA at 8/20 microsecond wave as per IEC 61643-12. During earth fault and failure of MOV, the SPD shall safely disconnect the healthy system. 18. PCS Shall have provision to be isolated from grid (AC and DC) through Circuit Breakers which shall be inbuilt within the PCS. 19. Local LCD Display - PCS shall have Local LCD display to monitor various functions and parameters locally viz. charging / discharging, voltage, current, power, alarms etc. Control and read-out should be provided on the indicating panel integral to the Inverter 20. PCS should be suitable for parallel operation of multiple PCSs to scale energy storage installations for future expansion without any common mode voltage noise 21. The bidder shall ensure by carrying out all necessary studies that the PCS will not excite any resonant conditions in the system that

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Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00			Date of Issue: 11/03/2025
		may result islanding / tripping of BESS Plant 22. PCS should communicate with EMS for its optimized operation & for reporting health parameters to EMS to monitor & control. 23. Bidders to propose Modular Type of PCS preferably. Bidder shall ensure shall ensure that no abnormal interaction shall take place among the various PCS modules during any grid operating condition which may result in outages. The PCS controller offered by the Contactor shall be such as to ensure stability, reliability and a good dynamic performance . 24. Active Standby mode shall be provided so that unnecessary losses are minimized. 25. The inverter shall be capable of supplying reactive power as per grid requirement (automatically or manual intervention through EMS) during normal operation. However, reactive power support, beyond 0.95 pf, might be at the behest of active power. 26. Outdoor Type PCS - PCS enclosure must be suitable to withstand the harsh environmental conditions for complete life of plant. The PCS enclosure shall be made of Alu Zinc and C5M coated. 27. PCS shall be compatible to conduct functions as mentioned below: a)Active/ Reactive Power Control: PCS shall have capability to provide both active and reactive power separately as per requirement limited to rated MVA capacity of system and provide power in all four quadrants complied to IEEE 1547 and IEEE 519 . Change in delivery of active/reactive power towards load side should be smooth over the range of 0~100%. Similarly, the change in charging current of batteries should also be smoothly controllable. PCS output power shall remain within 1% of the set value, for AC input variation of +/- 10%. PCS shall be able to provide 0.8 lead to 0.8 lag reactive power support without curtailing the active power b)Charge control functions – PCS shall be able to control battery Charge based upon power/energy requirements, Charge battery in float/boost /cc-cv mode as per requirement and regulate float/boost voltage in case of prescribed temperature rise	

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Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00			Date of Issue: 11/03/2025
		of battery (OEM Recommendation) to avoid thermal runaway through EMS System (Without any manual intervention). The maximum C-rate for charging and discharging shall be C/2. c)Charge control functions – PCS shall be able to control battery Charge based upon power/energy requirements, Charge battery in float/boost /cc-cv mode as per requirement and regulate float/boost voltage in case of prescribed temperature rise of battery (OEM Recommendation) to avoid thermal runaway through EMS System (Without any manual intervention). The maximum C-rate for charging and discharging shall be C/2. d)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. e)Ramp up and Ramp Down – PCS Shall have suitable positive and negative ramp rate (Bidder to specify) to support BESS Operation in Grid Connected and islanded mode. Bidder shall study the load profile of EHV Power transformers (Grid connected Scenario) and DSS power Transformers (islanded Scenario) and propose the BESS equipment accordingly. Bidders shall consider highest ramp up/down load profile of power transformers while designing the BESS Solution. 28. PCS should have capability of seamless transition between grid following and grid forming mode with PCS transition from grid following to grid forming mode within 200 msec (Excluding sensing and switch opening time) a) PCS shall be capable of supplying reactive power as per grid requirement (automatically or manual input through EMS) during normal operation. However, it should supply required active and reactive power based on load during off grid mode of operation. b) PCS should have functionality to start multiple PCS together in a black start application. This should also be demonstrated during FAT at the factory. c) PCS should have operational capability for both standalone and	

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00			Date of Issue: 11/03/2025
		grid- connected mode. d) PCS include appropriate self-protective and self-diagnostic feature to protect itself and the Battery from damage in the event of PCS component failure or from parameters beyond the PCS's safe operating range due to internal or external causes. Faults due to malfunctioning within the PCS, including commutation failure, shall be cleared by the PCS protective devices. e) PCS Shall be capable of starting and operating as black start (Automatically or with external command from EMS). Exercise of the black start capability shall under no circumstance result in an accidental energizing of the Host Utility's bus. PCS black start shall be possible from EMS without any setting modification at PCS panel locally. f) The bidder shall specify the conversion efficiency at following load conditions i.e. 25%, 50%, 75% and 100% during detail engineering, which shall be confirmed by type test reports. 29. PCS should feature high speed controls that are capable of servicing load steps of up to 100% rated power in under 10 msec a) The PCS shall have protection against any sustained fault in the feeder line /Grid. b) PCS should be designed for volt VAR function i.e., immediate, and automatic voltage support to the grid. c) PCS should be designed for Hz-Watt function i.e., immediate, and automatic frequency support to the grid d) PCS should have weak grid support option as per CEA regulation e) PCS should be able to handle phase un-balancing. f) PCS should support frequency droop support in grid following mode. g) PCS should be designed for four-quadrant energy storage applications in both grid-tied and micro-grid applications. 30. Type test compliance report	

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00		Date of Issue: 11/03/2025

Type test reports and certification to be submitted along with bid. OEM should have attained the 'authority to mark' approval (for the offered product) for UL marking by third party certifying bodies. However, test report for IP test in accordance with IS 60529.

31. PCS Technical Parameters

Parameters	TPCL Requirement
Installation Type	Indoor / Outdoor
Cooling Type	Forced Air
Maximum DC voltage	Upto 1500 V _{DC} full power operation
User Interface HMI	Min 8 inch Touchscreen LCD
Communication	Modbus TCP, DNP 3.0
Type of AC & DC Side Disconnection	DC side contactor + Fuse
Nominal power (AC) at 50 °C	Minimum Capacity 2.5 MVA
Max. Total Harmonic Distortion (Amp)	Total < 3%,
Efficiency	Max. Efficiency > 98%,
IP Rating	IP54 or better with C5M coating
AC & DC side Surge Arrestor	Type 2 as standard
Noise Level	Maximum noise level – 85dBA
Operating Temperature	0°C to 50° C ambient Temperature with no derating and 95% non-condensing Humidity
Output current DC injection	Less than 0.5% of nominal load Current
Frequency Range	47.5 Hz to 52 Hz
Protection Systems (Illustrative list)	Thermal Overload Insulating monitoring ground fault Over Voltage : DC & AC Side Under Volatge : DC & AC Side Over Current : DC & AC Side

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00			Date of Issue: 11/03/2025
			Over and Under Grid Frequency Over Temperature Short Circuit Surge Protection (Power, Control & Signal Cables) Lightening Protection Surge Voltages induced on AC & DC Side due to external source Islanding & Anti Islanding as per IEC 62116 Internal Fault e.g Logic failure EMS requirement as per IEC61000 or equivalent standard Protection against any fault in feeder / load line Earth leakage faults Shock, Energy, Fire, Mechanical & Other Hazards
		(i) AC & DC overcurrent protection.	To be provided
		(ii) Synchronization loss protection.	To be provided
		(iii) Over temperature protection. (iv)DC & AC under and over voltage Protection	To be provided
		(v) Under & over frequency protection.	To be provided
		(vi) Cooling system failure protection	To be provided
		(vii) Ground fault monitoring & detection	To be provided
		(viii) LVRT and HVRT protection (ix)Anti-islanding protection	To be provided
		(x) Grid monitoring	To be provided
		(xi) Frequency response and droop function	To be provided
		12.	MULTI WINDING POWER TRANSFORMERS

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00		Date of Issue: 11/03/2025

		on two sides																																																
		3. Key Technical particulars																																																
		<table> <tr> <th>S.No</th><th>Particular</th><th>TECHNICAL DETAILS</th></tr> <tr> <td>1</td><td>Transformer Capacity/ Rating</td><td> a) 5 MVA, 33KV-22KV or 22KV-11KV/ 800V b) 5 MVA, 11KV/800 V c) 9.9 MVA, 11KV/ 800 V and 33KV-22KV or 22KV-11KV/ 800V </td></tr> <tr> <td>2</td><td>Application</td><td>Continuous application and inverter Duty (Outdoor)</td></tr> <tr> <td>3</td><td>Type</td><td>Oil immersed, core type, Shall be suitable for Bi Directional Power flow, 3 Winding</td></tr> <tr> <td>4</td><td>Standard applicable</td><td>IS : 2026 & IEC : 60076</td></tr> <tr> <td>5</td><td>Rated Voltage (kV)</td><td></td></tr> <tr> <td>5.1</td><td>Primary Voltage</td><td> a) 33kV-22kV or 22kV-11kV (Selectable through a selector switch on transformer) b) 11 KV </td></tr> <tr> <td>5.2</td><td>Secondary Voltage</td><td>800V shall be compatible to PCS Output</td></tr> <tr> <td>6</td><td>Insulating Oil (Cooling Type)</td><td>Ester Oil (KNAN) Bidder to offer smaller dimensions transformer.</td></tr> <tr> <td></td><td>Size of Transformer</td><td> a. 5MVA- max. 3mx3m b. 9.9MVA- max. 5mx5m </td></tr> <tr> <td>7</td><td>Overload Capacity of Transformer</td><td>125 % for 30 mins</td></tr> <tr> <td>8</td><td>Winding connection</td><td>HV / LV1-LV2</td></tr> <tr> <td>8.1</td><td>HV</td><td>Star</td></tr> <tr> <td>8.2</td><td>LV</td><td>Delta – Delta</td></tr> <tr> <td>9</td><td>Winding Details</td><td></td></tr> <tr> <td>9.1</td><td>Winding Material</td><td>Aluminium (As per Type tested Design)</td></tr> </table>	S.No	Particular	TECHNICAL DETAILS	1	Transformer Capacity/ Rating	a) 5 MVA, 33KV-22KV or 22KV-11KV/ 800V b) 5 MVA, 11KV/800 V c) 9.9 MVA, 11KV/ 800 V and 33KV-22KV or 22KV-11KV/ 800V	2	Application	Continuous application and inverter Duty (Outdoor)	3	Type	Oil immersed, core type, Shall be suitable for Bi Directional Power flow, 3 Winding	4	Standard applicable	IS : 2026 & IEC : 60076	5	Rated Voltage (kV)		5.1	Primary Voltage	a) 33kV-22kV or 22kV-11kV (Selectable through a selector switch on transformer) b) 11 KV	5.2	Secondary Voltage	800V shall be compatible to PCS Output	6	Insulating Oil (Cooling Type)	Ester Oil (KNAN) Bidder to offer smaller dimensions transformer.		Size of Transformer	a. 5MVA- max. 3mx3m b. 9.9MVA- max. 5mx5m	7	Overload Capacity of Transformer	125 % for 30 mins	8	Winding connection	HV / LV1-LV2	8.1	HV	Star	8.2	LV	Delta – Delta	9	Winding Details		9.1	Winding Material	Aluminium (As per Type tested Design)
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Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00		Date of Issue: 11/03/2025

		9.2	HV/ LV winding	Double paper covered
		10	Vector group	Bidder to offer
		11	Number of phases	3
		12	Frequency(HZ)	50
		13	Type of cooling	KNAN
		14	Impedance data	As per IS 2026 ...Bidder to specify
		15	Reactance	...Bidder to specify
		16	Resistance	...Bidder to specify
		17	Core Grade	M3 or better
		18	Efficiency at rated tap	
		18.1	50% load (upf)	Bidder to specify
		18.2	100% load (upf)	Bidder to specify
		19	Losses Maximum losses in kW at 100% rated voltage at 75°C at	Bidder to specify
		19.1	Extreme High Tap Maximum losses in kW at 100% rated voltage at 75°C at	Bidder to specify
		19.2	Extreme Low Tap	Bidder to specify
		19.3	No load losses (max) at rated V and f	0.1% of rated capacity
		19.4	Guaranteed total load losses @ 75	1% of rated capacity
		20	Thermal data	
		20.1	Temperature rise in top oil over an ambient of 50 DegC	50 °C
		20.2	Temperature rise in winding by resistance measurement method over an ambient of 50 DegC.	55 °C
		20.3	Thermal time constant (Hours)	4 hours (Approx)
		21	Withstand time for short circuit at	2 sec

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd				TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)	
ENSE-DS-2048-R00				Date of Issue: 11/03/2025	
			terminals (sec)		
		22	Over excitation withstand times (sec) for % over excitation of		
		22.1	110%	Continuous	
		23	Bushings		
		23.1.1	Manufacturer	Reputed Tier 1 make and shall produce valid type test certificates and reports (Vendor shall propose makes having type tested design)	
		23.1.2	Mounting	In cable box for HV and LV both	
		23.1.3	Rated current (A)	Bidder to specify (suitable as per PCS and BESS rating)	
		23.1.4	Total creepage distance	31mm/kV	
		23.1.5	Mounting	Top cover mounting with cable box	
		23.3	Shield Bushing		
		23.3.1	Make	Bidder to specify	
		23.3.2	Type	Bidder to specify	
		23.3.3	Bushing Class	Bidder to specify	
		23.3.4	Minimum Creep age Distance	31mm/kV	
		23.3.5	Rated Current	Bidder to specify	
		23.3.6	Lightning impulse voltage(1.2/50Us wave)	40	
		23.3.7	Phase to Phase Air clearance	As per CBIP	
		23.3.8	Phase to Earth Air clearance	As per CBIP	
		23.3.9	Shield Details	Bidder to specify	
		24	Tap change equipment	NA (Bidder to suggest if required)	
		25	Insulation level		
		25.1	HV winding		
		25.1.1	Lighting impulse withstand voltage (kVp)	Suitable BIL for 33kV, or 22 or 11kV as applicable	

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00		Date of Issue: 11/03/2025

		25.2	LV Winding	
		25.2.1	Power frequency with stand voltage (kV rms)	3 KV
		26	Conservator/ diaphragm/air cell	Transformer shall be hermetically sealed design hence not applicable.
		26.1	Type of protection	DGPT/IGPT protection required along with PRV and OTI, WTI.
		27	Oil make	As per approved make
		28	Core	
		28.1	Type of construction	Core type
		28.2	Net core area(mm2)	Bidder to specify
		28.3	Core material and grade used	M3 or better
		28.5	Thickness of stamping	0.23mm
		28.6	Percentage silicon content (%)	Bidder to specify
		29	Maximum flux density in core at rated frequency and at	
		29.1	90% voltage (Wb/m2)	1.4/ Bidder can specify as per the design without huge deviation
		29.2	100% voltage (Wb/m2)	1.60 Bidder can specify as per the design without huge deviation
		29.3	110% voltage (Wb/m2)	1.76 Bidder can specify as per the design without huge deviation
		30	Temperature Indicators	
		30.1	Winding temperature indicator	Digital type, shall be able to communicate via RS-485 Bidders to specify Make, Type, Range, Size, Setting for alarm, Setting for trip, NO Potential Free Contacts Nos.
				Digital type, shall be able to communicate

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd				TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)	
ENSE-DS-2048-R00				Date of Issue: 11/03/2025	
		30.2	Oil Temperature Indicator	via RS-485 Bidders to specify Make, Type, Range, Size, Setting for alarm, Setting for trip, NO Potential Free Contacts Nos.	
		31	Prismatic oil level gauge	With red color background and of Polycarbonate material, acrylic not accepted. With metal frames on sides. Mounting on side walls of tank upper side.	
		32	IGPT/ Buchholz relay	Analog type, Bidders to specify Make, Type, Size, NO Potential Free Contacts Nos.	
		33	Pressure relief valve	Analog type, Bidders to specify Make, Type, NO Potential Free Contacts Nos.	
		34	Marshalling Box details	Analog type, IP65 Bidders to specify Make, Type, Material & Thickness	
		35	Winding	Bidders to Specify HV & LV winding Type, Current density rated load, Conductor Area, Magnetizing inrush current (Amps) , No load current (Amps) at rated frequency and rated Vtg, Leakage reactance	
		36	Tank		
		36.1	Tank cover-	Bolted cover with sealed gasket	
		36.2	Approximate thickness of		
		36.2.1	Side (mm)	10	
		36.2.2	Bottom (mm)	12	
		36.2.3	Cover (mm)	12	
		37	Vacuum withstand capability of		
		37.1	Main tank	As per CBIP	
		37.2	Coolers and accessories	As per CBIP	
		40	Fault level	25kA/2 Sec on HV side	
		41	Gland plat (Detachable)		
		41.1	LV	AL Material- 3 MM	
		41.2	HV	AL Material- 3 MM	

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

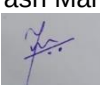
The Tata Power Company Ltd				TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00				Date of Issue: 11/03/2025
		42	Overall transformer dimensions	
		42.1	Length, mm	Max.
		42.2	Breadth, mm	
		42.3	Height, mm	Bidder to specify
		43	Total weight of the transformer with all accessories	Bidder to specify
		44	Transformer total oil volume, liters	Bidder to specify
		45	Transformer equipped with sensors / relays / Marshalling Box to integrate signals with EMS & SCADA System	- Oil Temp High Alarm - Winding Temp High Alarm - IGPT/Buchholz Alarm/Trip - PRV Trip - Winding Temp Trip - Both LV busbars with temperature sensors on R,Y,B all phases and with display unit having Modbus protocol
		48	Terminal connection	Cable Box with Air insulated Disconnect Chamber and cover with Handle is required.
13.	HT SWITCHGEAR SPECIFICATIONS	- The bidder shall procure 33 kV or 22 KV or 11 KV AIS Switchgear components from approved make / vendors only (ABB, Siemens, Schneider). - Switchgear relay shall support to integrate following signals with EMS & SCADA System - Circuit Breaker Status – ON/OFF, Auto Trip, Emergency PB Trip, Trip Circuit unhealthy, Service Position, Spring Charge fail, Local / SCADA mode, DC Supply unhealthy, HT Cable live, Heater Faulty, Synchronization status, Goose fail , Heater status, Heater Mode, Humidity Controller, and Power Transformer MCB and Master Trip etc - Circuit Breaker Measurands – KW, MD (KVA), KVAR, Current in each phase, Ph to Ph and Ph to N Voltage, PF etc		

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R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00		Date of Issue: 11/03/2025

5. Relay / Protection System – Real time Current, Relay pickup signals. Relay Operation Stage signals, Internal relay fail etc.
6. Separate Tata Power Logo branding plate visible size min. 0.4mx0.5m front.
7. Configuration: As per Annexure 1.

Sr No.	Description	Requirement
1.0	SWITCHGEAR PANEL	
1.1	Architecture	AIS/Hybrid
1.2	No. of Phases	Three
1.3	Rated Voltage	36 kV or 12 KV or 24kV
1.4	Service Voltage	33 kV or 11 KV or 22kV
1.5	Rated Frequency	50 Hz
1.6	Rated Lightning Impulse withstand voltage	As per BIS
1.7	One Minute Power Frequency Withstand Voltage	As per BIS
1.8	Rated short time withstand current	25 kA for 3 sec
1.9	Peak withstand current rating	62.5 kA
1.10	Normal service condition	Indoor
1.11	Internal arc Protection	IAC-A FLR as per IEC 62271-200, Shall withstand 25 kA for 1 sec.
1.12	Degree of Protection Enclosure / Partitions / for meters, relay & BCU	IP4X – Enclosure IP2X – Partitions IP5X or equivalent to completely protect against dust ingress.
2.0	BUS BAR	
2.1	Bus bar continuous rated current	1250 A as per existing bus rating for 11kV
2.2	Bus bar material	Copper with Silver / Tinned Coated contacts
2.3	Rated short time withstand current	25 kA for 3 sec
2.4	Max. permissible temperature rated normal Current	The maximum permissible current temperature for bus bar shall be as per IEC
3.0	CIRCUIT BREAKER FOR IC/OG (INCOMER, BUSCOUPLER AND OUTGOING FEEDER)	
3.1	Application /Class	Indoor
3.2	Type of circuit	Vacuum (VCB)
3.3	No. of poles	3
3.4	Rated Voltage	36 kV rms or 12 KV rms
3.5	Rated Insulation Level	36 KV or 12 KV
3.6	Lighting impulse	170 kV peak or 75 KV peak
3.7	One minute power frequency withstand	70 kV rms or 28 KV rms
3.8	Rated frequency	50 Hz

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd				TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)			
ENSE-DS-2048-R00				Date of Issue: 11/03/2025			
		3.9	Rated normal current	For 22kV and 33kV - 1250 A For 11kV – 630A			
		3.10	Rated operating sequence	O-t-CO-T-CO (t=0.3sec, T= 3 min.)			
		3.11	Max. Spring Charging Time of Motor	10 sec			
		3.12	Rated load breaking current (sym)	25 kA rms			
		3.13	Rated short circuit withstand current	25 kA rms for 3 sec			
		3.14	Rated short circuit making current	62.5 kA peak			
		4.0	OPERATING AUXILIARY VOLTAGES				
		4.1	For Protection relays	220V DC			
		4.2	For Ant condensation Heaters	220V AC			
		4.3	Spring Charging Motor (Universal Motor)	230V AC			
		4.4	No. of spare auxiliary contacts with wiring	8NO + 8 NC			
		5	VOLTAGE TRANSFORMER				
		5.1	Type	Plug In type, Dual ratio			
		5.2	Ratio	a) 33KV/ $\sqrt{3}$ / 110/ $\sqrt{3}$ -110/ $\sqrt{3}$ OR b) 22KV/ $\sqrt{3}$ / 110/ $\sqrt{3}$ -110/ $\sqrt{3}$			
		5.3	Core Details	Core-I	Core-II		
		i)	Accuracy class	0.2S	3P		
		ii)	Burden	50VA	50 VA		
		6	CURRENT TRANSFORMER				
		6.1	For Metering and Protection				
		6.1.1	Ratio	a) 100-200/5A OR b) 300-600/5 A			
		6.1.2	Burden & Class				
		i)	Core –I	0.2S , 10VA; Isf < 5			
		ii)	Core –II	5P20, 10 VA			
		6.2	For Differential Protection	Outgoing			
		i)	Ratio	a) 100-200/1A OR b) 300-600/1 A			
		ii)	Core- III	PS			
		General Technical Parameters of BCPU					

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Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd				TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)	
ENSE-DS-2048-R00				Date of Issue: 11/03/2025	
		S N.	Description	Specification	
		1.0	Approved vendors	SIEMENS/ABB/ALSTOM/SCHNEIDER	
		1.1	System Frequency	50 Hz	
		1.2	Rated current	5/1A	
		1.3	Auxiliary Voltage	220V DC +/- 20%	
		1.4	Timing Accuracy	10 μs or better	
		1.5	Sampling Rate	Disturbance events should be recorded up to 2 seconds at 8 kHz sampling rate and 5 seconds at 1 kHz sampling rate.	
		1.6	Sequential Events & Recorder Memory	Latest 1000 entries should be stored	
		1.7	Environment	Shall be suitable for continuous operation over a temperature range of 10°C to 50°C in accordance with IEC 60255-6. The relays internal PCB board should coated with conformal coating.	
		1.8	Ingress Protection	IP-54	
		1.9	Protection functions for BCPU	POL & EF with Hiset1, Hiset2, IDMT Breaker failure Trip circuit supervision Synchro check / energizing check, Negative Sequence Current, VT supervision relay and Trip circuit supervision relay, Integrated CB failure protection, Configurable LEDs shall also be provided to indicate the BCPU operation and the alarm/status change of a bay equipment e.g. Phase Fault operated/ Earth Fault operated/ CB Open/ CB Close/ Spring charged etc., Auto Reclose (79) Protection, synch-check facility.	
				Configuration of all input and output logical signals and binary inputs, Analog Inputs and relay outputs for all built-in functions and signals shall be possible both locally and remotely. BCPU must have broken conductor and fault locator facility	

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd				TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)	
ENSE-DS-2048-R00				Date of Issue: 11/03/2025	
				Electrically reset type high speed, heavy duty relay (master trip 86) shall be used for tripping on operation of BCPU. Tripping coil shall be provided with independent potential free contacts from different fused DC supplies. The trip relay shall be supervised. Trip relay should be such that on resetting its flag should be automatically reset	
		1.10	Protection functions for BCPU	Transformer protection	
			INTEGRATION OF BCPU	BCPU should support integration with SCADA / RTU system on IEC 104 and IEC 61850	
		1.11	Software tools	A user-friendly engineering and disturbance handling tool shall be available.	
				It shall be possible to retrieve/download the disturbance records and parameterization of all BCPUs through Gateway/Master.	
				It shall be possible to access the BCPU remotely from the Master Station for configuration / maintenance activity. The bay control shall have multilevel passwords to safeguard bay control, logic, and automation settings.	
				User friendly on-line monitoring facility of real time data shall be provided to maintenance engineer for monitoring/analysing the real time status of the process, program logic from the engineering station (Configuration tool – Laptop).	
		BCPU should support all BO's as per attached IO list. BCPU should possess minimum 16 No BI's and 8 No BO's			
1.12	Breaker Health Monitoring	BCPU should support Breaker Health monitoring feature like opening time, closing time, I^2t , etc.			
1.13	Group Setting	BCPU should support Group setting change control from remote as well as local.			

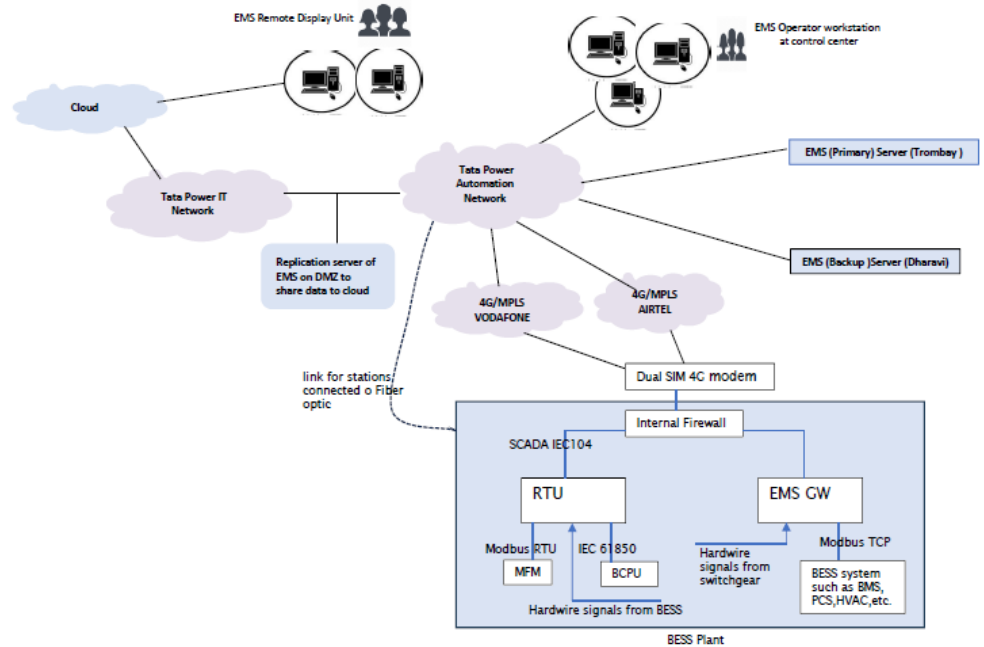
Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00			Date of Issue: 11/03/2025
14.	LT Cables and Accessories	- DC Power Cables required for interconnection between Battery Rack & PCS & Earthing System shall be sized considering connecting equipment Manufacturers recommendations for Volatge and Cable Loading. - AC Power Cables required for interconnection between PCS, ACB & Multi Winding Transformer (MWT), and Auxilary Power Supply System shall be sized considering connecting equipment Manufacturers recommendations for Volatge and Cable Loading. Auxiliary cable form metering point. - The power cable used shall conform to IS7098 part I & XLPE insulated Al Cables shall be used for connection. Type test reports shall be submitted for approval. - The communication cables depending on protocol supported by various devices connected to EMS shall be laid at min. safe distance, in separate Cable trays from power cables. - Any other cable including the cables as specified above shall be considered under the scope of bidder. - Cables shall be laid in perforated GI cable trays/cable trench (as per IS 1255) of suitable size. The routing of cable shall be finalized along with TPCL representative. - Approved Cable makes for LT Cable – Apar, Ravin, KEC, Torrent, KEI Cables, Polycab	
15.	EMS Hardware, Control Panel and Communication for BESS Site	Bidder shall deploy all hardware like controller, RTU, I/O Cards, Control Panel, Controller, Processors, Firewall, Local Control room Hardware, network racks, data cables, routers, display screens, nodes etc required to integrate the BESS and its components to centralized EMS Software on Cloud and prem at centralized location Communication Media shall be Fibre optic or GPRS having 4 G, 5 G cellular routers (to be supplied by bidder) with 2 number of sim cards of different service provider. Bidder to consider adequate redundancy of critical components to meet the SLAs. TPCL intends to deploy single EMS System at Centralized location to monitor and control the DERMS.	

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00		Date of Issue: 11/03/2025

Proposed EMS architecture for BESS Site is as mentioned below



1NOTE – SCADA – Supervisory Control and Data Acquisition System, RTU – Remote Terminal Unit, PCS – Power Conditioning System,

Bidder shall include in his proposal all the Industrial Grade Hardware, Firmware, Software, Panels, Power Supply, Networking equipment and associated Cable etc. needed for the completeness even if the same are not specifically appearing in this specifications. All electronic items supplied shall have conformal coating and industrial grade Hardware to withstand the harsh environment.

Bidder shall deploy necessary infrastructure for local EMS including EMS, HMI, network switches, Firewalls, racks, etc

1. All hardware or devices deployed on BESS site for EMS system shall be compatible for remote firmware update and configuration from centralized location without affecting the operation or taking any outage of BESS and its components.
2. Bidder shall conduct EMS Controller / RTU integration test cases to achieve seamless integration with proposed EMS hosted on Cloud and existing SCADA systems in TPCL.
3. EMS operator at local / centralized system shall be able to

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00			Date of Issue: 11/03/2025
		monitor the power flow at BESS 33 KV or 22 kV or 11 KV AIS Panel. Bidder shall deploy IEC 61850 relays for 33kV or 22 kV or 11 KV BESS AIS panel (will be finalized based on architecture) 4. RTU/Controllers, Firewalls and network devices within the architecture shall be redundant and configured with dual LAN to achieve redundant network scenario. At device level if the working port or communication cable or hardware becomes faulty, then the data communication shall continue on the redundant port without any disturbance in the monitoring and control operation of the entire system. Every critical function must be supported by hardware redundancy to ensure that no single hardware failure will interrupt/impact the monitoring and control operations at any point of time. 5. System shall be capable of device management including Access Control Management, Device Configuration, Firmware Upgrade, Real Time Devices Status, Report compliance configuration, Alarm Event configuration, Threshold configuration for events , reports, triggering DI/DO etc 6. Bidder shall also maintain the site EMS system spares required during CATS period (12 Years), replenish of spares based on consumption trend during CATS period (12 Years) of the matching quality, quantity and rating within shortest possible time., Bidder shall maintain the spares in his custody at the respective location. TPCL will provide space to Bidder to maintain the required spare inventory. 7. EMS system Hardware, Software systems procured by bidders for BESS shall comply MoP / CEA guidelines. 8. Time synchronization – Bidder shall deploy GPS Time base where EMS system shall be time synchronized using SNTP every 15 minutes. 9. Cyber & Data Access Security - Bidders to ensure local login for all Controllers / RTU deployed on BESS Site to access the device locally. 10. Refer specification of Control Panels, GPS and Local EMS infrastructure mentioned under respective sections in this Document. 11. EMS system shall have open control system API in	

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00			Date of Issue: 11/03/2025
		order to integrate the same with Tata Power custom applications (like Power Manager) to accept control commands from Tata Power custom applications. It shall also be possible to fetch required reports from EMS, through custom applications. 12. Operator should be able to upload periodic (daily/weekly/monthly) charging and discharging schedules from centralized EMS system, at once. It shall run automatically till operator modifies the same or system observes any deviation. Alerts in case of any deviation observed with respect to set schedule. 13. Minimum quantum of BESS charging/discharging schedule shall be 1MW or lower on 15/5 minutes basis. 14. EMS shall be able to automatically optimize priority of charging/discharging of individual batteries basis on operational efficiency. 15.EMS Input and Output Modules, Controllers : 16.Bidder shall deploy necessary EMS input and Output modules, Controllers, network switches / Racks, data cables, power supply system and other accessories required at BESS Site for successful integration of BESS Components to EMS and TPCL SCADA System. 17.Bidder shall propose modular input/output system for expansions in future or quick repair / replacement. All input/output cards shall have quick disconnect termination allowing for card replacement without disconnection of external wiring and without switching off power supply 18.All I/O Cards, controllers circuits shall be powered through protection of fuse units of appropriate rating. 19.The interfaces of all I/O cards, controller shall have electrical isolation of 1.5kV from plant input/output to avoid damage / maloperation of cards, controllers due to inadvertent voltage are voltage spikes. 20.In case of power supply failure, hardware fault, loss of I/O	

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00			Date of Issue: 11/03/2025
		communication link, the system shall be automatically switch to fail safe mode to avoid any maloperation. The fail-safe mode shall be finalized during detailed engineering. 21.All proposed Output Modules shall be capable of switching ON/OFF inductive loads like auxiliary relays etc. Without any additional hardware. Analog output modules shall be able to drive a load impedance of 500 ohms minimum and Binary output modules shall have contact rating minimum 10Amp. Vendor shall evaluate and confirm this required contact ratings based on actual system requirements. Bidder shall ensure and supply the system with additional 25% I/O capacity for each type, along with all the spares I/O and processor modules. All I/O modules, Processor, controller modules shall be prewired upto TBs including contact multiplying relays (DI) and heavy duty relays (DO) within the panel Data Communication System (DCS) 22.All the infrastructure deployed for data communication between various systems shall have redundant networking devices and redundant media (OFC / STP CAT6 / 4 G, 5 G Modem). The communication devices shall switch to redundant devices in case of failure of active devices without any glitch in network and loss of data. 23.Bidder shall provide Built-in diagnostics for faster fault detection and Communication errors along with correction facility at all levels of communication. 24.The design shall ensure that any single failure or physical removal of module connected to the system bus shall not affect the entire or part of BESS Communication function and only disrupted message gets transmitted automatically. 25.The bidder shall furnish details regarding the communication system like communication protocol, bus utilization calculations etc during detailed engineering. 26.Each Modbus cable shall be provided with surge protection device at EMS panel end.	

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00			Date of Issue: 11/03/2025
16.	RTU Panel	1. Panels and Accessories 1) All the panels shall be of IP54 class and industrial grade. 2) Interconnection between panels shall be by prefabricated cables. 3) The Bidder shall submit the GA drawing considering the maintenance and aesthetic requirements and submit the drawings along with bill of material for purchaser's review. 4) The bidder shall guarantee the satisfactory functioning of the system hardware mounted in the panels even in the event of failure of air-conditioning. 5) Proper size Cable trays shall be provided in the panel after reviewing the number of cables to be terminated in the panel. 6) Enough space (for easy termination, for easy viewing of cable tags) shall be provided between the terminal channels and cable trays. 7) Terminals shall be distributed functionally in the panel. 8) Panel door locks shall have the common key. 9) Acrylic glass sheet shall be provided, wherever the power cables & terminations are exposed and prone to be fatal. 10) Electrostatic strap shall be fitted with each panel. 11) At least 50% of the space inside each enclosure shall be unused (spare) space that shall be reserved for future use. The bidder shall provide required panels conforming to IEC 529 for housing the RTU modules/racks, relays etc. and other required hardware. 12) Panels shall be free-standing, floor mounted and overall height shall not exceed 2350 mm. The width & depth shall not exceed 800 mm. All doors and removable panels shall be fitted with long life rubber beading. Panel shall be openable from both the sides. 13) Front glass door with 19" rack arrangement. Anti-vibration pad of 15 mm thickness should be provided. Panel base frame should be of 100 mm height. 14) Panels shall be fabricated from minimum 3 mm thickness steel sheet for all load bearing members and non-load bearing members shall be fabricated from minimum 2.0 mm thickness steel sheet. 15) Panels shall have maintenance access to the hardware and wiring through lockable full height doors. 16) Panels shall have the provisions for bottom cable entry. 17) Undrilled gland plate of minimum 3 mm thickness to be provided.	

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00			Date of Issue: 11/03/2025
		18) The safety ground shall be isolated from the signal ground and shall be connected to the ground network. Safety ground shall be a copper bus bar. 19) Connect the panel's safety ground of to the owner's grounding network. Signal ground shall be connected to the communication equipment signal ground. 20) All panels shall be supplied with 230 Vac, 50 Hz, single-phase switch and 15/5A duplex socket arrangement for maintenance. 21) All panels shall be provided with an 1 no internal maintenance lamp, 2 nos space heaters and PU gaskets. 22) All panels shall be indoor, dust-proof with rodent protection, and meet IP54 class of protection. 23) There shall be no sharp corners or edges. All edges shall be rounded to prevent injury. 24) Document Holder shall be provided inside the cabinet to keep test report, drawing, maintenance register etc. 25) All materials used in the enclosures including cable insulation or sheathing, wire troughs, terminal blocks, and enclosure trim shall be made of flame-retardant material and shall not produce toxic gasses under fire conditions. 26) The panel shall be dust, moisture and vermin proof construction. 27) Panel shall have 4 nos lifting eye-bolts for hooks of good capacity and even distributed lifting. Test certificates shall be available for the lifting bolts. 28) It is the responsibility of the bidder to ensure that the equipment specified, and such unspecified complementary equipment required for completeness of the SAS design shall be properly accommodated in the panel, in such a way that the maintenance, identification, isolation of any component or circuit shall be easy. Equipment shall be mounted such that removal and replacement can be carried out individually without affecting the services of the adjacent devices. No price increase at a later date on this account shall be allowed. 29) Panel shall have self-cooled design with adequate louvers on sides. The louvers shall have screens and filters on inner side of panel. The screens shall be of fine wire mesh made of brass or GI wire. 30) Panel shall be provided with labels on the front and rear indicating the panel designation. 31) Provided with pocket on rear door for keeping A4 size copy of panel drawings.	

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
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Date	11/03/2025	11/03/2025	11/3/2025

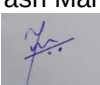
The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00			Date of Issue: 11/03/2025
		32) Provided with neoprene/ polyurethane gaskets all-round the perimeter of covers, gland plates, removable covers and doors. 33) Tinned copper earth bar of 25 mm x 3 mm (75 sq.mm) must be provided for equipment earthing. 34) All sheet steel work shall be degreased, pickled, phosphate and then applied with two coats of zinc chromate primer and two coats of finishing synthetic enamel paint, both inside and outside. The paint shade shall be Siemens Grey (RAL 7032). The final finished thickness of paint film on steel shall 60 - 80 microns. 35) For every distribution of AC and DC circuits MCB's must be provided. These MCB's must be rated according to the load on the distributed circuit. 36) Each RTU/Gateway, Switch panels shall be provided with 20% spare terminals 37) If I/O interface boards are used for field input connection proper isolation facility shall be provided. Preferably disconnecting type of terminal blocks shall be used for all inputs. 38) Interconnection between panels shall be by prefabricated cables. 39) Terminal blocks shall be having provision for isolation, with full-depth insulating barriers made from moulded self-extinguishing material. Terminal blocks shall be appropriately sized and rated for the electrical capacity of the circuit and wire used. No more than two wires shall be connected to any terminal. Required number of TBs shall be provided for common shield termination for each cable. 40) Proper lighting arrangement shall be made in the panel. Space heater with thermostat shall be provided in the panel to maintain the required temperature. 41) Disconnecting type terminal blocks shall be used for main AC & DC circuit. 42) Panel/Station shall be grounded through a flexible braided copper conductor rigidly. 2. Wiring /Cable Requirements 1) The panels shall gather all signals from and to the devices located in Control & Relay panels in the substation control room. Pre-wired and prefabricated cabling may be used. All wires that carry low-level signals shall be adequately protected and separated as far as possible from power wiring. All wires shall be identified either by using ferrules or by colour coding. In addition, cables shall be provided with cable numbers at both ends.	

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00			Date of Issue: 11/03/2025
		attached to the cable itself at the floor plate where it enters the cubicles. The cable distance shall be site surveyed by the bidder. The distance between RTU panels and Control & Relay panels in the substation control room is approximately 30 mtrs. These cable lengths mentioned are for indicative purpose only. The bidders are required to quote as per their site survey the external Cabling between the RTU and relay panels shall use shielded cables. 2) The external cables (except communication cables) shall have the following characteristics: i. All cables shall have stranded copper conductor ii. Minimum core cross-section of (3/20) 1.5 mm² Cu FRLSH for Control outputs and for Status inputs iii. Minimum core cross-section of 2.5 mm² Cu FRLSH for ground (yellow-green colour) iv. Rated voltage Vo/V of 0.6 / 1.1kV e. External sheathing of cable shall have oxygen index not less than 29 & temperature index not less than 250. Cable sheath shall meet fire resistance test as per IS 1554 Part- I. v. Shielding, longitudinally laid with overlap. vi. Dielectric withstand 2.5 kV at 50 Hz for 5 minutes vii. External marking with manufacture's name, type, core quantity, cross-section, and year of manufacture. viii. The Communication cable shall be of shielded, twisted pairs and of 0.22sq mm² size with dielectric withstand of 1 kV at 50 Hz for 1 minute. RTU/SIC cabinet shall be wired with all the DC distribution wiring and AC wiring for the Illumination and fans. ix. Following sizes of wires shall be Colour Codes • DC wiring 1.5 sq.mm Orange/ Blue • AC wiring 1.5 sq.mm Red/ Black x. Engraved identification ferrules marked to correspond with the wiring diagram shall be fitted at both ends of each wire. These ferrules shall fit tightly on the wires and should not fall off when the wire is removed. The wires should be terminated on terminal blocks using soldering crimping type of tinned copper lugs. Insulated sleeves shall be neatly punched and cleaned without affecting access to equipment mounted within the cabinet. Wiring troughs shall be provided for cable routing inside the cabinet. One piece molded, 650 V grade terminal blocks complete with insulated barriers, screws, identification strips shall be used. Terminals links shall be of Elmex or Connectwell make. Terminals for power connections shall be adequately rated for the circuit current and the rating of other terminal blocks for central indication etc. shall not be less than 15 amps. At least	

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00			Date of Issue: 11/03/2025
		twenty percent spare terminal blocks shall be provided. All the terminal blocks should be provided with proper identification strips. xi. All internal wiring shall be securely supported, neatly arranged, readily accessible and connected to equipment terminals and terminal blocks. Cable ways & troughs shall be used for this purpose. Wire termination shall be made with solderless crimping type and tinned copper lugs, which firmly grip the conductor. Insulated sleeves shall be provided at all the wire terminations. Engraved core identification plastic ferrules marked to correspond with panel wiring diagram shall be fitted at both ends of each wire. Ferrules shall fit tightly on the wire and shall not fall off when the wire is disconnected from terminal blocks. 5. Networking equipment & accessories (Communication system) 5.1. The proposed BCPUs shall communicate with redundant Master Control Room and Backup Control Room simultaneously; through a suitable Gateway over Fiber Optic IP Network at 100/1000 Mbps using IEC 60870-5-104 Protocol (as per availability of Fiber Point of presence). However, all communications equipment including but not limited to Gateways, Switches, Cables, Fiber Optic Cables, Fiber Optic Transmitters (FOTs) as necessary, Patch Cords, Connectors, Termination Boxes, Racks for mounting of communications equipment etc. as required at respective locations for connecting the vendor supplied equipment shall be the responsibility of the vendor. All switches & FOTs shall be of industrial grade. LAN cabling shall be structured. 5.2. Vendor should supply 2 nos. Dual SIM industrial grade 4G LTE cellular router along with antenna and power supply accessories with each gateway panel to establish the communication between gateway and Master. Purchaser will take care of SIM required to establish the connectivity. 5.3. The communication scheme from Gateway to Master shall be redundant with Auto-transfer to standby equipment when the corresponding main component fails. Each BCU/BCPUs shall have redundant IP Ports with independent addresses. 5.4. All communication devices, necessary cables, other interface modules and installation and commissioning shall be in the scope of Supplier/Vendor. 5.5. Vendor shall ensure that L2 Switches shall have minimum 2 optical port, single mode type maximum driving distance 50 KM.	

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00			Date of Issue: 11/03/2025
		5.6. Vendor shall ensure that L2 switches and other communication equipments used to establish the communication with proposed BCPUs/Gateways shall be of industrial grade IEC-61850 compliant and certified by renowned certification body. The use of switched Ethernet with priority tagging is required since this will meet the performance requirements of specific functions within the Sub-Station Automation system. 5.7. Vendor shall consider minimum 20% spare ports for the L2 switch to take care of the failure of the port. Vendor shall consider configuration of RTCC (remote tap changer controller), battery charger, fire alarms, ACDB energy meter configuration in the scope of the project. And ensure availability of the hardware required for the same. 5.8. Communication panels for mounting switches and other networking accessories shall be supplied by bidder for each of the different locations within the same station. 5.9. For all communication equipments bidder shall take Tata Power’s approval before finalizing the offer. 6. System Performance 6.1. System Performance Standards The system shall meet performance standards required to maintain real-time monitoring and control of the network. 6.2. System Response a. The system shall meet the following response and resource utilization requirements: The system functions and associated databases shall be capable of accommodating at least a 50% increase in the delivered capacity without requiring regeneration, recompilation, or any processing other than definition of the database by Tata Power. b. All Digital Inputs shall be reported with a resolution of 1 ms. c. The system shall report correct Time Stamping when all process inputs scanning and processing is in progress and all the data is transmitted over a Main Data Bus every sec. d. The worst loading condition shall include the following tasks: • All processor inputs scanning and processing is in progress and all the data is transmitted over the main data bus every sec. • All controls in operation. • Control / information request is initiated from all CRTs 7. Event recording pertaining to RTU	

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00			Date of Issue: 11/03/2025
		a. The RTU shall support event recorder that can handle up to 2000 time tagged events. Events shall be stored in non-volatile memory. In case of failure of RTU or communication channel, the recorded events shall be communicated to the master as soon as communication is restored after failure b. The RTU shall have an internal clock with the stability of minimum 10 ppm or better. The RTU time shall be set from time synchronization messages received from GPS clock or Master station. SOE time resolution shall be 1ms or better. c. The RTU shall maintain a clock and shall time-stamp the digital status data. Any digital input data in the RTU shall be assignable as an SOE point. Each time a SOE status indication point changes the state, the RTU shall time-tag the change and store in SOE buffer within the RTU. SOE shall be transferred to Master Station through RTU as per IEC 60870-5-104 protocol. d. It shall be possible to retrieve the recorded event on the Purchaser’s SCADA system. 8. Time Synchronization a. RTU time synchronization shall be through GPS clock via communication ports on SNTP or over the Communication protocol from master (IEC 60870-5-104). b. RTU in turn shall be capable of synchronizing all the slave IEDs c. Timing Accuracy: The RTU shall time-tag event reports to an absolute accuracy of 1ms or better. d. RTU shall generate an alarm if it gets drifted or loose the synchronization signal. e. Bidder to propose the solution for time synchronization of the RTU, if the same drifts beyond specified limit (e.g. 30 minutes drift) f. With each power cycle the RTU shall synchronize with GPS receiver or with Master DI/DO signal All soft signals including digital inputs, digital output, protection, fault current, etc available in BCP/relay shall be integrated & tested in RTU & ADMS. RTU should support atleast 5000 data points including following hardwired signals at each RSS: 1) Digital Input: 16 No. 2) Digital Output: 8 No.	

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
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Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00		Date of Issue: 11/03/2025

9. SCADA language based on IEC61131-3
RTU shall have capability to write various programs based IEC 61131-3 SCADA language. it will facilitate user to write various programs using points defined in the database .

10. Input DC Power Supply

Panel should have facility to take two independent DC power supply input through diode oring protection. Station DC supply available is 110V DC/220V DC, Bider to install appropriate Converter/Inverter to convert this voltage level to 48V DC. The RTU will be powered from a 48 V DC power supply system. The RTU shall not place additional ground on the input power source. The characteristics of the input DC power supply shall be

- Nominal voltage of 48 Vdc with variation between 40.8 and 57.6 Vdc.(i.e. 48(+20%/-15%)
- The RTU shall have adequate protection against reversed polarity, over current and under voltage conditions, to prevent the RTU internal logic from being damaged and becoming unstable causing mal- operation.

S. N.	Alarm Description as on SCADA	Alarm State	Normal State	Type of info
Switchgear				
1	Panel master L/R switch	Local	Remote	DPI
2	Breaker position indication	Opened	Closed	DPI
3	BKR Test/service position	Test	Service	DPI
4	Relay group setting status	Group B	Group A	DPI
5	BCPU Logic-L/R	INACTIV E	ACTIVE	DPI
6	Breaker Control	opened	Closed	DCO
7	Relay group setting change command	Group B	Group A	SCO
8	Relay Alarm/LED reset command	Reset	Acknowledge	SCO
9	Bkr Trip circuit supervision	Faulty	Healthy	SPI
10	Bkr spring charge	Discharg e	Charge	SPI
11	Relay local Alarm/LED Status	Active	Reset	SPI
12	Master trip 86	OPERAT ED	RESET	SPI
13	A phase start	Operated	Reset	SPI
14	B phase start	Operated	Reset	SPI
15	C phase start	Operated	Reset	SPI
16	Earth fault start	Operated	Reset	SPI
17	51 POL	Operated	Reset	SPI

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd				TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)			
				Date of Issue: 11/03/2025			
ENSE-DS-2048-R00							
		18	50 POL	Operated	Reset	SPI	
		19	51 Earth fault	Operated	Reset	SPI	
		20	50 Earth fault	Operated	Reset	SPI	
		21	Breaker closing time	High	Normal	SPI	
		22	Breaker opening time	High	Normal	SPI	
		23	Breaker Contact Wear	Abnormal	Normal	SPI	
		24	Relay communication status	Faulty	Healthy	SPI	
		25	Cable	Dead	Charge	SPI	
		26	TNC close	Operated	Reset	SPI	
		27	TNC open	Operated	Reset	SPI	
		28	Fault Current A Phase			MFI	
		29	Fault Current B Phase			MFI	
		30	Fault Current C Phase			MFI	
		31	Fault Current N Phase			MFI	
			ANALOG				
		1	Point description	Protocol	Mod Register add		
		2	R Phase Current	Modbus		AMI	
		3	Y Phase Current	Modbus		AMI	
		4	B Phase Current	Modbus		AMI	
		5	RY Phase Voltage	Modbus		AMI	
		6	YB Phase Voltage	Modbus		AMI	
		7	BR Phase Voltage	Modbus		AMI	
		8	3- Phase Real power	Modbus		AMI	
		9	3- Phase Reactive power	Modbus		AMI	
		10	3- Phase apparent power	Modbus		AMI	
		11	Frequency	Modbus		AMI	
		12	Power factor	Modbus		AMI	
		13	R phase current THD(total harmonic distortion)	Modbus		AMI	
		14	Y phase current THD(total harmonic distortion)	Modbus		AMI	
		15	B phase current THD(total harmonic distortion)	Modbus		AMI	
			Accumulator or Energy	Protocol			
		1	Total Active Energy Import	Modbus		ITI	
		2	Total Reactive Energy Import	Modbus		ITI	
		3	Total Active Energy Export	Modbus		ITI	
		4	Total Reactive Energy Export	Modbus		ITI	
		Annexure A:					

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
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Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00		Date of Issue: 11/03/2025

		<table> <tr> <th>Sr. No.</th><th>Item Description</th><th>Quantity</th></tr> <tr> <td>1</td><td>Pre wired RTU with panel and accessories</td><td>1</td></tr> <tr> <td>2</td><td>Dual SIM 4G cellular router with accessories such as antenna and power supply converter</td><td>2</td></tr> <tr> <td>3</td><td>LAYER-2 SWITCH, 19" Rack mountable. With (8RJ45, 4MM FO With LC Connectors SFP based)</td><td>2</td></tr> <tr> <td>4</td><td>LAYER-2 SWITCH, DIN rail mountable suitable to mount in switchgear control panel With (8RJ45, 4MM FO With LC Connectors)</td><td>5</td></tr> <tr> <td>5a</td><td>FO patchcord, multimode,LC-LC connectors, Length 5mtrs</td><td>3</td></tr> <tr> <td>5b</td><td>FO patchcord, multimode,LC-LC connectors, Length 15mtrs</td><td>1</td></tr> <tr> <td>5c</td><td>FO patchcord, multimode,LC-LC connectors, Length 15mtrs</td><td>1</td></tr> <tr> <td>6</td><td>UTP Lan Cable, Cat6 For IEC104 Connectivity, with RJ45- RJ45 ports</td><td>305 mtrs</td></tr> <tr> <td>7</td><td>2 Pair (4 Core) Shielded Twisted Pair Armoured cable for Meter Looping (RS485)</td><td>200 mtrs</td></tr> <tr> <td>8</td><td>UTP Connectors</td><td>50 nos(25 nos per Bus section)</td></tr> <tr> <td>9</td><td>12 Port LIU MM LC type connectorisation</td><td>4 (2 for RTU panel, 2 for Swgr pane)</td></tr> <tr> <td>10</td><td>MM FO CABLE (ARMOURED) (from Switchgear to Panel)</td><td>300m</td></tr> </table>	Sr. No.	Item Description	Quantity	1	Pre wired RTU with panel and accessories	1	2	Dual SIM 4G cellular router with accessories such as antenna and power supply converter	2	3	LAYER-2 SWITCH, 19" Rack mountable. With (8RJ45, 4MM FO With LC Connectors SFP based)	2	4	LAYER-2 SWITCH, DIN rail mountable suitable to mount in switchgear control panel With (8RJ45, 4MM FO With LC Connectors)	5	5a	FO patchcord, multimode,LC-LC connectors, Length 5mtrs	3	5b	FO patchcord, multimode,LC-LC connectors, Length 15mtrs	1	5c	FO patchcord, multimode,LC-LC connectors, Length 15mtrs	1	6	UTP Lan Cable, Cat6 For IEC104 Connectivity, with RJ45- RJ45 ports	305 mtrs	7	2 Pair (4 Core) Shielded Twisted Pair Armoured cable for Meter Looping (RS485)	200 mtrs	8	UTP Connectors	50 nos(25 nos per Bus section)	9	12 Port LIU MM LC type connectorisation	4 (2 for RTU panel, 2 for Swgr pane)	10	MM FO CABLE (ARMOURED) (from Switchgear to Panel)	300m
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17.	BESS ENERGY MANAGEMENT SYSTEM (EMS) SOFTWARE	Bidder shall provide EMS Solution as per specification mentioned in – Centralized EMS Solution																																							
18.	PROTECTION SYSTEM	All BESS components 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 action Emergency shutdown : Provision shall be given for automatic as well as manual disconnection of the BESS from distribution system if and																																							

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Date	11/03/2025	11/03/2025	11/3/2025

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ENSE-DS-2048-R00			Date of Issue: 11/03/2025
		not limited to following conditions	
		1. Protection system fail is detected during self-diagnostic, control healthy check 2. Breaker trip coil or interruptive device fails 3. DC Supply lost 4. Overall BESS components shall be equipped with following protection system 5. AC Protection 6. Under & Over Voltage Protection 7. Under & Over Current Protection 8. Earth Fault Protection 9. Transient / Surge Protection 10. Breaker Failure Protection 11. Synchronization check for Relay 12. Loss in Phase Difference 13. DC Protection 14. Under & Over Voltage Protection 15. Over Current Protection 16. Ground Fault Protection 17. Transient / Surge Protection 18. Breaker Failure Protection 19. Synchronization check for Relay	
19.	FIRE DETECTION & SUPPRESSION SYSTEM (FSS)	The bidder shall design and install a fire alarm and protection system that conforms to national, CEIG requirements and local codes, as applicable. Bidder shall provide adequate fire protection and BESS shall comply with international standards such as IEC 62897 or NFPA 72.A or NFPA 855. The fire protection system design and associated alarms shall take into account that the BESS will be unmanned at most times. 1. Bidder shall also obtain thermal runaway characterization of BESS.	

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
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Date	11/03/2025	11/03/2025	11/3/2025

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ENSE-DS-2048-R00			Date of Issue: 11/03/2025
		2. Larger Battery rooms shall be confined /restricted to adequate capacity in case of indoor Type BESS using brick wall partitions. 3. Bidder shall be deploy smoke detectors, H2, CO & CO2 gas detectors, for early detection of fire in each battery room / Container. 4. Bidder shall also deploy Fire Detection and suppression system for Battery room / Yard including Gas Release Panel, NOVAC / AEROSOL Cylinder & piping, VESDA, Abort and Emergency Release Switches, Manual Call Points for each battery room / Container. Fire fighting system shall be provided as per NFPA and shall be proven & certified, duly endorsed by the battery OEM. 5. Bidder shall deploy Sand Buckets / Portable Fire extinguishers at requisite sites of BESS. Bidder shall also deploy Corner Convex mirrors in Battery room to view any exigency from outside than entering into Battery room. 6. All the fire equipment to be supplied shall be certified product suitable for operating temperature of 0-55 Deg C in general and/or 0-49 Deg C if UL (US) certified. 7. Fire protection/ alarm system for the Batteries shall be proven & certified and shall be duly endorsed by the battery OEM. All the hardware, relay and accessories required for completeness of fire alarm system is in Bidder scope 8. Bidder shall deploy Main Fire Controller panel along with requisite cabling through trays, racks & switches and integration of these sensors for main fire Controller Panel 9. Bidder shall also deploy Abort & Emergency release switches in Local EMS Control Room. Bidder shall minimum supply Type tested portable fire extinguishers as per relevant codes and site requirement for each site as mentioned below (additional to as specified in 20.7)	

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Date	11/03/2025	11/03/2025	11/3/2025

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ENSE-DS-2048-R00				Date of Issue: 11/03/2025		
		Portable fire extinguishers	Electrical Equipment / Switchgear Area	Power Transformer Yard	Control Room (Local & Centralized) & / Yard (per 100 Sq.m)	Battery Room
		DCP Type (ABC Type) 10 kG	1	1		1
		BC Type 20 kG with wheel		1		
		Foam Type Hand 9 KG	1	1		1
		CO2 Type 9 KG		1	2	1
		Hand Portable Pressurized Water CO2 9 Litre	1			1
		Sand Buckets with Stand & Sand		2		2
		10. Bidder shall deploy single integrated Fire detection and Suppression system for BESS and its components including building, batteries, PCS, transformers, Switchgear room, Control Room etc.				
Microprocessor based Fire alarm Panel						
11. Bidder to provide intelligent microprocessor based main fire alarm panel and sensor of modular construction complete with central processing unit, input and output modules, power supply module, supervision control and isolator modules with 10% spare						

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Date	11/03/2025	11/03/2025	11/3/2025

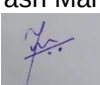
The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00			Date of Issue: 11/03/2025
		provisions in each loop. 12. Bidder shall deploy single Fire detection alarm system shall include but not limited to the following items A. Fire Alarm control Panel B. H2 ,CO & CO2 gas detectors C. Multi Sensor smoke detector D. Heat Detectors E. Fire Dampers F. Hooter cum strobe (Outdoor Duty) G. Manual call Point H. Hooter I. Fault isolation modules Control Modules J. Cables from Sensors to Fire panels. K. Digital output from the fire detection system shall be integrated with EMS and SCADA Network Module i. All the cable trench inside the control room and inverter room shall be provided with smoke detector. ii. Fault Isolation module shall be provided in every room and for every 15 sensors at location proposed by Bidder to be approved by employer during detailed engineering iii. Fire Alarm Control Panel Indication - Alarm conditions shall be immediately displayed on the control panel, EMS and SCADA. Alarm LED shall flash on the control panel until the alarm has been acknowledged. LED shall remain lit for acknowledged alarm. Panel display shall show alarms with LED independently for each zone. All alarm signals shall be automatically “locked in” at the control panel until the operated device is returned to its normal condition and the control panel is manually reset iv. Bidder shall deploy weather proof Hooter cum strobe outside and hooter inside each Indoor location for indication of fire alarm for respective zone/area at suitable location. .Each location with fire sensors shall be also be provided with manual call point, Alarm	

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ENSE-DS-2048-R00			Date of Issue: 11/03/2025
		acknowledge and reset facility for alarm for respective zone only. v. Bidder shall submit fire alarm system configuration, layout, BoM, Datasheet and necessary test report to TPCL for final approval. vi. Bidder shall submit FAT, SAT Test Procedure for approval of TPCL. Bidder shall carry out necessary modification and supply hardware/accessories if required in case of unsatisfactory performance during SAT, free of cost at site. vii. Bidder to provide fire alarm at EMS and integration with centralized EMS and SCADA level.	
20.	HEATING VENTILATION AND AIR CONDITIONING (HVAC) SYSTEM FOR BESS	1) Bidder shall submit Design, capacity calculation, proposed equipment document, Technical particulars etc for BESS liquid cooling system for review and approval of TPCL. 2) Proposed liquid cooling system shall be integrated with EMS System for real time performance monitoring of the System. 3) Considering the harsh and saline environment, Bidder shall also include the Air Purifier, dehumidifiers required to maintain the air Quality inside Battery Room, PCS, Switchgear room to improve service life of equipment.	
21.	TEMPERATURE SCANNING SYSTEM	1. Bidder shall deploy Temperature scanning System comprising Temperature sensors, Controllers etc for early detection of rise in temperature in battery system, PCS etc 2. TSS shall be integrated with EMS System for real time monitoring of inside and outside temperature of Battery Room / Container. 3. Bidder shall deploy sufficient temperature scanning sensors / thermostats in Battery room in case of indoor setup (minimum 1 sensor behind 8 Sq.m area) 4. Bidder shall submit the detailed specifications, documents for about TSS for TPCL review and approval during detailed Engineering.	

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Date	11/03/2025	11/03/2025	11/3/2025

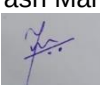
The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00			Date of Issue: 11/03/2025
22.	EARTHING AND LIGHTNING PROTECTION	1. The bidder shall submit the detailed specification, calculations and drawings of Earthing arrangements and lightning protection for TPCL approval 2. The earthing conductor should be rated for 1.56 times the maximum short circuit current of the BESS Components. The factor 1.56 considers 25 percent as a safety factor and 25 percent as albedo factor to protect from any unaccounted external reflection onto the Battery System increasing its current. 3. The earthing system as per IS 3043 and lightning protection System (LPS) design & material as per IEC 62305 & IEC 62561-1 to 4 shall be provided by the bidder. Earth resistance should be as low as possible and shall never be higher than 5 ohms. The earth strips should not be bolted. Earthing GI strips shall be interconnected by proper welding / brazing. 4. The complete Earthing system shall be mechanically & electrically connected to provide independent return to earth. 5. Masonry enclosure with the earth pit of size not less than 450mm X 450 mm(depth) complete with cemented brick work (1:6) of minimum 150mm width duly plastered with cement mortar (inside)shall be provided. Hinged inspection covers of size not less than 300mm X 300mm with locking arrangement shall be provided. 6. Suitable handle shall be provided on the cover by means of welding a rod on top of the cover for future maintenance. 7. Necessary provisions shall be made for bolted isolating joints of each earthing pit for periodic checking of earth resistance. For each earth pit, a necessary test point shall be provided. 8. The main earth conductors connected with copper strip shall be connected to earth test point through bimetallic strip. Electrode just below the G.I. cap, with proper terminal lugs, brass check nuts/ welding. Bimetal strip Consisting Copper(Sheet metal) clad on steel GI earthing strip(Base metal), both metal being diffused together to form an inseparable whole by rolling bonding process. 9. The lightning protection against induced high-voltages due to atmospheric disturbance, lightning etc shall be provided by the use of Metal Oxide Varistors (MOVs)/Franklin Rod type LA/Early streamer type LA. Lightning protection should be provided as per	

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ENSE-DS-2048-R00			Date of Issue: 11/03/2025
		NFC17-102:2011/IEC 62305 standard. The lightning arrestor shall be CLASS I (Copper Solid Round conductor min. diameter of 16mm with type test report for 200KA, 10/350us current wave) with coverage radius covering complete BESS structure for safe operation of BESS. The current carrying cable from lightning arrestor to the earth pit should have sufficient current carrying capacity according to IEC 62305. (6 mm2 copper/ 16 mm2 aluminum or GI strip bearing size 25*3 mm thick). Separate pipe for running earth wires of Lightning Arrestor shall be used. 10. Type test reports for Earthing and lightning protection shall be submitted for approval 11. Earthing and Grounding for equipment shall be carried out as per OEM Recommendations.	
23.	RATING PLATES, NAME PLATES, CLOUR CODES AND LABELS	1. Bidder shall ensure non corrosive material rating plates for each equipment at conspicuous position which shall be engraved with manufacturer's name, equipment type, Serial number, rating details, service condition, diagram etc. 2. Bidder shall deploy nameplates and labels for each equipment on front and rear side with suitable material depending upon indoor / outdoor type installation. 3. Bidder shall ensure tagging of cables, control cables with Aluminium strips on both ends depending upon indoor / outdoor type installation. 4. Bidder shall ensure labeling of all sections of BESS and its components (Battery room/Yard, Control room, Transformer yard etc). Bidder shall deploy signages such as Door Push / Pull, First aid Box, section details etc and safety signages such as Emergency exit, Gas Discharged, BESS and its components safety & Operating instructions etc for each section of BESS Premise. 5. All equipment/ piping/ pipe services are to be painted by the bidder in accordance with TPCL standard colour coding scheme. 6. Bidder shall submit rating plates, name plates and labels, colour code details during detailed engineering for TPCL review and approval.	

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ENSE-DS-2048-R00			Date of Issue: 11/03/2025
24.	AUXILIARY POWER SYSTEM FOR BESS	1. Bidder shall avail redundant power supply from existing redundant Station Transformers LT Panels installed at Distribution Substation. TPCL may extend existing LT 415 V power supply through metered connection to auxiliary requirement as per site feasibility. 2. Auxiliary Power System for BESS comprises of laying LT Cables from existing distribution Transformers LT Panels through open trenches or cable trenches, deploying Distribution boards at various BESS Site. 3. Design, assumptions. Load calculation and engineering drawings, type test reports for BESS Auxiliary Power System shall be submitted to TPCL for approval during detailed engineering.	
25.	SAFETY MANAGEMENT	1. Bidder shall submit the Safety Plan and Safety coordination Procedure during detailed Engineering. Bidder shall ensure Safety procedure compliance for personnels and BESS equipment during Project execution as well as CATS period as per regulatory requirements, OEM Recommendations and TPCL safety policy. 2. Bidder shall ensure that cost towards compliance of safety norms as per Safety Plan, Policy and safety coordination procedure is included in Bid Price. 3. BESS system & Component deployed and integrated with EMS System shall be supplied with Operation mode as Local and Remote for safety purpose. Any control signal from Local / Centralized EMS system shall be rejected for execution in case BESS Component is in local mode. 4. Bidder shall provide physical Emergency SWITCH OFF provision at strategic locations which shall be integrated with TPCL Centralized and Local EMS System	
26.	EMS CONTROL ROOM INFRASTRUCTURE	Bidder to deploy Local and Centralized EMS Control room Infrastructure as mentioned below (Indicative list). Bidders to submit the layout along with BoQ details for TPCL approval during detailed Engineering. Local EMS HMI to be wall mounted under shed if installed outdoor, shed not required if installed indoor. 1. Bidder shall also create Centralised EMS Control Station to monitor and control local EMS stations remotely from an industrial Computer / PC.	

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		2. BESS Local EMS and Centralised EMS infrastructure comprising of SCADA Panel, Server, network Racks, workstation, keyboard, mouse, LAN Cable, and all associated items shall be in bidders scope. 3. Bidder shall submit the design and item specification for TPCL approval during detailed engineering. Minimum Technical specifications of Workstation, etc are as below 4. (Redundant engineering workstation with dual power supply in server room to be provided) 5. Operator Workstation- Bidder to deploy the EMS workstation compatible for EMS Software and TPCL existing security Platform respectively. Workstation specs shall be finalized in coordination with EMS Bidder and TPCL. Workstation Details: <table><tr><th>Sl. No.</th><th>Technical Particulars</th><th>Tata Power Requirement</th></tr><tr><td>1</td><td>Make</td><td>HP/DELL</td></tr><tr><td>2</td><td>Model</td><td>To be specified by bidder</td></tr><tr><td>3</td><td>Operating System</td><td>Windows (Latest Version), 64 bit</td></tr><tr><td>4</td><td>Processor</td><td>Multi core (min Quad) Intel Xeon processor, 4.0 GHz or later, 64 Bit</td></tr><tr><td>5</td><td>Memory</td><td>32 GB Main Memory</td></tr><tr><td>6</td><td>Hard Disk</td><td>500GB SDD Enterprise grade</td></tr><tr><td>7</td><td>Optical Drive</td><td>DVD-RW drive</td></tr><tr><td>8</td><td>Ethernet Ports</td><td>1000 Mbps Dual Ethernet ports</td></tr><tr><td>9</td><td>Additional port</td><td>Dual Ethernet ports for interfacing LVS independently</td></tr><tr><td>10</td><td>USB ports</td><td>Yes</td></tr><tr><td>11</td><td>Redundant Power Supply</td><td>Redundant power supply (230 V AC) with 80 Plus Platinum certification</td></tr><tr><td>12</td><td>Size</td><td>Desktop/Rack mounted</td></tr><tr><td>13</td><td>Monitor Size & Type</td><td>27", LED</td></tr><tr><td>14</td><td>Aspect Ratio</td><td>16:09</td></tr><tr><td>15</td><td>Number of Monitor</td><td>Two</td></tr><tr><td>16</td><td>Peripherals</td><td>Keyboard & Optical Mouse</td></tr><tr><td>17</td><td>Graphic card</td><td>8 GB NVIDIA Quadro, DVI+VGA</td></tr></table>		Sl. No.	Technical Particulars	Tata Power Requirement	1	Make	HP/DELL	2	Model	To be specified by bidder	3	Operating System	Windows (Latest Version), 64 bit	4	Processor	Multi core (min Quad) Intel Xeon processor, 4.0 GHz or later, 64 Bit	5	Memory	32 GB Main Memory	6	Hard Disk	500GB SDD Enterprise grade	7	Optical Drive	DVD-RW drive	8	Ethernet Ports	1000 Mbps Dual Ethernet ports	9	Additional port	Dual Ethernet ports for interfacing LVS independently	10	USB ports	Yes	11	Redundant Power Supply	Redundant power supply (230 V AC) with 80 Plus Platinum certification	12	Size	Desktop/Rack mounted	13	Monitor Size & Type	27", LED	14	Aspect Ratio	16:09	15	Number of Monitor	Two	16	Peripherals	Keyboard & Optical Mouse	17	Graphic card	8 GB NVIDIA Quadro, DVI+VGA
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		14	Aspect Ratio	16:09																																																					
		15	Number of Monitor	Two																																																					
		16	Peripherals	Keyboard & Optical Mouse																																																					
17	Graphic card	8 GB NVIDIA Quadro, DVI+VGA																																																							

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00		Date of Issue: 11/03/2025

18	Video Interface	4 (2 – Dual headed Monitor, 2 – Large Video Wall) Video interface for connecting Large Video Wall (SCADA & LVS independently)
19	Other I/O interface	Sound Card and Speakers for audible alarms, Stereo line-in, Microphone-in, front headphone/speaker out
20	Condition Monitoring	Hardware shall be MIB compliant with secure SNMP Ver3.0. The system shall able to display /provide Sync Status- Main/Backup , Heartbeat of the Processor, LPMT, SPMT etc.
21	Heat Load (in watts)	<< 500 w
22	Environment & Temperature	Ambient temperature range of 0 - 65 Degree C, Relative Humidity 95% non condensing
23	Specint & Specfp	As per the base runtime requirements of SPEC CPU 2017 Benchmarking Standards.
24	Software	MS. Windows latest, MS Office Editor (EXCEL,WORD, POWER POINT

Server Details

Sl. No.	Technical Particulars	Tata Power Requirement
1	Make	HP/DELL/IBM
2	Model	To be specified by bidder
3	Operating System	Preferably, RED HAT LINUX, Windows with latest version
4	Processor	Multi core (min Octa) Intel Xeon processor, 3.0 GHz or later, 64 bit
5	Memory	Min 64 GB or better RDIMM RAM
6	SAS / RAID Controller	RAID Controller with 1.2 GB or better Cache, Integrated hardware
7	Hard Disk	Min 4 x 20 TB in RAID 10 configuration SAS 10K rpm or better. Bidders to propose suitable capacity & same will be reviewed during detailed Engineering.
8	Optical Drive	DVD-R/W drive
9	Ethernet Ports	4 nos Embedded Gigabit Ethernet ports
10	USB ports	Yes
11	Additional Ethernet SFP port	Server should support 2 Number of 10G Fiber Ethernet Ports with SFP
12	KVM Interface	Common mouse, monitor and keyboard for all server
13	Tape Drive (DAT)	Interface required

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
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Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd				TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00				Date of Issue: 11/03/2025
		14	Redundant Power Supply	Redundant power supply (230 V AC) with 80 Plus Platinum Certification
		15	Hot Swappable	Power supply Cards, Hot swappable disks, Hot pluggable/replaceable PCI Controllers, Cooling fans etc.
		16	Failure Alerting Mechanism	The server should be able to alert impending failures on server component to administrator in order to avoid any downtime on the server due to actual failure
		17	Management Console	The server should support integrated management with remote presence, Server should be supplied with OEM Server Management software/hardware and required ports
		18	Condition Monitoring	Hardware shall be MIB compliant with secure SNMP Ver3.0. The system shall able to display /provide Sync Status- Main/Backup , Heartbeat of the Processor, LPMT, SPMT etc.
		19	Size and Chassis	19", 2U Rack Chassis w/sliding Rapid/Versa Rails and Cable management Arm
		20	Heat Load (in watts)	<< 500 w
		21	Environment & Temperature	Ambient temperature range of 10 - 35 Degree C, Relative Humidity 95% non condensing
		22	Specint & Specfp	As per the base runtime requirements of SPEC CPU 2017 Benchmarking Standards.
27.	GPS TIME SYNCHRONIZATION	1. The bidder shall deploy GPS clock, at BESS Site which shall synchronized the local system hardware, Communication devices etc 2. Equipment shall be supplied with necessary electrical protection against surges and over voltages. All hardware, software, auxiliary systems including special cables, communication cable, power supply, antenna, processing equipment for Time synchronization unit at BESS Site shall be supplied and commissioned by Bidder. 3. System shall be able to track minimum 1 satellite at a time to ensure uninterrupted synchronization. The system shall be fully tested to the relevant international standards such as IEC: 801 and IEC: 255. The actual port requirements (no./type) in line with the system offered shall be finalized during detailed engineering. 4. GPS clock accuracy upto 1 ms. 5. The equipment should have a periodic time correction facility of one-sec. periodicity.		

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
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Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00		Date of Issue: 11/03/2025

		6. (GPS at server side and all sites to be synced with central GPS system)															
28.	ENERGY METERING	Bidders to deploy bidirectional Energy meter of 0.5 class accuracy (as per IS-14697) for recording export/import energy from/to BESS including CTs and PTs used in the energy metering at following points of BESS. 33 kV or 22 kV or 11 KV BESS GIS Panel – Incoming & Outgoing feeders (To be supplied by TPCL) Auxiliary Power Supply – Incoming Feeders All Energy Meters shall be integrated with BESS EMS System.															
29.	APPROVED MAKES FOR BESS AND ITS COMPONENTS	- Bidder shall ensure to procure the BESS and its components as per approved make list mentioned below. - Bidder shall validate the type test of item for the makes mentioned below before submitting proposal to TPCL - Bidder may propose equivalent make for the items above In case of poor response of approved manufacturers / OEMs or non availability of type test, subject to compliance to Type Test, specifications & Qualification Criteria by proposed OEM - TPCL has indicated the approved make list for critical BESS Components only. Approved make for items not listed below shall be finalized during detailed Engineering. - Approved makes for BESS and its Components (Electrical System) <table border="1"> <thead> <tr> <th>Sr.No.</th><th>Particular</th><th>Approved Make</th></tr> </thead> <tbody> <tr> <td>1</td><td>BESS Building Electrical work</td><td></td></tr> <tr> <td>1.1</td><td>Wires for point and circuit wiring</td><td>Universal, Polycab, KEI, Ravin Cables, Torrent, Apar</td></tr> <tr> <td>1.2</td><td>Heavy Duty GI CONDUIT</td><td>BEC or equivalent conforming to IS 9537</td></tr> <tr> <td>1.3</td><td>LED - Wall Mounted / Suspended</td><td>BAJAJ / CG / PHILIPS / WIPRO</td></tr> </tbody> </table>	Sr.No.	Particular	Approved Make	1	BESS Building Electrical work		1.1	Wires for point and circuit wiring	Universal, Polycab, KEI, Ravin Cables, Torrent, Apar	1.2	Heavy Duty GI CONDUIT	BEC or equivalent conforming to IS 9537	1.3	LED - Wall Mounted / Suspended	BAJAJ / CG / PHILIPS / WIPRO
Sr.No.	Particular	Approved Make															
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Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd				TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)	
ENSE-DS-2048-R00				Date of Issue: 11/03/2025	
			1.4	Street Light Poles with Brackets	Transrail, Valmont, Advance Steel, Skipper, Utkarsh
			1.5	Ceiling / Pedestal / Exhaust Fan	Bajaj / Crompton / Havells
			1.6	Switchboards & Sockets	MK/Havells/Schneider/Anchor
			2	Cables & Accessories	
			2.1	LT Power Cables	Apar, Ravin, KEC, KEI, Zenium, Polycab
			2.2	LT Control Cables	Apar, Ravin, KEC, KEI, Zenium, Polycab
			2.3	LT Cable Lungs & Gland	Braco,Dowells, Alpha, Pioneer,ECC, SMI
			3	BESS 33 kV or 22 kV or 11 AIS Switchgear	ABB. Siemens, Schneider electric
			4	Power Conditioning System	Fimer, TMEIC,Ingeateam,Gamesa, Dyna Power, Delta Electronics, Newen Systems
			5	Multi Winding Transformer	Schneider, Toshiba, Crompton, Telawne, Danish, Tesla (Bhopal), Wilson Power
			6	Battery System (BMS,Modules, BCS, Connectors, Racks)	1. Contemporary Amperex Technology Co., Limited. (CATL) 2. LG Energy Solution 3. Panasonic Corporation 4. BYD Company Ltd 5. SAMSUNG SDI CO., LTD 6. Tianjin Lishen Battery Joint-Stock Co., Ltd 7. Gotion High tech Co Ltd 8. EVE Energy Co. Ltd 9. Kore Power 10. Xiamen Hithium Energy Storage Technology Co., Ltd. 11. Shanghai Electric Gotion New Technology 12. Delta Eletronics

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd				TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)	
ENSE-DS-2048-R00				Date of Issue: 11/03/2025	
			7	EMS System & Control Room	
			7.1	Control Panels	Schneider electric , Rittal or equivalent
			7.2	Switches	Hirschman/RuggedCOM, Moxa-Industrial Grade
			7.3	Data Cables	DLINK, Schneider electric, Polycab
			7.4	Firewall	Fortinet / Juniper / Cisco / Checkpoint / PaloAlto
			7.5	Routers	Hirschman / MOXA/RuggedCOM / (Planet)
			7.6	RTU/PLC	HITACHI / SIEMENS / SCHNEIDER
			7.7	GPS Clock (Time Master)	Sertel / Masibus / Sands
			7.8	Workstations	HP / Dell
			7.9	LCD Screens	Samsung/Sony/LG/Delta Electronics
			8	Auxiliary Power System	
			8.1	ACB*	Siemens (WA Mdel), Schneider (NW), ABB (New Emax), L&T (Omega U power), Socomec
			8.2	MCCB*	Siemens (VA model), Schneider (NS), ABB (Tmax), Eaton, Socomec
			8.3	MCB	Polycab, Havells, Legrand, Chint, Eaton, Panasonic
			8.4	RCCB /RCBO	Polycab, Havells, Eaton, Siemens
			8.5	MFM	Rishmaster 3440 , Satec or equivalent
			8.6	CTs	Pragati, Narayan Power Tech, Reco, Perfect Sales
			9	HVAC - Precision Cooling System	Emerson, Stulz, Climetva, Retail, advance cooling, Swegon
			10	Fire Suppression & Detection System	

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
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Date	11/03/2025	11/03/2025	11/3/2025

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ENSE-DS-2048-R00				Date of Issue: 11/03/2025	
			10.1	Fire Suppression & Detection System (Panel & Accessories)	Honeywell. Johnson Control, Stat - X or Equivalent
			10.2	Fire suppression agent	NOVAC / AEROSOL or equivalent
			10.3	Portable Fire Extinguisher	Transpower, Jupiter or equivalent
			10.4	NIFPS for Transformer	CTR
			11	RODENT REPELLENT SYSTEM	Maser, R-Scat or equivalent
30.	MANDATORY SPARES	1. Bidder shall supply the spares of BESS and its components as mentioned below. The list indicated below is illustrative and bidder shall additional items to ensure availability, operability, maintainability and the reliability of the complete work and BESS plant during CATS contract period. Bidder shall submit the spare list for TPCL review and approval during detailed engineering,			
		2. Bidder shall keep on replenishing the spares finalized based on consumption trend during CATS contract period.			
		3. Bidder shall ensure availability of following spares during CATS period at his premises or through suitable contract, such that SLA can be met.			
		Sr.No.	Particular	Spares Remark	
		1	Battery Systems		
		1.1	Battery Modules	2% of Battery Modules Population	
		1.2	Battery Module Connectors	2% of Battery Module Connectors population	
		1.3	Battery Control Unit (BCU)	2% of Battery Control System (BCU) Population	
		1.4	Battery Rack BMS Controller & Accessories	1 Set	
		1.5	DCP- DC Fuses / Breaker for Protection	5% of DC Fuses / Breaker Population	
		2	Power Conditioning System		
		2.1	Electronic cards	5% of Population for each type	
3	HVAC System and its components for container including refrigerant,fans, oil,Pipes,Control equipments, Blowers,	5% of Population			

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
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Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd				TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)	
ENSE-DS-2048-R00				Date of Issue: 11/03/2025	
			Casings, Coils, Tubes, Valves, Air fans, Filters etc 4 MultiWinding Transformer 4.1 WTI with Contacts 4.2 OTI with Contacts 4.3 Transformer Protection - MOG, Aircell Rapture, Buchholz, PRV, Buchholz etc relay with contacts and accessories 5 33 kV or 22 kV BESS or 11 KV AIS Panel - 33kV or 22 kV or 11 KV Switchgear panels with Aux Relays, contactors, fuses, MCBs, trip coils, closing coils and spring charging Motors, VCB, CTs, PTs, Numerical protection relay, Indicating LEDs.	for each type One time spares to be submitted at TPCL stores 1 Set for each Type 1 Set for each Type 1 Set for each Type 1 Set for each Type	
NOTE – Cases where 5% of population of spare is less than single unit, Bidder shall make the arrangement of minimum one item in that category.					
31.	TESTING	1. Bidder shall submit the Type Test report to TPCL for approval as mentioned in this specification. Type Test carried out by Bidder / OEM on equipment similar to proposed to be supplied under this proposal / Contract, within last ten (10) years from the date of bid opening at an independent laboratory are accepted. However cases where Type Test on equipment is not carried out within applicable period or not meeting the specification requirements, bidder shall conduct all such tests at no additional cost to TPCL at third party lab and in presence of TPCL representative and submit the reports for approval. 2. Bidder shall carry out all acceptance and routine tests as per specification and relevant standards wherein charges for these shall be deemed to be included in the bidders proposal / offer. Bidder shall submit the FAT and SAT Test Plan for TPCL review and approval during detailed engineering. 3. Continuous operation for 7 days under Trial Operation - BESS plant shall perform trouble-free operation for 7 days during which functionality of all plant components shall be demonstrated and the system shall be in export/import Mode. BESS shall also demonstrate the name plate power continuously for one hour as per TPCL requirement on			

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00			Date of Issue: 11/03/2025
		daily basis. 4. Performance Guarantee (PG) test shall be carried out as mentioned below. All equipments, tools & Tackles, instruments measuring devices required for successful conductance of PG test shall be provided by bidder and cost associated with it shall be included in bid price. 5. AC to AC Round Trip Efficiency (RtE) including Auxiliary Power Consumption 6. Procedure shall be approved during detailed engineering Test Period – 1 Month 7. Incoming & Outgoing energy at interconnection point will be measured using Energy Meters having accuracy class of 0.5s. 8. Bidder shall guarantee a minimum AC to AC RtE of 83% on monthly basis at Grid Point level 9. Penalty on AC to AC Rount Trip Efficiency (RtE) shall be applicable for 1st year. Penalty on AC to AC Rount Trip Efficiency (RtE) for subsequent years will be measured as per service level agreement (SLA) criteria mentioned under CATS Clauses. 10. MWh Capacity Installed Testing - Bidders shall demonstrate the MWh capacity at the point of interaction / Grid Point as per mutually agreed procedure during detailed engineering. Bidders shall augment the battery capacity of BESS at its own risk and cost in case MWh capacity installed is less than required value, within 90 days of demonstration made, failing which cost estimated by TPCL or OEM for such augmentation of BESS shall be recovered from the Performance Bank Guarantee / CATS Cost.	
32.	DOCUMENTATION (TO BE SUBMITTED ALONG WITH BID)	Bidder shall submit a comprehensive list of the documents applicable for the offered system to the TPCL for review and approval before the commissioning of the project. Bidder 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. Bidder shall submit soft copy with each submission during the bidding. The documentation shall be in English. Review and acceptance of the documents does not encumber TPCL with	

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
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Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00			Date of Issue: 11/03/2025
		responsibility for the adequacy and safety of the bidders design Documentation shall cover following but not limited to 1. Design Sizing Calculation for Battery, PCS considering CEA regulation. 2. BESS System Overview and description Document BESS and its components Functional description document. System configuration, System Architecture document 3. Equipment drawings and specifications. Block Diagrams and Single Line Diagrams, 4. Construction and installation drawings including civil layout, electrical layout, communication architecture, EMS hardware configuration 5. Electrical & Communication wiring diagrams 6. Bill of materials / Quantities 7. Conduit Diagram 8. Assembly Drawings 9. List of Connected Devices – EMS & Entire System 10. Contact Details of Bidder 11. Document checklist mentioned above is indicative and shall be updated and shared with bidder during bid submission. Documents shall be submitted in soft copy. 12. No submission is acceptable without check list compliance 13. Deficient/ improper document/ drawing submission shall be liable for rejection. Any drawing not included above but necessary for detailed engineering shall be deemed to be included in bidder’s scope.	
33.	DOCUMENTATION (TO BE SUBMITTED	Documents / drawings to be submitted after award of contract 1. Design Sizing Calculation for Battery, PCS considering CEA	

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00			Date of Issue: 11/03/2025
	AFTER AWARD OF CONTRACT)	regulation. 2. BESS System Overview and description Document BESS and its components Functional description document, System configuration, System Architecture document 3. Equipment drawings and specifications, Block Diagrams and Single Line Diagrams, 4. Construction and installation drawings including civil layout, electrical layout, communication architecture, EMS hardware configuration 5. Electrical & Communication wiring diagrams 6. Bill of materials / Quantities 7. Conduit Diagram 8. Assembly Drawings 9. Instruction manual 10.Erection and commissioning Manuals / Checklists 11.O&M Manual 12.Maintenance Schedule 13.Project Implementation Schedule 14.Project Progress Reports 15.Project Completion Report 16.Master Test Plan and Procedures 17.Quality Assurance Documentation 18.Software Documentation 19.BESS & Its Components Test Reports 20.FAT and SAT Test procedure and Reports 21.Relay & Control Settings	

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00			Date of Issue: 11/03/2025
		22.Training Manuals 23.5 Minutes Audio and Video film of BESS 24.List of Connected Devices – EMS & Entire System 25.Troubleshooting Manual 26.Asset Register Covering Model No., Description, Country of Origin, 27.Type of Device (Active & Passive) 28.Detailed engineering Drawing and Data Submission Matrix 29.No submission is acceptable without check list compliance Any drawing not included above but necessary for detailed engineering shall be deemed to be included in bidder’s scope.	
34.	TRAINING	1. This section describes general requirements that apply to all training courses. The bidder shall submit the training proposal along with the bid. The training content, schedule and location shall be finalized during project execution 2. Training shall be conducted by bidders personnel, who are experienced (Minimum 8 years of relevant topic) instructors and speak understandable English. 3. All necessary training material shall be provided by the Contractor. Each trainee shall receive individual copies of all technical manuals and all other documents used for training. 4. Class materials, including the documents sent for the training courses as well as class handouts, shall be retained with the users. TPCL shall have the right to create the copy such material for in-house training and use only. 5. Hands-on training shall be done on equipment similar to that as supplied under the contract 6. The training shall be conducted at bidders facility. For all training courses, the travel and per-diem expenses will be borne by the TPCL	

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

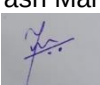
The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00			Date of Issue: 11/03/2025
		7. The bidder shall include training cost in bid proposal 8. The schedule, location, and detailed contents of each course will be finalized during TPCL and bidder discussions in project kick-off or project engineering. The TPCL shall review and approve the contents of the overall training prior to the start of the training. 9. Training Course Requirements - TPCLs training course requirements are described below in terms of the contents of each course to be provided. Training shall be provided on actual BESS system. 10. Operator Training Course – 2 Mandays per location (Max 6 Days) 11. This training course shall provide training to TPCLs operators on EMS Systems so that operators can understand / manage the system effectively. The training shall include: 12. System Overview: Configuration of the system, a functional overview, and an overview of system capabilities and performance. 13. General Operating Procedures: Hierarchical structure of displays, display capabilities and features, user procedures, log-on and user access restrictions, and error messages. 14. System Applications: Theory of operation, capabilities, and operating procedures for each application function. 15. Handling of Equipment: Minor maintenance operations which do not require spares/specialized skills. 16. Operator Documentation: Orientation of the organization and application of all user documentation for Operator and verification of the information contained therein. 17. The course shall focus on hands-on training on the system. 18. EMS Application Software Course – 2 Mandays 19. The bidder shall provide training on Application software courses covering all EMS applications. The training shall include: 20. Overview: Block diagrams of the application software and data flows. Programming standards and program interface conventions. 21. Application Functions: Overview of Functional capabilities,	

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Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00			Date of Issue: 11/03/2025
		design, and algorithms. Associated maintenance and expansion techniques 22. System Programming: An introduction to software architecture, Effect of tuning parameters (OS software, Network software, database software and Application Software etc.) on the performance of the system. Administration of Database (both real-time and RDBMS), 23. Software Documentation: Orientation in the organization and use of system software and Application software documentation. 24. Display building and Report generation 25. EMS Architecture and Database system. How to identify database fields, entries, records, tables, and contents 26. Hands-on Training: shall be provided with allocated computer time for trainee performance of unstructured exercises and with the course instructor available for assistance as necessary. 27. BESS Hardware and Software Course – 2 Mandays 28. The training course shall be designed to give TPCL hardware & software personnel sufficient knowledge of the overall design and operation of the system so that they can understand / correct obvious problems, configure the hardware, perform preventive maintenance, run diagnostic programs if required 29. The following subjects shall be covered: 30. System Hardware Overview: Configuration of the system hardware. 31. Operating System: Including the user aspects of the operating system, such as program loading and integrating procedures; scheduling, management service, and TPCL functions; and system expansion techniques and procedures 32. Equipment Maintenance: Basic theory of operation, maintenance techniques and diagnostic procedures for each element of the BESS system, 33. Troubleshooting and Diagnostics: Including the execution of diagnostic procedures and the interpretation of diagnostic outputs 34. Troubleshooting and diagnostic tools and software shall be provided and training shall be provided to operate the BESS	

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00			Date of Issue: 11/03/2025
		Components 35. System Maintenance: Theory of operation and maintenance of the BESS System 36.Operational Training: Practical training on preventive and corrective maintenance of all equipment, including use of testing tools. 37.Protection System details and Configuration 38.Safety Precautions 39.Equipment Configuration, Firmware update	
35.	WARRANTY AND SUPPORT TERMS & CONDITIONS	Standard Warranty 1. Bidder to ensure adequate warranty of BESS and its components including bought out items from OEMs for successful delivery of Comprehensive Annual Maintenance Contract for 12 years. 2. Vendor to ensure warranty against the manufacturing defects of BESS and its components also. 3. Comprehensive Annual Maintenance Contract (CATS) / Support Scope of Work 4. Essence of Contract - The essence of the Agreement (to be entered) is to provide CATS for the designated BESS and its component, with the goal of meeting the Availability as set forth herein and to provide system tuning and configuration to accommodate a growing system. 5. CATS Contract period shall be 12 years post installation and commissioning of BESS and its component. 6. Vendor to maintain the BESS during contract period post installation & Commissioning of BESS including Electrical Components / equipment, hardware and Software system deployed at Site. 7. The bidder shall be responsible for supply of all spare parts, repairs / replacement of any defective equipment(s) at his own cost as required from time to time during CATS period without affecting the overall performance of BESS. Bidder shall ensure genuine spares of high quality standards for optimum performance of BESS. 8. Bidder shall obtain the necessary certificate from TPCL for successful completion of project before commencement of CATS	

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00			Date of Issue: 11/03/2025
		services. The CATS will immediately start after submission of Project completion certificate. 9. The Scope of Work for CATS shall include the software & hardware maintenance support to be provided by the bidder in respect of the system supplied under this project without any charges (labour, travel , accommodation etc) to TPCL. 10. Vendor should repair or replace any part or entire equipment that are found to defective either in material or manufacture during CATS contract without any additional cost to TPCL. 11. The bidder shall ensure that all BESS components (Hardware & Software) are maintained in good working condition and in case of any defect, timely replacement/repair shall be carried out to meet the availability requirements specified herein. 12. The bidders on-site standard hours of service timings for BESS would be 24 hours a day, 7 days a week throughout the year (i.e. 24x365). 13. Sufficient nos. of engineers for on-site support for BESS and its component shall be deployed. 14. The support personnel so deployed shall be qualified personnel having experience in the delivered BESS system. 15. Bidder shall submit the CATS document / Plan before completion of Trial run. 16. Bidders to maintain all records of maintenance during CATS period which shall be shown to TPCL on demand. All maintenance records during CATS tenure shall be handed over to TPCL after closure of CATS period. 17. Bidder will assign a service delivery manager for TPCL who will provide the management interface facility and has the responsibility for managing the complete service delivery during the contractual arrangement between TPCL and the Bidder. Service delivery Manager will be responsible for preparation and delivery of all monthly/weekly reports as well as all invoicing relating to the service being delivered. Service delivery Manager's responsibilities should essentially cover the following 18. Overall responsibility for monitor, review and delivery of BESS performance and Service Level Agreement (SLA). 19. Act as a primary interface to TPCL for all matters that can affect the performance baseline of services. 20. Maintain communication – accepting queries / problems and respond 21. Provide strategic and tactical recommendations in relation	

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00			Date of Issue: 11/03/2025
		to technology related issues 22. Provide escalation to Bidders senior management if required 23. Identify and resolve problems and issues together with TPCL 24. Responsible for preparation and delivery of all monthly reports as well as all invoicing relating to the services being delivered. 25. As part of this activity, for efficient and effective CATS implementation, the Bidder team will: 26. Manage the vendors / OEMs / Service providers for escalations on support including Logging calls and co-ordination with them, 27. SLA tracking 28. Management of assets sent for repair 29. Provide MIS on performance of BESS on Daily, Weekly, Monthly and yearly basis. 30. Coordinate with OEM / service providers for maintenance services and replenish spares 31. Respond and attend the problem / issue within agreed service level objectives set forth 32. The bidder shall submit the CV's of all such personnel to TPCL for approval before deployment at site. 33. The Bidder shall be responsible for 24*7*365 management of all the BESS systems as per scope of work with services rendered at least as per Service Level Agreement between TPCL & Bidder. The Scope does not include management of physical security for access to the said facilities. 34. The Bidder must adhere to well-defined processes and procedures to deliver consistent quality services throughout its contractual period. Any hardware/software to meet the requirements under this section must be provided by the bidder. 35. The bidder is expected to have the SLA management tools having 36. facility to build escalations, workflows, action types and its sequence, etc 37. Repair, Maintain, servicing, lubrication of Air / liquid cooling system, Auxiliary Power Supply System, Fire Detection & Suppression System, Temperature Scanning System, EMS System, Control Room Infra. Refill / replace fire suppression agents of FSS, cooling agent of cooling system during preventive maintenance. 38. Bidder shall ensure statutory compliances like CFO, PWD etc for BESS and its components during CATS period.	

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00			Date of Issue: 11/03/2025
		On Site Support 39. Preventive Maintenance Services shall be carried out on Monthly / Quarterly or as recommended by equipment manufacturer basis to achieve the Service level agreement mentioned below 40. Vendor Qualified Expert Engineer / Supervisor / team shall visit the site every month to carry out routine check-up of BESS and its components. 41. The vendor engineer / Supervisor will check performance of BESS and its components and will inform TPCL about observations and necessary actions to be carried out. Vendor shall also diagnose the problem / issues in BESS System. 42. Bidder shall check all BESS setup and carry out following scope of work for proper functioning of Setup. 43. Bidder shall also carry out necessary cleaning of BESS area and its equipment, BESS visual inspection for any deformation, repair / rectification of any deficiencies observed. checking / adjusting and carry out calibration of parameters, measuring devices, tightening of all connections, functional checkup and operational tests on the equipments. 44. All issues / problems that have been identified need to be rectified appropriately. The resolution measures undertaken by the Bidder, RCA of any failure/problem and results produced after resolution shall be documented in the report. 45. Replacing of consumable items if necessary, during maintenance shall be without any cost to TPCL. 46. Replacing of spare part items if necessary, during maintenance shall be without any cost to TPCL. 47. Preventive activities also include (but not limited to) Cleaning of the plant including battery yard on regular basis and as and when required, Cleaning of drains, cable trenches, box culverts, Herbicide spray and grass cutting on a periodic basis etc 48. Breakdown/Corrective Maintenance Services 49. Under this Support, TPCL / Bidders person monitoring and controlling centralized EMS System will report breakdown calls for onsite support to single point contact person designated by bidder through phone or system notification or email. Service tickets raised on designated number / email id will be acknowledged within 1 hour. 50. Bidder shall attend unlimited break down calls in a period 7 days week, 24 hours/day. No extra charges shall be applicable for such breakdown	

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00			Date of Issue: 11/03/2025
		call visits. Spares required, Site Visits, Travel charges is in scope of vendor 51. Vendor shall provide Escalation Matrix along with contact numbers for escalation to next level as per duration defined in the Escalation Matrix. 52. Vendor shall be required to provide Support Services to manage deployed BESS setup and associated work to meet the desired Service Level Agreement as mentioned below. Vendor shall submit a comprehensive Support process, plan and deliverables for the entire system including the field activities for approval to TPCL. It shall be the responsibility of the vendor to maintain the network uptime and provide the data availability as mentioned in SLA. Emergency Support 53. The severity levels are defined in “ Framework for Problem Resolution” of this document. Emergency Support for Severity 1 issues are to be provided 24 hours a day, seven days a week. The on-call support team shall include all key technical competencies so that any aspect of a system failure can be attended. The team comprise of experienced technical staff that are skilled in troubleshooting BESS systems. Severity 1 problems shall be reported by telephone for rapid response; target response times are defined in Service level agreement section. The Bidder shall submit the process details to meet the above requirements along with the offer. For severity 1 problems, the key objective is to restore the system to an operational state as quickly as possible, including by a temporary workaround. Resolution of the defect may be completed during standard hours. Severity 2 and 3 problems shall be tracked through a call tracking system to be provided by the Bidder. The Emergency Support service goal is to meet the availability targets greater than specified in this document. Scope of work (illustrative) during CATS shall include following 54. Remote Monitoring of BESS plant to check non availability / functioning / low performance of any equipment / network / Battery Modules /EMS System etc 55. Regular analysis of events and logs generated in BESS systems. 56. Submit performance data to TPCL online and / or through a report on regular basis every Day / Week or Month. 57. Routine servicing/ troubleshooting/ setting/ adjustments/ cleaning/ checking of safeties etc. to ensure smooth and trouble free	

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00			Date of Issue: 11/03/2025
		working of the system. 58.Repairs/ replacement to the BESS system including re-loading software etc. in the event of any malfunctioning including replacement of spares/ components/ sub-system/ cards/ and any other component, part or whole, which may need replacement/ repairs 59.Procurement, including Import, wherever required, of spares and stocking them shall be responsibility of the bidder. Non availability of spares/ components will not be accepted as a reason for waiving of penalty towards delay in rendering prompt service 60.All manufacturers preventive maintenance schedules/ replacement periodicity of components like electrical/electronics parts including checking of safety of devices, its performance, periodic testing etc. shall be strictly followed as per the manufacturer's periodicity or as required in addition to the scope of maintenance indicated above 61.Inspection along with measurement of earth resistance of all the earth stations and report to be submitted to the concerned TPCL in charge once in a year. 62.Testing, calibration, maintenance, renewal, and repair of all equipments / components and meters at BESS Site. 63.Bidder to ensure that the safety practices outlined by Battery manufacturer for handling battery to be strictly followed. Bidder shall also provide first aid/safety measures at suitable locations to minimize health risk of the personnel involved in battery O&M. 64.The Contractor shall immediately report the accidents, if any, to the Engineer In charge & to all the concerned authorities as per prevailing laws of the state. 65.Other service / support condition – In addition to the on-site services described above, Vendor shall provide support on following aspects: 66.Supply and replacement of all spares, consumables and parts required for smooth operation and serviceability of the BESS system shall be the responsibility of the selected bidder during CATS contract period. In this respect the bidder shall maintain sufficient spares/consumables for immediate replacement of defective / damaged part during day-to-day routine maintenance / breakdown maintenance. Cost of these spares and any other spares which may be required during maintenance is deemed to be included in the rates quoted by the bidder. The periodicity of	

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00			Date of Issue: 11/03/2025
		service shall be monthly or more depending upon the weather conditions and recommendation of OEM. Bidder shall submit the list of mandatory spares proposed during detailed engineering for review and approval of TPCL. 67. Technical assistance should be provided by OEMs (over phone and other means of communication or site visit) for quick resolution of problems wherein on-site field team needs support. 68. The engineer / supervisor should carry special tools if required for troubleshooting and maintenance of BESS and its components at their own cost. 69. Vendor shall depute qualified and trained engineers, experienced team for BESS System to take up preventive and corrective maintenance jobs. 70. Vendor shall work within the limits of the Permit for Work obtained by TPCL engineer. 71. Vendor shall arrange special tools which may be required for the purpose of diagnostic and repairing activity on the BESS as required. 72. Vendor representative should strictly observe all the instructions relating to the work issued from time to time by the Engineer-in-Charge from TPCL. Vendor engineer / supervisor must complete the planned maintenance jobs as per the schedule and to the entire satisfaction of the Engineer-in-Charge. 73. Vendor engineer shall provide report on the work carried out, which should be presented to the Engineer-in-Charge whenever demanded. 74. The decision of Engineer-in-Charge shall be final regarding all matters relating to this contract. 75. Accommodation at Site / To and Fro Travel Charges and Local conveyance is in Vendor Scope. 76. Selected Bidder to submit the Preventive and breakdown Service Report, Plant Performance Report to TPCL Site Incharge on time to time basis along with Invoice raised towards CATS. 77. Insurance – TPCL shall take Fire and allied Peril insurance during CATS Period. Bidder shall ensure insurance of BESS and its Component risks against any loss or damage, under performance, failure etc for successful delivery of CATS services. 78. TPCL personnel shall have unrestricted entry to BESS during CATS Period. TPCL may depute a personnels to associate with O&M Activities. Bidder shall assist TPCL in developing the expertise during	

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00			Date of Issue: 11/03/2025
		day to day O&M activities. 79. Bidder shall strictly adhere to the TPCL’s information security, Safety and Environment Management policy and System etc during CATS period. Bidder shall fulfill the entire requirement mentioned in the policy and its documents. Violation to the stipulated norms shall lead to heavy penalty in this regard. Any changes in the policy during the CATS period and its fulfillment or compliance shall be binding on bidder and no extra amount shall be paid for the same by TPCL. 80. Bidder shall ensure that hazardous and e-waste like Battery modules, PCB, IO modules etc 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. Bidder shall carry out battery disposal through authorized vendor of CPCB/MPCB and submit the proof of disposal / certificate to TPCL. Framework for Problem Resolution - Severity-1 (Urgent support) - This support is required when there is a complete system failure, severe system instability, the loss/ failure of any major sub-system / system or its components, which may significantly impact the system availability, performance, or operational capability at centralized Control Centre. Upon receiving intimation, the representative of the bidder shall immediately attend to the problem. - Any temperature rise or Fire incident in BESS - Loss of data or operational capability to centralized EMS System - Failure of critical BESS equipment resulting into non availability of Capacity more than 20% of installed Capacity. - Failure of GPS clock & Time synchronization - Severe system instability - Severity 2 - The support services not defined under Severity-1 are included under this category. - Severity-3 (General Technical Help) - Request for information, technical configuration assistance, “how to” guidance, and enhancement requests are included under this category.	

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd				TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)	
ENSE-DS-2048-R00				Date of Issue: 11/03/2025	
		Service Level agreement			
		Defined Parameter	Service level requirement	Validation Procedure	Penalty*
		BESS Performance Management :			
		BESS Availability (Energy and Power) *	Bidder shall guarantee a minimum BESS availability of 95% on annual basis at Grid Point level including planned and unplanned outages.	Records / Report EMS.	2% penalty on the Support / CATS charges for every 1% of non availability below 95%, subject to a maximum of 50% of the value of CATS charges as mentioned in the payment schedule shall To be recovered from CPBG / CATS Cost.
		Min. Battery Energy at the end of Year (% of installed capacity & excl Aux. Consumption)	Bidder shall guarantee a minimum Battery energy at the end of year against installed Capacity & Excluding Aux Consumption as mentioned below 1st Year – 94% 2nd Year – 90% 3rd Year – 88% 4th year – 86% 5th Year – 84% 6th year – 82% 7th Year – 80% 8th Year – 78% 9th Year – 76% 10th Year – 74% 11th year – 72% 12th year – 70%	Records/ Report of EMS.	Maintain / Augment* the residue capacity of BESS at its own risk and cost within 90 days of demonstration made, failing which cost estimated by TPCL or OEM for such augmentation of BESS shall be recovered from the Performance Bank Guarantee / CATS Cost.

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd				TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)	
ENSE-DS-2048-R00				Date of Issue: 11/03/2025	
		AC to AC Rount Trip Efficiency (RtE)** Including Auxiliary Power Consumption	Bidder shall guarantee a minimum AC to AC RtE of 83% on monthly basis at Grid Point level without Aux Consumption	Records/ Report EMS and Energy Meter installed for BESS	A Penalty on additional losses incurred in BESS above18% shall be recovered from bidder at Twice the rate of ABR approved by MERC for TPCL in Tariff Order from the performance Bank Guarantee / CATS Cost
		Resolution of issue / Problem :			
		Severity 1	Response Time – 30 Min Action Time – 24 Hours	Telephone Call from Centralized EMS control room	2% penalty on the Support / CATS charges for every reported incident subject to a maximum of 50% of the value of CATS charges as mentioned in the payment schedule shall be recovered from CPBG / CATS Cost.
		Severity 2	Response Time – 1 Day Action Time – 3 Days	Call registration in Tracking System	1% penalty on the Support / CATS charges for every reported incident subject to a maximum of 50% of the value of CATS charges as mentioned in the payment schedule shall be recovered from CPBG / CATS Cost.

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd				TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)	
ENSE-DS-2048-R00				Date of Issue: 11/03/2025	
		Severity 3	Response Time – 2 Day Action Time – 5 Days	Call registration in Tracking System	0.5% penalty on the Support / CATS charges for every reported incident subject to a maximum of 50% of the value of CATS charges as mentioned in the payment schedule shall be recovered from CPBG / CATS Cost.
*NOTE – Annual System Availability = System availability of all time-blocks during the year in which the TPCL has capacity requirement (Power & Energy) for charging/discharging and same is delivered by BESS subject to availability of SoC and operating the BESS within OEM recommended parameters. TPCL will communicate / Configure the BESS capacity requirement (Power & Energy) in EMS system on 15 minute basis before start of time block. Annual System Availability of individual station shall be calculated through EMS system only. **NOTE – AC to AC round Trip Efficiency (RtE) shall be derived using data recorded by Energy Meter installed for BESS at Grid Point. AC to AC Round Trip Efficiency = Sum of Total of Actual energy injected / discharging in a month / Sum of Total Actual Energy drawn / charging in a month *Bidder shall ensure that all Battery modules 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. Bidder shall carry out battery disposal through authorized vendor of CPCB/MPCB and submit the proof of disposal / certificate to TPCL.					

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd			TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00			Date of Issue: 11/03/2025
36.	ABBREVIATION	Abbreviation	Meaning
		AC	Alternate Current
		ACDB	Alternate Current Distribution Board
		TPCL	Tata Power Company Ltd
		BAU	Battery Administration Unit
		BCU	Battery Control Unit
		BESS	Battery Energy Storage System
		BIS	Bureau of Indian Standards
		BMS	Battery Management System
		BMU	Battery Management Unit
		BoQ	Bill of Quantities
		CATS	Comprehensive Annual Technical Support
		CEA	Central Electricity Authority
		CEIG	Chief Electrical Inspector
		CFO	Chief Fire Officer
		CPBG	Contract Performance Bank Guarantee
		CRZ	Coastal Regulation Zone
		DB	Distribution Board
		DC	Direct Current
		DCDB	Direct Current Distribution Board
		DIN	Deutsches Institut für Normung
		DSS	Distribution Substation
		EES	Electrical Energy Storage
		EHV	Extra High Volatge (220 kV)
		EMC	Electromagnetic compatibility
		EMS	Energy Management System
		FAT	Factory Acceptance Test
		FSS	Fire Detection and Suppression System
		AIS	Air Insulated Substation
		GPS	Global Positioning System
		HMI	Human Machine Interface
		HT	High Tension
		HVAC	Heating, Ventilation and Air Conditioning
		HVRT	High-Voltage Ride-through Capability
		IEC	International Electrotechnical Commission
		IEEE	Institute of Electrical and Electronics Engineers
		ILAC	International Laboratory Accreditation Cooperation
		IP	Ingress Protection
		IPC	Institute of Printed Circuits

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd				TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)	
ENSE-DS-2048-R00				Date of Issue: 11/03/2025	
		IS	Indian Standard		
		kV	Kilo Volt		
		LT	Low Tension		
		LVRT	Low-Voltage Ride-through Capability		
		MOG	Magnetic Oil Gauge		
		MOV	Metal Oxide Varistor		
		MW	Mega Watt		
		MWh	Mega Watt Hour		
		MWT	Multi Winding Transformer		
		N2	Nitrogen		
		NFPA	National Fire Protection Association		
		O&M	Operation & Maintenance		
		OEM	Original Equipment Manufacturers		
		PCS	Power Conditioning System		
		PPE	Personal protective equipment		
		PRV	Pressure Relief Valve		
		PWD	Public welfare Dept.		
		QAP	Quality Assurance Plan		
		RoHS	Restriction of (the use of certain) Hazardous Substances		
		RtE	Round Trip Efficiency		
		SAT	Site Acceptance Test		
		SCADA	Supervisory Control & Data Acquisition System		
		SLA	Service Level Agreement		
		SoC	State of Charge		
		SoH	State of health		
		SOW	Scope of Work		
		SPD	Surge Protection Device		
		TB	TeraBytes		
		TSS	Temperature Scanning System		
		UL	Underwriters Laboratories		
		UPS	Uninterrupted Power Supply		
		VDE	Verband der Elektrotechnik		
		VESDA	Very Early Smoke Detection Apparatus		
37.	MANUFACTURING ACTIVITIES	The successful bidder will have to submit first GTP & Drawing with 7 days from placement of outline agreement for approval and complete the approval process within 14 days of outline agreement. The date of Code -2/ Code-1 approval given by TATA Power will be treated as first day for assessment of LD (if applicable).			

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00		Date of Issue: 11/03/2025

38.

GUARANTEED
TECHNICAL
PARTICULARS

Sr. No.	Parameters	To be provided by Bidder	Unit
1	Discharge Energy at POC on SAT		MWh
2	Discharge Energy at POC 12th Year end		MWh
3	AC-AC RTE on SAT		%
4	DC-DC RTE on SAT		%
5	AC-AC RTE on 12th Year end		%
6	DC-DC RTE on 12th Year end		%
7	DC Cu cable Efficiency, Battery -PCS (%)		%
8	PCS Charge/ discharge Efficiency (%)		%
9	LV Cable Efficiency,PCS- IDT (%)		%
10	IDT Efficiency (%)		%
11	HT Cable Efficiency IDT- POC (%)		%
12	Estimated Aux consumption of BESS without EMS		MWh
13	Net output Power without Aux		MW

Equipment sizes

Sr. No.	Parameters	To be provided by Bidder
1	(LxBxH) of PCS (Limiting Dimensions of L = 2260 mm, D=1350 mm and H=2125mm)	
2	(LxBxH) of 5 MW Battery Container	
3	(LxBxH) of Multiwinding transformer	

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00		Date of Issue: 11/03/2025

39.	SCHEDULE OF DEVIATIONS	<u>(TO BE ENCLOSED WITH THE BID)</u> All deviations from this specification shall be set out by the Bidders, clause by Clause in this schedule. Unless specifically mentioned in this Schedule, the tender shall be deemed to confirm the purchaser's specifications: <table border="1"> <thead> <tr> <th>Sr. No.</th> <th>Clause No.</th> <th>Details of deviation with justifications</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table> We confirm that there are no deviations apart from those detailed above. Seal of the Company: Signature Designation			Sr. No.	Clause No.	Details of deviation with justifications			
		Sr. No.	Clause No.	Details of deviation with justifications						

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR GRID CONNECTED BATTERY STORAGE SYSTEM (BESS)
ENSE-DS-2048-R00		Date of Issue: 11/03/2025

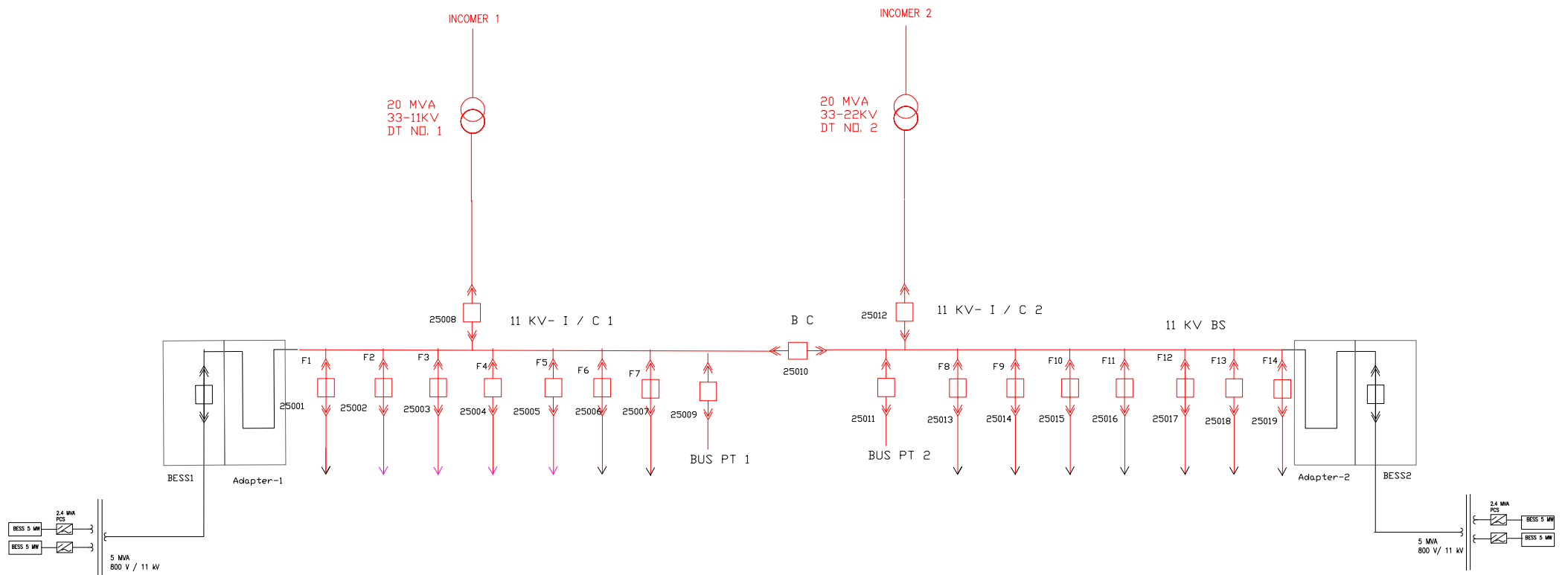
Annexure 1

Tentative Location and site specific requirement list

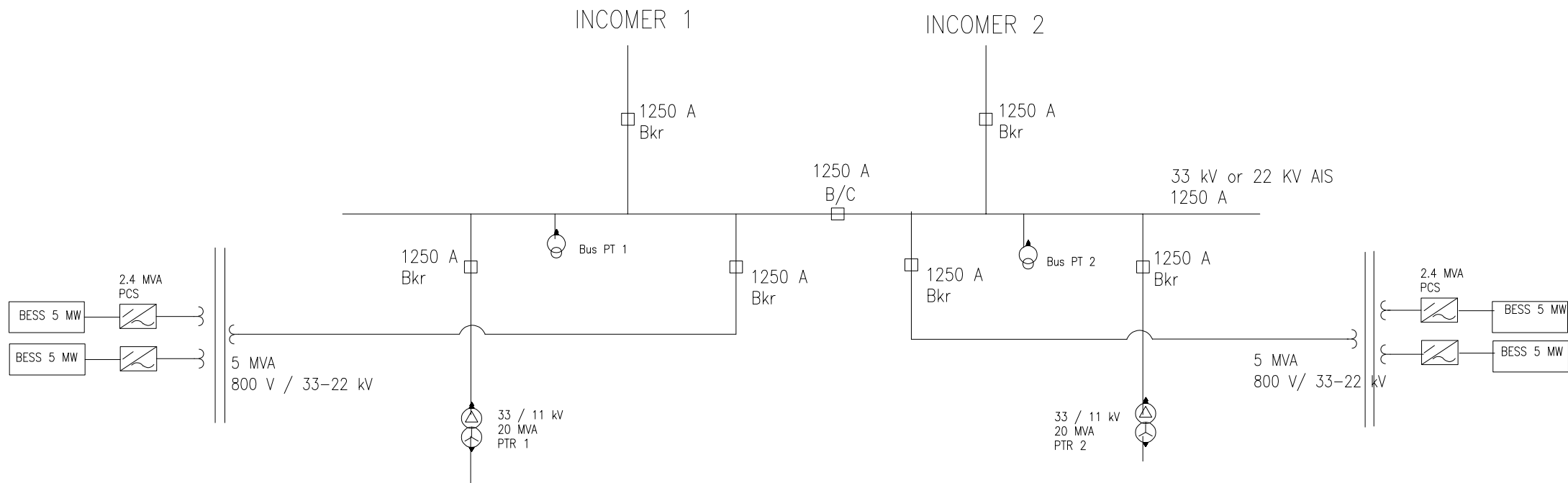
Sr no	Location	Requirement		POC Voltage	IDT primary Tap	PTR rating	Switchgear
		MW	MWh	kV			
1	Mira Road DSS,	10	20	11		2 x 5 MVA or if not feasible in space then 1 x 9.9 MVA	2 no Adaptor + 2 no 11 KV Bay OR 1 no Adaptor + 1 no 11 KV Bay
2	Dahisar DSS,	10	20	11		2 x 5 MVA or if not feasible in space then 1 x 9.9 MVA	2 no Adaptor + 2 no 11 KV Bay OR 1 no Adaptor + 1 no 11 KV Bay
3	Reservoir Plot DSS,	10	20	11		2 x 5 MVA or if not feasible in space then 1 x 9.9 MVA	2 no Adaptor + 2 no 11 KV Bay OR 1 no Adaptor + 1 no 11 KV Bay
4	Dharavi RSS,	20	40	33 or 22	with tap at 11kV	4 x 5 MVA	33 or 22kV 2 IC + 1 BC + 4 OG + 2 BPT
5	Mahalaxmi RSS,	20	40	33 or 22	with tap at 11kV	4 x 5 MVA	33 or 22kV 2 IC + 1 BC + 4 OG + 2 BPT
6	SEEPZ DSS,	20	40	33 or 22	with tap at 11kV	4 x 5 MVA	33 or 22kV 2 IC + 1 BC + 4 OG + 2 BPT
7	Godrej DSS *	5	10	11		1 x 5 MVA	1 no Adaptor + 1 no 11 KV Bay
8	Ram Tekadi/ Parel DSS	10	20	11		2 x 5 MVA	
9	MIAL 2 DSS*	10	20	11		2 x 5 MVA or if not feasible in space, then 1 x 9.9 MVA	2 no Adaptor + 2 no 11 KV Bay OR 1 no Adaptor + 1 no 11 KV Bay
10	BARC DSS*	10	20	33 or 22	with tap at 11kV	2 x 5 MVA	33 or 22kV 2 IC + 1 BC + 4 OG + 2 BPT
11	Carnac DSS	10	20	11		2 x 5 MVA or if not feasible in space then 1 x 9.9 MVA	2 no Adaptor + 2 no 11 KV Bay OR 1 no Adaptor + 1 no 11 KV Bay
Total		130	260				

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

Indicative SLD 1



Indicative SLD 2



The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

TECHNICAL SPECIFICATION

Supply, Installation, Testing and Commissioning of Energy Management System (EMS) for Grid Connected Battery Energy Storage System (BESS) along with integrated Comprehensive Annual Technical Support (CATS) for 12 Years

The Tata Power Company Ltd.
Engineering Services (ENSE),
Distribution Division, Senapati Bapat Marg,
Lower Parel, Mumbai – 400013 Maharashtra

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
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Document No: ENSE-DS-2049-R00

Document Title: Technical specifications for Energy Management System for Grid Connected Battery Energy Storage System

00	For tender purpose (ENSE-DS-2049-R00)	11/03/2025	YMM		AVP		RMB	
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	Remarks	Date	Prepared By		Checked By		Approved and Issued By	

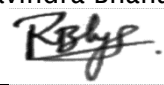
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Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

Contents

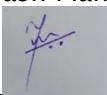
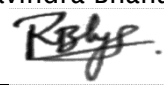
1.	Introduction.....
2.	Scope.....
3.	Solution Overview 1
4.	Qualifying Criteria 1.....
5.	EMS functional requirement 1.....
6.	EMS Display Interactions 3.....
7.	System Requirements 4.....
8.	Cyber and Data Access Security 4.....
9.	Information to be submitted along with Bid 5.....
10.	Specific Terms and Conditions.....
11.	Testing and Documentation.....
12.	CATS / Support.....

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

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ENSE-DS-2049-R00		Date of Issue: 11/03/2025

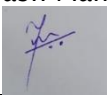
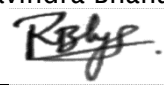
Abbreviation

Particular	Remark
AES	Advanced Encryption Standard
AFC/FRR	Automatic Frequency Control/Frequency Regulation Reserve
ATS	Annual Technical Supports
ANSI	American National Standards Institute
AOR	Area of Responsibility
API	Application Programming Interface
AWS	Amazon Web Services
BESS	Battery Energy Storage System
BOQ	Bill of Quantities
CATS	Comprehensive Annual Technical Support
CCTV	Closed-Circuit Television
CEA	Central Electricity Authority
CIM	Common Information Model
CPBG	Contract Performance Bank Guarantee
CPCB/MPCB	Central Pollution Control Board/Maharashtra Pollution Control Board
CRUD	Create, Read, Update, Delete
CSP	Cloud Service Provider
CV	Curriculum Vitae
DC	Direct Current
DER	Distributed Energy Resources
DI/DO	Digital Input/Digital Output
DNP3	Distributed Network Protocol 3
DR	Disaster Recovery
DSM	Deviation Settlement Management
ECMA	European Computer Manufacturers Association
EMS	Energy Management System
ESS	Energy Storage System

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
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Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

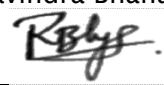
Particular	Remark
FAT	Factory Acceptance Test
FDS	Functional Design Specification
FMS	Facility Management System
FSS	Fire Detection & Suppression System
GUI	Graphical User Interface
HMI	Human-Machine Interface
HTML	HyperText Markup Language
HVAC	Heating, Ventilation, and Air Conditioning
ICCP	Inter-Control Center Communications Protocol
IDS/IPS	Intrusion Detection System/Intrusion Prevention System
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IEX	Indian Energy Exchange
ISO	International Organization for Standardization
ISR	Information Storage & Retrieval
LAN	Local Area Network
LCD	Liquid Crystal Display
LDAP	Lightweight Directory Access Protocol
LT	Low Tension
MFA	Multi-Factor Authentication
MFM	Multi Function Meter
MODBUS	Modbus Protocol
MoP	Ministry of Power
MPLS	Multiprotocol Label Switching
MQTT	Message Queuing Telemetry Transport
NABL	National Accreditation Board for Testing and Calibration Laboratories
NOVAC	Non-Oxidizing VOC Abatement Compound
ODBC	Open Database Connectivity
OEM	Original Equipment Manufacturer
OFC	Optical Fiber Cable
OPC	Open Platform Communications
Open ADR	Open Automated Demand Response

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Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

OT	Operational Technology
PCS	Power Conditioning System
PDF	Portable Document Format
PL/SQL	Procedural Language/Structured Query Language
RCA	Root Cause Analysis

Particular	Remark
RDBMS	Relational Database Management System
REST API	Representational State Transfer API
RFP	Request for Proposal
RPO	Recovery Point Objective
RTMS	Real Time Monitoring System
RTO	Recovery Time Objective
RTS	Roof Top Solar
RTU	Remote Terminal Unit
SaaS	Software as a Service
SAT	Site Acceptance Test
SCADA	Supervisory Control and Data Acquisition
SLA	Service Level Agreement
SLD	Single Line Diagram
SMS	Short Message Service
SOA	Service-Oriented Architecture
SOAP	Simple Object Access Protocol
SOC	State of Charge
SQL	Structured Query Language
SSL/TLS	Secure Sockets Layer/Transport Layer Security
STP CAT6	Shielded Twisted Pair Category 6
TCP / IP	Transmission Control Protocol/Internet Protocol
TSS	Temperature Scanning System
UPS	Uninterruptible Power Supply
VA/PT	Vulnerability Assessment and Penetration Testing
VAR	Volt-Ampere Reactive
VM	Virtual Machine
VPN	Virtual Private Network

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Date	11/03/2025	11/03/2025	11/3/2025

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ENSE-DS-2049-R00		Date of Issue: 11/03/2025

WAN	Wide Area Network
XML	Extensible Markup Language

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
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Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

1 Introduction

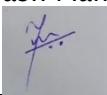
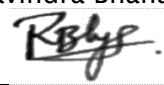
The main purpose of EMS deployment is real time monitoring, operation, control, reliable & efficient operation and optimization of performance of the DERMS (RTS, BESS etc)

Bidder shall deploy Cloud based Infrastructure Services for Energy Management System (EMS) along with warranty and comprehensive support for 12 Years.

EMS shall be able to acquire real time data of various equipment of BESS system and have in built logic/programming to monitor, control and optimize the performance of BESS as per specification.

The broader scope of the bidder(s) together with partners / OEMs shall supply Cloud based IT Infrastructure Services for proposed EMS. Successful bidder shall be responsible for the following core components & deliverables:

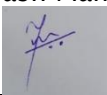
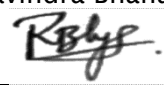
- Supply of Services - Cloud Infrastructure Services for proposed EMS System
- Security and Maintenance - Successful Bidder shall be responsible for the maintenance & updating the systems to maintain the security and performance parameters of the EMS system
- CATS Support – Bidder shall provide EMS System CATS Support for 12 Year after successful commissioning of the system including Cloud Infrastructure Services & maintenance related to proposed EMS system.
- Training – Successful Bidder along with respective partner / OEM should also provide support and training to TPCL officials.

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
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ENSE-DS-2049-R00		Date of Issue: 11/03/2025

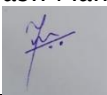
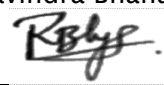
2 Scope

- 2.1. Bidder shall provide subscription based EMS Software (12 year licensing for Cloud services under SaaS model) – including managed services Cost (Web Applications, DR system, Yearly operation, FMS, Comprehensive Support services) including integration with TPCL IT System
- 2.2. Bidder shall provide complete EMS system with necessary hardware required on Cloud including Firewalls, servers on Cloud , Workstations, MPLS Connectivity, VPN Access for remote clients, data cables and accessories etc for the safe, efficient and reliable operation of entire BESS and its components from Centralised Control room.
- 2.3. Bidder shall deploy necessary infrastructure for Centralised control room including EMS, workstation, master clock, network switches, racks.
- 2.4. Bidder shall deploy the EMS software on cloud server along with clients at Centralized and Local EMS Control room.
- 2.5. Bidder shall include in his proposal all the Industrial Grade Hardware, Software, Panels, Power Supply, HMI, Gateway, Networking equipment, associated Cable and additional items required if any needed for the completeness even if the same are not specifically appearing in this specifications. The Bid / Proposal shall include all cost required to ultimately commission a viable and fully functional EMS that meets and exceeds the capacity and performance required.
- 2.6. Implementation, deployment & commissioning of Cloud Services for proposed EMS (Web portal) capable of upgrades and scalable as per TPCL requirements with robust system security features and due consideration of data privacy, confidentiality cyber security guidelines (CEA guidelines).
- 2.7. Any other software/tools for delivering the intended scope of the tender
- 2.8. Bidder can choose one of the Cloud platforms from TPCL provided CSP list (any of these hyper scalar AWS, Azure, Google).

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Date	11/03/2025	11/03/2025	11/3/2025

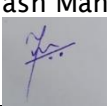
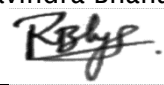
The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

- 2.9. Bidder to ensure that hyper scalar / Cloud solution provider (CSP) is empaneled by MeitY (Ministry of Electronics and Information Technology). Since this is OT (Operational technology) data, bidder shall ensure that data is stored in India only to meet compliance to statutory entities and TPCL Policy.
- 2.10. Ensure IT infrastructure must be hosted in India only (i.e. , all data functions and processing are performed within the boundaries of India)
- 2.11. Supply of SaaS Back -up & Disaster Recovery (DR) solution for proposed EMS in Active passive mode.
- 2.12. Design, installation and commissioning of secure network and backbone connectivity for proposed EMS.
- 2.13. Support multiple (primary and additional) secured broadband (MPLS) service provider network interfaces.
- 2.14. All Distribution Substations in TPCL are connected through TPCL's own Fibre network or 4g / 5g Modem with 2 sims of different service providers and TPCL uses it for OT and IT Operation. Bidder shall provide redundant (different service provider) secured broadband (MPLS) connectivity of sufficient capacity from TPCL various locations to Cloud location. Bidder shall include the One time commissioning as well as operating charges towards MPLS Connectivity for 12 years in its proposal. Bidder shall ensure that all remote clients are connected to EMS System through VPN only in coordination with TPCL
- 2.15. Providing requisite network connectivity on cloud side is in bidders scope.
- 2.16. EMS Application - All access to systems shall be controlled by an authentication method involving a minimum of a unique user ID/password combination. Provide a mechanism to authenticate and authorize users & shall have in-built functionality to integrate with existing authentication mechanisms (including integration with existing on-prem Active Directory)

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

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ENSE-DS-2049-R00		Date of Issue: 11/03/2025

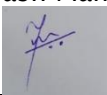
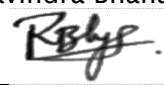
- 2.17. Provide training to TPCL users for operating, administrative and developing of cloud services for proposed EMS.
- 2.18. To conduct a detailed assessment and design a comprehensive technical architecture and project plan including
- 2.18.1. Assessment of the business requirements and proposed EMS requirements for the TPCL
- 2.18.2. Risk Assessment and Mitigation plan
- 2.18.3. Overall Cloud architecture including solution design
- 2.18.4. Build the solution for TPCL as per the design considerations
- 2.18.5. EMS solution Backup & Disaster recovery plan
- 2.18.6. Plan for development on Cloud, configuration, and customization of proposed EMS
- 2.18.7. Plan for development, Maintenance, security, and Upkeep/Support for proposed solution
- 2.19. To conduct EMS Controller / RTU integration test cases to achieve seamless integration with proposed EMS hosted on Cloud and existing SCADA systems in TPCL
- 2.20. Solution should be architected to run on cloud services offered from multiple data center facilities to provide business continuity with no interruptions in case of any disruptions / disaster to one of the data centers. In case of failure, automated processes should move customer data traffic away from the affected area.
- 2.21. As a when required, provide separate environment for development, Data Engineering, test, training & production, for proposed EMS Solution
- 2.22. DR as a service for all resources offered on primary DC site. Vendor shall be responsible for provisioning of bandwidth for replication of data between the DC cloud and DR cloud. Geographical Location of the Disaster Recovery Environment

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Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

shall be different location (Seismic Zone) from the DC Cloud (Data Center) environment

- 2.23. Responsibility for Managed Database Services for all proposed EMS Databases.
- 2.24. Bidder shall ensure Backup and recovery of data, Cyber Security system and Testing as per policy of TPCL
- 2.25. Backup solution for on cloud infrastructure to be considered with different features, like, incremental and full back up of all data
- 2.26. Provision of firewall, IDS/IPS and syslog server for enhanced security. 24x7x365 days uninterrupted cloud services.
- 2.27. The proposed system (web portal) shall be scalable and extendable.
- 2.28. Includes a Disaster Recovery support in a separate Data Center. The DR site should be providing for a one-minute RPO and 15 minutes RTO in event of a disaster.
- 2.29. Provide managed service for system patch and configuration management in a timely and consistent manner to minimize the impact on business. Critical security patches shall be applied not later than 3 months from the date of release of patches.
- 2.30. Monitor EMS properly for unauthorized activity.
- 2.31. Bidder shall provide all documentations related to EMS solution
- 2.32. Bidder shall provide warranty and Comprehensive Annual maintenance (CATS) support after Go-Live/UAT of the system for 12 Years
- 2.33. Bidder shall provide all software updates, patch management, free of cost during warranty and CATS period.
- 2.34. EMS software, including the Operating system, RDBMS and support software, shall comply with the industry-accepted software standards produced by national and international organizations, such as ANSI, ISO, IEC, IEEE, ECMA in order to facilitate maintenance and enhancement of the EMS systems being supplied.

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Date	11/03/2025	11/03/2025	11/3/2025

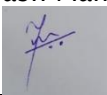
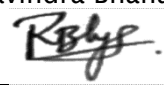
The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

Bidder shall provide the EMS based on open standards and SOA principals. It should have following functionality of EMS system

- 2.34.1. Bidder shall design this system based on open standards and using SOA principals.
- 2.34.2. Central & Single data repository for BESS & metering devices.
- 2.34.3. Web based, flexible and user friendly GUI
- 2.34.4. Device management like registration, provisioning, maintenance, decommissioning etc. Device management shall include asset inventory of all relevant (Programmable) devices/components that are part of EMS environment.
- 2.34.5. Scheduled and on demand Data collection from devices, meter reading processing etc
- 2.34.6. Deploy System requirement and Implement functional requirement as mentioned in specifications

2.35. **Interfaces & Integrations**

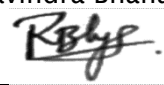
- 2.35.1. EMS shall Interfaces with TPCL IT Systems as per communication architecture.
- 2.35.2. EMS – TPCL SCADA Integration – TPCL proposes a control philosophy where power flow on 33 kV BESS GIS switchgear shall be monitored and controlled by relevant divisional SCADA Operators whereas EMS operator at local / centralized system shall only able to monitor the power flow at BESS 33 kV GIS Panel. Bidder shall sent SoS (Emergency Stop) signal from EMS Software to SCADA System through secured communication protocol to switch off BESS 33 kV GIS Panel and isolate BESS.
- 2.35.3. EMS – Real Time Monitoring System of TPCL. Real Time monitoring System

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ENSE-DS-2049-R00		Date of Issue: 11/03/2025

is web based application used by TPCL to optimize Power purchase cost as well as monitor the TPCL Grid performance (Scheduled Vs Actual demand linked with frequency) under frequency based Deviation Settlement Mechanism (DSM).

- 2.36. All the required licenses, license updates, license renewal, ATS (Software Licenses, Hardware used), software updates, change requests is the responsibility of vendor
- 2.37. Indemnify TPCL from any claim made by any third parties, including but not limited to any third-party software providers whose software might be or otherwise used in conjunction with the software developed by EMS Provider.
- 2.38. Develop customized reports as per TPCL requirement

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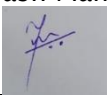
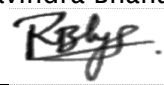
3 Solution Overview

Reference solution Architecture shown below is representing various modules of EMS and how data shall flow to and from this system. EMS shall be flexible and integrates with any and every type of system that are – downstream (Distributed Energy Resources such as Electric vehicle (EV), BESS, Roof Top Solar (RTS) etc) and upstream utility systems (Centralized EMS, SCADA System) that are present inside and outside the data center, securely over well-defined interfaces, supporting standards and otherwise. Illustrative architecture / block diagram is as shown below.

3.1. Key components in reference architecture are :

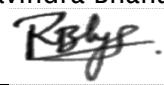
- 3.1.1. Compatible EMS Hardware on Site – BESS has various components such as 33 kV Switchgear, Multiwinidng Transformers, PCS, Battery System, FSS, TSS, Energy Meters, HVAC , Auxiliary Power Supply and CCTV Control System. These devices data shall be integrated to EMS Controller on Standard protocol for remote monitoring & Control Purpose.
- 3.1.2. EMS Solution on Cloud – EMS is scalable cloud-based platform having integrations with multiple site BESS-EMSs deployed across various locations to optimize energy storage, distribution, and utilization. The centralized EMS acts as an overall energy management system that balances multiple BESS based on grid requirement. It comprises of Software on Cloud having features such as Site data collection and storage, and load balancing, optimize BESS Operation , Energy dispatch and scheduling etc. EMS Software shall be deployed at Local & Centralised Control Room.

Bidder shall submit EMS Control logic diagram, schemes and architecture during submission of BESS proposal. Bidder shall also submit the details regarding EMS

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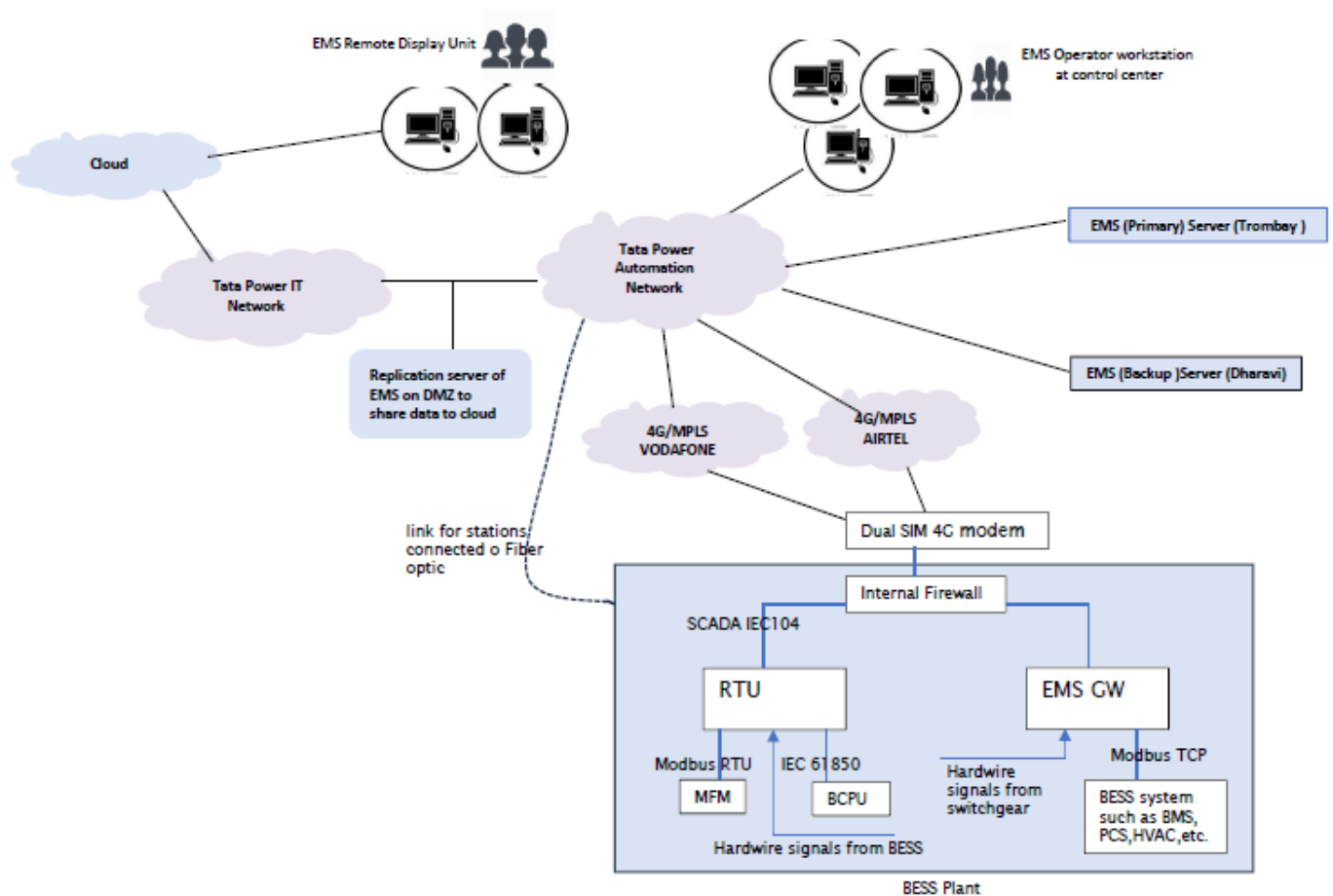
The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

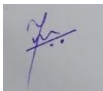
architecture, IO sizing Parameters, Servers and workstation sizing and specifications, Communication Protocols proposed, Time Synchronization and software display design (BESS Component symbology and color codes) etc for review and approval of TPCL during detailed engineering.

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

Bidder shall provide redundant (different service provider), MPLS Connectivity from TPCL Various Location to Cloud and ensure that all clients are connected to EMS System through VPN only in coordination with TPCL. Cost of providing and maintaining redundant , MPLS Connectivity from TPCL Various Location to Cloud for 12 years shall be part of bid proposal. Bidder shall also ensure redundant hardware like Firewall, Workstation, router and network devices and configured with dual LAN to achieve redundant network scenario.

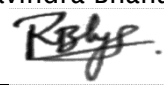


Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

4 Qualifying Criteria

The bidder should provide authorization of **EMS software** OEM for the EMS. EMS OEM should have successfully executed 10 projects in India. EMS shall be successful in operation for at least six (6) months prior to tender document date. Copy of client testimonials to be submitted. The software shall comply to prevailing regulation in India. OEM of EMS should have India based service-support.

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

5 EMS functional requirement

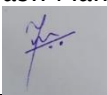
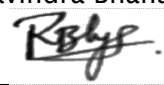
5.1. Following EMS functions are envisaged (but not limited to)under this specification

- 5.1.1. Data acquisition from Field Devices Controller / RTU / Gateways
- 5.1.2. Time synchronization of Controller / RTU / Gateways
- 5.1.3. Data exchange with TPCL IT Systems
- 5.1.4. Data Processing
- 5.1.5. Continuous real-time data storage
- 5.1.6. Sequence of event processing
- 5.1.7. Closed loop (Auto) & User Control (Manual)
- 5.1.8. Remote database downloading, diagnostics & configuration
- 5.1.9. Information Storage & Retrieval (ISR)

5.2. EMS shall provide complete Distributed Energy Resources Management Solution in terms of Energy Management System, Power Management , real time monitoring System, receiving and scheduling Communication data and event execution, environmental control system, peak load shaving system, safety management and protection mechanism system , early warning management, data analysis, energy analysis, exception management and Electric Power Ancillary Services (AFC/FRR).

5.3. Data Acquisition

- 5.3.1. EMS shall support following standard protocols but not limited, to integrate various equipments and Systems
 - 5.3.1.1. Modbus (TCP / IP, RTU)
 - 5.3.1.2. Substation Control such as IEC 61850, IEC 60870-5-/104
- 5.3.2. Digital status and Analog Values data shall be **reported** and shall be updated and displayed within 5 seconds
- 5.3.3. Digital status data shall have higher priority than the Analog data.

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

5.3.4. Apart from the periodic integrity scan, the integrity scan shall also be initiated automatically whenever the following situations arise:

5.3.4.1. Upon startup of the system

5.3.4.2. RTU/ Controller status change is detected such as restart,
Communication Link restoration

5.3.4.3. On demand by EMS functions

5.3.4.4. On request by the user

5.3.5. EMS shall be able to acquire the real time data, status, alarms & warning signals generated by following equipment (but not limited).

5.3.5.1. 33 kV GIS Switchgear Panels (Relays, MFM, Energy Meters, Transducers, Contacts)

5.3.5.2. Auxiliary Power System Comprising of UPS, Battery, Battery Charger, Distribution Board (MFM) and contacts

5.3.5.3. Energy Meters

5.3.5.4. Power Conditioning System (PCS)

5.3.5.5. Fire Detection & Suppression System (FSS) for all BESS Components

5.3.5.6. Temperature Scanning System (TSS)

5.3.5.7. GPS Time Synchronization Unit

5.3.5.8. Battery BMS

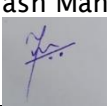
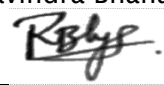
5.3.5.9. Breakers

5.3.5.10. HVAC Control System

5.3.5.11. Any other equipment as offered by Bidder

5.4. Data Processing

5.4.1. Data processing involves a value which has been converted to internal form and analyzed for violations of limits. The data processing shall set various data

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

attributes depending on the results of the checks and shall trigger any additional processing or calculation.

5.4.2. Analog data processing

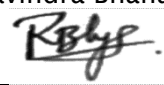
5.4.2.1. Analog points that are transmitted to EMS system in raw data format shall be converted to engineering units before being stored in the database

5.4.2.2. Zero dead band processing - The acquired value, if falls between the dead band range around zero then it shall be considered as clamped zero value else the actual value shall be considered.

5.4.2.3. Reasonability limit check - All analog values shall be compared against defined high and low reasonability limits. The comparisons shall be performed at the scan rates of the analog values. An alarm shall be generated the first time a reasonability limit violation is detected. The last valid value of the variable shall be maintained in the database and marked with a quality code indicating the 'reasonability limit violation'. When data returns to a reasonable value, the new value shall be accepted, and a return-to-normal message shall be generated.

5.4.2.4. Limit monitoring -

5.4.2.4.1. For bi-directional quantities (positive or negative) there shall be a set of five limits for each direction. For unidirectional quantities

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

there shall be a set of three limits in one direction. emergency limit shall necessarily be assigned as audible alarm.

5.4.2.4.2.

5.4.2.4.3.

5.4.2.4.4. Any change in alarm states resulting from a change in limit value shall be reported. Contractor shall finalize & take approval from TPCL for limit values

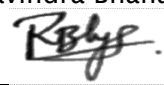
5.4.2.5. Rate of change (ROC) / gradient

5.4.2.5.1. All telemetered and calculated analog points shall be also processed for rate of change of / Gradient processing, if defined that point for such processing in the database. An Alarm for overshoot & event message for return to normal shall be generated

5.4.2.5.2. All the requirements that apply to calculated points, such as limit checking, alarming and availability for display and processing shall apply to the ROC points. There shall be a positive limit and a negative limit to catch excessive rises in the analog value.

5.4.2.6. Sign Convention - All imports to bus bars shall be represented with + sign and all exports from bus bars shall be with -ve sign.

5.4.3. Digital input data processing

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

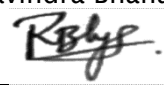
The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

5.4.3.1. Each state of a digital input point shall be associated with the state of an actual device.

5.4.3.2. Alarm checking - The following digital input data types shall be accommodated as a minimum:

5.4.3.2.1. **Two** - state points: The following pairs of state names shall be provided as minimum:

- Open/Closed
- Tripped/Closed
- Alarm/Normal or Reset
- On/Off
- Auto/Manual
- Remote/Local
- Appear/Disappear
- On Control/Off Control
- Set/Reset
- Operated /Reset
- Healthy/Unhealthy
- Service/Test
- Charge /Discharge
- Available /Unavailable
- Grounded /ungrounded
- High / normal
- Ok / not ok
- Raise /Lower
- Trip/ Reset

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
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Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

5.4.3.3. Commanded changes - Commanded changes initiated by control shall shall be recorded as event or log. 5.4.4. Calculated Data Processing

5.4.4.1. EMS system shall be capable of performing calculations and storing the result in the database as calculated data available for display.

5.4.4.2. The database variables to be used for arguments and the mathematical/statistical/logical functions to be used as operations shall be definable interactively at a console as well as by the programmer using database creation and maintenance procedures.

5.4.4.3. Calculated analog values shall use database points as the arguments and mathematical and statistical functions as the operations.

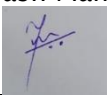
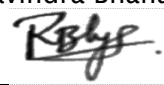
5.4.4.4. Functions such as addition, subtraction, multiplication, division, maximum value, minimum value and average value, count, integration, square root extraction, exponentiation, trigonometric functions, logarithms and logical & comparative operators etc. shall be provided.

5.4.4.5. It shall be possible to calculate running maximum value, minimum value and average value over a time interval (time interval configurable from 5 minutes to 60 minutes). The value shall be reset after the elapse of defined time interval. These values shall be stored with time of occurrence for maxima and minima and the time for averaging.

5.4.5. Substation Topology

5.4.5.1. EMS system shall be provided with a Substation SLD/topology function. This function shall be capable of analyzing the open/closed status of switching devices, such as breakers and disconnectors, in order to define the configuration of the substation for display

5.4.5.2. The energization of lines, transformers, bus sections and generating

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

units shall be determined so that the associated displays may correctly show the status of these power system elements.

5.4.5.3. The configuration shall be re-evaluated and updated whenever a switching device status change & analog value change beyond dead band is detected.

5.4.6. Quality Codes

5.4.6.1. Quality codes indicate the presence of one or more factors that affect the validity of a data value. All quality codes that apply to a data value shall be maintained in the database for that data value.

5.4.6.2. The quality of the calculated value shall be the quality of its "worst" component of its arguments. The presence of a quality code on any of the component data values shall not disrupt the calculation using that value.

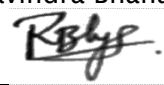
5.4.6.3. Results of calculations that are manually overridden by the user shall be denoted with a quality code that can be differentiated from the propagation of a manual replaced quality code from one of its component values.

5.5. Continuous Real Time data storage

5.5.1. All real-time data (Analog and status) shall be continuously stored in Server/ISR for at least 6 months as and when it is received in the local EMS database.

5.5.2. It shall be possible to have tabular and graphical trends of the stored data.

5.5.3. The users shall be able to select the time window of interest for fetching of data from archive during retrieval in EMS system. This archived data shall be transferable in RDBMS database tables of ISR system for generation of

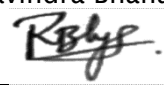
Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
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Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

tabular displays and reports

5.6. BESS Control

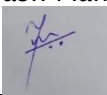
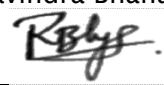
- 5.6.1. System shall have capability to operate the BESS in Auto and Manual mode as per TPCL requirement. Activate local control of BESS, modify charge / discharge set points and ramp up and down rates.
- 5.6.2. BESS shall be operated either in Auto or manual Mode.
- 5.6.3. Manual Mode – Operator shall be able to provide grid power set point to EMS Controller through Local / Centralized EMS of TPCL System. BESS shall charge / discharge the power within the band of 5% of reference target power. BESS shall remain into designated input / Output level until terminated by operator

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
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Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

through Local / Centralized EMS System or battery charging / discharging limit is reached.

- 5.6.4. Manual Mode – Operator shall be able to configure Ramp up and Ramp Down rates of BESS Power (up to BESS Maximum rating) by providing the set point to EMS Controller either through Local / Centralized EMS System. BESS shall remain into designated input / Output level until terminated by operator through Local / Centralized EMS or battery charging / discharging limit is reached.
- 5.6.5. EMS shall operate to manage the BESS Component operating parameters within specified range as per applicable technical and industry / OEM Standards in Auto Mode.
- 5.6.6. BESS Operation shall be controlled through EMS local HMI or centralized EMS HMI, or through SCADA / DERMS.
- 5.6.7. BESS operation should be controlled by one operator at a time, positioned at centralized location thus it must have suitable interlock features.
- 5.6.8. The operator shall be able to request digital status control, set-point control and raise/lower control on selected points and analogs using Select check before operate (SCBO) Sequence.
- 5.6.9. The control features in Local as well as centralized EMS shall be customizable.
- 5.6.10. EMS shall also have Emergency SWITCH OFF provision (Single click with warning) to deenergize / disconnect the entire plant during any emergency situation.
- 5.6.11. A control request shall be sent from control center only after the controlled point was checked for proper conditions. The request shall be rejected by the System if:

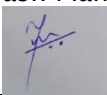
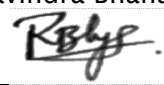
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R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

- 5.6.11.1. The requested control operation is inhibited by a tag placed on the device;
- 5.6.11.2. The device or BESS in local manual control mode
- 5.6.11.3. The Operating Mode/ user permission of the workstation/console attempting control does not permit control
- 5.6.11.4. The device is already selected for control request or control execution is from another workstation / user/window /console or control request is progressing
- 5.6.11.5. Time out after selection

5.7. Information Storage and Retrieval (ISR)

- 5.7.1. Information Storage and Retrieval (ISR) function shall allow collection of data from real-time EMS system and storing it periodically in a Relational database management /MS system (RDBMS) database (Oracle/MySQL SQL, Post GRE SQL) as historical information (HI) data.
- 5.7.2. This includes storing of data such as Status data, Analog values, calculated values, Energy values etc. There shall be provision to create and categorize the archives based on 15minmax, 15minavg, 1 hourmax, 1 houravg and so on.
- 5.7.3. Programmer shall also be able to set storage mode as periodic storage. Subsequently, the data shall be retrieved for analysis, display, trending and report generation.
- 5.7.4. All stored data shall be accessible from any time period regardless of changes made to the database after storage of that data.
- 5.7.5. It should be able to compress data and should have 100% retrieval accuracy.
- 5.7.6. The database in ISR shall support and provide us of SQL-based language for selecting, retrieving, editing, sorting, analyzing, and reporting of data stored in

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Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

ISR database. The selection and sorting criteria shall include time tags and ranges, station names, equipment types, status values, text string matches on selected data fields etc. and combinations of these criteria. The ISR shall have retention of data minimum for 5 years for analysis, display, trending and report generation.

5.7.7. The data stored in the ISR system shall support the following retrieval capabilities:

5.7.8. The user shall be able to view Historical Information (HI) data on displays/Forms and reports. The user shall be able to edit HI data, request recalculation of all derived values, and regenerate and print any daily, weekly or monthly HI report for the current and previous month.

5.7.9. The user shall be able to view tabular trend and graphical trend of multiple data points simultaneously by specifying the start date and time, the end date and time, and the time period between displayed samples. The duration of viewable tabular trend and graphical trend could be up to 24 hours.

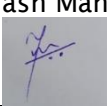
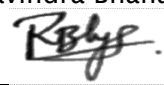
5.8. The HI retrieval shall expose the ISR Data over SOA / Enterprise Services BUS, over, ICCP , OPC ODBC Interfaces / Adapters.

5.9. The retrieval shall provide 100% accuracy and fidelity of data.

5.10. System Message Log Storage and Retrieval

5.10.1. System message log, which shall consist of the chronological listing of the EMS computer system event messages and user messages shall be stored for archival and analysis. Each entry shall consist of time tag and a text containing user and device identification as displayed on the Alarm Summary or Event Summary displays.

5.10.2. The System message log data storage shall be sized for up to 20,00 entries per month. Message log data shall be stored in daily tables & shall be available

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

for minimum two months on auxiliary memory.

5.10.3. System message log data for previous months shall be configured for automatic backup on backup sever and any errors can be reported. Option of Taking Manual backups shall be provided as per requirement of the system Admin.

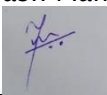
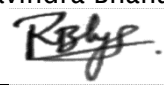
5.10.4. Facilities to sort and selectively display and print the contents of the system message log shall be provided. The user shall be able to select the display of system message log entries based upon Alarm type, Events, User generated messages, Device, and Time period.

5.11. EMS Uses Cases at BESS Plant Level

5.11.1. Power Quality - Use energy storage to provide a high level of power quality Like power factor compensation, Voltage support, Frequency support, etc...

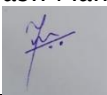
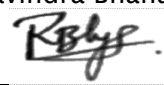
5.11.2. Emergency back-up and islanding scheme - In the event of grid failure, Battery energy storage shall island from the Grid and cater the electricity requirement of load, critical load connected on BESS 33 kV GIS Panel without any manual intervention. System shall manage and operate the load / critical load depending upon BESS Operating Parameters in islanded Mode. BESS shall set and automatically control the voltage and frequency within acceptable limit. BESS shall have all the required hardware, Control and Protection feature for safe operation of islanding scheme / Microgrid.

5.11.3. Automatic change-over between grid-tied & off-grid / grid forming at full load during operation. The above transitions between the On-grid and Off-grid state of operation shall be without any disturbance to loads. The transition shall be smooth, and the transition time shall be less than 200 milli second.

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
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Date	11/03/2025	11/03/2025	11/3/2025

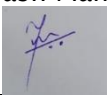
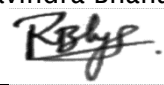
The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

- 5.11.4. Peak Demand Management, Peak Shaving / Load levelling – BESS shall be configurable, operate in auto mode to store the power during light load and inject power back into grid during high demand.
- 5.11.5. Voltage Regulation – BESS shall support voltage regulation feature thereby maintaining the voltage at Grid point within acceptable range to ensure that both real and reactive power production are matched with demand. BESS operator shall be able to provide reactive power/power factor set point to EMS controller through Local / Centralized EMS. The VAR output of the BESS may be limited based on remaining capacity left after providing real power output.
- 5.11.6. Manage Grid Point Import / Export – BESS shall manage the power injection / Drawl (as per configuration) at Grid Point by Balancing the demand Vs generation of power.
- 5.11.7. Deviation settlement Mechanism – BESS shall be configurable to manage DSM Scenarios where BESS shall support to minimize the gap between scheduled Vs actual demand of TPCL by drawing the power from grid during underdrawer scenario and inject into grid during overdrawl scenario. BESS shall be operate in manual and Auto mode (as per requirement) to manage drawl or injection in terms of quantity and Time based upon gap between scheduled Vs actual demand of TPCL, Grid Frequency, IEX rate, DSM Rate, TPCL Allowable deviation at particular time slot to minimize penalty and maximize incentive under Deviation Settlement Mechanism.
- 5.11.8. Power Purchase Optimize – BESS shall be configurable and operate in Auto / manual mode to store the power during Surplus Power Position and inject the power back into grid during shortfall Scenario. BESS shall be able to configure its drawl or injection in terms of quantity and time based on TPCL Surplus / shortfall power position, demand and IEX Rates.

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

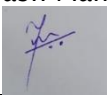
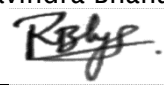
The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

- 5.11.9. Black Start – System shall support Black Start Operation of BESS Plant.
- 5.11.10. EMS shall Monitor following but not limited to critical parameters, alarms & Events of BESS Components
- 5.11.10.1. PCS – Active, Reactive Power, Status , Black Start Status etc
- 5.11.10.2. Battery (BMS) – Output Voltage, SOH, SoC, Temperature, Total Energy, Battery Status, cumulative no. of cycles, DoD, charging/discharging current etc
- 5.11.10.3. BESS Mode - Automatic Mode (Normal Charge / Discharge, Grid Connected / islanded mode) and Manual Mode (Normal Charge / Discharge, Force Charge / Discharge, Grid Connected / islanded mode)
- 5.11.10.4. Health of Battery Cooling System – Usage of power, Temperature, Status, Alarms, Pressure etc
- 5.11.10.5. Health of Fire Detection and Suppression System – signals & measurements from smoke detectors, Gas detectors, Spectroscope, GasRelease Panel, Fire Dampers, NOVAC / AEROSOL Cylinder & piping, Emergency Release Switches, Manual Call Points, Fire Controller panel in Control Room, Abort & Emergency release switches in Control Room
- 5.11.10.6. Temperature Scanning System – Temperature data
- 5.11.10.7. 33 kV GIS Panel – Breaker Status, Relay Status / Measurements
- 5.11.10.8. Multiwinding Transformers – Winding and Oil Temperatures, Transformer health parameters, Relay Status
- 5.11.10.9. Auxiliary Power System – Status & Measurements of Battery Chargers, UPS, Battery and Distribution Boards
- 5.11.11. EMS shall have following but not limited Control functions of BESS Components

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

- 5.11.11.1. SoC % - Configure SOC level & factor level
- 5.11.11.2. Operation – Open / close breakers, change of operating modes, change control logic for applications, charging control, change of local / remote control etc
- 5.11.11.3. Protection: Protection relay parameter setting, configure through OEM only / control alarm / tripping for various signals of BESS Components
- 5.11.11.4. EMS system shall have open control system API in order to integrate the same with Tata Power custom applications (like Power Manager) to accept control commands from Tata Power custom applications. It shall also be possible to fetch required reports from EMS, through custom applications.
- 5.11.11.5. Operator should be able to upload periodic (daily/weekly/monthly) charging and discharging schedules from centralized EMS system, at once. It shall run automatically till operator modifies the same or system observes any deviation. Alerts in case of any deviation observed with respect to set schedule.
- 5.11.11.6. Minimum quantum of BESS charging/discharging schedule shall be 1MW or lower on 15/5 minutes basis.
- 5.11.11.7. EMS shall be able to automatically optimize priority of charging/discharging of individual batteries basis on operational efficiency. To be added suggested by PSCC
- 5.11.12. Single line diagram representation - Monitor & Control critical parameters of BESS & its Components using HMI. EMS shall display the SLD of BESS and its components in user friendly manner.
- 5.11.13. Monitor & Control Battery Temperature and Fire suppression System

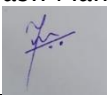
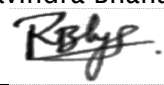
Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

- 5.11.14. Monitor & Control BESS Plant Operation –
- 5.11.14.1. Plant Operation Mode (Local / Remote),
 - 5.11.14.2. Grid Status (Connected / Disconnected)
 - 5.11.14.3. Enable / Disable – Use case modes like Active Power Control, Peak Shaving Control, Active Power Ramp, Reactive Power Control, SOC Stabilizer Control, Black Start, Voltage Regulation, Zero Export to Grid etc
- 5.11.15. EMS shall be programmed for Micro grid functionality i.e. The Micro-Grid Controller allows the ESS to run in synchronization with the grid and in case of grid failure it allows the ESS to run in off-grid mode or island mode (i.e., form its own grid). EMS, in case of grid failure, shall create its own grid by isolating Utility grid.
- 5.11.16. Other Use cases : EMS shall have features such as Grid voltage threshold based dispatch, Wholesale price threshold based dispatch, aggerating capacity across multiple BESS for open access and ancillary services (SRAS) in future.

5.12. Integration

- 5.12.1. EMS system Integration with TPCL IT/OT System
- 5.12.1.1. EMS shall support various open standard protocols such as IEC 60870-5-101/104, IEC 61850-7-420:2021, MODBUS RTU / TCP, MQTT, OpenADR , DNP3, SparkPlug 2.0b, Sunspecs, IEEE1815.2, etc for integration of various make DERMS on EMS Platform.
 - 5.12.1.2. EMS shall Interfaces with TPCL IT Systems (RTMS, SAP, Power BI etc)
 - 5.12.1.3. EMS controller should be able to exchange the BESS 33kV GIS Switchgear and multiwinding transformer operation parameters with

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

SCADA System independently on dedicated interface on IEC 60870-5-101/104 Protocol for monitoring and Control purpose.

5.12.1.4. Centralised EMS shall also exchange the parameters with TPCL Real Time monitoring System (RTMS) on real time basis to monitor BESS operational parameters through web services based on SOAP/RestAPI.

5.12.2. EMS shall also read the data from RTMS like IEX Rates, TPCL deviation in Schedule Vs Actual demand and use these inputs to manage operation (Charging / Discharging) of BESS.

5.12.2.1. TPCL and Bidder shall finalize detailed parameters to be exchanged between EMS and TPCL IT systems during detailed engineering,

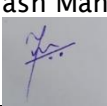
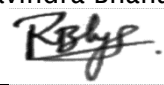
5.12.2.2. The real-time data shall be exchanged on a cyclic basis or by exception basis. In case of cyclic exchange, the frequency of exchange shall be configurable by user. In case of exchange by exception, it shall be possible to configure the dead band for individual parameter being exchanged.

5.12.2.3. The EMS shall have REST APIs that can be exposed to external endpoints. These APIs can manage and operate EMS platform including managing flexibility, ingesting forecast data, scheduling delivery, dispatching assets, and retrieving the telemetry and other data associated with the operation of the system

5.12.2.4. EMS shall be capable of accepting dispatch instructions from concerned load Dispatch centers over SCADA systems using industrial communication protocols (e.g. DNP3, Modbus, OPC UA etc.).

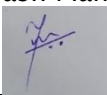
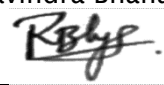
5.13. EMS shall also perform following functions

5.13.1. Real time acquisition of data, store and display data such as

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

- measurements, indications, equipment status, alarms, events and trends
- 5.13.2. Configure frequency of data such as measurements, indications, equipment status, alarms, events.
- 5.13.3. Control BESS equipments as per requirement
- 5.13.4. Display and store Derived, calculated the integrated values
- 5.13.5. Maintain and display history data
- 5.13.6. Display the status of BESS equipments in SLD format
- 5.13.7. Perform logical functions for Control, Protection and Annunciation of equipment and systems
- 5.13.8. BESS Plant – Schedule and Control the Active and Reactive Power as per TPCL requirement
- 5.13.9. EMS system shall be capable for self supervise and diagnosis functions.
- 5.13.10. Historical data analysis and reasonable calculation of energy consumption.
- 5.13.11. User shall be able to carry out following operations on the selected circuit breaker / isolator or Earth Switch
- 5.13.11.1. Select and carry out ON/OFF operation
- 5.13.11.2. Update values manually
- 5.13.11.3. Block event processing
- 5.13.11.4. Block Controls
- 5.13.12. User Management, Role Management, Permission Management (including CRUD Operations)

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

6 EMS Display Interactions

6.1. The user interface for EMS system shall be Web based Application

6.2. Display Requests

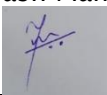
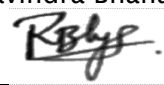
- 6.2.1. Selection of a display from a menu display
- 6.2.2. Cursor target selection on any menu, graphic, or tabular display
- 6.2.3. Selection of an event /alarm: in this case, it shall call up the display containing the event /alarm's location.
- 6.2.4. Option to switch the display in regular and full screen mode.
- 6.2.5. Selection of pictures / functions by using keyboard shortcuts.
- 6.2.6. Per instance of application, 4 simultaneous windows shall be supported.

6.3. Permeant Indicators - Several indicators, including those listed below, shall be permanently shown on each EMS Display screen as minimum:

- 6.3.1. Date and Time: Date shall be presented in the format DD/MM/YYYY. Time shall be presented in the format HH24:MM:SS with a resolution of one second, and shall be updated once per second.
- 6.3.2. Username: Name of the user logged in the EMS
- 6.3.3. Name of the EMS display accessed
- 6.3.4. Name of the display window

6.4. Trend

- 6.4.1. Trend shall be a display of series of values of parameters on a time axis. Both graphical trend and tabular trends shall be possible. Multiple parameters with multiple axis shall be used to create trends as per user requirements. It should be possible to select date and period of trend.
- 6.4.2. Typical trends to be provided but not limited to one minute, one hour, one day and one week. Trends shall be available for instantaneous as well as for

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

derived parameters like max, average etc

6.4.3. It shall be possible to highlight various flags like maximum, minimum, average value of the samples used for the trend, by using representation like base line, colored point based on user settings used for the trend.

6.4.4. It shall be possible to display tool tips at various samples of the trend. The tool tips shall highlight value & timestamp of the sample

6.4.5. It shall be possible to export the trends in into pdf and excel format

6.5. Alarms

6.5.1. All alarms shall be presented to the user in a consistent manner. Alarm conditions shall include, but not limited to, the following

6.5.1.1. Telemetered or calculated value limit violations

6.5.1.2. Alarming state of events.

6.5.1.3. Data source communication errors resulting in loss of data

6.5.1.4. EMS system hardware or software failures.

6.5.1.5.

6.5.1.6. Alarm for gradient limit violations

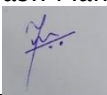
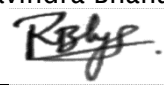
6.5.2. EMS system shall support alarm priority levels. It shall be possible to assigned distinct audible and/or representation to each alarm priority level. There shall be a provision/flexibility to view different priority alarms in separate display as per user requirement. For each alarm, it shall be possible for the user to independently configure the following actions.

6.5.2.1. Audible alarm tone type selection and its enabling/disabling

6.5.2.2. Alarm messages to be displayed on an alarm summary

6.5.2.3. Alarm message disappear from alarm summary when acknowledged
(for non-persistent alarms)

6.5.2.4. Alarm message disappear from alarm summary when return-to-normal

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

alarm occurs

6.5.2.5. Alarm message deleted from alarm summary when return-to-normal alarm is acknowledged

6.5.2.6. Alarm message deleted by user action.

6.5.3. User Interaction for Alarms

6.5.3.1. The User shall be able to perform the alarm interactions described below

6.5.3.1.1. Alarm Inhibit/Enable

6.5.3.1.2. Alarm acknowledge

6.5.3.1.3. Audible alarm silencing

6.5.3.1.4. Change alarm limits

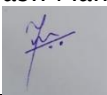
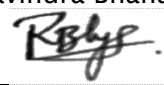
6.5.4. Alarm Presentations

6.5.4.1. Alarm presentation shall be determined by the alarm's category and priority. Displays shall highlight every alarm condition using a combination of colour, intensity, blinking and audible sound. The alarm condition highlighting shall show whether the alarm has been acknowledged.

6.5.4.2. The highlighted alarm condition shall appear on all displays containing that device or value at all consoles regardless of the alarm's category. Alarm messages shall be a single line of text describing the alarm that has occurred and the time of occurrence. The alarm message shall be English text and shall not require the use of a reference document for interpretation.

6.5.4.3. Provision to export alarm list shall be provided

6.5.4.4. Provision to filter and sort shall be provided in EMS system based on Priority, station, device, time slot, console, operator etc. from any console.

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

6.6. Events :

6.6.1. Events are conditions or actions that shall be recorded by the EMS system but do not require user action

6.6.1.1. User initiated actions

6.6.1.2. Conditions detected by application functions that do not require immediate user notification but should be recorded

6.6.2. Events shall be recorded in the form of an event message. The event message format shall be similar to the alarm message format. The same message format shall be used for displaying and printing events. Event messages shall be displayed on an events summary

6.6.3. Provision to filter and sort shall be provided in EMS system based on Priority, station, device, time slot, console, operator etc. from any console. Provision to export event list in excel and pdf format shall be provided

6.7. Reports

6.7.1. Generate , store and retrieve user defined reports on event , trend, comparison and summary, Dashboards on Energy Consumption, Daily, Weekly, monthly and yearly reports, Event /Alarm Data and Report accessible on web, time series event data report. Report shall include but not limited to alerts, alarm, events, BESS usage report, Status report, Energy drawn / injection report, hours of utilization, revenue generation etc.

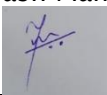
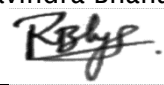
6.7.2. TPCL will finalise the list reports and its format during detailed engineering.

6.10.3. Export the report in PDF, MS Excel or xml Format

6.10.4. EMS System shall able to provide following evaluation and statistics reporting structure which includes

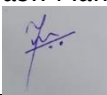
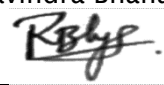
6.10.4.1. User defined reports on event , trend, comparison and summary,

6.10.4.2. Web and Window based details analysis, reports

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

- 6.10.4.3. User and Management web report
- 6.10.4.4. Dashboards on Energy Consumption
- 6.10.4.5. Monthly/yearly event report.
- 6.10.4.6. Event Data and Report accessible on web
- 6.10.4.7. Downloading of time series and event data for selected duration in Xcel/PDF or XML format or CSV format
- 6.10.4.8. Graphical user interface to show time series data for selected duration
- 6.10.4.9. It should have numerous chart types option vis (stacked), column/bar, , line, curved lines, scatter plot and curved area.
- 6.10.4.10. Alarm configuration, Alarm dispatch (Email) configuration for listed user
- 6.10.4.11. Robust Reporting engine for customized user report.
- 6.10.4.12. Accessing time for historical data should be less than 60 seconds.
- 6.10.4.13. Report templates shall store in HTML/MS Doc etc format, and easily changed to meet user's visual requirements.
- 6.10.5. System shall be able to configure the schedule of reports on Daily/Weekly/Fortnightly/monthly and yearly basis.
- 6.10.6. Report generation tool shall have features to edit the predefined reports, create new reports as per the user requirement.
- 6.10.7. Report generation tool shall have capability to connect with other databases (Oracle/MySQL/MS SQL/Postgres etc) & shall support generation of reports by combining data from EMS and other external database as per TPCL requirement. Report tool shall have capability to use PL/SQL code supported by EMS and external databases to generate reports on fly.

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

6.8. System Configuration Monitoring - The user shall be provided with the capability to monitor BESS and its component status, network element status

6.9. Dynamic data configuration

6.9.1. It shall be possible to present any item in the database on any display. All control capabilities shall be supported from any window.

6.9.2. Device status or data values along with time stamp shall be displayable anywhere on the screen, excluding dedicated screen areas such as the display heading

6.9.3. Bidder shall submit the details about status and data values to be presented for followings but not limited to for review and approval of TPCL during detailed engineering

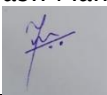
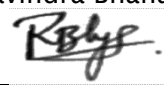
6.9.3.1. Analog values - number of characters, number of decimal places, and the use of positive /negative sign and flow direction arrows, time stamp of that value etc.

6.9.3.2. Telemetered and calculated values with the sign/direction on SLD & network diagram. Symbols, including alphanumeric text strings for an item, based upon state changes, data quality flags,

6.9.3.3. Colors, textures, and blink conditions based upon state or value changes or a change of data quality

6.9.3.4. display and update the analog data values through ODBC data source on displays

6.10. Element highlighting - Element highlighting techniques shall be provided to draw the attention of Dispatcher to critical state of the system. The highlighting technique shall include change of colour, colour intensity, blinking, Character inversion, Line texture, appended symbols etc. This feature shall be used to

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

highlight alarms, power system device and measurement status, data quality, data entry locations on a display and error conditions.

6.11. Display Types – Bidder shall provide following but not limited display type in EMS Solution. Same shall be submitted for TPCL review and approval during detailed engineering.

6.11.1. BESS network / schematic

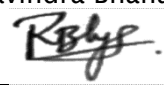
6.11.2. Single line diagram

6.14.10. BESS overview tabular display 6.14.4. Alarm Summary display 6.14.5. Event summary display Tag Summary

6.14.11. Tabular trending summary

6.14.12. EMS application display

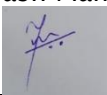
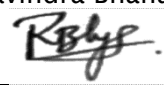
6.14.13. Help

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

7. System Requirements

- 7.1. System shall support Service Oriented Architecture and modular based approach in design, operations and implementation. System shall be composed of an integrated suite of applications and programs. System shall be web based, flexible and user friendly GUI.
- 7.2. System shall be robust and based on following basic attributes: scalability, availability, reliability, safety, confidentiality, integrity and maintainability.
- 7.3. System shall be capable of running in a clustered environment to provide high availability, reliability, scalability (vertically and horizontally). It must perform under periods of high usage and high processing loads based on BESS integrated and technical requirements. System shall be scalable as per TPCL requirement to accommodate future expansion.
- 7.4. EMS System should have capability to integrate Distributed Energy Resources (BESS, Roof Top Solar etc) of similar / different size and with different Technology in future.
- 7.5. EMS shall be interoperable and scalable with any other EMS or Distributed Energy Resources Management System (DERMS) in future.
- 7.6. The EMS should be supporting open protocols capable of integrating multiple battery energy storage systems or DERMS at different locations in future as well. The system shall be Cloud Agnostic, OS Agnostic and Different BESS Agnostic and works with multiple BESS and DERMS technologies.
- 7.7. EMS shall support various open protocol such as IEC 60870-5-101/104, MODBUS RTU / TCP, MQTT, OpenADR , DNP3, SparkPlug 2.0b etc for integration of DER on EMS Platform.
- 7.8. System shall need the ability to recover from a hardware or application failure. It must have built-in redundancy and fail-over architecture to ensure seamless

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

system recovery. To address high availability requirement, the system shall have redundant hardware and software operating in a high availability mode. Cloud Infra, network devices within the architecture shall be configured with dual LAN to achieve redundant network scenario. At device level if the working port or communication cable becomes faulty, then the data communication shall continue on the redundant port without any disturbance in the monitoring and control operation of the entire system. Every critical function must be supported by hardware redundancy to ensure that no single hardware failure will interrupt/impact the monitoring and control operations at any point of time.

7.9. Error detection & Failure Determination :

7.9.1. All Cloud System, peripheral devices, on-line software functions, and maintenance functions in EMS system shall be monitored for fatal, developing and recoverable errors.

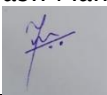
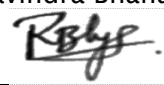
7.9.2. All errors shall be recorded for review by maintenance personnel.

7.10. System shall have backup and archival features for complete system which can be initiated as per schedule or by manual request. The system shall support recoverability feature using commonly available and industry standard backup & archival applications and approaches.

7.11. Ensure dedicated tenancy for the Energy Management System (EMS) in a cloud-based environment. Bidder must guarantee that the EMS will be hosted on dedicated physical servers or instances, ensuring complete isolation from other tenants. Specify that shared resources (e.g., storage, network) will not be used by other tenants and will be exclusively allocated to the TPCL EMS

7.12. System shall be able to interoperate with multiple industries standard database platforms like Oracle, MS SQL, MY SQL, NoSQL etc

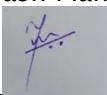
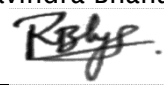
7.13. System shall be able to interoperate with Multiple cloud services provided by

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

leading EMSs

- 7.14. System database shall be accessible from application through business processes and managed APIs
- 7.15. System shall support both transactions processing
- 7.16. System shall provide end-to-end data protections to ensure no data is lost or corrupted during processing, storage, and transportation between applications and interfaces. The system should provide workflow management capabilities to manage and control routine processes of the application.
- 7.17. System shall maintain the highest level of security in order to maintain the confidentiality of each information stored i.e. BESS Devices, meter information, and reports etc to prevent security breaches
- 7.18. System shall have capabilities for cloud based hosting (either dedicated or shared infrastructure) and architectural considerations to support variety of implementation options.
- 7.19. System shall have defined priorities which will be used to process the prioritized tasks first in case of system constraints.
- 7.20. System shall have in-built features for sending SMS, mobile notification (enterprise) & email alerts to the users based on the requirements. System shall be able to interface with the standard mail system like Lotus Notes, MS exchange, MS Outlook and express etc.) for alert and notification.
- 7.21. Establishing communication for Centralized EMS system through laying of Data Cables / OFC and installing network switches, requisite Hardware and software on both side (Centralized EMS and Cloud Side) shall be in bidders scope.
- 7.22. Data Communication System (DCS)
 - 7.22.1. Bidder shall provide redundant OFC communication link/backbone between local panels, Cloud Infra, Firewalls etc with ring topology.

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

7.22.2. All the infrastructure deployed for data communication between various systems shall have redundant networking devices and redundant media (OFC / STP CAT6). The communication devices shall switch to redundant devices in case of failure of active devices without any glitch in network and loss of data.

7.22.3. Bidder shall provide Built-in diagnostics for faster fault detection Gateway redundancy is to be considered)The bidder shall furnish details regarding the communication system like communication protocol, bus utilization calculations etc during detailed engineering.

7.23. Bidder shall deploy necessary solution for security of data on cloud storage, deploying firewalls (hardware) and Software for authorized and control User, devices privileges and rights and role based access for accessing the system over Centralised EMS.

7.24. System shall be capable of device management including Access Control Management, Device Configuration, Firmware Upgrade, Real Time Devices Status, Report compliance configuration, Alarm Event configuration, Threshold configuration for events , reports, triggering DI/DO etc

7.25. System shall also support to upload the External data e.g TPCL demand forecast in EMS System using MS Excel or XML format.

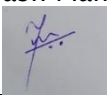
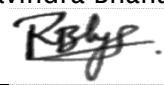
7.26. Notifications – EMS System shall be able dispatch notification

7.26.1. Via Email to list of users, measurement points and parameters can be selective for user

7.26.2. Notification via organization smtp server

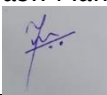
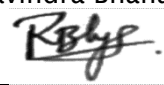
7.28.3.Notification contents shall be configurable

7.28.4.Email Notification should contain type of event and Time Stamp, and other details.

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

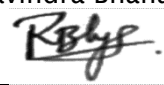
- 7.27. System should ensure that inadvertent incorrect operation of BESS Components causing damage and accidents in case of false operation does not take place
- 7.28. Bidder shall also maintain the EMS system spares required during CATS period (12 Years), replenish of spares based on consumption trend during CATS period (12 Years) of the matching quality, quantity and rating within shortest possible time., Bidder shall maintain the spares in his custody at Centralised Control room location.
- 7.29. EMS system Hardware, Software systems procured by bidders for BESS shall comply MoP / CEA guidelines.
- 7.30. BESS system & Component deployed and integrated with EMS System shall be supplied with Operation mode as Local and Remote for safety purpose. Any control signal from Local / Centralized EMS system shall be rejected for execution in case BESS Component is in local mode.
- 7.31. EMS system shall be compatible to synchronize with central GPS Time base using SNTP.
- 7.32. EMS system shall use different Symbolology & Colour Codes to represent the BESS single line diagrams in EMS System
- 7.32.1. Symbolology – Circuit Breaker, Isolators and Earth Switches etc
- 7.32.2. Each parameter shall have unique identity in system which shall be used to refer objects in pictures, calculation etc. Identification text of the object shall be used to present event list, alarm list, status list
- 7.33. EMS System shall provide safe operation under all plant disturbances and on component failure so that under no condition the safety of plant, personnel or equipment is affected.
- 7.34. EMS system shall be designed to prevent abnormal swings due to loss of

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

Control System power supply, failure of any Control System component, open circuit/short circuit. On any of these failures the controlled equipment/parameter shall either remain in last position before failure or shall come to fully open/close or on/off state as required for the safety of plant/personnel/equipment and as finalized during detailed engineering.

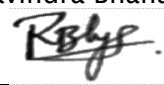
- 7.35. Manual intervention shall be possible at any stage of operation. Protection commands shall have priority over manual commands and manual commands shall prevail over auto commands.
- 7.36. Refer Annexure 1 BESS Specs for specification of Control Panels and Centralised EMS Control room infrastructure to be deployed at Centralised EMS Control room.

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

8 Cyber and Data Access Security

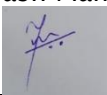
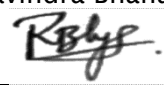
- 8.1. Secure Access Controls: System shall have access control management where different (Standard, custom etc) roles and rights based on job profile and requirements can be created. The EMS should have provision for application administrator to grant access to users by assigning these various roles & rights. The EMS system shall also include mechanisms for defining and controlling user access to the operating system environment and applications.
- 8.2. Authorization Controls: A least-privilege concept such that users are only allowed to use or access functions for which they have been given authorization shall be available.
- 8.3. Login to system shall be based on single sign on feature. After a user has successfully logged on, access to the EMS functions, displays, reports, and databases shall be governed by pre-assigned Area of responsibility (AOR) role. (Remote Access: In case of users/user interfaces having remote access with any component/application of the EMS system will require multi-factor authentication. All remote access to the EMS system must be performed through a VPN)
- 8.4. It shall be possible to assign multiple AOR (Multiple locations / Area) to a user with a discrimination that, on one AOR user shall have view only or read only access whereas on the other AOR he/she shall have all the control rights. There shall be various combinations possible with reference to assigning AOR and their respective access & control rights.
- 8.5. These operating areas shall be defined when the function, display, report, or database element is defined
- 8.6. Bidder shall comply all applicable latest regulations and guidelines from relevant authorities such as CERT-IN, CEA
- 8.7. System shall have support for active directory based centralized authentication

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

mechanism to authenticate users.

- 8.8. It shall be possible to assign multiple AOR to single user irrespective of those AOR are assigned to other users. It shall be possible for any user to logon to any console without affecting the desired performance of the user
- 8.9. It shall be possible to change the server and operator login passwords periodically as per security policy without affecting the system functionality.
- 8.10. When multiple AOR are assigned to single console, audible alarms shall function as defined in AOR. It shall be possible for user to mute individual Audible Alarm as per priority.
- 8.11. Logging: Logs must be maintained for all attempts to log on (both successful and unsuccessful), any privilege change requests (both successful and unsuccessful), user actions affecting security (such as password changes), attempts to perform actions not authorized by the authorization controls, all configuration changes etc. Each log-on and log-off shall be reported as an event. Unsuccessful attempts to log-on shall also be reported as events. Preferably, the logging system should utilize a standardized format, such as syslog, for seamless integration with TPCL's SIEM (Security Integration and Event Management system).
- 8.11.1. In the system a maximum session time (duration) is configured by system admin. When the session time is getting close to the end, a reminder (pop-up) message is prompted to the user. It shall be possible to configure at what time before the session ends, the reminder messages should pop-up and how often the messages should pop-up. Once, the operator accepts the message, he must do a shift change login. If the user decides to ignore all the messages, he will be logged out automatically at the session end time. All the actions, the login, logout by the operator and automatic Logout at the session end time shall be

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

recorded in the event list.

8.11.2. System shall have audit trail functionality for managing all the records of activities performed by users. This module shall be designed with adequate Cyber Security and Controls

8.12. Network Security: The network architecture of the EMS system must be secure with support for firewalls and encryption addressing data security and cybersecurity aspects of end to end solution.

8.13. The system shall support end-Users and Administrator security, including:

8.13.1. Individual, named accounts for each end-user and administrator

8.13.2. Role-based security

8.13.3. Administration privileges provided only through specific authorization capability to integrate with LDAP v3 compliant directories for seamless user authentication and access control within the EMS

8.13.4. Configurable, fine-grained access by service delivery point

8.13.5. SSL / TLS secured communications

8.14. The system shall support system integration security, including:

8.14.1. Web-services/ SOAP protocol shall require username/password authentication

8.14.2. Keystore used to manage certificates and access credentials

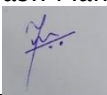
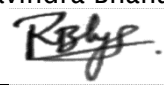
8.14.3. Support for Mutual or 2-Way authentication

8.14.4. SSL / TSL secured communications

8.15. The system's underlying data shall support the following security mechanisms:

8.15.1. Role-based security for database and application administration, application operations and execution, ad-hoc read-only privileges

8.15.2. Confidential information must be encrypted with strong encryption when

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

stored & when transmitted over public and internal networks. AES-256 bit encryption for persisting sensitive data at rest

8.15.3. Keystore to manage certificates and access credentials

8.15.4. SSL secured communications

8.15.5. All certificates provided by bidder should support at least SHA-2. TLS/SSL wildcard certificates are not allowed and bidder need to provide certificates specific to all sub-domains. The bidder shall provide cryptographic keys from a Certificate Authority (CA) approved by TPCL.

8.16. Hardening - All unnecessary packages must be removed and/or disabled from the system. Additionally, all unused operating system services and unused networking ports must be disabled or blocked. Only secure maintenance access shall be permitted and all known insecure protocols shall be disabled. Bidder should provide/ maintain an asset baseline configuration for all the assets that are part of proposed EMS IT infrastructure.

8.17. The application shall be designed with adequate Cyber Security and Controls. System shall support and use latest standard for Data encryption.

8.18. The system shall align to Indian Guidelines for Smart Grid Cyber Security

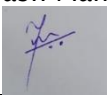
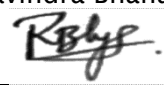
8.19. Malicious Software Prevention: Implementation of anti-virus software and other malicious software prevention tools shall be supported.

8.20. The application should have the feature of MFA

8.21. The bidder should employ robust endpoint protection measures for the proposed EMS solution.

8.22.

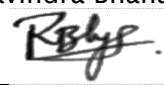
8.23. Bidder should make use of Intrusion detection & prevention (IDS/IPS) systems for complete solution.

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
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Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

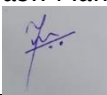
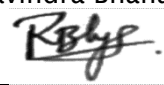
9 Information to be submitted along with Bid

- 9.1. The bidder shall submit a comprehensive list of documents as applicable for the proposed system. The schedule for submission and approval of these documents shall be in line with the overall project implementation timeline. The document shall be identified with Buyer document number. If any document is revised the bidder shall indicate each revision with a number date and description for approval.
- 9.1.1. Bidders Company profile, including policies related to Ethics and Sustainability.
- 9.1.2. Client Testimonial Letters
- 9.1.3. Copies of valid ISO certificates
- 9.1.4. Technical offer consisting of necessary documents including proposed architecture, bill of material, guaranteed technical particulars (GTP) for hardware to be supplied, non-disclosure agreement (NDA), Functional Design Specifications (FDS) for the system and modules being proposed for deployment etc.
- 9.1.5. Proposed System Solution document with software versions and hardware specifications
- 9.1.6. Detailed specifications and technical particulars for all the hardware and software
- 9.1.7. Drawings / documents /manuals for installation of system and its components
- 9.1.8. EMS solution document detailing following shall be submitted for review and approval of TPCL during bid submission.
- 9.1.8.1. Functional/Logical Architecture,
- 9.1.8.2. Deployment Architecture,
- 9.1.8.3. Network/Communication Architecture (protocols proposed)
- 9.1.8.4. Security Architecture,

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

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ENSE-DS-2049-R00		Date of Issue: 11/03/2025

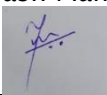
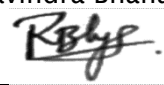
- 9.1.8.5. Integration Architecture,
- 9.1.8.6. Servers & workstation sizing & specifications, IO sizing Parameters,
- 9.1.8.7. Incident Response Plan, Data Backup & Disaster Recovery Plan etc
- 9.1.8.8. EMS Control logic diagram, schemes and architecture.
- 9.1.8.9. Time Synchronization and software display design (BESS Component symbology and color codes) etc
- 9.1.8.10. All necessary test certificates, procedures, plan where ever applicable
- 9.1.8.11. All necessary licenses where ever applicable
- 9.1.8.12. User License Agreement of all software after Purchase Order placement
- 9.1.8.13. Un priced BOQ
- 9.1.8.14. Response document to CATS & SLA
- 9.1.8.15. Document on security model in the proposed system
- 9.1.8.16. Standard Product & User manuals both for standard and Custom Applications
- 9.1.8.17. Project Management & Issue resolution strategy including escalation process.
- 9.1.8.18. Resource Plan & Project Plan
- 9.1.8.19. Specify process of change management pertaining to the changes to the EMS environment.
- 9.1.8.20. Termination & Exit strategy: How the EMS environment will be decommissioned or transitioned to a different service provider, ensuring a smooth exit process.

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The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

10. Specific Terms and Conditions

- 10.1. Vendor shall furnish the documents from OEMs indicating and confirming that the hardware and software being supplied under this project are not declared as end-of-sale as on the date of supply and OEM shall have support for the hardware and/or software for at-least 12 years from the date of delivery of hardware and/or software.
- 10.2. Vendor shall submit duly signed and stamped this document as compliance to EMS System along with deviations if any.
- 10.3. All the required miscellaneous and third party software/ hardware which is not mentioned in specification however required for smooth functioning and desired performance of system will be in the scope of vendor and shall be provided by the vendor.
- 10.4. The vendor shall start the design and engineering of the project only after the approval of associated documents for EMS Software and hardware specifications, FDS, NDA etc. by TPCL. Supply and commissioning of EMS software and hardware at local and centralized site shall include
- 10.4.1. Deployment of cloud infrastructure
- 10.4.2. Installation of requisite software in cloud
- 10.4.3. Data engineering of BESS Stations
- 10.4.4. Creation of Displays for BESS stations as per the requirement, which will be discussed and finalized during project engineering phase
- 10.4.5. Integration of all BESS Components to EMS (Local & Centralised) and SCADA System, point to point testing (Commands-100% and indications – 20% random samples) for the same
- 10.4.6. Interface for Trends, reports which can be easily exported.
- 10.4.7. Creation of reports as per user requirement in addition to existing reports

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

10.4.8. Report for availability (downtime) for EMS and its component

10.4.9. Integration with TPCL IT Systems

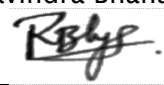
10.4.10. Conduct FAT and SAT

10.4.11. Submit Documents (hard and Soft)

10.4.12. Training of EMS System

10.5. Vendor to Maintain & Operate the EMS for 12 Years post installation & Commissioning as mentioned in CATS Section and ensure sufficient warranty for bought out items from OEMs / Service Providers.

10.6. TPCL group has institutionalized cyber security policy and took various measures such as multi-tier review of proposed solution through Architecture review board (ARB) and Solution Review Board (SRB). Bidder shall support and share the requisite information to the boards during these review. The bidder shall also conduct application VA/PT through Cert-In empaneled vendor and share results for review of board. Cost towards the same shall be part of bid proposal.

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

11. Testing and Documentation

11.1. This section describes the specific requirements for testing and documentation of the EMS system

11.2. **Type Testing** - Type test reports of tests conducted in NABL accredited Labs or internationally accredited labs with in last 5 years from the date of bid opening may be submitted. In case, the submitted reports are not as per specification, the type tests shall be conducted without any cost implication to TPCL.

11.3. Factory Acceptance Test (FAT)

11.3.1. EMS system shall be tested at the bidder's facility. All hardware and software associated with the EMS system shall be staged for the factory testing.

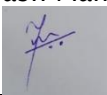
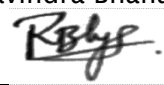
11.3.2. The requirements for exchanging data with other computer systems like SCADA, SAP, RTMS etc shall also be simulated.

11.3.3. Each of the factory tests described below (i.e. the hardware integration test, the functional performance test, integrated system test and unstructured tests) shall be carried out under factory test for the EMS system

11.3.4. The factory tests, requiring site environment, shall be carried out during the Field Tests after mutual agreement for the same from TPCL. Factory Acceptance Test shall be conducted on system ready with 100% scope as per the RFP

11.3.5. Hardware Integration Test

11.3.5.1. The hardware integration test shall be performed to ensure that the offered computer hardware, conforms to this Specification requirements and the Contractor-supplied hardware documentation. All the EMS system hardware shall be integrated and staged for testing. Applicable hardware diagnostics shall be used to verify the hardware configuration of each equipment. The complete hardware & software bill of quantity including

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

software licenses & deliverables on electronic media shall also be verified.

11.3.6. Functional Performance test –

11.3.6.1. The functional performance test shall verify all features of the EMS hardware and software. As a minimum, the following tests shall be included in the functional performance test:

11.3.6.1.1. Testing of the proper functioning of all EMS & other software application software in line with the requirements of various sections of this specification document

11.3.6.1.2. Simulation of field inputs from test panels that allow sample inputs to be varied over the entire input range

11.3.6.1.3. Simulation of field input error and failure conditions

11.3.6.1.4. Simulation of all type of sample control outputs

11.3.6.1.5. Vérification of communication Protocol

11.3.6.1.6. Verification of Data Integration from EMS system to other TPCL IT systems etc.

11.3.6.1.7. Verification of interoperability profile of all profiles of all protocols being used.

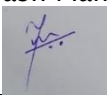
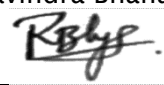
11.3.6.1.8. Verification of RTU /Controller communication interfaces

11.3.6.1.10. Verification of LAN and WAN interfaces with other computer systems

11.3.6.1.11. Testing of all user interface functions, including random tests to verify correct database linkages

11.3.6.1.12. Simulation of hardware failures and input power failures to verify the reaction of the system to processor and device failure

11.3.6.1.13. Demonstration of all features of the database, display, and report generation and all other software maintenance features of

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

system. Online database editing shall also be tested. Demonstration of the software utilities, libraries, and development tools.

11.3.6.1.14. Verification of system to check system meets or exceeds TPCLs performance requirements (as per table for peak & normal loading in Design parameters)

11.3.6.1.15. Verification that ultimate expansion requirements are met.

11.3.6.1.16. Verification of Development system

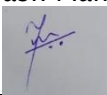
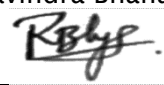
11.3.6.1.17. Unstructured testing of the EMS system by TPCL. The unstructured tests shall include the test, which are not in the approved test procedures and may be required to verify the compliance to the specification. (Max 20% of total testing)

11.4. Field Tests (Site Acceptance tests -SAT)

11.4.1. The EMS system shall be tested at the site. All hardware and software associated with the EMS system along with all connected devices viz RTUs/Controllers etc. shall be tested under the field tests.

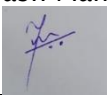
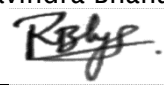
11.4.2. Field functional Performance Test

11.4.2.1. The field performance test shall concentrate on areas of EMS operations that were simulated or only partially tested in the factory (e.g., system timing and loading while communicating with a full complement of RTUs/Controllers and data links and system reaction to actual field measurements and field conditions). Further the validity of factory test results determined by calculation or extrapolation shall be examined. After the end to end test, the bidder shall conduct the field performance test to verify the functional performance of the system in line with the technical specification which includes the following:

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

- 11.4.2.2. The communication of other system SCADA, SAP, RTMS etc with EMS system
- 11.4.2.3. Mapping of EMS database with other system database
- 11.4.2.4. Verify that all the variances observed during the Factory test are fixed and implemented.
- 11.4.2.5. Conduction of the Factory tests deferred (tests requiring site environment)
- 11.4.2.6. Functional tests of EMS system
- 11.4.2.7. Verify the execution rates of all EMS application
- 11.4.2.8. Verify update rate & time for data update & control command execution as per specification requirements
- 11.4.2.9. Verify the response time of all EMS applications.
- 11.4.2.10. Verify the response time for User interface requirements Testing of all features of the database, display, and report generation and all other software maintenance features on cloud.
- 11.4.2.11. Online database editing shall also be tested.
- 11.4.2.12. Conduction of unstructured tests as decided by the TPCL
- 11.4.2.13. Verification of RTU /Controller communication Protocol
- 11.4.2.14. Verification of Data Integration from EMS system other systems viz IT Systems etc.
- 11.4.2.15. Verification of data exchange with other systems like SCADA,
- 11.4.2.16. Verification of interoperability profile of all profiles of all protocols being used.
- 11.4.2.17. Verification of RTU /Controller communication interfaces
- 11.4.2.18. Verification of LAN and WAN interfaces with other computer systems
- 11.4.2.19. Testing of all user interface functions, including random tests to verify

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

correct database linkages

11.4.2.20. Demonstration of all features of the database, display, and report generation and all other software maintenance features on system. Online database editing shall also be tested on system. (I) Demonstration of the software utilities, libraries, and development tools.

11.4.2.21. Verification that the EMS computer system meets or exceeds TPCL performance requirements (as per table for peak & normal loading in Design parameters)

11.4.2.22. Verification that ultimate expansion requirements for multiple BESS integration are met for centralized EMS.

11.4.2.23. Verification of Development system

11.4.2.24. Verification of Restoration of system from available Backup

11.4.2.25. Centralised EMS capability test for power management when demand of specific MW given.

11.4.2.26. Verification of data transfer from main to back up EMS system

11.4.2.27. Unstructured testing of the EMS system by TPCL. The unstructured tests shall include the test, which are not in the approved test procedures and may be required to verify the compliance to the specification. (Max 20% of total testing)

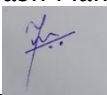
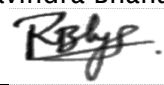
11.4.3. End to end Test

11.4.3.1. After the field installation tests, the bidder shall carry out end-to-end test to verify:

11.4.3.2. The communication of RTUs/Controllers with EMS system

11.4.3.3. Communication channel monitoring in the EMS system

11.4.3.4. The mapping & point to point testing of EMS database with RTU

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

/Controller database for all points.

11.4.3.5. The mapping of EMS database with displays and reports

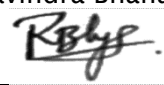
11.4.3.6. The Contractor shall provide the details of all the variances observed and corrections carried out during end to end test.

11.4.4. Continuous operation Test (48 hours)

11.4.4.1. This test shall verify the stability of the EMS hardware and software after the functional performance test has been successfully completed.

11.4.4.2. During the test, all EMS functions shall run concurrently and all Contractor supplied equipment shall operate for a continuous 48 (forty-eight) hour period with simulated exchange with other interconnected system

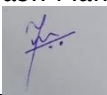
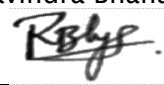
11.4.4.3. The test procedure shall include periodic repetitions of the normal and peak loading scenarios defined. These activities to be tested may include, but shall not be limited to, database, display, and report modifications, configuration changes (including user-commanded processor and device failover).

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

12. CATS / Support

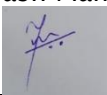
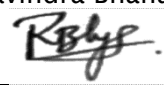
- 12.1. Essence of Contract - The essence of the Agreement (to be entered) is to provide CATS for the designated EMS and its component, with the goal of meeting the Availability as set forth herein and to provide system tuning and configuration to accommodate a growing system
- 12.2. Vendor to Operate and maintain the EMS Solution along with associated deployed infra for 12 Years post installation & Commissioning including hardware and Software system deployed at Site
- 12.3. The bidder shall be responsible for supply of all spare parts, repairs / replacement of any defective equipment(s) at his own cost as required from time to time during CATS period without affecting the overall performance of EMS Solution. Bidder shall ensure genuine spares of high quality standards for optimum performance of EMS.
- 12.4. Bidder shall obtain the necessary certificate from TPCL for successful completion of project before commencement of CATS services. The CATS will immediately start after submission of Project completion certificate.
- 12.5. Vendor should repair or replace any part or entire equipment that are found to defective either in material or manufacture during CATS contract without any additional cost to TPCL.
- 12.6. The bidder shall ensure that all EMS solution components (Hardware & Software) are maintained in good working condition and in case of any defect, timely replacement/repair / upgrade shall be carried out to maintain the availability of system.
- 12.7. The bidders on-site standard hours of service timings for EMS would be 24 hours a day, 7 days a week throughout the year (i.e. 24x365).
- 12.8. Sufficient nos. of engineers for on-site support for EMS solution and its

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

component shall be deployed.

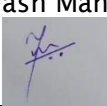
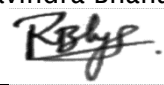
- 12.9. The support personnel so deployed shall be qualified personnel having experience in the delivered EMS system and on the Payroll of the bidder.
- 12.10. Bidder shall submit the CATS document / Plan before completion of Trial run.
- 12.11. Bidders to maintain all records of maintenance during CATS period which shall be shown to TPCL on demand. All maintenance records during CATS tenure shall be handed over to TPCL after closure of CATS period.
- 12.12. Bidder will assign a service delivery manager for TPCL who will provide the management interface facility and has the responsibility for managing the complete service delivery during the contractual arrangement between TPCL and the Bidder. Service delivery Manager will be responsible for preparation and delivery of all monthly/weekly reports as well as all invoicing relating to the service being delivered. Service delivery Manager's responsibilities should essentially cover the following
- 12.12.1. Overall responsibility for monitor, review and delivery of EMS performance and Service Level Agreement (SLA).
- 12.12.2. Act as a primary interface to TPCL for all matters that can affect the performance baseline of services.
- 12.12.3. Maintain communication – accepting queries / problems and respond
- 12.12.4. Provide strategic and tactical recommendations in relation to technology related issues
- 12.12.5. Provide escalation to Bidders senior management if required
- 12.12.6. Identify and resolve problems and issues together with TPCL
- 12.12.7. Responsible for preparation and delivery of all monthly reports as well as all invoicing relating to the services being delivered.
- 12.13. As part of this activity, for efficient and effective CATS implementation,

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

the Bidder team will:

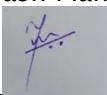
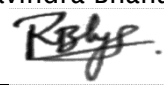
- 12.13.1. Manage the vendors / OEMs / Service providers for escalations on support including Logging calls and co-ordination with them,
- 12.13.2. SLA tracking
- 12.13.3. Management of assets sent for repair
- 12.13.4. Provide MIS on performance of BESS and EMS on Daily, Weekly, Monthly and yearly basis.
- 12.13.5. Coordinate with OEM / service providers for maintenance services and replenish sparesRespond and attend the problem / issue within agreed service level objectives set forth
- 12.14. The bidder shall submit the CV's of all such personnel to TPCL for approval before deployment at site.
- 12.15. The Bidder shall be responsible for 24*7*365 management of all the EMS systems as per scope of work with services rendered at least as per Service Level Agreement between TPCL & Bidder.
- 12.16. The Bidder must adhere to well-defined processes and procedures to deliver consistent quality services throughout its contractual period. Any hardware/software to meet the requirements under this section must be provided by the bidder.
- 12.17. The bidder is expected to have the SLA management tools having facility to build escalations, workflows, action types and its sequence, etc
- 12.18. **Scope of Work**
 - 12.18.1. The Scope of Work for CATS shall include the software & hardware maintenance support to be provided by the bidder in respect of the EMS solution supplied under this project without any charges (labour, travel ,

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

accommodation etc) to TPCL.

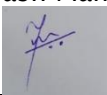
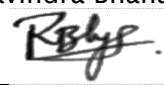
- 12.18.2. Vendor should repair or replace any part or entire equipment that are found to defective either in material or manufacture during CATS contract without any additional cost to TPCL.
- 12.18.3. The maintenance of the EMS System under CATS period shall be comprehensive in nature and would broadly include but not limited to diagnosis, troubleshooting, rectification and replacement of the software and hardware failures as applicable. The Scope also includes:
- 12.18.4. Configuration of the software & hardware, periodic routine checking of functionality of hardware and software as part of a preventive maintenance program (as described in further detail in this document) to ensure the satisfactory performance of the system. Services to bring up any or all the EMS systems upon its failure and to restore the functioning of EMS system at Local & Centralized Control Centers etc.
- 12.18.5. All Software modules under the EMS System
- 12.18.6. Routine works like database updating, addition of analog and status points and other such day-to-day operational activity would primarily be the responsibility of bidder.
- 12.18.7. Bidder shall ensure deployment updates/release/security patches to latest version for OS within 3 months of release , application software and network environment which can be applied without any performance impact on the EMS system till CATS Contract Period. The bidder should conduct periodic application VA/PT through Cert-In empaneled vendor.
- 12.18.8. Bidder shall carry out device data engineering, changes in SLD, Tables, Reports, Display Parameters, Configurations etc for efficient operation of BESS and TPCL requirement without any additional cost to TPCL during CATS

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

Period.

- 12.18.9. Upgrades to next version of EMS system, its Protocol and interfaces whenever released within 3 months without any cost to TPCL
- 12.18.10. The bidder shall diagnose problems that could arise as part of the Software and network. These include performance and connectivity problems due to failures in communication transport links, routing configuration points, or from software bugs etc.
- 12.18.11. EMS Hardware/Software Maintenance and Monitoring: This would include problem determination, configuration issues, and hardware and software fault reporting and resolution. All such issues would need to be recorded and rectified.
- 12.18.12. Bidder shall perform backup and restore management in accordance with the guidelines as mentioned below:
- 12.18.12.1. Backup and restore of data in accordance to defined process / procedure.
- 12.18.12.2. Backup check by Database restoration as per schedule.
- 12.18.12.3. Performance analysis of infrastructure and rework of backup schedule for optimum utilization.
- 12.18.12.4. Generation and publishing of backup reports periodically.
- 12.18.13.5. Ensuring failed backups are restarted and completed successfully within the backup cycle.
- 12.18.13.6. Monitor and enhance the performance of scheduled backups
- 12.18.13.7. Real-time monitoring, log maintenance and reporting of backup status on a regular basis.
- 12.18.13.8. Management of storage environment to maintain performance at optimum levels.

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

12.18.13.9. Management of the cloud storage solution including, but not limited to, management of space, volume, performance , configuration etc.

12.18.13.10. Regularly monitor and maintain a log of the performance monitoring of Cloud System.

12.18.13.11. Interacting with TPCL in developing / maintaining Backup & Restoration Policies / Procedures

12.18.13.12. The bidder shall ensure that all the relevant data back-up of EMS system is taken at regular frequency which is required for restoration in case of complete failure.

12.18.13. Regular analysis of events and logs generated in all the sub systems including but not limited to servers, operating systems, databases, applications etc. The system administrators shall also ensure that the logs are backed up and truncated at regular intervals.

12.18.14. Monitoring - The bidder shall conduct the following monitoring, for the supplied EMS System.

12.18.14.1. Error Log Monitoring - To monitor the performance of EMS system on a bi-weekly basis, the bidder shall review the following, analyze the results, and communicate to TPCL:

12.18.14.1.1. System logs for a selected day

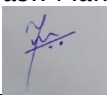
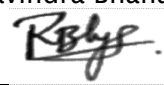
12.18.15.1.2. System history log

12.18.15.1.3. Aggregate data collection

12.18.15.1.4. Events Collection

12.18.15.1.5. During monitoring if any defect is found, the Contractor shall undertake corrective action for the same. The Contractor shall submit the process details to meet the above during detailed engineering.

12.18.14.2. Resource Monitoring - Resource Monitoring services comprises

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

checking the system's major node resources, gather log data, analyze results, and advise TPCL on the appropriate actions to be taken and undertake any agreed upon actions. A necessary tool used continuously collect the following information on cloud

12.18.14.2.1. Compute loading (Peak and Average)

12.18.15.2.2. System error log

12.18.15.2.3. Cloud space utilization (Peak and Average)

12.18.15.2.4. Operating system error reports

12.18.15.2.5. LAN utilization (Peak and Average)

12.18.15.2.6. Bandwidth utilization

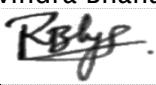
12.18.15.2.7. Memory utilization (Peak and Average)

12.18.15.2.8. The Contractor shall submit the procedures details to meet the above during detailed engineering.

12.18.15. Bidder may re-install the program modules, Firmware etc to optimize and improve the response of the system after making the TPCL engineer aware of the consequence (like data loss, database rebuild etc.).

12.18.16. The vendor engineer / Supervisor will check performance of EMS and its components and will inform TPCL about observations and necessary actions to be carried out. Vendor shall also diagnose the problem / issues in EMS System.

12.18.17. Any modification of software/Operating System required to restore functionality due to hardware upgrades, patches, or arising out of a necessity to fix FPRs, would be done by the bidder at no extra cost to TPCL. Also, any software updates/upgrades released till the completion of CATS shall be provided and installed & commissioned free of cost as per instructions from TPCL.

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

12.18.18. Preventive Maintenance - Bidder shall carry out visual inspection for any deformation, repair / rectification of any deficiencies observed, functional check up and operational tests on the System.

12.18.19. All issues / problems that have been identified need to be rectified appropriately. The resolution measures undertaken by the Bidder, RCA of any failure/problem and results produced after resolution shall be documented in the report.

12.18.20. Replacing of consumable items if necessary, during maintenance shall be without any cost to TPCL.

12.18.21. Replacing of spare part items if necessary, during maintenance shall be without any cost to TPCL.

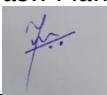
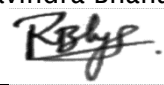
12.18.22. Preventive activities also include software version update , patch management, checking and enhancing software performance etc on a periodic basis.

12.18.23. Breakdown/Corrective Maintenance Services

12.18.23.1. Under this Support, TPCL / Bidders person monitoring and controlling centralized EMS System will report breakdown calls for onsite support to single point contact person designated by bidder through phone or system notification or email. Service tickets raised on designated number / email id will be acknowledged within 1 hour.

12.18.23.2. Bidder shall attend unlimited break down calls in a period 7 days week, 24 hours/day. No extra charges shall be applicable for such breakdown call visits. Spares required, Site Visits, Travel charges is in scope of vendor

12.18.23.3. Vendor shall provide Escalation Matrix along with contact numbers for escalation to next level as per duration defined in the

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

Escalation Matrix.

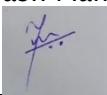
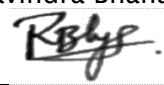
12.18.24. Vendor shall be required to provide Support Services to manage deployed EMS solution and associated work to meet the desired Service Level Agreement as mentioned below. Vendor shall submit a comprehensive Support process, plan and deliverables for the entire system including the field activities for approval to TPCL. It shall be the responsibility of the vendor to maintain the network uptime and provide the data availability as mentioned in SLA.

12.19. Emergency Support

12.19.1. The severity levels are defined in “ Framework for Problem Resolution” of this document. Emergency Support for Severity 1 issues are to be provided 24 hours a day, seven days a week. The on-call support team shall include all key technical competencies so that any aspect of a system failure can be attended. The team comprise of experienced technical staff that are skilled in troubleshooting EMS systems. Severity 1 problems shall be reported by telephone for rapid response; target response times are defined in Service level agreement section. The Bidder shall submit the process details to meet the above requirements along with the offer. For severity 1 problems, the key objective is to restore the system to an operational state as quickly as possible, including by a temporary workaround. Resolution of the defect may be completed during standard hours. Severity 2 and 3 problems shall be tracked through a call tracking system to be provided by the Bidder. The Emergency Support service goal is to meet the availability targets greater than specified in this document.

12.20. Scope of work (illustrative) during CATS shall include following

12.20.1. Remote Monitoring of EMS System to check non availability /

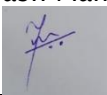
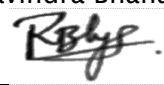
Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

functioning / low performance of any hardware and software modules, features etc

- 12.20.2. Regular analysis of events and logs generated in EMS systems.
- 12.20.3. Submit performance data to TPCL online and / or through a report on regular basis every Day / Week or Month.
- 12.20.4. Routine servicing/ troubleshooting/ setting/ adjustments/ cleaning/ checking of safeties etc. to ensure smooth and trouble free working of the system.
- 12.20.5. Repairs/ replacement to the EMS system including re-loading software etc. in the event of any malfunctioning including replacement of spares/ components/ sub-system/ cards/ and any other component, part or whole, which may need replacement/ repairs
- 12.20.6. Procurement, including Import, wherever required, of spares and stocking them shall be responsibility of the bidder. Non availability of spares/ components will not be accepted as a reason for waiving of penalty towards delay in rendering prompt service
- 12.20.7. All manufacturers preventive maintenance schedules/ replacement periodicity of components like electronics parts including checking of safety of devices, its performance, periodic testing etc. shall be strictly followed as per the manufacturer's periodicity or as required in addition to the scope of maintenance indicated above
- 12.20.8. The bidder shall immediately report the accidents, if any, to the Engineer In charge & to all the concerned authorities as per prevailing laws of the state.

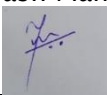
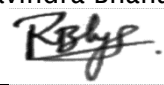
12.21. Other service / support condition – In addition to the on-site services

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

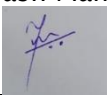
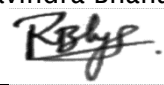
described above, Vendor shall provide support on following aspects:

- 12.21.1. Supply and replacement of all spares, consumables and parts required for smooth operation and serviceability of the deployed EMS Solution shall be the responsibility of the selected bidder during CATS period of 12 Years . In this respect the bidder shall maintain sufficient spares/consumables for immediate replacement of defective / damaged part during day-to-day routine maintenance / breakdown maintenance. Cost of these spares and any other spares which may be required during maintenance is deemed to be included in the rates quoted by the bidder. The periodicity of service shall be monthly or more depending upon the weather conditions and recommendation of OEM. Bidder shall submit the list of mandatory spares proposed during detailed engineering for review and approval of TPCL.
- 12.21.2. Monitor and maintain MPLS network connectivity and provide VPN access to clients in coordination with TPCL. Bidder shall ensure that cost of MPLS connectivity charges for 12 years is included in the rates quoted by the bidder for CATS.
- 12.21.3. Technical assistance should be provided by OEMs (over phone and other means of communication or site visit) for quick resolution of problems wherein on-site field team needs support.
- 12.21.4. Vendor shall depute qualified and trained engineers, experienced team for EMS System to take up preventive and corrective maintenance jobs.
- 12.21.5. Vendor representative should strictly observe all the instructions relating to the work issued from time to time by the Engineer-in-Charge from TPCL. Vendor engineer / supervisor must complete the planned maintenance jobs as per the schedule and to the entire satisfaction of the Engineer-in-Charge.

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

- 12.21.6. Vendor engineer shall provide report on the work carried out, which should be presented to the Engineer-in-Charge whenever demanded.
- 12.21.7. The decision of Engineer-in-Charge shall be final regarding all matters relating to this contract.
- 12.21.8. Accommodation at Site / To and Fro Travel Charges and Local conveyance is in Vendor Scope.
- 12.21.9. Selected Bidder to submit the Preventive and breakdown Service Report, System Performance Report to TPCL Site Incharge on time to time basis along with Invoice raised towards CATS.
- 12.21.10. Insurance – TPCL shall take Fire and allied Peril insurance during CATS Period. Bidder shall ensure insurance of EMS and its Component risks against any loss or damage, under performance, failure etc for successful delivery of CATS services.
- 12.21.11. TPCL personnel shall have unrestricted entry to Control room during CATS Period. TPCL may depute a personnels to associate with O&M Activities. Bidder shall assist TPCL in developing the expertise during day to day O&M activities.
- 12.21.12. Bidder shall strictly adhere to the TPCL's information security, Safety and Environment Management policy and System etc during CATS period. Bidder shall fulfill the entire requirement mentioned in the policy and its documents. Violation to the stipulated norms shall lead to heavy penalty in this regard. Any changes in the policy during the CATS period and its fulfillment or compliance shall be binding on bidder and no extra amount shall be paid for the same by TPCL.
- 12.21.13. Bidder shall ensure that hazardous and e- after their 'end of life' (when they become defective/ non-operational/ non-repairable) are disposed in

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

accordance with the “e-waste (Management and Handling) Rules, 2022” as notified by the Government of India and as revised and amended from time to time. Bidder shall carry out battery disposal through authorized vendor of CPCB/MPCB and submit the proof of disposal / certificate to TPCL.

12.22. Framework for Problem Resolution

12.22.1. Severity-1 (Urgent support) - This support is required when there is a complete system failure, severe system instability, the loss/ failure of any major sub-system / system or its components, which may significantly impact the system availability, performance, or operational capability at centralized Control Centre. Upon receiving intimation, the representative of the bidder shall immediately attend to the problem.

12.22.1.1. Loss of data or operational capability of EMS Solution at Local or centralized EMS System

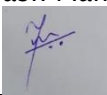
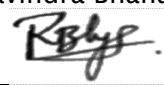
12.22.1.2. Loss of data to integrated TPCL IT Systems

12.22.1.3. Severe system instability

12.22.2. Severity 2 - The support services not defined under Severity-1 are included under this category.

12.22.3. Severity-3 (General Technical Help) - Request for information, technical configuration assistance, “how to” guidance, and enhancement requests are included under this category.

12.22.4. Performance SLAs: Need to comply with specific performance Service Level Agreements (SLAs) for the EMS, including metrics like response times,

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

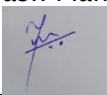
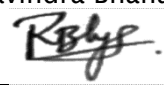
availability, and throughput. Bidder should ensure that the EMS consistently meets performance expectations during CATS period.

12.23. 24 X 7 monitoring and control of EMS Centralized Control Room

12.23.1. The following facilities will be provided to bidder by TPCL for carrying out the 24X7 monitoring & Control responsibilities: Appropriately secured lockable storage/setup area at Centralized Control Room

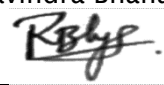
12.24. Service level agreement

Defined Parameter	Service level requirement	Validation Procedure	Penalty*
Resolution of issue / Problem :			
Severity 1	Response Time – 30 Min Action Time – 8 Hours	Telephone Call from Centralized EMS control room	2% penalty on the Support / CATS charges for every reported incident subject to a maximum of 50% of the value of CATS charges as mentioned in the payment schedule shall be recovered from CPBG / CATS Cost.

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

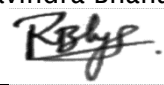
The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

Severity 2	Response Time - 1 Day Action Time - 2 Days	Call registration in Tracking System	1% penalty on the Support / CATS charges for every reported incident subject to a maximum
Defined Parameter	Service level requirement	Validation Procedure	Penalty*
			of 50% of the value of CATS charges as mentioned in the payment schedule shall be recovered from CPBG / CATS Cost.
Severity 3	Response Time - 2 Day Action Time - 5 Days	Call registration in Tracking System	0.5% penalty on the Support / CATS charges for every reported incident subject to a maximum of 50% of the value of CATS charges as mentioned in the payment schedule shall be recovered from CPBG / CATS Cost.

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

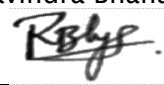
EMS System Performance			
User Interface - Application Response time if accessed by multiple users simultaneously	All web / Mobile pages response within 2 seconds Reports generation within 2 seconds	EMS System	
Defined Parameter	Service level requirement	Validation Procedure	Penalty*
	Analysis and data processing within 5 seconds.		
Data Storage - Data retention in EMS	100% data to be retained in the system for 5 years, previous data to be achieved in a recoverable format with recovery time 30min	EMS System	0.5% penalty on the Support / CATS charges for every reported incident subject to a maximum of 50% of the value of CATS charges as mentioned in the payment schedule shall be recovered from
Data Exchange with TPCL IT systems	Data requests from others system processed with 30 seconds	EMS & TPCL IT System	

Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		TECHNICAL SPECIFICATION FOR Energy Management System for Grid Connected Battery Energy Storage System
ENSE-DS-2049-R00		Date of Issue: 11/03/2025

Integration Services uptime	>99.5% of the time	EMS & TPCL IT System	CPBG / CATS Cost.
Generation of Report	Reports generation within 5 seconds	EMS System	
Execution of Control Command	Request to be completed within 30 seconds excluding response time of Device	EMS System	
Remote Firmware upgrade	Firmware upgrade requests completed for the BESS within 1 hour	EMS System	
Defined Parameter	Service level requirement	Validation Procedure	Penalty*
Time Sync	100% of the BESS sync with reference clock.	EMS System	
All User Interface Displays mentioned in Specification	Response time within 2 Second	EMS System	

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Rev No.	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R00	Yash Mane 	Ajay Potdar 	Ravindra Bhanage 
Date	11/03/2025	11/03/2025	11/3/2025

The Tata Power Company Ltd		OPEN TENDER NOTIFICATION
Tender Reference: 4100044502/CC25ADO034		Document Date: 12 th March 2025

ANNEXURE III

Schedule of Deviations

*Bidders are advised to refrain from taking any deviations on this TENDER. Still in case of any deviations, all such deviations from this tender document shall be set out by the Bidders, Clause by Clause in this schedule and submit the same as a part of the **Technical Bid**.*

Unless specifically mentioned in this schedule, the tender shall be deemed to confirm the TPC's specifications:

S. No.	Clause No.	Tender Clause Details	Details of deviation with justifications

By signing this document we hereby withdraw all the deviations whatsoever taken anywhere in this bid document and comply to all the terms and conditions, technical specifications, scope of work etc. as mentioned in the standard document except those as mentioned above.

Seal of the Bidder:

Signature:

Name:

The Tata Power Company Ltd		OPEN TENDER NOTIFICATION
Tender Reference: 4100044502/CC25ADO034		Document Date: 12 th March 2025

ANNEXURE IV

Schedule of Commercial Specifications

(The bidders shall mandatorily fill in this schedule and enclose it with the offer Part I: Technical Bid. In the absence of all these details, the offer may not be acceptable.)

S. No.	Particulars	Remarks
1.	Prices firm or subject to variation (If variable indicate the price variation clause with the ceiling if applicable)	Firm / Variable
1a.	If variable price variation on clause given	Yes / No
1b.	Ceiling	----- %
1c.	Inclusive of Excise Duty	Yes / No (If Yes, indicate % rate)
1d.	Sales tax applicable at concessional rate	Yes / No (If Yes, indicate % rate)
1e.	Octroi payable extra	Yes / No (If Yes, indicate % rate)
1f.	Inclusive of transit insurance	Yes / No
2.	Delivery	Weeks / months
3.	Guarantee clause acceptable	Yes / No
4.	Terms of payment acceptable	Yes / No
5.	Performance Bank Guarantee acceptable	Yes / No
6.	Liquidated damages clause acceptable	Yes / No
7.	Validity (180 days) (From the date of opening of technical bid)	Yes / No
8.	Inspection during stage of manufacture	Yes / No
9.	Rebate for increased quantity	Yes / No (If Yes, indicate value)
10.	Change in price for reduced quantity	Yes / No (If Yes, indicate value)
11.	Covered under Small Scale and Ancillary Industrial Undertaking Act 1992	Yes / No (If Yes, indicate, SSI Reg'n No.)

The Tata Power Company Ltd		OPEN TENDER NOTIFICATION
Tender Reference: 4100044502/CC25ADO034		Document Date: 12 th March 2025

ANNEXURE V

Checklist of all the documents to be submitted with the Bid

Bidder has to mandatorily fill in the checklist mentioned below:-

S. No.	Documents attached	Yes / No / Not Applicable
1	EMD of required value	
2	Tender Fee as mentioned in this RFQ	
3	Company profile/organ gram	
4	Signed copy of this RFQ as an unconditional acceptance	
5	Duly filled schedule of commercial specifications (Annexure IV)	
6	Sheet of commercial/technical deviation if any (Annexure III)	
7	Balance sheet for the last completed three financial years; mandatorily enclosing Profit & loss account statement	
8	Acknowledgement for Testing facilities if available (duly mentioned on bidder letter head)	
9	List of Machine/tools with updated calibration certificates if applicable	
10	Details of order copy (duly mentioned on bidder letter head)	
11	Order copies as a proof of quantity executed	
12	Details of Type Tests if applicable (duly mentioned on bidder letter head)	
13	All the relevant Type test certificates as per relevant IS/IEC (CPRI/ERDA/other certified agency) if applicable	
14	Project/supply Completion certificates	
15	Performance certificates	
16	Client Testimonial/Performance Certificates	
17	Credit rating/solvency certificate	
18	Undertaking regarding non blacklisting (On company letter head)	
19	List of trained/untrained Manpower	

The Tata Power Company Ltd		OPEN TENDER NOTIFICATION
Tender Reference: 4100044502/CC25ADO034		Document Date: 12 th March 2025

ANNEXURE VI

Acceptance Form for Participation In Reverse Auction Event

(To be signed and stamped by the bidder)

In a bid to make our entire procurement process more fair and transparent, TPC intends to use the reverse auctions through SAP-SRM tool as an integral part of the entire tendering process. All the bidders who are found as technically qualified based on the tender requirements shall be eligible to participate in the reverse auction event.

The following terms and conditions are deemed as accepted by the bidder on participation in the bid event:

1. TPC shall provide the user id and password to the authorized representative of the bidder. *(Authorization Letter in lieu of the same shall be submitted along with the signed and stamped Acceptance Form).*
2. TPC will make every effort to make the bid process transparent. However, the award decision by TPC would be final and binding on the supplier.
3. The bidder agrees to non-disclosure of trade information regarding the purchase, identity of TPC, bid process, bid technology, bid documentation and bid details.
4. The bidder is advised to understand the auto bid process to safeguard themselves against any possibility of non-participation in the auction event.
5. In case of bidding through Internet medium, bidders are further advised to ensure availability of the entire infrastructure as required at their end to participate in the auction event. Inability to bid due to telephone line glitch, internet response issues, software or hardware hangs, power failure or any other reason shall not be the responsibility of TPC.
6. In case of intranet medium, TPC shall provide the infrastructure to bidders. Further, TPC has sole discretion to extend or restart the auction event in case of any glitches in infrastructure observed which has restricted the bidders to submit the bids to ensure fair & transparent competitive bidding. In case of an auction event is restarted, the best bid as already available in the system shall become the start price for the new auction.
7. In case the bidder fails to participate in the auction event due any reason whatsoever, it shall be presumed that the bidder has no further discounts to offer and the initial bid as submitted by the bidder as a part of the tender shall be considered as the bidder's final no regret offer. Any offline price bids received from a bidder in lieu of non-participation in the auction event shall be outrightly rejected by TPC.
8. The bidder shall be prepared with competitive price quotes on the day of the bidding event.
9. The prices as quoted by the bidder during the auction event shall be inclusive of all the applicable taxes, duties and levies and shall be FOR at TPC site.
10. The prices submitted by a bidder during the auction event shall be binding on the bidder.
11. No requests for time extension of the auction event shall be considered by TPC.
12. The original price bids of the bidders shall be reduced on pro-rata basis against each line item based on the final all inclusive prices offered during conclusion of the auction event for arriving at Contract amount.

Signature & Seal of the Bidder

The Tata Power Company Ltd		OPEN TENDER NOTIFICATION
Tender Reference: 4100044502/CC25ADO034		Document Date: 12 th March 2025

Annexure VII
Inspection Test Plan

Not Applicable

CONFIDENTIAL

The Tata Power Company Ltd		OPEN TENDER NOTIFICATION
Tender Reference: 4100044502/CC25ADO034		Document Date: 12 th March 2025

Annexure VIII
General Conditions of Contract

The Tata Power Company Limited is hereunder referred to as the “Purchaser” or “Company”. The person, firm or company selling the goods, the subject of this purchase order is referred to as “Vendor” or “Contractor”. The subject of this purchase order is hereinafter referred to as the “Material(s)” or “Goods”.

The Contract shall mean the contract as derived from the following:

1. Purchase Order (with ‘Commercial Notes’ and Annexures to the Purchase Order referred thereon)
2. Technical Specifications.
3. General Terms & Conditions

The documents including all reference document (s) and Annexures forming the Contract are to be read together as a whole and are to be taken as mutually explanatory.

1. Price:

Unless otherwise specifically stipulated, the price shall be firm and shall not be subject to escalation for any reason till the validity of this Contract.

Unless otherwise specifically stipulated, the price shall be inclusive of road/ rail worthy water-proof packing & forwarding charges up to effecting delivery at FOT/ FOR despatch point, GST and shall also be inclusive of inland freight, terminal taxes and entry taxes as leviable on the transportation or entry of goods into any local area limits pursuant to the Contract.

2. Taxes and Duties:

- 2.1 The Contract Price shall be inclusive of all taxes, duties, including but not limited to GST or any local taxes, levies imposed by State/Central/Local governments
- 2.2 Taxes as mentioned in the Contract Price or Price Schedule shall be paid to the contractor subject to the Contractor complying with all the statutory requirements and furnishing the relevant documents including error free invoices containing detailed break-up of the taxes
- 2.3 However the payment of GST or local levies shall be restricted to the total amount as indicated in the price schedule.
- 2.4 Any duties, levies or taxes not mentioned in Contract Price or Price Schedule but applicable as per any statute (s) shall be deemed to be

Rev. date: 25 July 2017

included in the Contract price and shall be to the account of the Contractor.

- 2.5 Any statutory variation in duties, levies or taxes if applicable and specified in this Contract till the scheduled date for supply of Goods and limited to direct invoices of the Contractor shall be to the account of Purchaser. The Contractor shall have the obligation to provide the necessary documentary evidence / supporting by way of gazetted notifications etc. to prove the change in such levies or taxes between the due date of submission of the Bid and the scheduled date of supply of goods to claim the difference.
- 2.6 The Contractor shall pass on to the Purchaser all the benefits of either reduction in tax rates, exemptions, concessions, rebate, set off, credits etc. or introduction of new tax rates exemptions, concessions, rebate, set off, credits etc. pertaining to all taxes, duties, imposts, fees and levies in respect of the supplies of Goods or performance of obligations under the contract. This would specifically include reduction of tax rates as a result of statutory changes or judicial rulings.
- 2.7 Any other taxes, levies and duties not mentioned in Contract Price or Price Schedule but applicable as per any statute (s) or introduction (omission) of new taxes, levies and duties shall be deemed to be included in the Contract Price and shall be to the account of the Contractor.
- 2.8 For facilitating availment of a credit, set-off, rebate, drawback or like benefit available to the Purchaser, the Contractor will facilitate the Purchaser by providing the necessary documentary and/or procedural support. In any process of assessment or re-assessment, of taxes payable by the Purchaser. Wherever expressly agreed the purchaser would provide the statutory form ‘C’ to the seller for availing the concessional rate of Central sales tax.
- 2.9 The Contractor shall bear and pay all the costs, liabilities, levies, interest, penalties in respect of non-compliances of any legal requirements as per various statutory provisions. The contractor shall keep the owner indemnified at all times from any tax liability, interest, penalties or assessments that may be imposed by the statutory authorities for non-compliances or non-observation of any statutory requirements by the Contractor.
- 2.10 Purchaser shall pay the invoices to the Vendor after necessary deductions as prescribed under the applicable law, income – tax or other

deductions under the State Tax laws as may be applicable to the Contract.

3 Packing details:

Packing details: The material must be packed in suitable packing to suit the mode of transport and to ensure its safe receipt at point of delivery. Any damage to material noticed at the time of delivery at site, due to improper packing or any other reason whatsoever shall be the responsibility of the Vendor. Such damaged goods shall be replaced within 14 days from intimation from the Purchaser.

4 Transportation and Unloading at Site:

The Vendor shall deliver the Material(s) at site/ Stores as per the delivery address specified in the Purchase order. The unloading at delivery shall be organised by the Purchaser unless otherwise specified. The receipt of the material/ equipment is subject to inspection and rejection if Material(s) is found unsatisfactory or any of the clauses under this purchase order are violated.

5 Insurance:

Unless otherwise specified, Purchaser will be responsible to obtain transit insurance for the Material(s). The Vendor shall intimate the Order Manager (as mentioned in the Purchase Order) along with Invoice, packing list, the Railway Receipt/Truck or Lorry Receipt etc. immediately after the consignment is booked, at the e-mail id mentioned in the Purchase order.

6 Payment Terms:

100% payment shall be made within 60 days from the receipt and acceptance of the material at the Consignee Stores/ Site/ Location as per the Contractual terms and conditions herein.

7 Bills and invoice:

The tax invoices should contain the details to comply with the GST Law. The supplier shall:

- i) Furnish (electronically) and communicate to the Owner, the details of Goods or Services supplied by the 10th of the month succeeding the said tax period,
- ii) Upon discovery of any discrepancy, rectify it and shall pay the tax and interest thereof,
- iii) Furnish the returns (electronically), for the inward and outward supplies of

Goods and/or Services, before the specified dates as per the GST Law,
iv) Communicate the tax paid, credits etc. as and when credited.

v) The Invoice should clearly state the description of the goods, quantity, sale price, tax %, and tax amount;

vi) The Invoice should be signed by an Authorized Signatory.

Bills/Invoices in the name of The Tata Power Company Ltd. with packing lists in triplicate shall be forwarded along with the equipment.

Contractor to furnish GST Registration no. in all invoices as well as Purchaser's (Tata Power's) GST no.

8 Transfer of Title and risk:

The transfer of property and risk of Material(s) shall be deemed to take place as follows:

- a. For delivery F.O.R. or F.O.T. despatch point: Transfer of property on handing over the Material(s) to the carrier against receipt of clean Railway Receipt/Truck or Lorry Receipt and such receipt having been handed over to Purchaser. However, the risk of loss shall pass to the Purchaser on delivery of goods at the specified destination.
- b. In case the Material(s) are procured by the Vendor from sub-vendors on receipt of duly endorsed documents of title to the goods.

9 Contract Performance Bank Guarantee (In case applicable):

9.1 The Vendor shall within 15 days of issue of this Purchase Order furnish an unconditional irrevocable bank guarantee duly stamped and strictly as per the prescribed format of the Purchaser from any nationalized bank or any scheduled bank having a branch in Mumbai and approved by the Purchaser for a sum equivalent to 10% of the Total value of Order valid for a period not less than 6 months from the expiry of the Warranty period.

9.2 Irrespective of the performance demonstrated as part of the Factory Acceptance Tests Take-over tests / Performance Tests etc, the Purchaser may call for re-validation of performance of the system during the performance guarantee period by conducting fresh performance tests if in its opinion, the

system is not able to deliver the designed performances based on its operational performance results. If the equipment fails to prove the performance during such performance tests, the Purchaser may allow the Vendor to either rectify the system by addition / modification of equipment etc at the Vendor's costs & risk to restore the performance levels. Failure to rectify the system to achieve the designed performance levels may result in imposition of penalties including revocation of the Performance Bank Guarantee and forfeiture of the entire amount under the Performance Guarantee.

- 9.3 In case the Vendor fails to furnish the requisite Bank Guarantee as stipulated above, then the Company shall have the option to terminate the contract besides other contractual remedies.

10 Price reduction:

- 10.1 The Vendor agrees that time of supply of Material(s) is of prime importance. If the Vendor fails to supply Material(s) before the respective scheduled / fixed date for supply. Company may without prejudice to any other right or remedy available to the Company: -

10.1.1 Recover from the Vendor ascertained and agreed, genuine pre-estimate liquidated damages, and not by way of penalty, a sum equivalent to 1% (of total value of order) per week or part thereof for each week's delay, beyond the scheduled supply date each subject to maximum of 10% of the total order value, even though the Company may accept delay in supply after the expiry of the scheduled supply date. The Company may, at its discretion, set off the aforesaid amounts from any other amounts owed by the Company to the Vendor or recover such amounts in other manner as may be permissible under applicable laws.

10.1.2 Arrange to get supply from elsewhere on account and at the sole risk of the Vendor, such decision of the Company being final and binding on the Vendor; or

10.1.3 Terminate the contract or a portion of supply of the supply work thereof, and if so desired, arrange for the supply in default by the Vendor to be attained from elsewhere at the sole risks and costs of the Vendor.

- 10.2 Liquidated damages for performance shortfall (if applicable) shall be specified in the Technical Specifications.

- 10.3 The Liquidated Damages referred in this clause 10 may be recovered by the Company from the Vendor as set off against any monies owed by the Company to the Vendor or in any other manner permissible under applicable laws.

11 Warranties:

- 11.1 Materials and Workmanship: Vendor shall fully warrant that all the stores, equipment and component supplied under the order shall be new and of first class quality according to the specifications and shall be free from defects (even concealed fault, deficiency in design, materials and workmanship).

- 11.2 Should any defects be noticed in design, material and/or workmanship within 12 months after the Material(s) or any portion thereof as the case may be have been commissioned or for 24 months from the date of delivery, whichever period concludes earlier. Purchaser shall inform Vendor and Vendor shall immediately on receipt of such intimation, depute their personnel within 7 days to investigate the causes of defects and arrange rectification/ replacement/modification of the defective equipment at site, without any cost to Purchaser within a reasonable period. If the Vendor fails to take proper corrective action to repair/replace defects satisfactorily within a reasonable period, Purchaser shall be free to take such corrective action as may be deemed necessary at Vendor's risk and cost after giving notice to the Vendor, including arranging supply of the Goods from elsewhere at the sole risk and cost of the Vendor.

- 11.3 In case defects are of such nature that equipment shall have to be taken to Vendor's work for rectification etc., Vendor shall take the equipment at his costs after giving necessary undertaking or security as may be required by Purchaser. After repair Vendor shall deliver the equipment at site on freight paid basis. Any taxes applicable in relation to this repair shall be to the Vendor's account. All risks in transit to and fro shall be borne by the Vendor.

- 11.4 Equipment or spare parts thereof replaced shall have further warranty for a period of 12 months from the date of acceptance.

12 Quality, Testing, inspection, installation:

- 12.1 All Material(s) supplied under this Contract shall be new and unused.

12.2 Wherever a specific Quality Assurance Plan is provided with the Request for Quotation (RFQ) or agreed as part of the commercial/ technical discussions, the same shall be binding on the Vendor.

12.3 The material shall be inspected

- a. At consignee end by Purchaser.
- b. At factory premise of the Vendor/ sub-vendor by Purchaser or third party duly nominated by Purchaser. The Vendor shall extend all necessary co-operation to Purchaser/ third party inspector carrying out the inspection. The Inspector(s) shall have the right to carry out the inspection or testing, which will include inspection and testing of the raw materials at manufacturers shop, at fabricators shop and at the time of actual despatch before and/or after completion of packing.

12.4 The Vendor will inform Purchaser at least eight (8) days in advance of the exact place, date and time of tendering the Material(s) for required inspection and provide free access to the Inspector(s) during normal working hours at Vendor's or his/ its sub-Suppliers works, and place at the disposal of the Inspector(s) all useful means for undertaking the Inspection, checking the results of tests performed, marking the Material(s), getting additional tests conducted and final stamping of the Material(s).

12.5 Even if the inspection and tests are fully carried out, the Vendor shall not be absolved from its responsibilities to ensure that the Material(s), raw materials, components and other inputs are supplied strictly to conform and comply with all the requirements of the Contract at all stages, whether during manufacture and fabrication, or at the time of Delivery as on arrival at site and after its erection or start up or consumption, and during the defect liability period. The inspections and tests are merely intended to prima facie satisfy Purchaser that the Material(s) and the parts and components comply with the requirements of the Contract.

12.6 *All costs associated with the inspection shall be included in cost of Material(s).*

12.7 Original material test certificate/ performance test certificate/ fitment certificate/ test reports etc. relevant/ applicable as per the

specifications/ standards shall be dispatched along with the material supply failing which the material may be rejected.

13 Rejection:

13.1 Rejected goods shall be removed and replaced within 14 days of the date of communication of rejection.

13.2 Claim in respect of breakage/shortages in any cases shall be referred on the Vendor within ninety (90) days from the date of receipt of Goods by the Purchaser which shall be replaced/made good by the Vendor at his own cost. All risk of loss or damage to the material shall be upon the Vendor till it is delivered to the purchaser/consignee.

14 General Indemnity:

The Vendor shall indemnify and keep the Purchaser indemnified from and against any and all claims, costs, liabilities (financial), litigations, compensations, judgments, expenses or damages (including attorney's fees and other related expenses) arising out of any breach or alleged breach of any of the conditions of this Contract, performance of the obligations hereunder, or any representation or misrepresentation made by the Vendor or any third party with regard to the subject of this Contract.

15 Indemnity against IPR:

The equipment, system, drawings, and other materials that shall be supplied against the order will become the Purchaser's property. Without limitation of any liability of whatsoever nature, the Purchaser shall be indemnified and kept indemnified against any claim for infringement or breach of any of the statutes, rules & regulations by the use of or sale of any article or material supplied by the Vendor. The indemnity shall include any infringement of patent, trade mark, design, copyright or other property rights whether in Country of Origin, or elsewhere resulting from the Vendor's design, manufacture, use, supply or re-supply & would also cover use or sale of any article or material supplied by the Vendor to the Purchaser under the Purchase Order. The Indemnity shall cover any claim/action taken by a third party either directly against the Purchaser or any claim/action made against the Vendor & where under the Purchaser is made liable. The

Indemnity shall be for losses, damages, and costs including litigation costs, attorney fees etc incurred by the Purchaser in relation to the Purchase Order.

16 Latent Defects Liability period (if applicable):

Notwithstanding the inspections, acceptance tests, quality checks etc carried out by the Vendor and witnessed/accepted by the Purchaser, the Vendor shall further warrant the equipment for any latent defects in its design, material or workmanship against the specifications set forth and shall make good any such defects by way of repair or replacement of the part or whole of the defective product at its own cost & risks as and when such latent defects are observed and intimated by the Purchaser and intimated to the Vendor within 36 months of completion of warranty period.

17 Force Majeure:

- 17.1 In the event of either party being rendered unable by force majeure to perform any obligation required to be performed by it under this Contract the relative obligation of the party affected by such force majeure shall, after notice under this articles be suspended for the period during which such cause lasts. The term 'Force Majeure' as employed herein shall mean acts of God, wars (declared or undeclared), riots or civil commotion, fire, floods, and acts and regulations of the Government of India or State Government or any of the statutory agencies. Both the party shall pay to the other party, the amount payable upon the date of the occurrence of such force majeure.
- 17.2 Upon the occurrence of such cause and upon its termination, the party alleging that it has been rendered unable as aforesaid, thereby shall notify the other party in writing immediately but not later than twenty four (24) hours of the alleged beginning and ending thereof giving full particulars and satisfactory evidence in support of the claims.
- 17.3 During the period, the obligations of the parties are suspended by force majeure, the contractor shall not be entitled to payment of any rate.
- 17.4 In the event of the force majeure conditions continuing or reasonably expected to continue for a period more than thirty (30) days, Purchaser shall have the option of terminating the contract by giving seven (7) days notice thereof to the contractor.

18 Variation:

Except for any provisions in this Purchase Order, any change /modification to the terms and conditions of this Order can be issued only by Purchaser or with the prior written approval from Purchaser.

19 Termination

- 19.1 The Contract shall be deemed to be terminated on completion of delivery of Material(s)
- 19.2 Termination of Default by Vendor:
Purchaser may terminate the contract at any time if the Vendor fails to carry out any of his obligations including timely delivery under this Contract. Prior to termination, the Vendor shall be advised in writing of the causes of unsatisfactory performance to be improved upon 15 days of the receipt of notice. In case, if the Vendor fails to bring about the improvement to the satisfaction of the Purchaser, then the order shall be terminated.
- 19.3 Without prejudice to the rights and remedies available to Purchaser, Purchaser may terminate the Contract or part thereof with immediate effect with written notice to the Vendor if,:
- 19.3.1 The Vendor becomes bankrupt or goes into liquidation.
- 19.3.2 The Vendor makes a general assignment for the benefit of creditors.
- 19.3.3 A receiver is appointed for any substantial property owned by the Vendor.
- 19.3.4 The Vendor has misrepresented to Purchaser, acting on which misrepresentation Purchaser has placed the Purchase Order on the Vendor.

The Vendor/ Contractor shall not be entitled to any further payment under the Contract if the Contract is terminated. If the order is terminated under clause 19.2 and 19.3, the Vendor shall not be entitled to any further payment, except that, if Purchaser completes the supply of Material(s) and the costs of completion are less than the Total Order value, the Purchaser shall pay Vendor an amount properly allocable to supply of Material(s) fully performed by Vendor prior to termination for which payment was not made to Vendor. In case, the cost of completion of Material(s) exceed the total Order value, the additional cost incurred by Purchaser for such completion shall be paid by the Vendor.

19.4 Purchaser shall be entitled to terminate the Contract at its convenience, at any time by giving thirty (30) Days prior notice to the Contractor. Such notice of termination shall specify that termination is for Companies convenience and the date upon which such termination becomes effective. Upon receipt of such notice, the Contractor shall proceed as follows:

- 19.4.1 cease all further work, except for such work as may be necessary and instructed by the Company/ Company's representative for the purpose of protecting those parts of the supplies already manufactured;
- 19.4.2 stop all further sub-contracting or purchasing activity, and terminate Sub-contracts;
- 19.4.3 handover all Documents, equipment, materials and spares relating to the supply of goods prepared by the Contractor or procured from other sources up to the date of termination for which the Contractor has received payment equivalent to the value thereof; and
- 19.4.4 handover those parts of the supplies manufactured by the Contractor up to the date of termination.

Upon termination pursuant to clause 19.4, the Vendor shall be entitled to be paid the full value on the Material(s) delivered in accordance with the Contract.

19.5 The Contractor shall not be released from any of his obligations or liabilities accrued under the Contract on termination. For the avoidance of doubt, the termination of the Contract in accordance with this clause shall neither relieve the Contractor of his accrued obligations for Warranty or his accrued liability to pay (liquidated) damages for Delay nor shall entitle him to reduce the value of Performance Security.

20 Sub letting and assignment:

The contractor shall not without prior consent in writing of the Purchaser, sublet, transfer or assign the contract or any part thereof or interest therein or benefit or advantage thereof in any manner whatsoever, provided nevertheless that any such consent shall not relieve the contractor from any obligation, duty or responsibility under the contract.

21 Dispute Resolution:

Dispute or differences arising out or relating to this Order shall be resolved amicably by the parties. Failing such amicable resolution of dispute / differences either party may refer the matter to arbitration of a Sole Arbitrator to be appointed jointly by both the parties. The award of the Arbitrator shall be final, binding and conclusive on the parties. The venue for arbitration shall be Mumbai. The Arbitration proceedings will be governed and regulated by the provisions of Indian Arbitration and Conciliation Act, 1996 as amended from time to time and the rules framed there under.

22 Governing laws

This Contract shall be construed in accordance with and governed by the Laws of India without giving effect to any principle of conflict of law.

23 Jurisdiction

This Contract and the transaction contemplated herein shall be subject to the exclusive jurisdiction of the competent Courts in Mumbai only.

24 Limitation of Liability

Notwithstanding anything contained in the Contract, the Contractor's aggregate liability under this Contract shall be limited 100% of the Total order value. This shall however, exclude liability arising pursuant to clause 2.8- tax indemnity, clause 14- General Indemnity, clause 15- Indemnity against IPR, clause 25 – Confidentiality and liabilities arising due to wilful misconduct, gross negligence, third party claims and corrupt acts attributable to the Vendor.

25 Confidentiality:

The Vendor shall use the Confidential Information of the Purchaser only in furtherance of this Contract and shall not transfer or otherwise disclose the Confidential Information to any third party. The Vendor shall (i) give access to such Confidential Information solely to those employees with a need to have access thereto; and (ii) take the same security precautions to protect against disclosure or unauthorized use of such Confidential Information that the party takes with its own confidential information but, in no

event, shall a party apply less than a reasonable standard of care to prevent such disclosure or unauthorized use.

26 Consequential Damages:

Unless otherwise specified, neither Party shall be responsible for and nor shall be liable to the other Party for indirect/consequential losses and damages suffered by such Party including for loss of use, loss of profit whether such liability or claims are based upon any negligence on the part of the other Party or its employees in connection with the performance of the Purchase Order.

27 New Legislation (The Micro, Small and Medium Enterprise Development Act 2006)

- a. This Act has been enacted and made effective from 2nd October 2006. The Interest on Delayed Payments to Small Scale and Ancillary Industrial Undertaking Act, 1993 is repealed.
- b. Vendor is requested to inform the purchaser if vendor fall under The Micro, Small and Medium Enterprises Development Act, 2006 legislation and provide the purchaser, registration number and date to enable purchaser to take necessary care. The vendors are also requested to mention the same on their invoice / bill.

28 Relation between parties:

The Purchase Order shall be entered into on a principal-to-principal basis only. The Purchase order shall not be construed as a partnership or an association of persons. There is no agent and principal relationship between the parties. Each party shall be responsible for its own conduct. The Vendor shall ensure at all times that all the work carried out under this contract either by its own person or through any of its sub-Vendors shall be always done under its own direct supervision.

29 Environment / ISO 14001 Certification:

The Vendor to confirm whether their organization is ISO 14001 certified. If not, the Vendor must certify that the handling, use and disposal of their product / by-products conform to practices consistent with sound environmental management and local statutes. The Vendor shall ensure that all the wastes are disposed in environmental friendly way with strict compliance to applicable laws including

adherence to MoEF guidelines with respect to disposal of batteries, lead waste, copper cables, ash, waste oil, e-waste etc which shall be disposed through MoEF approved parties only. The Vendor shall also be responsible to collect and recycle all the e-waste generated at the end of the product life cycle at its own costs and risks as per the MoEF guidelines/ orders.

30 Tata Code of Conduct

The Purchaser abides by the Tata Code of Conduct in all its dealing with stake holders and the same shall be binding on the Purchaser and the Vendor for dealings under this Purchase Order. A copy of the Tata Code of Conduct is available at our website: <http://www.tatapower.com/aboutus/code-of-conduct.aspx>. The Vendor is requested to bring any concerns regarding this to the notice of our Chief Ethics Officer on the e-mail ID: cecounsellor@tatapower.com.

31 Responsible Supply Chain Management:

The Purchaser is committed for a cleaner environment and respect of Human rights through its Responsible Supply Chain Management policy. The Vendor is required to comply with all the environment & Human rights related laws, including emission norms, Labour and environmental regulations. The Purchaser encourages its Vendors/ Contractors/ Business partners to pay more attention to green design, green supply, green production, green logistics and green packaging in performing their business obligations.

The Vendor is required to abide by the Tata Power Corporate Environment policy, Energy Conservation and Corporate Sustainability Policy.

A copy of the Responsible Supply Chain Management Policy along with Environment policy, Energy Conservation policy, Sustainability policy, Health & Safety policy and Human Rights policy is available at website: <http://www.tatapower.com/sustainability/policies.aspx>.

Vendor/Bidder is required to completely fill the attached "Supplier Sustainability Questionnaire" in support of their Green Supply Chain Management initiatives and submit the same with their offer.

The Owner recognizes that diversity in the workplace positively impacts business. The Owner is committed to help people from SC/ST background either by helping them to become entrepreneurs or by engaging workforce from SC/ST community under the contracts agreed herein. To encourage engaging SC/ST community, the owner may consider on the merit to incentivize the Contractor by paying additional 1% of the service contract portion if the number of SC/ST workforce engaged in the contract exceeds 30% of the total deployed strength and 2%, if the strength goes beyond 50%. While the Contractor will assist the workforce so engaged to become self-reliant in meeting the work expectation, the Owner may also volunteer its training resources to the extent possible to improve their employability. The Contractor shall maintain the proper documentation of such category of the workforce engaged and the owner may consider to pay the incentive after its verification.

The Owner may also consider extending price preference of 5% in the bid evaluation for an order value up to Rs.50 Lacs, provided the company is owned by a person from SC/ST community having minimum 50% holding in the company.

32 Vendor rating

You are requested to ensure compliance to the terms of the individual orders with regards to timely delivery, provision of all applicable documents / challans / test certificate, quality of the material etc. Your performance with respect to the said factors will be taken into consideration for future business.

33 Vendor Feedback:

- 33.1 In this dealing Vendors feedback is important for the purchaser to improve its processes. If vendor have to report any grievance, problem or require any clarification, information, vendor is requested to contact purchaser at email ID: CC_CUSTOMERFEEDBACK@tatapower.com
- 33.2 Vendor is requested to ensure compliance to the terms of the individual orders with regards to timely delivery, provision of all applicable documents / challans / test certificate, quality of the material etc. Vendor performance with

respect to the said factors will be taken into consideration for future business.

34 Non-Waiver:

Failure of Purchaser or its representatives to insist upon adherence to any of the terms or conditions incorporated in the Contract or failure or delay to exercise any right or remedies herein or by law accruing, or failure to promptly notify the Vendor in the event of breach or the acceptance of or the payment of any Material(s) hereunder or approval of any design or Material(s) shall not release the Vendor and shall not be deemed a waiver of any right of Purchaser to insist upon the strict performance thereof or of any of its rights or remedies as to any such Material(s) regardless of when the Material(s) are shipped, received or accepted not shall any purported oral modification or revisions of the Contract by Purchaser or its representative(s) act as waiver of the terms hereof.

35 Repeat Order:

Purchaser may place the repeat order for 100% of ordered quantities within a span of 6 months from the date of issue of this Purchase Order & Vendor shall execute it at same rates, terms and conditions.

36 Severability

If any provision of this Contract is invalid, unenforceable or prohibited by law, this Contract shall be considered divisible as to such provision and such provision shall be inoperative and shall not be part of the consideration moving from any Party hereto to the others, and the remainder of this Contract shall be valid, binding and of like effect as though such provision was not included herein.

ESG FRAMEWORK FOR BUSINESS ASSOCIATES

Tata Power's Sustainability philosophy sits at the core of its Business Strategy. Tata Power Sustainability Model has an overarching objective of 'Leadership with care' with key elements of 'Care for the Environment'; 'Care for the Community'; 'Care for our Customers / Partners' and 'Care for our People'. These sustainability objectives encompass the Environmental, Social and Governance objectives driven as integrated elements.

Tata Power, together with its stakeholders is determined to achieve sustainable growth while creating shared value for all.

As a part of future ready roadmap, Tata Power has targeted following as our Environment, Social and Governance priorities:

- Being Carbon Net Zero before 2045
- Growing Clean capacity (80% by 2030)
- Customer centricity
- Becoming water neutral before 2030
- Achieving zero waste to landfill before 2030
- No net loss of biodiversity before 2030
- Positively impacting 80 million lives by 2027

In order to create a sustainable business ecosystem, Tata Power expects that all its Business Associates (BA) which includes its suppliers, vendors, consultants and service providers to align to its ESG and sustainability commitments.

Tata Power encourages improved efficiencies and scaling up of green initiatives through technology and innovation taking us farther on the journey of reducing carbon emissions and preparing the entire eco-system towards products and services that would have net positive impact on the environment and communities that we operate in.

The Vendors/ bidders wishing to associate with Tata Power are expected to share their own sustainability and ESG journey. We at Tata Power promote all Business Associates to have a sustainable procurement policy for their supplier and service providers to contribute to our integrated approach in achieving a sustainable supply chain. The BA is encouraged to carry out the assessment of their sub-contractors and sub-vendors on sustainability readiness so that they are aware of the expectation/ business requirement.

The Vendor/ Bidder shall fill-in the 'Environment, Social and Governance Compliance Screening Questionnaire for Business Associates' attached at Annexure-I and submit the same along with the Bid in Ariba online platform.

Responsible Supply Chain Management:

Tata Power is committed for a cleaner environment and respect of Human rights through its Responsible Supply Chain Management policy.

Tata Power Business Associate (BA) shall comply with all the environment & Human rights related laws, including emission norms, Labour and environmental regulations.

Tata Power encourages its BA to focus on green design, green supply, green production, green logistics and green packaging in performing their business obligations. The BA is expected to abide by the Tata Power Corporate Environment policy, Energy Conservation and Corporate Sustainability Policy (enclosed with this document as Annexure-II).

The BA is expected to:

- Strive towards Conservation of Energy, Water, Resources and optimize transportation of Men & Materials to minimize environmental impact and reduce carbon footprint.
- Carry out the assessment of materials used for construction, operation & maintenance, consumables and accordingly phase out those materials which are environmentally hazardous.
- Be cognizant that diversity in the workplace positively impacts business.
- Promote affirmative action by supporting people from SC/ ST background by engaging workforce from SC/ ST community under the contracts agreed herein.
- Share the commitment of 'No child labour', 'No forced labour', Non-discrimination on the basis of caste, colour, religion, gender, disability, maternity or pregnancy or any other factor unrelated to the requirements of the job
- Pay the wages or remuneration to the workforce, personnel deployed in compliance to all applicable laws and regulations.
- Provide its employees/ deployed labor with an employment environment that is free of physical or psychological harassment.
- Carry out the assessment of their Sub-contractors on their Sustainability Readiness so that they are aware of the above expectation/ standards
- To ensure usage of suitable package material which is more environmentally sustainable. Further the packing material shall be recycled to the extent possible. The material used for packing is expected to suit the mode of transport and to ensure its safe receipt at point of delivery.

Waste Disposal:

The BA is expected to follow best practices for disposal of waste, few of which are listed below:

- Have a detailed project plan that includes the waste management, segregation of all designated waste material (Recyclable/ Non-Recyclable), collecting, storing, disposing and transferring the same to pre-arranged facility/ destination in timely and safe manner as per environmental legislations. The project plan shall also include the innovative construction practice to eliminate or minimize waste, protect surface/ground water, control dust and other emissions to air and control noise.
- Have purchase policy to encourage the procurement of material with recycled and minimum packaging of goods during delivery and appropriate means for site-to-site transportation of materials to avoid damage and litter generation.
- Ensure that the residents living near the site are kept informed about proposed working schedule and timings/ duration of any abnormal noise full activity that is likely to happen.
- Ensure the regular maintenance and monitoring of vehicles and equipment for efficient fuel use so that emissions and noise are within acceptable limits to avoid air pollution.

Water Management:

The BA is expected to follow best practices for water management, few of which include a management and monitoring system for water withdrawals and consumption, procedures to reduce water usage or reuse/recycle water, and pretreatment of wastewater before disposal.

Compliance to Law:

The BA shall adhere to responsible business practices and comply with the provision of all the Statutory Acts Applicable. Special attention of the BA is drawn towards the compliance of provision of the following statutes: (along with the latest amendments/additions, as applicable):

- The Child Labour (Prohibition and Regulation) ACT, 1986.
- The Contract Labour (Regulation and Abolition) ACT, 1970.
- The Employee's Pension Scheme, 1995.
- The Employee's Provident Funds and miscellaneous provisions Act, 1952.
- The Employees State Insurance Act, 1948.
- The Equal Remuneration Act, 1976.
- The Industrial Disputes Act, 1947.
- The Maternity Benefit Act, 1961.
- The Minimum Wages Act, 1948.
- The Payment of Bonus Act, 1965
- The Payment of Gratuity Act, 1972.
- The Payment of Wages Act, 1936.
- The Shops & Establishment Act, 1954.
- The Workmen's Compensation Act, 1923.
- The Employer's Liability Act, 1938.
- and any other applicable statutory act

Social Accountability (SA 8000):

Tata Power expects its BAs to follow guidelines of SA 8000:2014 on the following aspects

- Child Labour
- Forced or Compulsory Labour
- Health & Safety
- Freedom of Association & Right to Collective Bargaining
- Discrimination
- Disciplinary Practices
- Working Hours
- Remuneration
- Management System

Health and Safety

The BA is expected to ensure the health and safety of his and his Sub-contractor's staff and labour. The BA shall, in collaboration with and according to the requirements of the local health authorities, ensure that medical staff, first aid facilities, sick bay and ambulance service are available at the accommodation and on the Site at all times, and that suitable arrangements are made for all necessary welfare and hygiene requirements and for the prevention of epidemics. The BA shall maintain records and make reports concerning health, safety and welfare of persons deployed, and damage to property, as the Owner's Representative may reasonably require. The BA shall be responsible for the medical treatment / hospitalization of his and his Sub-contractor's staff/ labour.

The BA shall appoint a qualified Safety officer at the Site to be responsible for maintaining the safety, and protection against accidents, of all personnel on the Site. Such Safety officer shall have the authority to issue instructions and take protective measures to prevent accidents.

The BA shall comply in toto with the Tata Power's Contractor Safety Terms & Conditions, Health Safety & Environment Manual while working on Tata Power Site/ Services/ Contracts.

Grievance Mechanism

The BA is expected to have grievance procedures that allow stakeholders to anonymously bring environmental and/or work-related violations and/or concerns to the attention of management. In addition, the BA is expected to have procedures for examining reports of environmental and/or work-related violations or concerns and/or privacy complaints.

Data Protection

The BA is expected to have a formal process to address data security or privacy issues.

ANNEXURE-I



Sr. No.	Question Description	Response (Y/N)	Remarks
Organization			
1	Does your Company have Sustainability Policy at Organization Level? If Yes, Please attach		
2	Do you have sustainable procurement policy in place for your own suppliers? If Yes, Please attach		
3	Does your company do regular assessment of its suppliers on ESG parameters?		
4	Are there ESG risks, or negative impacts identified in your supply chain		
Governance			
1	Is diversity taken into consideration when appointing board members/ senior management? Do you have an independent director/s?		
2	Has your company taken initiatives to ensure ethical practices at workplace? Please share the details, Policies etc.		
3	Does your company have a formal process to address data security or privacy issues? Please share the details, Policies etc.		
4	Does your company have grievance mechanism for stakeholder issues and track resolution?		
Environment/ Planet			
1	Does your company have Environmental Policy? If Yes, Please attach		
2	Do you have a formal process for waste management including solid wastes, liquid wastes and hazardous waste?		
3	Does your company track greenhouse gas emission? Also, what percentage of own consumption comes from the renewable energy?		
4	Does your company have a formal process for water management including monitoring of water consumption and withdrawals, and if applicable, pretreatment of wastewater?		
Green Technology/ Innovation			
1	Are your facility/ Product/ Services provided by you is based on green design, green production, green packaging or green logistics considerations? Please elaborate.		
2	Do your products or services have any environmental or social features or benefits (e.g. environmental/energy certification, ecolabels, fair trade certification, etc.)?		
Social/ People			
1	Does you facility/ Company have written personnel policies in place Are you an equal opportunity employer?		
2	Please describe any formal programme / campaign in place to promote company involvement with the community (volunteering, etc.). What is the percentage of profit spend on community activities?		
3	Does your company have a written Health & Safety Policy or Program? If Yes, Please attach		
Certifications: Does your company have following certifications (valid till date-please mention validity)			
1	ISO9001 accreditation		
2	SA8000 or equivalent		
3	ISO 14001 certification		
4	ISO 18001/45001 or equivalent		
5	ISO/IEC 27001 or equivalent		
6	Any Other (Please specify)		

Signature

Business Associate Name

ANNEXURE-II

CORPORATE SUSTAINABILITY POLICY

At Tata Power, our Sustainability Policy integrates economic progress, social responsibility and environmental concerns with the objective of improving quality of life. We believe in integrating our business values and operations to meet the expectations of our customers, employees, partners, investors, communities and public at large

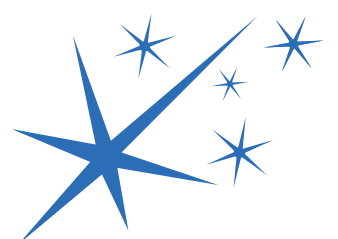
- We will uphold the values of honesty, partnership and fairness in our relationship with stakeholders
- We shall provide and maintain a clean, healthy and safe working environment for employees, customers, partners and the community
- We will strive to consistently enhance our value proposition to the customers and adhere to our promised standards of service delivery
- We will respect the universal declaration of human rights, International Labour Organization's fundamental conventions on core labour standards and operate as an equal opportunities employer
- We shall encourage and support our partners to adopt responsible business policies, Business Ethics and our Code of Conduct Standards
- We will continue to serve our communities:
 - By implementing sustainable Community Development Programmes including through public/private partnerships in and around our area of operations
 - By constantly protecting ecology, maintaining and renewing bio-diversity and wherever necessary conserving and protecting wild life, particularly endangered species
 - By encouraging our employees to serve communities by volunteering and by sharing their skills and expertise
 - By striving to deploy sustainable technologies and processes in all our operations and use scarce natural resources efficiently in our facilities
 - We will also help communities that are affected by natural calamities or untoward incidence, or that are physically challenged in line with the Tata Group's efforts

The management will commit all the necessary resources required to meet the goals of Corporate Sustainability.



(Praveer Sinha)
CEO & Managing Director

Date: 15th June, 2018



Supplier Code of Conduct

Tata Power follows the Tata Code of Conduct (TCoC) and the Whistle blower Policy and expect all its Suppliers to adhere to the same principles. “**Supplier**” here means any business, company, corporation, person or other entity that provides, sells or seeks to sell, any kind of goods or services to Tata Power, including the Supplier’s employees, agents and other representatives.

Tata Code of Conduct- (TCoC): <https://www.tatapower.com/pdf/aboutus/Tata-Code-of-Conduct.pdf>

Whistle Blower Policy: <https://www.tatapower.com/pdf/aboutus/whistle-blower-policy-and-vigil-mechanism.pdf>

Anti-Bribery & Anti-Corruption Policy: <https://www.tatapower.com/pdf/aboutus/abac-policy.pdf>

The suppliers are expected to adhere to the following Do’s and Don’ts:

Do’s

1. The Suppliers shall be committed to supplying products and services of high quality that meet all applicable standards and laws, including product packaging, labelling and after-sales service obligations.
2. Comply with all applicable laws and regulations, both in letter and in spirit, in all the territories in which it operates.
3. Strive to provide a safe, healthy and clean working environment for its employees.
4. Strive for environmental sustainability, particularly with regard to the emission of greenhouse gases, consumption of water and energy and the management of waste and hazardous materials.
5. The Supplier shall represent our company (including Tata brand) only with duly authorised written permission from our company.
6. Safeguard the confidentiality on the use of intellectual property, information and data of the Company.
7. Gifts and hospitality given or received should be modest in value and appropriate as per Company Policy.
8. The assets of Tata Power shall be employed primarily and judiciously for the purpose of conducting the business for which they are duly authorised.
9. All actual or potential conflicts due to financial or any other relationship with a Tata Power employee shall be disclosed.

Don’ts

1. The Supplier shall not make unfair or misleading statements about the products and services of competitors.
2. Children shall not be employed at workplaces.
3. Forced labour shall not be used in any form.
4. The Suppliers shall neither receive nor offer or make, directly or indirectly, any illegal payments, remunerations, gifts, donations or comparable benefits that are intended, or perceived, to obtain uncompetitive favours for the conduct of its business with Tata Power.

Reporting Violations

The Supplier shall notify the Company regarding any known or suspected improper behaviour of other suppliers or employees relating to its dealings with Tata Power, by email to: cecounsellor@tatapower.com. The same can also be raised through our 3rd party ethics helpline facility:

Toll-free Number	1800 267 4065
Email	tatapower@tip-offs.in
Website & Chatbot	www.tatapower.tip-offs.in
Postal address	Attn to: Mr. Puneet Arora, Deloitte Touch Tohmatu India LLP, 6 floor, AIPL Business, Sector 62, Gurugram, Haryana 122102

The Tata Power Company Limited is hereunder referred to as the "Owner" or "Company". The person, firm or company offering the services, the subject of this order is referred to as "Contractor". The subject of this order is hereinafter referred to as the "Work".

"Sub-Contractor" means any person named in the Contract as a Sub-contractor, sub-vendor, manufacturer or supplier for a part of the Works or any person to whom a part of the Works has been subcontracted and the legal successors in title to such Person, but not any assignee of such Person.

The Contract shall mean the contract as derived from the following:

1. Work Order (with 'Commercial Notes' and Annexures to the Work Order referred thereon)
2. Scope of Work.
3. General Terms & Conditions - Service

The documents including all reference document (s) and Annexures forming the Contract are to be read together as a whole and are to be taken as mutually explanatory, provided however, in the event of any inconsistency or discrepancy between the aforementioned documents, the order of precedence in interpretation of the documents shall be as set out above. For the avoidance of doubt, it is clarified that the terms set forth in the Work Order (with 'Commercial Notes' and Annexures to the Work Order referred thereon) shall take precedence over the terms set out in the Scope of Work, which shall in turn take precedence of the terms set out in the General Terms & Conditions – Service.

1. Contractor's obligation:

- 1.1 Contractor warrants that it is a competent, qualified and experienced contractor, equipped, organised and financed to perform and complete the services in the operating area in an efficient and professional manner and capable of meeting all the requirements of the Contract.
- 1.2 The Contractor has the overall responsibility of executing the contract, conducting Planning, Job Scheduling, Maintenance Planning, Maintenance Job Scheduling, executing the Work and maintenance jobs as per the Scope of work & schedule.
- 1.3 Except to the extent that it may be legally or physically impossible or create a hazard to safety, the Contractor shall comply with the Owner's representative(s) instructions and directions on all matters relating to the Work.
- 1.4 Contractor shall at all times have full responsibility for control of the Equipment and for the direction and supervision of operations being carried out under the Contract.
- 1.5 In the performance of the Work, Contractor shall be and act as an independent Contractor fully responsible and accountable for the proper execution of its responsibilities, obligations and

liabilities under this Contract and for its own acts and the acts of its Sub-Contractors and the Personnel. Owner's supervision, examination or inspection of the (performance of the) Work or omission to carry out the same shall not be construed in any manner whatsoever as relieving Contractor from its responsibilities, obligations or liabilities under this Contract.

- 1.6 Contractor shall submit list of tools & tackles with details of make, year of manufacturing, valid certification to the Project Manager/ User for their approval.

Project Manager may during the execution of project inspect & verify that the tools & tackles are as per the qualification requirements approved by him and will have right to seek replacements in case of any discrepancies. The Contractor shall always comply with such directives.

- 1.7 Contractor shall engage Tata Power Skill Development Institute (TPSDI) certified labour force at the site for execution of the job. Requirement & fees for TPSDI certification shall be as per Company Policy.
- 1.8 Contractor shall take full responsibility for the protection and security of Owner's materials and equipment while such materials and equipment are temporarily stored in Contractor's facility or otherwise in Contractor's custody.
- 1.9 All notices, instructions, information, and other communications given by the Contractor to Owner under the Contract shall be given to the Order Manager/ Owner's representative, except as otherwise provided for in this Contract.
- 1.10 The Contractor shall make its own arrangements for movement of personnel and equipment, within and outside the sites / units / offices at the various locations covered by the Contract.
- 1.11 The Contractor shall acquire in its name all permits, approvals, and/or licenses from all local, state, or national government and other statutory authorities and/or public service undertakings that are necessary for the performance of the Contract.
- 1.12 Neither the Contractor nor its personnel shall during the term of this Contract, engage in any business or professional activities in India/abroad which would conflict with the activities assigned to them under this Contract.

2. Service Warranties:

Contractor warrants that all services performed for or on behalf of Owner will be performed in a competent,

workmanlike manner and shall be free from faults and defects. Said warranties shall be in addition to any warranties of additional scope given by Contractor to Owner. None of said warranties and no other implied or express warranties shall be deemed is claimed or excluded unless evidenced by a change notice or revision issued and signed by Owner's authorized representative.

3. Compliance of Local Laws:

Contractor shall be responsible and shall comply with the provision of all the Statutory Acts Applicable. Special attention of the Contractor is drawn towards the compliance of provision of the following statutes: (along with the latest amendments/additions, as applicable):

- a) The Child Labour (Prohibition and Regulation) ACT, 1986.
- b) The Contract Labour (Regulation and Abolition) ACT, 1970.
- c) The Employee's Pension Scheme, 1995.
- d) The Employee's Provident Funds and miscellaneous provisions Act, 1952.
- e) The Employees State Insurance Act, 1948.
- f) The Equal Remuneration Act, 1976.
- g) The Industrial Disputes Act, 1947.
- h) The Maternity Benefit Act, 1961.
- i) The Minimum Wages Act, 1948.
- j) The Payment of Bonus Act, 1965
- k) The Payment of Gratuity Act, 1972.
- l) The Payment of Wages Act, 1936.
- m) The Shops & Establishment Act, 1954.
- n) The Workmen's Compensation Act, 1923.
- o) The Employer's Liability Act, 1938.
- p) and any other applicable statutory act

Site Specific requirements shall be as Annexure at I. The compliance to these Site Specific requirements shall not absolve the Contractor of its obligation to comply with the Owner's Contractor Safety Management Policy.

4. Owner's Obligation:

- 4.1 The order manager (As specified in the 'Commercial Notes') shall have the authority to represent Owner on all day-to-day matters relating to the Contract or arising from the Contract. All notices, instructions, orders, certificates, approvals, and all other communications under the Contract shall be given by the order manager, except as otherwise provided for in this Contract. The order manager may appoint the Engineer-In-Charges for different areas for monitoring the work progress, inspections and signing of bills.

- 4.2 Owner shall ensure the availability of site access, all information and/or data to be arranged/ supplied by Owner to the Contractor for execution of the Work. The terms on which the Contractor shall be allowed access to the site shall be specified by the Owner prior to commencement of the execution of the Work and thereafter shall be governed in accordance with such policies as the Owner may provide in writing to the Contractor from time to time.

5. Contractor's/ Sub-contractor's employees:

- 5.1 The Contractor shall engage appropriately qualified persons to provide the services with the prior approval of Owner. Owner may withhold such approval for any reason whatsoever.
- 5.2 The Contractor hereby represents and warrants that:
 - i) the personnel are duly qualified, and are, and will remain, sufficiently qualified, careful, skilful, diligent and efficient to provide the services to Owner; and
 - ii) the Services will be rendered carefully, skilfully, diligently and efficiently, and to the professional standard reasonably expected by Owner of a contractor qualified and experienced in providing services substantially the same as the Services.
- 5.3 The Contractor must ensure that the Contractor's personnel conduct themselves in a proper manner and comply with the procedures and all policies, regulations and directives of Owner including any occupational, health and safety policies and the relevant prevailing laws and regulations in the Country of operations and specifically in the area where Work is being executed.
- 5.4 Owner may inform the Contractor to immediately remove Contractor's personnel from the relevant premises in the event of misconduct or incompetence on the part of the Personnel. The Contractor shall at all times remain liable for all acts and/or omissions of its Personnel.
- 5.5 It is made clear that no relationship of Owner and employee is created between Owner and the Contractor's resident engineers, employees and no claim for employment of any such personnel shall be tenable or entertained.

6. Title of Property:

- 6.1 Unless otherwise provided in this order or agreed to in writing, property of every description including but not limited to all tooling, tools, equipment and material furnished or made available to Contractor, title to which is

in Owner, and any replacement thereof shall be and remain the property of Owner. Such property other than material shall not be modified without the written consent of Owner. Such property shall be plainly marked or otherwise adequately identified by Contractor as being owned by Owner and shall be safely stored separately and apart from Contractor's property.

- 6.2 Contractor shall not use such property except for performance of work hereunder or as authorized in writing by Owner. Such property while in Contractor's possession or control shall be listed in writing and kept in good condition, shall be held at Contractor's risk, and shall be kept insured by Contractor, at its expense, in an amount equal to the replacement cost with loss payable to Owner. To the extent such property is not material consumed in the performance of this order, it shall be subject to inspection and removal by Owner and Owner shall have the right of entry for such purposes without any additional liability whatsoever to Contractor. As and when directed by Owner, Contractor shall disclose the location of such property, prepare it for shipment and ship it to Owner in as good condition as originally received by Contractor, reasonable wear and tear excepted.

7. Work Completion schedule:

Contractor shall plan and execute the Work in accordance with a detailed schedule mutually agreed upon by the Parties (Owner and Contractor).

8. Contract Price and Payment:

- 8.1 The Contract Price shall be a firm & fixed Contract Value for the Work inclusive of all the taxes, levies & duties and shall remain firm till the validity of this contract.
- 8.2 Unless Specifically stated elsewhere in the contract, the Contractor is solely liable for payment of , and warrants that it will pay, or ensure the payment of all taxes imposed, assessment made in relation to the Work.
- 8.3 An amount as stated in the table below shall be retained towards Contractor's safety performance against every RA bill:

Contract Value	Retention Amount (%)
Upto Rs. 10 lakhs	2.5
Above Rs. 10 lakhs and below Rs. 50 lakhs	2
Above 50 lakhs and upto Rs. 10 Crores	1.5
Above Rs. 10 Crores	1

The above mentioned safety retention shall be over and above any other retentions/ deferred payments as may have been specifically agreed in the Contract.

- 8.4 For Contract Price Rs. 1 crores or above and Contract Completion Schedule 12 months or more, the above safety retention will be released half yearly against the Safety Performance Score (methodology for evaluation enumerated in the Safety Terms & Conditions attached as Appendix to this General Terms & Condition) which will be evaluated by the Order Manager every month. For all other contracts, the above said safety retention shall be released along with the final settlement only at the end of the contract period.
- 8.5 The Owner shall have the right to stop any work which in its opinion is not meeting the safety standards/ guidelines of the Owner and good engineering practice. The Contractor shall not be eligible for and shall not be granted any extension in Completion Schedule due to such stoppage of work by the Owner.
- 8.6 The above retention towards safety shall not absolve the Contractor of its liabilities including statutory liabilities towards safety violations, injury or death (whether by accident or otherwise). An amount between Rs. 5 to 50 lakhs as deemed appropriate by Owner's appointed Committee for incident investigation and/ or as determined by statutory authorities (whichever higher), will be payable by the Contractor in case of such severe incidents of injury leading to loss of property or partial/ permanent disablement (e.g. loss of limb/s, vision etc.) or death.
- 8.7 Notwithstanding anything else stated in the Contract, the Contractor shall be liable for termination without any notice and without recourse to Owner in case of three (3) or more severe safety violations. There shall be no termination fees/ compensation payable to Contractor for such termination.
- 8.8 In case the Contractor achieves 100% on the Safety Performance Score, the Contractor shall be awarded a discretionary bonus of 1% of invoiced value subject to a maximum of Rs. 50 lakhs towards Safety Performance.
- 8.9 Payment shall be released within 60 days of submission of error free invoice with supporting documents duly certified by the Order Manager/ Engineer-in-Charge after deducting taxes at source as prescribed under the applicable law, income – tax or other deductions under the state value added tax laws . If such payment release

day falls on a holiday of Owner, payment will be released on the next working day. Against deduction of statutory taxes, tax deduction certificates where ever applicable shall be issued as per the applicable provisions of the statute. The Order Manager may recover any amount wrongly paid in excess in any previous bills certified by him.

- 8.10 *Mode of Payment:* All payments shall be made direct to the Contractor or his authorized representative in the shape of RTGS or Electronics Transfer method, on certification of the Order Manager/Engineer-in-Charge and on compliance of contractual terms & conditions.

9. **Taxes and Duties:**

- 9.1 The Contract Price shall be inclusive of all taxes, duties, including but not limited to Customs duty, GST or any local taxes, levies imposed by State/Central/Local governments.

- 9.2 Taxes as mentioned in the Contract Price or Price Schedule shall be paid to the contractor subject to the Contractor complying with all the statutory requirements and furnishing the relevant documents including error free invoices containing detailed break up of the taxes.

- 9.3 The tax invoices should contain the details to comply with the GST Law. The supplier shall:

- i) Furnish (electronically) and communicate to the Owner, the details of Goods or Services supplied by the 10th of the month succeeding the said tax period,
- ii) Upon discovery of any discrepancy, rectify it and shall pay the tax and interest thereof,
- iii) Furnish the returns (electronically), for the inward and outward supplies of Goods and/or Services, before the specified dates as per the GST Law,
- iv) Communicate the tax paid, credits etc. as and when credited.
- v) The Invoice should clearly state the description of the goods, quantity, sale price, tax %, and tax amount;
- vi) The Invoice should be signed by an Authorized Signatory.

Bills/Invoices in the name of The Tata Power Company Ltd. with packing lists in triplicate shall be forwarded along with the equipment.

Contractor to furnish GST Registration no. in all invoices as well as Purchaser's (Tata Power's) GST no.

- 9.4 However the payment of tax shall be restricted to the total amount as indicated in the price schedule.

- 9.5 Any statutory variation in duties, levies or taxes if applicable and specified in this Contract till the scheduled date for completion of Work and limited to direct invoices of the Contractor shall be to the account of Owner. The Contractor shall have the obligation to provide the necessary documentary evidence / supporting by way of gazetted notifications etc. to prove the change in such levies or taxes between the due date of submission of the Bid and the scheduled date of completion of work to claim the difference.

- 9.6 The Contractor shall pass on to the Owner all the benefits of either reduction in tax rates, exemptions, concessions, rebate, set off, credits etc. or introduction of new tax rates exemptions, concessions, rebate, set off, credits etc. pertaining to all taxes, duties, imposts, fees and levies in respect of the supplies of Goods or performance of obligations under the contract. This would specifically include reduction of tax rates as a result of statutory changes or judicial rulings.

- 9.7 Any other taxes, levies and duties not mentioned in Contract Price or Price Schedule but applicable as per any statute (s) or introduction (omission) of new taxes, levies and duties shall be deemed to be included in the Contract Price and shall be to the account of the Contractor.

- 9.8 For facilitating availment of a credit, set-off, rebate, drawback or like benefit available to the Owner, the Contractor will facilitate the Owner by providing the necessary documentary and/or procedural support. In any process of assessment or re-assessment, of taxes payable by the Owner,

- 9.9 The Contractor shall bear and pay all the costs, liabilities, levies, interest, penalties in respect of non-compliances of any legal requirements as per various statutory provisions. The contractor shall keep the owner indemnified at all times from any tax liability, interest, penalties or assessments that may be imposed by the statutory authorities for non-compliances or non-observation of any statutory requirements by the Contractor.

- 9.10 All formalities required under statutes, for availing any concessions under relevant tax laws shall be adhered to by the Contractor.

- 9.11 Deduction at source: Recovery at source towards income tax calculated at the rate prescribed from time to time under the Income Tax Act 1961 and other relevant sections of Income Tax Act shall be made from the bills of the Contractor and the amount so recovered shall be

deposited with the Income Tax Department. Necessary TDS certificate to this effect will be issued to the Contractor in the prescribed proforma.

- 9.12 If any other taxes / duties / cess etc are to be recovered at source as per government regulations / Legislation from time to time, the same shall be recovered from the bills payable to the Contractor. Necessary receipt to this effect will be issued to the Contractor in this regard as per the applicable legislation.

10. Contract Performance Guarantees (If applicable)

The Contractor shall within 15 days of issuance of this Order/Contract furnish an unconditional irrevocable bank guarantee duly stamped, strictly as per the prescribed format of Owner from any nationalized bank or any scheduled bank having a branch in Mumbai and approved by the Owner for a sum equivalent to 10% of the Total Contract Price valid for the Contract Period and with a claim period of not less than 6 months from the completion of Contract Period. The issuing bank should be advised to send a direct confirmation of issue of bank guarantee to Owner.

In case the Contractor fails to furnish the requisite Bank Guarantee as stipulated above, then the Owner shall have the option to cancel the Contract besides other contractual remedies.

11. Price Reduction:

- 11.1 In case the Contractor fails to deliver the service/ Complete the work as per the agreed Completion Schedule including intermediate milestones (if applicable), the Owner shall recover from Contractor, as ascertained and agreed Liquidated Damages, and not by way of penalty, a sum equivalent to 1% of the Contract Value per week of delay. The Liquidated Damages referred above may be recovered by the Owner as set off against any amounts payable by the Owner to the Contractor or in any other manner in accordance with applicable laws.

- 11.2 The overall cap on liquidated damages shall be limited to 10% of the Contract Price.

12. Insurance

- 12.1 The Contractor agrees to indemnify and protect Owner against all liability, claims or demands for injuries or damages to any person or property growing out of the performance of this order/ Contract.
- 12.2 The Contractor further agrees to furnish evidence of insurance showing that Contractor has and will maintain adequate insurance coverage during the life of this Contract/ order in the opinion of Owner, including but not

limited to comprehensive general liability insurance. Such evidence of insurance must set forth the name of the insurer, policy number, expiration date, and limits of liability. Compliance by Contractor with insurance requirements does not in any way affect Contractor's indemnification of Owner under Indemnification clause

13. Indemnification:

The Contractor shall indemnify, save harmless and defend the Owner and keep the Owner indemnified from and against any and all claims, costs, liabilities (financial), litigations, compensations, judgments, expenses or damages (including attorney's fees and other related expenses) arising out of any breach or alleged breach of any of the conditions of this Contract including compliance to statutory laws of provisioned under clause 3, performance of the obligations hereunder, or any representation or misrepresentation made by the Contractor or by any third party in respect of death or bodily injury or in respect to loss or damage to any property with regard to the subject of this Contract.

14. Indemnity against IPR:

The equipment, system, drawings, and other materials that shall be supplied against the Contract will become the Owner's property. Without limitation of any liability of whatsoever nature, the Owner shall be indemnified and kept indemnified against any claim for infringement or breach of any of the statutes, rules & regulations by the use of or sale of any article or material supplied by the Contractor. The indemnity shall include any infringement of patent, trade mark, design, copyright or other property rights whether in Country of Origin, or elsewhere resulting from the Contractor's design, manufacture, use, supply or re-supply & would also cover use or sale of any article or material supplied by the Contractor to the Owner under the Contract. The Indemnity shall cover any claim/action taken by a third party either directly against the Owner or any claim/action made against the Contractor & where under the Purchaser is made liable. The Indemnity shall be for losses, damages, and costs including litigation costs, attorney fees etc incurred by the Owner in relation to the Contract.

15. Free Issue Material:

Wherever contracts envisage supply of Free Issue Material (FIM) by the Owner to the contractor for fabrication/ use in service performance, such Free Issue Material shall be safeguarded by an insurance policy to be provided by the Contractor at his own cost for the full value of such materials and the insurance policy shall cover the following risks specifically and shall be valid for six months beyond the Contract Validity date :

RISKS TO BE COVERED: Any loss or damage to the Owner's materials due to fire, theft, riot, burglary,

strike, civil commotion, terrorist act, natural calamities etc. and any loss or damage arising out of any other causes such as other materials falling on Owner's materials.

The amount for which insurance policy is to be furnished shall be indicated in the respective Contract.

Free Issue material (FIM) will be issued to the Contractor only after receipt of the Insurance Policy from the Contractor. The contractor shall arrange collection of the FIM from the Owner's premises and safe transportation of the same to his premises at his risk and cost. Notwithstanding the insurance cover taken out by the Contractor as above, the Contractor shall indemnify the Owner and keep the Owner indemnified to the extent of the value of free issue materials to be issued till such time the entire contract is executed and proper account for the free issue materials is rendered and the left over/surplus and scrap items are returned to the Owner. The contractor shall not utilize the Owner's free issue materials for any job other than the one contracted out in this case and also not indulge in any act, commission or negligence which will cause/result in any loss/damage to the Owner and in which case, the Contractor shall be liable to the Owner to pay compensation to the full extent of damage/loss. The Contractor, shall be responsible for the safety of the free issue materials after these are received by them and all through the period during which the materials remain in their possession/control/custody. The Free issue materials on receipt at the Contractor's works shall be inspected by them for ensuring safe and correct receipt of the material. The contractor shall report the discrepancies, if any, to the Owner within 5 days from the date of receipt of the material. The contractor shall take all necessary precautions against any loss, deterioration, damage or destruction of the FIMs from whatever cause arising while the said materials remain in their possession/custody or control. The free issue materials shall be inspected periodically at regular intervals by the Contractor for ensuring safe preservation and storage, the Contractor, shall also not mix up the materials in question with any other goods and shall render true and proper account of the materials actually used and return balance remaining unused material on hand and scrap along with the final product and if it is not possible within a period of one month from the date of delivery of the final product/ completion of Service covered by this Contract. The Contractor shall also indemnify the Owner to compensate the difference in cost between the actual cost of the free issue material lost/damaged and the claim settled to the Owner by the insurance company.

16. Relation between parties:

The Contract shall be entered into on a principal-to-principal basis only. The Contract shall not be construed as a partnership or an association of persons. There is no agent and principal relationship between the parties. Each party shall be responsible for its own conduct. The Contractor shall ensure at all times that all the work carried out under this contract

either by its own person or through any of its sub-Vendors shall be always done under its own direct supervision.

17. Safety:

Contractor shall comply with all legal and statutory provisions including all rules and regulations pertaining to Safety, Health and the Environment and will be responsible for all legal liabilities arising due to any of their acts or of their personnel.

The Contractor shall comply with the Owner's Contractor Safety Policy and Safety Terms and Conditions. Any misconduct and/ or violation with respect to the Owner's Contractor Safety Policy and Safety Terms and Conditions or any other legal and statutory provisions pertaining to Safety, Health and Environment shall be dealt with as per the Safety Terms and Conditions.

Prior to commencement of any work at site Contractor shall submit an undertaking in writing to adhere to and comply with all the provisions of Owner's Contractor Safety Code of Conduct.

The Contractor shall have a valid ISO 14001/ OHSAS certification. In absence of the same, the Contractor shall obtain the same within 6 months from the date of the Effective Date of Contract.

18. Suspension of Work

Owner may instruct Contractor at any time to suspend performance of the Work or any part thereof with a notice of 7 days for whatever reason. Provided Contractor is not in default under this Contract subject to Articles 1 and 5 inclusive, the Contractor shall be paid a mutually agreed fee, if any, necessarily incurred by Contractor as a direct consequence thereof of suspension and the Project Completion Schedule may be revised accordingly.

Without prejudice to any other rights Owner may have under this Contract or at law if Contractor is in default under this Contract, Owner may instruct Contractor to suspend performance of the Work or any part thereof by giving 7 days notice till such default has been corrected to the satisfaction of Owner. Also Liquidated Damages in accordance with Clause 11 shall continue to be applicable during such period until the default is cured. The costs incurred by the Contractor for such correction shall be to the Contractor's account, and furthermore no payment shall become due to the Contractor. Any cost incurred due to non - performance of the Contractor by the Owner shall be charged to the Contractor.

19. Change Management:

Owner shall have the right at any time to order any change in the Work in accordance with the following procedure. Contractor shall furnish to Owner upon request as soon as reasonably possible but no later

than five (5) days following the request, a written statement specifying:

- (a) the increase or decrease, as the case may be, in the costs of the Work which will result from a change in the Work as requested by Owner,
- (b) any effect such change in the Work may have on any other provision of this Contract originating from either parties, and
- (c) such other details as Owner may require.

Any change in costs shall be reasonably related to the proportional change in the Work and any other costs incurred by Contractor. If Owner agrees to Contractor's statement Owner shall notify Contractor thereof in writing in the form of a change order, whereupon the change in the Work shall be incorporated in the Work and immediately implemented. In the event that the change relates to a reduction in Work, the work in question shall not be undertaken pending the issue of an appropriate Change Order.

20. Governing Laws

This Contract shall be construed in accordance with and governed by the Laws of India without giving effect to any principle of conflict of law.

21. Jurisdiction

This Contract and the transaction contemplated herein shall be subject to the exclusive jurisdiction of the competent Courts in Mumbai only.

22. Dispute settlement:

Dispute or differences arising out or relating to this Order shall be resolved amicably by the parties. Failing such amicable resolution of dispute / differences either party may refer the matter to arbitration of a Sole Arbitrator to be appointed jointly by both the parties. The award of the Arbitrator shall be final, binding and conclusive on the parties. The venue for arbitration shall be Mumbai. The Arbitration proceedings will be governed and regulated by the provisions of Indian Arbitration and Conciliation Act, 1996 as amended from time to time and the rules framed there under.

23. Force majeure:

- 23.1 In the event of either party being rendered unable by force majeure to perform any obligation required to be performed by it under this Contract the relative obligation of the party affected by such force majeure shall, after notice under this articles be suspended for the period during which such cause lasts. The term 'Force Majeure' as employed herein shall mean acts of God, wars (declared or undeclared), riots or civil commotion, fire, floods, and acts and regulations of the Government of India or State Government or any of the statutory agencies. Both the party

shall pay to the other party, the amount payable upon the date of the occurrence of such force majeure.

- 23.2 Upon the occurrence of such cause and upon its termination, the party alleging that it has been rendered unable as aforesaid, thereby shall notify the other party in writing immediately but not later than twenty four (24) hours of the alleged beginning and ending thereof giving full particulars and satisfactory evidence in support of the claims.

- 23.3 During the period, the obligations of the parties are suspended by force majeure; the contractor shall not be entitled to payment of any rate.

- 23.4 In the event of the force majeure conditions continuing or reasonably expected to continue for a period more than thirty (30) days, Owner shall have the option of terminating the contract by giving seven (7) days notice thereof to the contractor.

24. Sub letting and Assignment

The contractor shall not, without prior consent in writing of the Owner, sublet, transfer or assign the contract or any part thereof or interest therein or benefit or advantage thereof in any manner whatsoever, provided nevertheless that any such consent shall not relieve the contractor from any obligation, duty or responsibility under the contract.

25. Limitation of Liability:

Notwithstanding anything contained in the Contract, the Contractor's aggregate liability under this Contract shall be limited 100% of the Total Contract value. This shall exclude liability arising pursuant to clause 3- Compliance to Local Laws, clause 9.10, clause 14- Indemnity against IPR, clause 13- Indemnity, clause 26 – Confidentiality, liability arising due to loss of or damage to the Free Issue Material (FIM) issued by Owner to Contractor for completion of the Work and liability arising due to wilful misconduct, gross negligence, third party claims and corrupt acts attributable to the Contractor.

26. Confidentiality:

The Contractor shall use the Confidential Information of the Owner only in furtherance of this Contract and shall not transfer or otherwise disclose the Confidential Information to any third party. The Contractor shall (i) give access to such Confidential Information solely to those employees with a need to have access thereto; and (ii) take the same security precautions to protect against disclosure or unauthorized use of such Confidential Information that the party takes with its own confidential information but, in no event, shall a party apply less than a reasonable standard of care to prevent such disclosure or unauthorized use.

27. Termination:

27.1 The Contract shall be deemed to be terminated on completion of the Contract period.

27.2 Termination of default by Contractor:
Owner may terminate the contract at any time if the Contractor fails to carry out any of his obligations under this Contract. Prior to termination, the Contractor shall be advised in writing of the causes of unsatisfactory performance to be improved upon 15 days of the receipt of notice. In case, if the Contractor fails to bring about the improvement to the satisfaction of the Owner, then the Contract shall be terminated.

27.3 Without prejudice to the rights and remedies available to Owner, Owner may terminate the Contract or part thereof with immediate effect with written notice to the Contractor if:

27.3.1 The Contractor becomes bankrupt or goes into liquidation.

27.3.2 The Contractor makes a general assignment for the benefit of creditors.

27.3.3 A receiver is appointed for any substantial property owned by the Contractor.

27.3.4 The Contractor is in breach of any representation or warranty made to the Owner by the Contractor.

The Contractor shall not be entitled to any further payment under the Contract if the Contract is terminated. If the order is terminated under clause 27.2 and 27.3, the Contractor shall not be entitled to any further payment, except that, if Owner completes the Work and the costs of completion are less than the Contract Price, the Owner shall pay Contractor an amount properly allocable to services fully performed by Contractor prior to termination for which payment was not made to Contractor. In case, the cost of completion of Work exceeds the Contract Price, the additional cost incurred by Owner for such completion shall be paid by the Contractor.

27.4 Owner shall be entitled to terminate the Contract at its convenience, at any time by giving thirty (30) Days prior notice to the Contractor. Such notice of termination shall specify that termination is for Companies convenience and the date upon which such termination becomes effective. Upon receipt of such notice, the Contractor shall proceed as follows:

27.4.1 cease all further work, except for such work as may be necessary and instructed by the Owner/ Owner's representative for the purpose of preserving and protecting Work already in progress and protect

materials, facilities and equipment on the Work Site or in transit;

27.4.2 stop all further sub-contracting or purchasing activity, and terminate Sub-contracts;

27.4.3 handover all Documents, equipment, materials and spares relating to the portion of Work already executed by the Contractor or procured from other sources up to the date of termination for which the Contractor has received payment equivalent to the value thereof; and

27.4.4 handover those parts of the supplies manufactured/ work executed by the Contractor up to the date of termination.

Upon termination pursuant to clause 27.4, the Contractor shall be entitled to be paid (a) all sums properly due to the Contractor under the Contract up to the date of termination; and (b) any direct and substantiated charges already incurred or committed for cancellation of the procurement of third party goods or services which were to have been supplied by the Contractor in connection with this Contract provided that the Contractor shall use its best endeavours to minimise such charges

25.5 The Contractor shall not be released from any of his obligations or liabilities accrued under the Contract on termination. For the avoidance of doubt, the termination of the Contract in accordance with this clause shall neither relieve the Contractor of his accrued obligations for Warranty or his accrued liability to pay (liquidated) damages for Delay nor shall entitle him to reduce the value of Performance Security.

28. Consequential Damages:

Unless otherwise specified, neither Party shall be responsible for and nor shall be liable to the other Party for indirect/consequential losses and damages suffered by such Party including for loss of use, loss of profit whether such liability or claims are based upon any negligence on the part of the other Party or its employees in connection with the performance of the Contract.

29. Environment / ISO 14001 Certification:

The Contractor to confirm whether their organization is ISO 14001 certified. If not, the Contractor must certify that the handling, use and disposal of their product / by-products conform to practices consistent with sound environmental management and local statutes. The Contractor shall ensure that all the wastes are disposed in environmental friendly way with strict compliance to applicable laws including adherence to MoEF guidelines with respect to disposal of batteries, lead waste, copper cables, ash, waste oil, e-waste etc which shall be disposed through MoEF approved

parties only. The Contractor shall also be responsible to collect and recycle all the e-waste generated at the end of the product life cycle at its own costs and risks as per the MoEF guidelines/orders.

30. Non-Exclusive Agreement

This Contract is non-exclusive and Owner reserves the right to engage other contractors to perform similar or identical work. Contractor shall accord such other contractors adequate opportunity to carry out their contracts and shall accomplish the Work in co-operation with those contractors and with Owner, in accordance with such instructions as may be issued by the Owner from time to time.

31. Severability

In the event that any of the provisions, or portions or applications thereof, of this Contract are held to be unenforceable or invalid by any court or arbitration panel of competent jurisdiction, Contractor and Owner shall negotiate an equitable adjustment to the provisions of the Contract with a view towards effecting the purpose of the Contract and the validity and enforceability of the remaining provisions, or portions or applications thereof, shall not be affected thereby.

32. Housekeeping & Removal of scrap:

The Contractor shall be responsible for keeping the areas of his work at site, neat and tidy throughout the period of his work. All excess material/ spares/ consumables taken by Contractor, as well as the scrapped items and wooden logs/ crates/ planks shall be returned, from time to time, to the Stores, and transported/ unloaded by Contractor's personnel at the place shown by Order Manager/Engineer-in charge.

The Contractor shall so arrange that all the scrap generated during the progress of his work, is separated into two categories, viz.

- i) Saleable scrap like steel, copper or other metals, etc., and,
- ii) Others, which have nil or negligible resale value, like insulation material, jute, debris, etc. (or as directed by the Order Manager/Engineer-in charge).

The saleable scrap shall be shifted to and unloaded at a central place as per directions of the Stores-in charge, while the other scraps shall be shifted to other locations as per directions from Order Manager/Engineer-in Charge, or as per terms of the order.

The Contractor shall arrange to remove the scrap on regular basis, or even on daily basis, depending upon the requirement, to keep the area around his workplace neat and tidy. In case, it is observed that the

Contractor is not carrying out regular cleaning of his areas of work, or, is not returning the excess materials/ scrap, etc., to the Stores, Owner reserves the right to arrange the same through other sources, and back-charge the Contractor the cost of doing so, along-with overheads, by deducting the amount from Contractor's bills.

Contractor's final bill will be cleared by Owner only after confirming that proper clearing of his areas of work has been completed by the Contractor, and same is certified by the Order Manager/ Engineer in-charge

33. Tata Code of Conduct

The Owner abides by the Tata Code of Conduct in all its dealing with stake holders and the same shall be binding on the Owner and the Contractor for dealings under this Order/ Contract. A copy of the Tata Code of Conduct is available at our website: <http://www.tatapower.com/aboutus/code-of-conduct.aspx>. The Contractor is requested to bring any concerns regarding this to the notice of our Chief Ethics Officer on the e-mail ID: cecounsellor@tatapower.com.

34. Responsible Supply Chain Management:

The Owner is committed for a cleaner environment and respect of Human rights through its Responsible Supply Chain Management policy. The Contractor is required to comply with all the environment & Human rights related laws, including emission norms, Labour and environmental regulations. The Owner encourages its Vendors/ Contractors/ Business partners to pay more attention to green design, green supply, green production, green logistics and green packaging in performing their business obligations.

The Contractor is required to abide by the Tata Power Corporate Environment policy, Energy Conservation and Corporate Sustainability Policy.

A copy of the Responsible Supply Chain Policy along with Environment policy, Energy Conservation policy, Sustainability policy, Health & Safety policy and Human Rights policy is available at website: <http://www.tatapower.com/sustainability/policies.aspx>.

Contractor/Bidder is required to completely fill the attached "Supplier Sustainability Questionnaire" in support of their Green Supply Chain Management initiatives and submit the same with their offer.

The Owner recognizes that diversity in the workplace positively impacts business. The Owner is committed to help people from SC/ST background either by helping them to become entrepreneurs or by engaging workforce from SC/ST community under the contracts agreed herein. To encourage engaging SC/ST community, the owner may consider on the merit to incentivize the Contractor by paying additional 1% of

the service contract portion if the number of SC/ST workforce engaged in the contract exceeds 30% of the total deployed strength and 2%, if the strength goes beyond 50%. While the Contractor will assist the workforce so engaged to become self-reliant in meeting the work expectation, the Owner may also volunteer its training resources to the extent possible to improve their employability. The Contractor shall maintain the proper documentation of such category of the workforce engaged and the owner may consider to pay the incentive after its verification.

The Owner may also consider extending price preference of 5% in the bid evaluation for an order value up to Rs.50 Lacs, provided the company is owned by a person from SC/ST community having minimum 50% holding in the company.

such Material(s) regardless of when the Material(s) are shipped, received or accepted not shall any purported oral modification or revisions of the Contract by Owner or its representative(s) act as waiver of the terms hereof.

35. Vendor rating:

You are requested to ensure compliance to the terms of the individual orders with regards to timely delivery, provision of all applicable documents / challans / test certificate, quality of the material etc. Your performance with respect to the said factors will be taken into consideration for future business.

36. Vendor Feedback:

34.1 In this dealing Vendors feedback is important for the purchaser to improve its processes. If Contractor have to report any grievance, problem or require any clarification, information, Contractor is requested to contact purchaser at email ID:

CC_CUSTOMERFEEDBACK@tatapower.com

34.2 Contractor is requested to ensure compliance to the terms of the individual orders with regards to timely delivery, provision of all applicable documents / challans / test certificate, quality of the material etc. Contractor performance with respect to the said factors will be taken into consideration for future business.

37. Non-Waiver:

Failure of Owner or its representatives to insist upon adherence to any of the terms or conditions incorporated in the Contract or failure or delay to exercise any right or remedies herein or by law accruing, or failure to promptly notify the Contractor in the event of breach or the acceptance of or the payment of any Material(s) hereunder or approval of any design or Material(s) shall not release the Contractor and shall not be deemed a waiver of any right of Owner to insist upon the strict performance thereof or of any of its rights or remedies as to any

ESG FRAMEWORK FOR BUSINESS ASSOCIATES

Tata Power's Sustainability philosophy sits at the core of its Business Strategy. Tata Power Sustainability Model has an overarching objective of 'Leadership with care' with key elements of 'Care for the Environment'; 'Care for the Community'; 'Care for our Customers / Partners' and 'Care for our People'. These sustainability objectives encompass the Environmental, Social and Governance objectives driven as integrated elements.

Tata Power, together with its stakeholders is determined to achieve sustainable growth while creating shared value for all.

As a part of future ready roadmap, Tata Power has targeted following as our Environment, Social and Governance priorities:

- Being Carbon Net Zero before 2045
- Growing Clean capacity (80% by 2030)
- Customer centricity
- Becoming water neutral before 2030
- Achieving zero waste to landfill before 2030
- No net loss of biodiversity before 2030
- Positively impacting 80 million lives by 2027

In order to create a sustainable business ecosystem, Tata Power expects that all its Business Associates (BA) which includes its suppliers, vendors, consultants and service providers to align to its ESG and sustainability commitments.

Tata Power encourages improved efficiencies and scaling up of green initiatives through technology and innovation taking us farther on the journey of reducing carbon emissions and preparing the entire eco-system towards products and services that would have net positive impact on the environment and communities that we operate in.

The Vendors/ bidders wishing to associate with Tata Power are expected to share their own sustainability and ESG journey. We at Tata Power promote all Business Associates to have a sustainable procurement policy for their supplier and service providers to contribute to our integrated approach in achieving a sustainable supply chain. The BA is encouraged to carry out the assessment of their sub-contractors and sub-vendors on sustainability readiness so that they are aware of the expectation/ business requirement.

The Vendor/ Bidder shall fill-in the 'Environment, Social and Governance Compliance Screening Questionnaire for Business Associates' attached at Annexure-I and submit the same along with the Bid in Ariba online platform.

Responsible Supply Chain Management:

Tata Power is committed for a cleaner environment and respect of Human rights through its Responsible Supply Chain Management policy.

Tata Power Business Associate (BA) shall comply with all the environment & Human rights related laws, including emission norms, Labour and environmental regulations.

Tata Power encourages its BA to focus on green design, green supply, green production, green logistics and green packaging in performing their business obligations. The BA is expected to abide by the Tata Power Corporate Environment policy, Energy Conservation and Corporate Sustainability Policy (enclosed with this document as Annexure-II).

The BA is expected to:

- Strive towards Conservation of Energy, Water, Resources and optimize transportation of Men & Materials to minimize environmental impact and reduce carbon footprint.
- Carry out the assessment of materials used for construction, operation & maintenance, consumables and accordingly phase out those materials which are environmentally hazardous.
- Be cognizant that diversity in the workplace positively impacts business.
- Promote affirmative action by supporting people from SC/ ST background by engaging workforce from SC/ ST community under the contracts agreed herein.
- Share the commitment of 'No child labour', 'No forced labour', Non-discrimination on the basis of caste, colour, religion, gender, disability, maternity or pregnancy or any other factor unrelated to the requirements of the job
- Pay the wages or remuneration to the workforce, personnel deployed in compliance to all applicable laws and regulations.
- Provide its employees/ deployed labor with an employment environment that is free of physical or psychological harassment.
- Carry out the assessment of their Sub-contractors on their Sustainability Readiness so that they are aware of the above expectation/ standards
- To ensure usage of suitable package material which is more environmentally sustainable. Further the packing material shall be recycled to the extent possible. The material used for packing is expected to suit the mode of transport and to ensure its safe receipt at point of delivery.

Waste Disposal:

The BA is expected to follow best practices for disposal of waste, few of which are listed below:

- Have a detailed project plan that includes the waste management, segregation of all designated waste material (Recyclable/ Non-Recyclable), collecting, storing, disposing and transferring the same to pre-arranged facility/ destination in timely and safe manner as per environmental legislations. The project plan shall also include the innovative construction practice to eliminate or minimize waste, protect surface/ground water, control dust and other emissions to air and control noise.
- Have purchase policy to encourage the procurement of material with recycled and minimum packaging of goods during delivery and appropriate means for site-to-site transportation of materials to avoid damage and litter generation.
- Ensure that the residents living near the site are kept informed about proposed working schedule and timings/ duration of any abnormal noise full activity that is likely to happen.
- Ensure the regular maintenance and monitoring of vehicles and equipment for efficient fuel use so that emissions and noise are within acceptable limits to avoid air pollution.

Water Management:

The BA is expected to follow best practices for water management, few of which include a management and monitoring system for water withdrawals and consumption, procedures to reduce water usage or reuse/recycle water, and pretreatment of wastewater before disposal.

Compliance to Law:

The BA shall adhere to responsible business practices and comply with the provision of all the Statutory Acts Applicable. Special attention of the BA is drawn towards the compliance of provision of the following statutes: (along with the latest amendments/additions, as applicable):

- The Child Labour (Prohibition and Regulation) ACT, 1986.
- The Contract Labour (Regulation and Abolition) ACT, 1970.
- The Employee's Pension Scheme, 1995.
- The Employee's Provident Funds and miscellaneous provisions Act, 1952.
- The Employees State Insurance Act, 1948.
- The Equal Remuneration Act, 1976.
- The Industrial Disputes Act, 1947.
- The Maternity Benefit Act, 1961.
- The Minimum Wages Act, 1948.
- The Payment of Bonus Act, 1965
- The Payment of Gratuity Act, 1972.
- The Payment of Wages Act, 1936.
- The Shops & Establishment Act, 1954.
- The Workmen's Compensation Act, 1923.
- The Employer's Liability Act, 1938.
- and any other applicable statutory act

Social Accountability (SA 8000):

Tata Power expects its BAs to follow guidelines of SA 8000:2014 on the following aspects

- Child Labour
- Forced or Compulsory Labour
- Health & Safety
- Freedom of Association & Right to Collective Bargaining
- Discrimination
- Disciplinary Practices
- Working Hours
- Remuneration
- Management System

Health and Safety

The BA is expected to ensure the health and safety of his and his Sub-contractor's staff and labour. The BA shall, in collaboration with and according to the requirements of the local health authorities, ensure that medical staff, first aid facilities, sick bay and ambulance service are available at the accommodation and on the Site at all times, and that suitable arrangements are made for all necessary welfare and hygiene requirements and for the prevention of epidemics. The BA shall maintain records and make reports concerning health, safety and welfare of persons deployed, and damage to property, as the Owner's Representative may reasonably require. The BA shall be responsible for the medical treatment / hospitalization of his and his Sub-contractor's staff/ labour.

The BA shall appoint a qualified Safety officer at the Site to be responsible for maintaining the safety, and protection against accidents, of all personnel on the Site. Such Safety officer shall have the authority to issue instructions and take protective measures to prevent accidents.

The BA shall comply in toto with the Tata Power's Contractor Safety Terms & Conditions, Health Safety & Environment Manual while working on Tata Power Site/ Services/ Contracts.

Grievance Mechanism

The BA is expected to have grievance procedures that allow stakeholders to anonymously bring environmental and/or work-related violations and/or concerns to the attention of management. In addition, the BA is expected to have procedures for examining reports of environmental and/or work-related violations or concerns and/or privacy complaints.

Data Protection

The BA is expected to have a formal process to address data security or privacy issues.

ANNEXURE-I



Sr. No.	Question Description	Response (Y/N)	Remarks
Organization			
1	Does your Company have Sustainability Policy at Organization Level? If Yes, Please attach		
2	Do you have sustainable procurement policy in place for your own suppliers? If Yes, Please attach		
3	Does your company do regular assessment of its suppliers on ESG parameters?		
4	Are there ESG risks, or negative impacts identified in your supply chain		
Governance			
1	Is diversity taken into consideration when appointing board members/ senior management? Do you have an independent director/s?		
2	Has your company taken initiatives to ensure ethical practices at workplace? Please share the details, Policies etc.		
3	Does your company have a formal process to address data security or privacy issues? Please share the details, Policies etc.		
4	Does your company have grievance mechanism for stakeholder issues and track resolution?		
Environment/ Planet			
1	Does your company have Environmental Policy? If Yes, Please attach		
2	Do you have a formal process for waste management including solid wastes, liquid wastes and hazardous waste?		
3	Does your company track greenhouse gas emission? Also, what percentage of own consumption comes from the renewable energy?		
4	Does your company have a formal process for water management including monitoring of water consumption and withdrawals, and if applicable, pretreatment of wastewater?		
Green Technology/ Innovation			
1	Are your facility/ Product/ Services provided by you is based on green design, green production, green packaging or green logistics considerations? Please elaborate.		
2	Do your products or services have any environmental or social features or benefits (e.g. environmental/energy certification, ecolabels, fair trade certification, etc.)?		
Social/ People			
1	Does you facility/ Company have written personnel policies in place Are you an equal opportunity employer?		
2	Please describe any formal programme / campaign in place to promote company involvement with the community (volunteering, etc.). What is the percentage of profit spend on community activities?		
3	Does your company have a written Health & Safety Policy or Program? If Yes, Please attach		
Certifications: Does your company have following certifications (valid till date-please mention validity)			
1	ISO9001 accreditation		
2	SA8000 or equivalent		
3	ISO 14001 certification		
4	ISO 18001/45001 or equivalent		
5	ISO/IEC 27001 or equivalent		
6	Any Other (Please specify)		

Signature

Business Associate Name

ANNEXURE-II

CORPORATE SUSTAINABILITY POLICY

At Tata Power, our Sustainability Policy integrates economic progress, social responsibility and environmental concerns with the objective of improving quality of life. We believe in integrating our business values and operations to meet the expectations of our customers, employees, partners, investors, communities and public at large

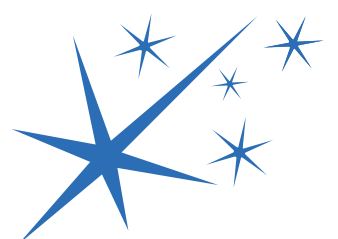
- We will uphold the values of honesty, partnership and fairness in our relationship with stakeholders
- We shall provide and maintain a clean, healthy and safe working environment for employees, customers, partners and the community
- We will strive to consistently enhance our value proposition to the customers and adhere to our promised standards of service delivery
- We will respect the universal declaration of human rights, International Labour Organization's fundamental conventions on core labour standards and operate as an equal opportunities employer
- We shall encourage and support our partners to adopt responsible business policies, Business Ethics and our Code of Conduct Standards
- We will continue to serve our communities:
 - By implementing sustainable Community Development Programmes including through public/private partnerships in and around our area of operations
 - By constantly protecting ecology, maintaining and renewing bio-diversity and wherever necessary conserving and protecting wild life, particularly endangered species
 - By encouraging our employees to serve communities by volunteering and by sharing their skills and expertise
 - By striving to deploy sustainable technologies and processes in all our operations and use scarce natural resources efficiently in our facilities
 - We will also help communities that are affected by natural calamities or untoward incidence, or that are physically challenged in line with the Tata Group's efforts

The management will commit all the necessary resources required to meet the goals of Corporate Sustainability.



(Praveer Sinha)
CEO & Managing Director

Date: 15th June, 2018



Supplier Code of Conduct

Tata Power follows the Tata Code of Conduct (TCoC) and the Whistle blower Policy and expect all its Suppliers to adhere to the same principles. “**Supplier**” here means any business, company, corporation, person or other entity that provides, sells or seeks to sell, any kind of goods or services to Tata Power, including the Supplier’s employees, agents and other representatives.

Tata Code of Conduct- (TCoC): <https://www.tatapower.com/pdf/aboutus/Tata-Code-of-Conduct.pdf>

Whistle Blower Policy: <https://www.tatapower.com/pdf/aboutus/whistle-blower-policy-and-vigil-mechanism.pdf>

Anti-Bribery & Anti-Corruption Policy: <https://www.tatapower.com/pdf/aboutus/abac-policy.pdf>

The suppliers are expected to adhere to the following Do’s and Don’ts:

Do’s

1. The Suppliers shall be committed to supplying products and services of high quality that meet all applicable standards and laws, including product packaging, labelling and after-sales service obligations.
2. Comply with all applicable laws and regulations, both in letter and in spirit, in all the territories in which it operates.
3. Strive to provide a safe, healthy and clean working environment for its employees.
4. Strive for environmental sustainability, particularly with regard to the emission of greenhouse gases, consumption of water and energy and the management of waste and hazardous materials.
5. The Supplier shall represent our company (including Tata brand) only with duly authorised written permission from our company.
6. Safeguard the confidentiality on the use of intellectual property, information and data of the Company.
7. Gifts and hospitality given or received should be modest in value and appropriate as per Company Policy.
8. The assets of Tata Power shall be employed primarily and judiciously for the purpose of conducting the business for which they are duly authorised.
9. All actual or potential conflicts due to financial or any other relationship with a Tata Power employee shall be disclosed.

Don’ts

1. The Supplier shall not make unfair or misleading statements about the products and services of competitors.
2. Children shall not be employed at workplaces.
3. Forced labour shall not be used in any form.
4. The Suppliers shall neither receive nor offer or make, directly or indirectly, any illegal payments, remunerations, gifts, donations or comparable benefits that are intended, or perceived, to obtain uncompetitive favours for the conduct of its business with Tata Power.

Reporting Violations

The Supplier shall notify the Company regarding any known or suspected improper behaviour of other suppliers or employees relating to its dealings with Tata Power, by email to: cecounsellor@tatapower.com. The same can also be raised through our 3rd party ethics helpline facility:

Toll-free Number	1800 267 4065
Email	tatapower@tip-offs.in
Website & Chatbot	www.tatapower.tip-offs.in
Postal address	Attn to: Mr. Puneet Arora, Deloitte Touch Tohmatsu India LLP, 6 floor, AIPL Business, Sector 62, Gurugram, Haryana 122102

OLA for 2 years for Design, Supply, Installation, Testing & Commissioning of Battery Energy Storage system at various locations in Mumbai Distribution. Ref. No. <u>4100044502/CC25ADO034</u>	THE TATA POWER COMPANY LIMITED	
	SPECIAL CONDITIONS OF CONTRACT	

Sr. No.	TOPIC	PRINCIPLES OF TERMS & CONDITIONS
1	GENERAL	The following Special Conditions of Contract (SCC) shall supplement the General Terms and Conditions Supply. Wherever there is a conflict, the provisions herein shall prevail over those in the "General Terms and Conditions - Indigenous Supply" and "General Terms and Conditions - Services" .
2	Earnest Money Deposit (EMD)	Bidders willing to participate in the tender shall submit an EMD for Rs. 50,00,000/- (Rs. Fifty Lakh only) in the form of Bank Guarantee (BG). Hard copy of EMD BG shall reach Tata Power at below mentioned address before the bid submission Date and Time. EMD BG shall be valid for 180 days from the due date of bid submission, favouring 'The Tata Power Company Limited'. The EMD must be strictly in the format as mentioned in Tender Document, failing which it shall not be accepted by Tata Power and the bid as submitted shall be liable for rejection. Address for submission of EMD BG- Head – Procurement The Tata Power Company Limited, Smart Centre of Procurement Excellence, 2nd Floor, Sahar Receiving Station, Near Hotel Leela, Sahar Airport Road, Andheri East, Mumbai-400059 EMD BG of the successful bidder shall be returned after submission of Contract Performance Bank Guarantee. EMD BG of unsuccessful bidders shall be returned on completion of the tendering process.
4	WARRANTY AND SUPPORT TERMS & CONDITIONS	As per clause 35 - "WARRANTY AND SUPPORT TERMS & CONDITIONS" of technical specifications.
5	CONTRACT PERFORMANCE BANK GUARANTEE (CPBG)	This is further to General Terms & Conditions – Indigenous Supply, Clause 9 Vendor shall submit an unconditional and irrevocable Contract Performance Bank Guarantee (CPBG) cum performance Bank Guarantee (PBG) for a value equal to 5% of the total Outline Agreement value. Such CPBG shall be valid till the expiry of the Warranty period of 12 Years with a further claim period of 6 months.
6	TERMS OF PAYMENT	This is further to General Terms & Conditions – Indigenous Supply

OLA for 2 years for Design, Supply, Installation, Testing & Commissioning of Battery Energy Storage system at various locations in Mumbai Distribution. Ref. No. <u>4100044502/CC25ADO034</u>	THE TATA POWER COMPANY LIMITED	
	SPECIAL CONDITIONS OF CONTRACT	

		Invoice shall be raised for a particular site, after successful commissioning and handover of Battery Energy storage system at that site. 88% of the invoice value shall be paid with a credit period of 60 days. Rest 12% of the invoice value shall be paid in 12 equal tranches at the start of each year of the Warranty. Credit period for MSME vendors is 45 days. Credit period shall start after acceptance of Invoice. The aforesaid payments shall be subject to receipt of invoices along with enclosures/supporting documents for having completed the Job according to the Scope and duly verified/certified by Owner's Order Manager against which payment is being claimed. Payments due to the Contractor shall be made after deduction of the Liquidated Damages (LD) amount, TDS, Safety Retention etc. as applicable.
7	Safety Retention	Safety Retention as per the Tata Power General Terms and Conditions shall be applicable and shall be released based on safety performance score after work completion.
8	Delivery Schedule:	Commissioning Schedule per site from the date of intimation from The Tata Power Co. Ltd. to go ahead will be as follows: Layout Finalization: 1 month Material Planning and Procurement: 5 Months Completion of Supply, Installation, Testing, Commissioning: 3 Months Final Integration with Central control room: 2 Months Overall, either ten sites or commissioning of 100MWh energy for two hours shall be completed within a period of 2 years.
9	Liquidated Damages (LD)	This is further to General Terms and Conditions – Indigenous Supply – Clause No. 10 Price Reduction. LD shall be applicable, @1% per week Maximum upto 10% of the Order Value, if the commissioning of Battery Energy Storage System along with all required support systems and auxiliaries at a site is delayed beyond 11 months from the date of intimation from The Tata Power Co. Ltd. to go ahead.
10	INSURANCE	This is further to General Terms & Conditions Complete Insurance will be in Bidder's scope.
11	Splitting of Quantities	Tata Power reserves the right to Split the quantity among 2 or more bidders.
12	Reverse Auction	Tata Power reserves the right to go for Reverse Auction (RA) for price negotiation and discover the most competitive price on ARIBA portal, Tata Power's official e-tendering platform. Date and time of e-auction will be intimated through E-Tender system to Authorized Person of Interested Bidder. This will be decided after techno-commercial evaluation of the bids. Bidders need to give their acceptance with the offer for participation in RA. Non-acceptance to participate in RA may result in non-consideration of their bids, in case Tata Power decides to go for RA.

OLA for 2 years for Design, Supply, Installation, Testing & Commissioning of Battery Energy Storage system at various locations in Mumbai Distribution. <u>Ref. No.</u> <u>4100044502/CC25ADO034</u>	THE TATA POWER COMPANY LIMITED	
	SPECIAL CONDITIONS OF CONTRACT	

		Only those bidders who are techno-commercially qualified shall be eligible to participate further in RA process. However, the original H1 bidder (whose price bid is the highest post techno-commercial evaluation) shall not be allowed to participate in further RA process provided minimum three techno-commercially qualified bids are available.
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The Tata Power Company Ltd	TPC ODL TPS ODL	 TATA TATA POWER	TPN ODL TPW ODL	Appendix 3 to CSCC Safety Terms and Conditions
Document No. TPSMS/GSR/STC/009 REV 05				Date of Issue: 01/08/2023

Appendix 3:

Safety Terms and Conditions

Reason for Change	Date of Last Revision	Prepared By	Reviewed By	Approved by
Inclusion of Odisha Discom and periodic Revision	<u>10-Jan-2021-R4</u>	All Discom and CFT members	Debi Prasad Acharya (Head-Safety-Odisha Discom)	Suresh H Khetwani (Chief safety and Environment)

The Tata Power Company Ltd	TPC ^{ODL} TPS ^{ODL}	 TATA TATA POWER	TPN ^{ODL} TPW ^{ODL}	Appendix 3 to CSCC Safety Terms and Conditions
Document No. TPSMS/GSR/STC/009 REV 05				Date of Issue: 01/08/2023

Clause	Sub-clause	Description	Page No
1.0		Objectives	3
2.0		Scope	3
3.0		Safety Organization & Responsibilities	3
	3.1	Contractor Site Management and Supervision	3
	3.2	Contractor Supervisors and General Staff	4
	3.3	Contractor Workforce	4
	3.4	Vendor/Contractor/sub-contractor	5
4.0		<u>Tools and Tackles(R5)</u>	6
5.0		Site Safety Rules and Procedures	6
6.0		Critical safety Rules and Procedures	6
7.0		<u>General Safety Rules and Procedure(R5)</u>	8
8.0		Training and Capability Building	10
9.0		Pre-Employment and Periodic Medical check-up	12
10.0		Safety performance retention(R5) and Safety Performance Evaluation	12
11.0		<u>Recognition to the Prior Learning in Safety-R5</u>	12
12.0		Other Conditions	13
<u>General Safety Conditions for various contracts Specific to Discom(R5)</u>			
13.0		<u>Safety Conditions for maintenance of STS (Sub Transmission System) Network for Discom(R5)</u>	14
14.0		<u>Safety Conditions for maintenance of 11 KV and LT Network for Discom(R5).</u>	15
15.0		<u>Safety Conditions for the major contract work in Civil Projects for Odisha Discom(R5)</u>	16
16.0		<u>Safety Conditions for the major contract work in Commercial Department like - MMG, RRG, EAG, etc(R5)</u>	17
17.0		<u>Safety Conditions for Major Projects in Distribution Network(R5)</u>	18
18.0		<u>Schedule of Safety Audits by BA Safety Staff(R5)</u>	19

The Tata Power Company Ltd		Appendix 3 to CSCC Safety Terms and Conditions
Document No. TPSMS/GSR/STC/009 REV 05		Date of Issue: 01/08/2023

1.0 Objective:

The Objective of Safety Terms and Conditions is to apprise the Business Associates about various critical procedures of the Tata power Division/Discoms and the expectations from the BA to implement such procedures without fail. Certain terms and conditions are also mentioned to ensure a safe work atmosphere round the year. Refer Contractor's Safety Code of Conduct- Document no TPSMS/GSP/ CSM/015

2.0 Scope:

This procedure applies to all operating and project sites of The Tata Power Company Ltd and Group companies including new businesses like Electric Vehicle charging, Home Automation, Microgrid, Roof top solar etc. This Code of Conduct also applies to all operating and project sites of four Odisha Discoms and New business based on mutually agreed timeline for implementation. R5

3.0 Safety Organization & Responsibilities

3.1 Contractor Site Management and Supervision

Each Contractor will be responsible for fulfilling all statutory and safety requirements as per the laws of the land and not limited to Factory Act, Electricity Act, Electricity Rules and Regulations, Shop and Establishment Act etc.

Each Contractor shall provide at least one competent full-time safety supervisor for workforce of every 50 workers or less than that. When workforce ranges to 500, the contractor must provide at least one qualified safety officer (This may be subjected to change as per applicable act). Thus, for work force of 500 workers there will be one qualified safety officer and 10 safety supervisors. For every 500 additions in workforce, the contractor must add 1 safety officer and 10 safety supervisors. The Order Manager or Safety Department of the Tata Power Division /Discoms will review and approve the appointment of all safety officers and supervisors. The safety supervisors/officers will work with the guidance from Tata Power Division /Discoms Safety Department and align themselves with Tata power Division/Discom safety requirements.

For O&M related AMC activities, minimum one qualified safety officer to be deployed for each Division of the Discoms.

Qualified safety officer means he or she has completed PDIS or ADIS from a recognized institute.

Site Safety Officer/Safety Supervisor / Safety Coordinator shall be interviewed by the Order Manager/ Safety head of the Tata Power Division/Discom and then gate passes shall be issued if the interview is successful.

The Tata Power Company Ltd		Appendix 3 to CSCC Safety Terms and Conditions
Document No. TPSMS/GSR/STC/009 REV 05		Date of Issue: 01/08/2023

Site Manager of Contractor/Subcontractor is responsible, and will be held accountable, for the safety of their own workforce as well as that of sub-contractors. He should also ensure that all equipment, materials, tools, and procedures remain in safety compliance at job site.

Responsibility of Site manager includes, but not limited to:

- 3.1.1 Holding officer/supervisors accountable for safety and actively promote safe work performance.
- 3.1.2 Participate in and cooperate with all safety program requirements to be implemented to meet Tata Power Division /Discoms safety objectives
- 3.1.3 Ensure timely reporting of safety incidents, near misses, unsafe acts, and conditions.
- 3.1.4 Identify the training needs of BA employees and maintain all safety training documents.
- 3.1.5 Provide Safety Performance Report at an agreed frequency.
- 3.1.6 Stopping of unsafe work (Acts and/or Conditions) immediately. Work to start only after corrective actions are implemented.
- 3.1.7 Ensure and participate in daily toolbox talk for all the jobs.
- 3.1.8 Ensure that only tested and certified tools and equipment are issued to the workers and being used at the site.

3.2 Contractor Supervisors and General Staff.

Contractors' site supervisors and general staff members in charge of job site functions such as field engineering, warehousing, purchasing, costing, and scheduling etc. are responsible for the safe performance of the work of those they supervise. They must set an example for their fellow employees by being familiar with applicable sections of the Site Safety program and ensuring that all site activities are performed with SAFETY as the primary objective.

Each site supervisor is responsible and will be held accountable for identifying, analyzing, and eliminating or controlling all hazards through implementation of an aggressive, pro-active Health, Safety and Environmental Program. Each supervisor will proactively participate in the Safety program by observing, correcting, and recording unsafe acts and conditions at plant / sites.

3.3 Contractor Workforce

- 3.3.1 Contractors shall provide adequate quality and quantity of manpower as mutually agreed. (R5)
- 3.3.2 All the contractor employees shall attend "SHE L0(Other than new business and Odisha Discom)/L1 Foundation Course in Safety". Depending on the critical procedure in job employees shall also be required to attend "SHE L2 course of critical/high risk operations". All Supervisors shall be required to attend "SHE L3 Supervisory Training". All the above trainings will be conducted by TPSDI/Skill development institute of Disco, or other equivalent institute approved by Tata Power.

The Tata Power Company Ltd Document No. TPSMS/GSR/STC/009 REV 05	    	Appendix 3 to CSCC Safety Terms and Conditions Date of Issue: 01/08/2023
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- 3.3.3 Contractor employees shall be required to attend any other additional training if suggested by Order manager or Site Safety Head. The cost of such additional training shall be borne by the Vendor.
- 3.3.4 Contractor / Vendor shall mobilize their manpower well in advance to complete the training through TPSDI/Sill development Institute.
- 3.3.5 The Vendor / BA shall arrange or bear the conveyance and food expenses incurred during training of BA employees in Odisha Discom. (R5)
- 3.3.6 The validity of the training L1, L2 and L3 is 3 years. There will be competency assessment as Revalidation test in every three months for Tata Power Division and six months for Odisha Discom till one year from implementation of CSCC.(R5) Those who fail in the competency assessment shall undergo training again.
- 3.3.7 Supervisors/Welder/Electricians/Line man /Fitters /Radiographers/Riggers engaged by the contractor shall have valid competency certificates issued by authorized agency/Institute.
- 3.3.8 Contractor workforce must make safety a part of their job by following safety rules and regulations and by using all safeguards and safety equipment. They must take an active part in the Safety programs for the Site.
- 3.3.9 Every member of the workforce is expected to report for work without influence of any Drug/Alcohol. Failure to comply with this requirement shall result in immediate termination of employees under the influence of drug and alcohol plus show cause notice/penalty to the vendor.
- 3.3.10 All employees shall report hazardous conditions, practices and behaviours in their work areas and correct wherever possible.
- 3.3.11 Workforce is responsible for active participation in safety and health programs, suggestion systems, trainings and reporting of unsafe act/practices, Unsafe conditions incidents and injuries to their supervisors.

3.4 Vendor/Contractor/sub-contractor

- 3.4.1 Vendors/Contractor shall always comply with and ensure that their workforce comply with all site safety rules and regulations. Specifically, with applicable provisions of the Site Safety Management Plan and all statutory safety rules and regulations.
- 3.4.2 After receiving the work order/ purchase order vendor/contractor/bidder shall not appoint Sub-contractor without safety assessment of the sub-contractor through safety concurrence group Under Contractor Safety Code of Conduct. Penalty of 5% of contract value will be applicable to the contractor if subcontractor is appointed without the permission of SCG and without evaluation through CSCC process.

The Tata Power Company Ltd		Appendix 3 to CSCC Safety Terms and Conditions
Document No. TPSMS/GSR/STC/009 REV 05		Date of Issue: 01/08/2023

4.0 Tools and Tackles(R5)

- 4.1 Tools & Tackles used to carry out the job shall be checked and inspected by Order Manager and safety Officer.
- 4.2 Vendor must submit a valid Certificate from Competent person under the Factories Act 1948 and State Factories Rule for all Lifting Tools and Tackles (like Hoist, D Shackles, chain Block, wire ropes etc.).
- 4.3 All Electrical Hand Tools must be tested for leakage of current by a person /agency authorized by Tata Power Division /Discoms. Electrical power must be taken through RCCB of 30mA. Electrical hand tools should not have cord more than 3 meters in length. If power source is at > 3 meters, extension boards with RCCB of 30 mA and ON/OFF switch, shall be used.
- 4.4 Removal or inclusion of tools any new tool /tackles / machinery / equipment at site should only be done with concurrence of the order Manager / Head Safety.

5.0 Site Safety Rules and Procedures:

The work in the safest possible manner can only happen when it has been carefully planned and all applicable procedures are followed. The Tata Power Safety Procedures are derived from Tata Power best practices and the applicable Government acts regulations. In each case, the most stringent regulation is used. All safety rules and procedures developed from time to time shall be mandatorily followed by the vendor and his employees while working at Site.

6.0 Critical safety Rules and Procedures: Following is the list of Tata Power's critical Safety Rules and Procedures. Contractor shall refer to approved Rules and Procedures for detailed requirements and ensure conformance

6.1 Lock Out and Tag Out Procedure.

This procedure is intended to be used for the protection of Personnel while servicing or performing maintenance on distribution network/ equipment / pipeline / vessel / process systems. This is a general procedure that shall be used as the minimum requirements for isolation of equipment, pipelines, machines, system from all possible sources of hazardous energy and / or material such as Steam, Hot Water, Compressed Air, any other process fluid / chemical energy /Mechanical energy or Electrical energy. For complete procedure kindly refer Procedure Document No. **TPSMS/CSP/LOTO/001**

6.2 Excavation Safety (Shoring and Sloping) Procedure

This procedure is developed to cover the safe practices required for shoring and sloping in excavation and trenching jobs. This procedure is developed to establish mandatory requirements for practices to protect personnel, property and equipment from hazards associated with above activities. For complete procedure kindly refer Procedure Document No **TPSMS/CSP/EXS/002**

6.3 Confined Space Entry Procedure:

This procedure outlines the steps required to perform the confined space entry and to protect personnel from the hazards of entering and conducting operations in confined spaces. For complete procedure kindly refer Procedure Document No – **TPSMS/CSP/CSE/003**.

The Tata Power Company Ltd		Appendix 3 to CSCC Safety Terms and Conditions
Document No. TPSMS/GSR/STC/009 REV 05		Date of Issue: 01/08/2023

6.4 Working at Height Procedure:

This procedure describes the rules and procedures to protect employees from the hazards of working at heights. This procedure is developed to cover the safe practices required for Working at Heights. This procedure is developed to establish mandatory requirements for practices to protect personnel from hazards associated in this area. For complete procedure kindly refer Procedure Document No – TPSMS/CSP/WAH/004.

6.5 Heavy Equipment Movement Safety Procedure.

Heavy equipment lifting and movement is an activity involving loading, unloading, storage and movement from one place to another including lifting and erection or repairing of equipment with cranes or hoists. Material, machinery and equipment handling operations are being carried out by large capacity cranes and hoists, which make the job safer and faster. This procedure addresses the hazards and precautions associated with such equipment and their use. For complete procedure kindly refer Procedure Document No –TPSMS/CSP/HEMS/005.

6.6 Mobile Crane Safety Procedure.

Mobile cranes are responsible for many incidents, injuries. Falling loads from mobile cranes pose a severe hazard to operators and nearby workers and property. Many types of cranes, hoists, and rigging devices are used for lifting and moving materials. To maintain safe, appropriate standards must be adhered to and only qualified and licensed individuals shall operate these devices. For complete procedure kindly refer Procedure Document No –TPSMS/CSP/MCS/006.

6.7 Scaffold Safety Procedure.

This procedure is developed to provide information on the safe erection, use, dismantling and maintenance of access scaffolding in the workplace. It is developed to establish mandatory requirements for practices to protect personnel from hazards associated with erection, use and dismantling of scaffolds. For complete procedure kindly refer Procedure Document No –TPSMS/CSP/SCAF/007.

6.8 Permit to Work Procedure.

Given the inherent hazards of the power generation and distribution industry, a significant number of TATA POWER operations and installations are critical. Work Permit (WP) System is an essential element in controlling the workplace risks in an effective manner. For complete procedure kindly refer Procedure Document No – TPSMS/CSP/PTW/008.

6.9 Job Safety Analysis (JSA) Procedure.

This objective of this procedure is to have a task-based risk assessment process in place that identifies, evaluates and controls the risks associated with work activities, and as a result, prevents those involved in the task or those potentially affected by the task, from being harmed. For complete procedure kindly refer Procedure Document No- TPSMS/CSP/JSA/009 REV 01.

6.10 Electrical Safety Procedure.

The Tata Power Company Ltd		Appendix 3 to CSCC Safety Terms and Conditions
Document No. TPSMS/GSR/STC/009 REV 05		Date of Issue: 01/08/2023

The objective of these standards is to specify minimum mandatory requirements and advisory guidance for identifying and controlling hazards to ensure 'Zero Harm' regarding operation maintenance and testing of electrical equipment. For complete procedure kindly refer Procedure Document No- TPSMS/CSP/ELEC/010

6.11 Fire Safety Management Procedure.

Objective of This standard is to specify the minimum mandatory requirements and advisory guidelines to ensure prevention of fire related incidents and managing / controlling their impacts if they do occur. For complete procedure kindly refer Procedure Document No - TPSMS/CSP/ELEC/011

6.12 Hazard Identification & Risk Assessment (HIRA) Procedure(R5):

Objective of this procedure is to define guidelines for Hazard identification, Risk assessment and determination of controls. For complete procedure kindly refer Procedure Document No - TPSMS/CSP/HIRA/012.

6.13 Management Of Change (MOC) Procedure(R5):

The objective of this document is to establish the procedures necessary to ensure that HSE risks are managed to an acceptable level in Tata Power Management of Change (MOC) process. For complete procedure kindly refer Procedure Document No - TPSMS/CSP/MOC/013.

6.14 Pre-Start-up Safety Review (PSSR) Procedure(R5).

Objective of this procedure is to provide guidelines for safe initial startup of a new facility or restart of a modified facility. The PSSR process verifies that the new/modified facility meets the original design and operating parameters. The intent is to prevent incidents caused by inadequate, incomplete, unauthorized design, construction, installation, and/or commissioning. For complete procedure kindly refer Procedure Document No - TPSMS/CSP/MOC/014.

6.15 Road Safety procedure(R5):

To provide Safety Rules for road travel management and safe usage of all types of vehicles viz. passenger/ commercial, owned/ hired by company, driven by employees or contractors. For complete procedure kindly refer Procedure Document No - TPSMS/CSP/RSP/015.

7.0 General safety Rules and Procedure:

7.1 Lift (Elevator) Safety Procedure:

To provide safe operating procedure for taking control of lift car before entering and existing the pit of OTIS make elevators. For complete procedure kindly refer Procedure Document No – TPSMS/GSP/LIFT/001,

7.2 Working on conveyor belt Procedure:

This procedure is developed to cover the safe practices required for Working on live equipment and to protect personnel from hazards associated with it. For complete procedure kindly refer Procedure Document No – TPSMS/GSP/CONV/003

7.3 Batteries Handling & Disposal(R5)

The Tata Power Company Ltd		Appendix 3 to CSCC Safety Terms and Conditions
Document No. TPSMS/GSR/STC/009 REV 05		Date of Issue: 01/08/2023

To provide procedure for recycling and / or safe disposal of used / waste batteries in compliance with all legislation. For complete procedure kindly refer Procedure Document No – **TPSMS/GSP/HAZM/003**

7.4 Material Handling and Storage Procedure:

The purpose of this document is to provide procedures to assist the safe handling of materials (manual handling and mechanical handling). For complete procedure kindly refer Procedure Document No – **TPSMS/GSP/MATL/004**.

7.5 Office Safety Procedure(R5):

The objective is to provide a safe working environment to those working in office premise, who may be exposed to emergency situations and other chronic / cumulative risks that may arise due to various reasons of unsafe act, unsafe condition, fire and or pandemic crisis like COVID-19 etc. For complete procedure kindly refer Procedure Document No - **TPSMS/GSP/OFS/006**

7.6 Earth Leakage Circuit Breaker (ELCB) Testing Procedure(R5):

The objective of this procedure is to define the minimum requirements for testing of Earth Leakage Circuit Breaker (ELCB). For complete procedure kindly refer Procedure Document No - **TPSMS/GSP/ELCB/008**.

7.7 Occupational Health & Safety Legal Compliance Procedure(R5):

Objective of this procedure is provide guidelines for compliance of Occupational Health & Safety (OH&S) legal requirements and all ratified protocols and agreements are incorporated in Tata Power Safety Management System (SMS). For complete procedure kindly refer Procedure Document No - **TPSMS/GSP/LEGL/009**.

7.8 Incident Reporting & Investigation Procedure(R5):

Objective of this procedure is to outline the process for reporting, recording and investigating an incident, recommending corrective and preventive actions and to communicate the lessons learned to prevent recurrence of similar incidents. For complete procedure kindly refer Procedure Document No - **TPSMS/GSP/IRI/011**.

7.9 Contractor Safety Management Procedure.

The purpose of this document is to engage with contractors in a way to create safe work environment for everyone working for Tata Power. For complete procedure kindly refer Procedure Document No – **TPSMS/GSP/CSM/015**.

7.10 Tree Trimming Procedure(R5):

The objective of this procedure is to define guidelines and minimum requirements for Tree trimming. For complete procedure kindly refer Procedure Document No – **TPSMS/GSP/TTRM/017**

7.11 Safe Lone Working Procedure(R5):

Objective of this procedure is to lay down guidelines for reduction and safe managing of any additional risk arising from lone working. For complete procedure kindly refer Procedure Document No – **TPSMS/GSP/LONE/019**.

7.12 Good Housekeeping(5S) Procedure(R5):

The Tata Power Company Ltd		Appendix 3 to CSCC Safety Terms and Conditions
Document No. TPSMS/GSR/STC/009 REV 05		Date of Issue: 01/08/2023

Objective of this procedure is to explain the meaning, importance and provide guidelines for implementation of Good Housekeeping(5S) at workplaces across organization. For complete procedure kindly refer Procedure Document No – **TPSMS/GSP/GHK/022**.

7.13 Personal Protective Equipment(R5):

This procedure describes the basic requirements, applicability, minimum specifications of Personal Protective Equipment (PPE). For complete procedure kindly refer Procedure Document No – **TPSMS/GSP/PPE/023**.

7.14 Process Safety Management Procedure(R5):

The objective of this document is to provide a standardized & uniform guideline to implement Process Safety Management in Tata Power, its JVs, and subsidiaries to prevent or minimize the consequences of releases of toxic, flammable, pressurized or uncontrolled chemicals/Steam/Water or any other material which may result in toxic, fire, explosion, burn or flood like situation. For complete procedure kindly refer Procedure Document No – **TPSMS/GSP/PSM/024**

The above procedures will be updated time to time and the updated version of the procedures as well as any additional critical procedure will be available on official website of Tata Power (www.tatapower.com) for your reference.

8.0 Training and Capability Building.

Safety Training and capability building of workforce is a major component of safety management program. All training required must be provided and documented as specified by Tata Power and Indian Regulations. Tata Power Division /Discoms Safety department will audit contractors training and related documentation to assure its adequacy.

8.1 Tata power Odisha Discom Site Safety Orientation.R5

All Tata Power contractor and subcontractor workforce is required to attend Site Safety Orientation Training to receive a Safety Training Card, which is required to obtain a Gate Pass to the site, prior to entry. This Safety Orientation Course will be for duration of minimum half day. The information provided during the orientation will include, but is not limited to following:

- 8.1.1 Job rules, personal safety, and conduct
- 8.1.2 Hazard's reporting
- 8.1.3 Reporting of injuries
- 8.1.4 Emergency procedures
- 8.1.5 Safety Activities and Program including disciplinary measure and incentives.
- 8.1.6 Critical safety procedure relevant to the job

8.2 Capability Building:

- 8.2.1 All Tata Power contractor and subcontractor workforce is required to attend L1 Training to receive a Safety Training Card, which is required to obtain a Gate Pass to the site, prior to entry.
- 8.2.2 Appropriate practical training such as SHE L1, L2& L3 is given to ensure that a jobholder, either supervisor or worker, is competent to do his/her job safely. The skill training is provided through TPSDI, and other agencies authorized

The Tata Power Company Ltd Document No. TPSMS/GSR/STC/009 REV 05	  	Appendix 3 to CSCC Safety Terms and Conditions Date of Issue: 01/08/2023
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- by Tata Power on the list of 15 critical Safety procedures mentioned under safety procedures. Duration of course is as specified by Division/Discom
- 8.2.3** Contractor shall ensure that concerned workmen are provided with adequate training before he/she is allowed to execute the work. An evaluation test will be conducted after the completion of the training. Those employees who meet the minimum required competency will be provided with Certificate (Card), which will be valid for 3 years, post which the workmen have to reappear for assessment.
- 8.2.4** If the workman is not able to qualify the assessment, he/she will be given 3 additional attempts to clear in 3-month time failing which he/she will not be allowed to work in the Division /Discoms.
- 8.2.5** After expiry of Certificate or Training /Competency Card again one day recertification of L1, L2 and L3 skill training will be provided. R7.
- 8.2.6** Quarterly /Half yearly(For Odisha and New business) Revalidation Test - "SHE L1 Revalidation test" will be conducted for the contractor's employees to revalidate their safety awareness and knowledge.
- 8.2.7** Order Manager and Safety In charge of the Division/Site /Plant will conduct a Competency Assessment of all workforces, going to be deployed at site / plant for high-Risk job.
- 8.2.8** The Contactor shall bear the conveyance and food expenses of his staff for attending training sessions and capability building sessions in new business-like Odisha Discom.
- 8.2.9** The Contactor shall bear the entire cost of L1/L2/L3, the costs towards training, salaries/wages, boarding and lodging of his staff for attending training sessions and capability building sessions. These trainings are offered on nominal chargeable basis payable by Contractor and rates shall be decided by TPSDI from time to time in case of training through TPSDI. Generally, L0 is of one day, L1 is for 2 days for each critical procedure and L3 is for one day. Around Rs 700+GST is approx. cost /Day/Candidate. -R5
- 8.2.10** Competency assessment of all critical workforce to be carried out for all who has taken L2 training. R5

9.0 Recognition to the Prior Learning in Safety-R5

If "Order Manager" recommends and "Head of the Safety Department of Discom" is satisfied with the safety knowledge and competency of the employee of contractor, a test may be conducted by Tata power Skill development Institute/ other recognized institute to assess the prior learning in safety. If employees of the contractors pass in such test, he will be exempted from appearing in SHE L1 training. This assessment is on nominal chargeable basis and rates are decided by TPSDI from time to time.

10.0 Safety performance retention(R5) and Safety Performance Evaluation: A certain percentage of the bill value will be retained against every running bill as safety performance retention. The amount will be released with the last invoice or every six-month based on Safety Performance Score of contractors. This is as per CSCC Document no TPSMS/GSP/ CSM/015

The Tata Power Company Ltd		Appendix 3 to CSCC Safety Terms and Conditions
Document No. TPSMS/GSR/STC/009 REV 05		Date of Issue: 01/08/2023

This safety retention shall be waived for Contractors who have either submitted a Contract Performance Bank Guarantee or have a retention from each running bill for an amount not less than 10% of each bill subject to the express undertaking / understanding that if there are any deductions required to be made for safety non-performance as per the Safety Performance Score, then Tata Power shall recover any such deductions against safety non-performance directly from the monthly bills / final settlement as the case may be failing which it shall be within its right to recover such sum from accounts payable or the CPBG or the retention of the Contractor available with Tata Power for the said contract or any other contract between the Contractor and Tata Power.

11.0 Pre-Employment and Periodic Medical check-up:

Contractor shall arrange to conduct a pre-employment and periodic medical check-up for its entire workforce by Tata Power medical officer or Tata Power authorized medical officer. The contractor shall be able to produce the certificate prior to the employment. The contractor shall also organize to conduct periodical medical checkup (six monthly) for the following category of employees:

- Drivers (Check for Vision & Hearing)
- HEM Equipment Operators (Check for Vision & Hearing)
- Workforce working at Height (Check for Vision, Hearing, Vertigo & Height Phobia)
- Workforce Handling the hazardous substances - Coal, ash and chemicals (Chest X-ray and Lung Function T)
- Workforce in high Noise area (> 90 Decibel), Check for Hearing
- Workforce handling radiography equipment for conducting NDT.
- Workforce, working in specific areas requiring specific medical attention should conduct the medical tests test as laid down in the respective Site Safety Management Plan.

12.0 Other Conditions:

- 12.1. The manpower/vehicles/Tools & Tackles/Equipment provided shall be as per mutually agreed SLA.
- 12.2. No Supervision No work policy should strictly be followed.
- 12.3. Test Before Touch must be ensured every time a job is being carried out in electrical network.
- 12.4. HIRA /JSA as per the job scope must be prepared in detail and submitted along with Site Safety Plan by the successful bidder.
- 12.5. Personal protective equipment (PPE) must always be checked before use to ensure that they are in good condition and clean. Replace them if necessary.
- 12.6. All relevant PPE shall be provided by the vendor while working at the site.
- 12.7. Housekeeping shall be maintained all the time while execution of work. All the unwanted material shall be removed from the site at the end of the day's work. Old/damaged parts if taken out of the system shall be kept at

The Tata Power Company Ltd	TPC ODL TPS ODL	 TATA TATA POWER	TPN ODL TPW ODL	<i>Appendix 3 to CCCC Safety Terms and Conditions</i>
Document No. TPSMS/GSR/STC/009 REV 05				Date of Issue: 01/08/2023

identified placed and it shall be shifted to scrap yard or disposed of as per instruction of order manager.

- 12.8. Site Safety Plan shall be prepared by successful bidder along with order manger. Appendix 1 to be filled by successful bidder and submitted to Tata Power safety in-charge, before mobilization of team at site and start of the work.
- 12.9. The Owner or Proprietor of BA must visit worksite at least once in a month and meet Order Manager every month. In case of incidents, the Owner or Proprietor of BA is required to attend Time Out Meetings to understand the gaps that contributed to the incident.

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The Tata Power Company Ltd		Appendix 3 to CSCC Safety Terms and Conditions
Document No. TPSMS/GSR/STC/009 REV 05		Date of Issue: 01/08/2023

General Safety Conditions for various contracts Specific to Odisha Discom(R5)

13.0. Safety Conditions for maintenance of STS (Sub Transmission System) Network.

A BA awarded a major contract work of maintenance of sub – transmission network in area of a power system will be required to fulfil the following conditions:

- Availability of Discharge Rods - Minimum 6 Nos. in each maintenance vehicle, fit for purpose and in good conditions and defective rods are removed from service.
- Availability of Neon tester - Minimum one Neon Tester in each Maintenance Vehicle, in good and working condition and defective or non-standard neon testers are removed from service.
- Electrical hand Gloves - Minimum two sets of 33 KV and two sets of 11 KV in maintenance vehicles.
- The BA linemen must be having required ELBO certification for the voltage level involved.
- BA shall provide Safety Policy, Safety Objectives, Organogram showing structure and responsibility of Safety management of his company and shall document the work practices and procedures in terms of Safety Management.
- BA shall comply with all statutory requirements like applicable acts, regulations, codes of practice, OHSAS Standards, Labour laws, etc.
- The BA shall participate in Safety promotional activities like celebration of Lineman day on 4th March, National Fire Service Day on 14th April and Theme based safety campaigns undertaken by the Discoms every month.
- BA shall abide by Safety manuals and guidelines of Discom issued from time to time.
- BA shall ensure safety training and induction program for the employees. The BA employees must carry safety training card / competency card to the worksite and produce the card on demand.
- All BA employees must be given valid ID card issued by BA cell of Discom who will check statutory compliances before issuing ID cards.
- BA shall not employ a new workman without training and issue of ID card.
- BA shall conduct safety audits & inspections as per Discom procedures.
- BA shall provide proper PPEs as per CSM F-8 ensure periodic inspection of PPE, Tools and tackles to ensure their serviceability.
- BA shall ensure the adherence to standard operating procedures or guidelines laid down by the Discoms.
- BA shall ensure that no job shall be carried out without efficient supervision.
- BA shall ensure reporting of any unsafe act, unsafe conditions, near miss, incident, or accident to engineer in-charge and SAFETY team of the Discom.
- BA shall provide safety performance and Safety MIS to engineer in-charge and Discom SAFETY group periodically. Based on any non-confirmation to the safety procedures and guidelines, BA is liable to be negatively marked for his performance and suitable penalty will be imposed.
- BA safety staff shall work as per the guidance of the Discom safety department and functionally report Safety Head of Discom. Any leaves by safety staff of the BA shall have to approved by Discom Safety Department.
- BA shall ensure to depute Safety Staff for managing safety in worksites. In case the BA has been awarded work in more than one area power system, then the following safety structure will be adopted.
- Safety manager and Safety engineer must be having PDIS or ADIS.

The Tata Power Company Ltd Document No. TPSMS/GSR/STC/009 REV 05	  	Appendix 3 to CSCC Safety Terms and Conditions Date of Issue: 01/08/2023
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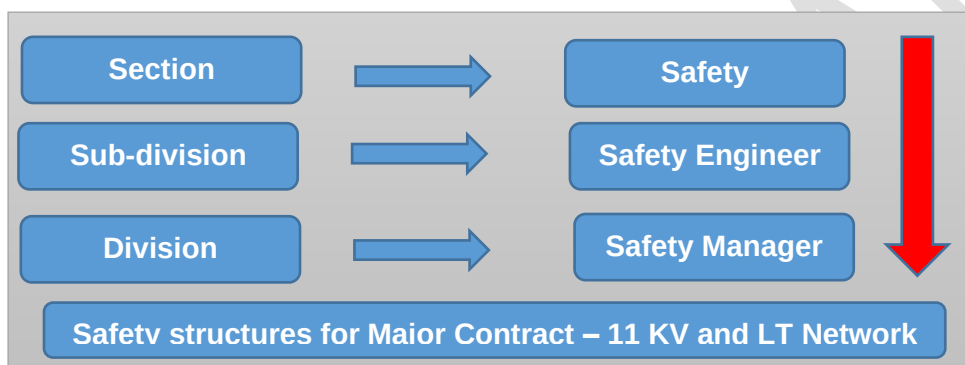
14.0 Safety Conditions for maintenance of 11 KV and LT Network.

A BA awarded a major contract work of maintenance of 11 KV and LT Network in area of a power system will be required to fulfil the following conditions:

- Availability of Discharge Rods - Minimum 6 Nos. in each PSS/FCC and maintenance vehicle, fit for purpose and in good conditions and defective rods are removed from service.
- Availability of Neon tester - Minimum one Neon Tester in each PSS/FCC/ Maintenance Vehicle, in good and working condition and defective or non-standard neon testers are removed from service.
- Electrical hand Gloves - Minimum two sets of 33 KV and two sets of 11 KV in each PSS/Maintenance vehicles and two sets of LT hand gloves at each FCC.
- The BA linemen must be having required ELBO certification for the voltage level involved.
- BA shall provide Safety Policy, Safety Objectives, Organogram showing structure and responsibility of Safety management of his company and shall document the work practices and procedures in terms of Safety Management.
- BA shall comply with all statutory requirements like applicable acts, regulations, codes of practice, OHSAS Standards, Labour laws, etc.
- BA shall abide by Safety manuals and guidelines of Discom issued from time to time.
- BA shall ensure safety training and induction program for the employees. The BA employees must carry safety training card / competency card to the worksite and produce the card on demand.
- All BA employees must be given valid ID card issued by BA cell of Discom who will check statutory compliances before issuing ID cards.
- BA shall not engage new workman without training and issue of ID card.
- PSS operator shall not be involved in maintenance activities.
- BA shall conduct safety audits & inspections as per Discom procedures.
- BA shall provide proper PPEs as per CSM F-8 ensure periodic inspection of PPE, Tools and tackles to ensure their serviceability.
- The BA shall participate in Safety promotional activities like celebration of Lineman day on 4th March, National Fire Service Day on 14th April and Theme based safety campaigns undertaken by the Discoms every month.
- BA to ensure that all LT complaints are routed through Call Centre and recorded in FCC. Rectification of fault shall be done only after call centre logging and with the knowledge of BA supervisor.
- No one will work alone or unsafely under public pressure or otherwise.
- BA shall ensure the adherence to standard operating procedures or guidelines laid down by the Discoms.
- BA shall ensure that no job shall be carried out without efficient supervision.

The Tata Power Company Ltd	  	Appendix 3 to CSCC Safety Terms and Conditions
Document No. TPSMS/GSR/STC/009 REV 05	TATA POWER	Date of Issue: 01/08/2023

- BA shall ensure reporting of any unsafe act, unsafe conditions, near miss, incident, or accident to engineer in-charge and SAFETY team of the Discom.
- BA shall provide safety performance and Safety MIS to engineer in-charge and Discom SAFETY group periodically. Based on any non-confirmation to the safety procedures and guidelines, BA is liable to be negatively marked for his performance and suitable penalty will be imposed.
- BA safety staff shall work as per the guidance of the Discom safety department and functionally report Safety Head of Discom. Any leaves by safety staff of the BA shall have to approved by Discom Safety Department.
- BA shall ensure to depute Safety Staff - One safety supervisor per section, One safety engineer per sub-division and one safety manager per Division Safety manager and Safety engineer must be having PDIS or ADIS.



15.0 Safety Conditions for the major contract work in Civil Projects:

A BA awarded a major contract work of / in civil project will be required to fulfil the following safety conditions:

- BA shall provide Safety Policy, Safety Objectives, Organogram showing structure and responsibility of Safety management of his company and shall document the work practices and procedures in terms of Safety Management.
- BA shall comply with all statutory requirements like applicable acts, regulations, codes of practice, OHSAS Standards, Labour laws, etc.
- BA shall abide by Safety manuals and guidelines of Discom issued from time to time.
- BA shall ensure safety training and induction program for the employees. The BA employees must carry safety training card / competency card to the worksite and produce the card on demand.
- All BA employees must be given valid ID card issued by BA cell of Discom who will check statutory compliances before issuing ID cards.
- BA shall not employ a new workman without training and issue of ID card.
- BA shall conduct safety audits & inspections as per Discom procedures.
- BA shall provide proper PPEs as per CSM F-8 ensure periodic inspection of PPE, Tools and tackles to ensure their serviceability.
- BA shall ensure the adherence to standard operating procedures or guidelines laid down by the Discoms.
- BA shall ensure that no job shall be carried out without efficient supervision.
- BA shall ensure reporting of any unsafe act, unsafe conditions, near miss, incident, or accident to engineer in-charge and SAFETY team of the Discom.

The Tata Power Company Ltd	  	Appendix 3 to CSCC Safety Terms and Conditions
Document No. TPSMS/GSR/STC/009 REV 05	TATA POWER	Date of Issue: 01/08/2023

- The BA shall participate in Safety promotional activities like celebration of Lineman day on 4th March, National Fire Service Day on 14th April and Theme based safety campaigns undertaken by the Discoms every month.
- BA shall provide safety performance and Safety MIS to engineer in-charge and Discom SAFETY group periodically. Based on any non-confirmation to the safety procedures and guidelines, BA is liable to be negatively marked for his performance and suitable penalty will be imposed.
- BA safety staff shall work as per the guidance of the Discom safety department and functionally report Safety Head of Discom. Any leaves by safety staff of the BA shall have to approved by Discom Safety Department.
- BA shall refer Construction Safety Manual of the Discom for details.
- BA shall ensure to depute a Safety Supervisor (for workforce up to 100 at site) / a safety engineer (for workforce up to 250 at site) / safety manager (for more than two safety engineers) for managing safety at the project site. In case the BA has been awarded more than one major contracts, then the following safety structure will be adopted.
- Safety Engineers and Safety Managers must be having PDIS or ADIS.



16.0 Safety Conditions for the major contract work in Commercial Department like - MMG, RRG, EAG, etc.:

A BA awarded a major contract work in meter management group & energy auditing group will be required to fulfil the following safety conditions:

- BA shall provide Safety Policy, Safety Objectives, Organogram showing structure and responsibility of Safety management of his company and shall document the work practices and procedures in terms of Safety Management.
- BA shall comply with all statutory requirements like applicable acts, regulations, codes of practice, OHSAS Standards, Labour laws, etc.
- BA shall abide by Safety manuals and guidelines of Discom issued from time to time.
- BA shall ensure safety training and induction program for the employees. The BA employees must carry safety training card / competency card to the worksite and produce the card on demand.
- All BA employees must be given valid ID card issued by BA cell of Discom who will check statutory compliances before issuing ID cards.
- BA shall not employ a new workman without training and issue of ID card.
- BA shall conduct safety audits & inspections as per Discom procedures.
- The BA shall participate in Safety promotional activities like celebration of Lineman day on 4th March, National Fire Service Day on 14th April and Theme based safety campaigns undertaken by the Discoms every month.
- BA shall provide proper PPEs as per CSM F-8 ensure periodic inspection of PPE, Tools and tackles to ensure their serviceability.

The Tata Power Company Ltd	  	Appendix 3 to CSCC Safety Terms and Conditions
Document No. TPSMS/GSR/STC/009 REV 05	TATA POWER	Date of Issue: 01/08/2023

- BA shall ensure the adherence to standard operating procedures or guidelines laid down by the Discoms.
- BA shall ensure that no job shall be carried out without efficient supervision.
- BA shall ensure reporting of any unsafe act, unsafe conditions, near miss, incident, or accident to engineer in-charge and SAFETY team of the Discom.
- BA shall provide safety performance and Safety MIS to engineer in-charge and Discom SAFETY group periodically. Based on any non-confirmation to the safety procedures and guidelines, BA is liable to be negatively marked for his performance and suitable penalty will be imposed.
- BA safety staff shall work as per the guidance of the Discom safety department and functionally report Safety Head of Discom. Any leaves by safety staff of the BA shall have to approved by Discom Safety Department.
- BA shall ensure to depute a Safety Supervisor for managing safety at worksite.
- The BA for the RRG work shall depute one Safety supervisor.



17.0 Safety Conditions for Major Projects in Distribution Network

A BA awarded a major Projects in Distribution Network shall be required to fulfil the following conditions:

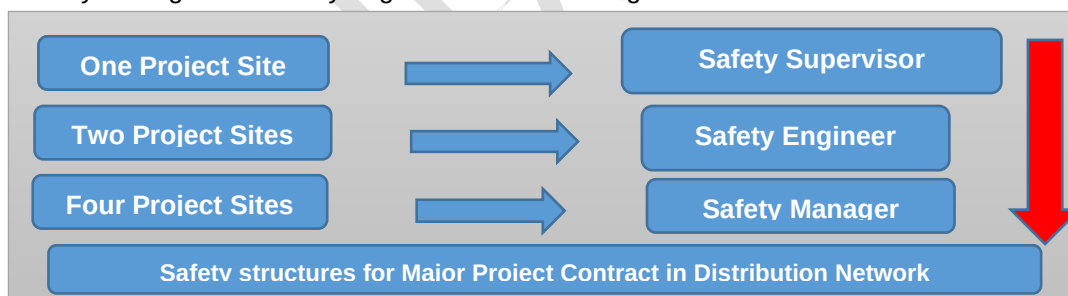
- Availability of Discharge Rods - Minimum 6 Nos. for each project site, fit for purpose and in good conditions and defective rods are removed from service.
- Availability of Neon tester - Minimum one Neon Tester in each project site, in good and working condition and defective or non-standard neon testers are removed from service.
- Electrical hand Gloves - Minimum one sets of 33 KV, 11 KV and LT in each project site.
- The BA linemen must be having required ELBO certification for the voltage level involved.
- BA shall provide Safety Policy, Safety Objectives, Organogram showing structure and responsibility of Safety management of his company and shall document the work practices and procedures in terms of Safety Management.
- BA shall comply with all statutory requirements like applicable acts, regulations, codes of practice, OHSAS Standards, Labour laws, etc.
- BA shall abide by Safety manuals and guidelines of Discom issued from time to time.
- BA shall ensure safety training and induction program for the employees. The BA employees must carry safety training card / competency card to the worksite and produce the card on demand.
- The BA shall participate in Safety promotional activities like celebration of Lineman day on 4th March, National Fire Service Day on 14th April and Theme based safety campaigns undertaken by the Discoms every month.
- All BA employees must be given valid ID card issued by BA cell of Discom who will check statutory compliances before issuing ID cards.
- BA shall not employ a new workman without training and issue of ID card.
- BA shall conduct safety audits & inspections as per Discom procedures.
- BA shall provide proper PPEs as per CSM F-8 ensure periodic inspection of PPE, Tools and tackles to ensure their serviceability.

The Tata Power Company Ltd	  	Appendix 3 to CSCC Safety Terms and Conditions
Document No. TPSMS/GSR/STC/009 REV 05	TATA POWER	Date of Issue: 01/08/2023

- BA shall ensure the adherence to standard operating procedures or guidelines laid down by the Discoms.
- BA shall ensure that no job shall be carried out without efficient supervision.

Sr. No	Type of Audit	Frequency
1	Tool Bag and PPE audit	Weekly
2	First Aid Box Maintenance Record	Fortnightly
3	Fire Extinguisher Record (Applicable for the BA involved in major construction works and have storage of flammable material at worksite)	Monthly
4	Safety Talk Register	Weekly
5	Site Safety Audit	Daily

- BA shall ensure reporting of any unsafe act, unsafe conditions, near miss, incident, or accident to engineer in-charge and SAFETY team of the Discom.
- BA shall provide safety performance and Safety MIS to engineer in-charge and Discom SAFETY group periodically. Based on any non-confirmation to the safety procedures and guidelines, BA is liable to be negatively marked for his performance and suitable penalty will be imposed.
- The BA shall participate in Safety promotional activities like celebration of Lineman day on 4th March, National Fire Service Day on 14th April and Theme based safety campaigns undertaken by the Discoms every month.
- BA safety staff shall work as per the guidance of the Discom safety department and functionally report Safety Head of Discom. Any leaves by safety staff of the BA shall have to be approved by Discom Safety Department.
- BA shall ensure to depute Safety Staff for managing safety in worksites. One safety supervisor per project site or 100 persons, one safety engineer for 2 project sites of 250 persons, and one safety manager for four project sites or 500 persons.
- Safety manager and Safety engineer must be having PDIS or ADIS.



18.0 Schedule of Safety Audits by BA Safety Staff

Safety Undertaking of BA by way of Affidavit

I _____ s/o _____ R/o _____ (AUTHORIZED REPRESENTATIVE/PARTNER/DIRECTOR/PROPRIETOR) of M/S _____ (name of company/firm) having its office at (Complete address of Company), authorized vide power

The Tata Power Company Ltd		Appendix 3 to CSCC Safety Terms and Conditions
Document No. TPSMS/GSR/STC/009 REV 05		Date of Issue: 01/08/2023

of attorney dated -----/Board resolution dated----/letter of authority dated----, hereinafter referred to as **Contractor [or Business Associate (BA)]** which expression shall, unless it be repugnant to or inconsistent with the meaning or context thereof, be deemed to include its heirs, executors, administrators, and assigns do hereby affirm and undertake as under :

1. The present undertaking shall remain in force from the date of execution of contract and shall be valid till the date of termination of the said contract by either party. The undertaking is binding on me (contractor) as well as my sub-contractor and its employees, representatives etc.
2. That I (the contractor) will be responsible and liable to comply and abide by all the safety rules, instructions and regulations as may be specified and laid down by the Discom to achieve its goal of Zero for on-site incidences.
3. That the Contractor shall be fully responsible for ensuring occupational health and safety of its employees, representatives, agents as well as of its subcontractor's employees, at all times during the discharge of their respective obligations under the contract including any methods adopted for performance of their tasks / work.
4. That Contractor shall ensure ,at its own expense to arrange for and procure, implement all requisite accident prevention tools, first aid boxes, personal protective equipment, fire extinguisher, safety training, Material Safety Data Sheet, pre-employment medical test, etc. for operations & activities including as & when so specified by Discom specifically. , failing which Discom shall be entitled, but not obliged, to provide the same and recover the actual cost thereof from the Contractor's payments.
5. That the Contractor shall engage adequate and competent Safety – Supervisor / Engineer / Manager / Skilled persons at site as per the Para 5 (Qualification and experience of safety personnel) and Annexure 3 of Contract Safety Management.
6. That the Contractor shall engage the competent Site – Supervisor with each group of workers for safe and correct workmanship, proper co-ordination of material and site work as per contract.
7. That the Contractor shall immediately replace supervisor in case it is found to be not up to the level of skill and experience required, but any such replacement shall be only with the prior concurrence of the Discom representative.

The Tata Power Company Ltd	TPC_{ODL} TPS_{ODL}	 TATA TATA POWER	TPN_{ODL} TPW_{ODL}	<i>Appendix 3 to CSCC Safety Terms and Conditions</i>
Document No. TPSMS/GSR/STC/009 REV 05				Date of Issue: 01/08/2023

8. That the Contractor and its subcontractors shall abide by all the safety guidelines as per Safety Manual, Contract Safety Management and other guidelines issued from time to time by Discom during the contract period.
9. That in case the Contractor and/or any of its Subcontractor fail to ensure the compliance as required in terms of this undertaking the Contractor shall keep and hold Discom / its directors / officers / employees indemnified against any / all losses / damage / expense / liability / fines / compensation / claims / action / prosecutions or the like which might be suffered by Discom or to which Discom might get exposed to as a result of any breach /wilful negligence /deliberate default on the part of the Contractor /Subcontractor in complying with the same. Contractor shall also furnish any press release, clarification etc. if sought by Discom for any near miss or safety violations, accidents, which are attributable to fault of Contractor.

VERIFICATION

DEPONENT

Verified aton this _Day of _____ 20__ that the contents of the above affidavit are true and correct and nothing material has been concealed therefrom

The Tata Power Company Ltd	TPC ODL TPS ODL	 TATA TATA POWER	TPN ODL TPW ODL	Contractor's Safety Code of Conduct
Document no TPSMS/GSP/ CSM/015/REV 07				Date of Issue: 01/08/2023

Annexure to Appendix 3 : Safety Terms and Conditions Safety Retention Matrix

5.5 Safety performance retention(R7): A certain percentage of the bill value will be retained against every running bill as safety performance retention. The amount will be released with the last invoice or every six-month based on Safety Performance Score of contractors. The retention amount will be calculated based on contract value as below. (R7)

Risk Category-(R7)	Contract Value	Retention Amount (%)
<u>Very high/High risk job/ Medium Risk jobs</u>	Up to 10 Lakhs	2.5
<u>Very high/High risk job/ Medium Risk jobs</u>	10 – 50 Lakhs	2
<u>Low/Very Low Risk jobs</u>	10 – 50 Lakhs	1
<u>Very high/High risk job</u>	0.5 to 10 Cr	2
<u>Medium Risk jobs</u>	0.5 to 10 Cr	1.5
<u>Low/Very Low Risk jobs</u>	0.5 to 10 Cr	1
<u>Very high/High risk job</u>	>10 Cr	1.5
<u>Medium Risk jobs</u>	>10 Cr	1

The Tata Power Company Ltd	  	Contractor's Safety Code of Conduct
Document no TPSMS/GSP/CSM/015/REV 07		Date of Issue: 01/08/2023

Appendix 6: CSM F6 - Safety Competency Assessment Form (Template)

Name of the Vendor/Bidder:

Name of the Sub Vendor (If job is given to Sub Vendor):

Description of the Job:

Request for Quotation (RFQ) No.:

Vendor/Bidder to mandatorily provide the below safety competency related information:

1. Proposed Manpower Deployment Schedule :-

Type of manpower	Qualification	Experience	Month 1	Month 2	Month 3	
Project /<u>AMC Manager(R7)</u>						
Site In Charge						
Safety Manager						
Safety Officer						
Supervisors						
Technicians						
High Skilled workmen						
Skilled workmen						
Semiskilled workmen						
Lineman						
Helpers						
Drivers						
Unskilled						
<u>Others(R7)</u>						

Instruction to Bidders:

- Indicate the overall site manpower deployment schedule as above
- Indicate direct or subcontracted employees by using color code given below:

Direct Bidder Employee – Green

Partly Direct / partly Subcontracted – Yellow

4.3.5 **Subcontracted – Red** *If subcontractor detail is not available at stage of Bid evaluation, then this can be agreed with Order manager or Engineer in charge before deployment Ensure that all sub-contractors follow the Tata Power Safety Procedure and agreed CSM F9 Site Safety Management Plan.R7*

- Against each category, indicate minimum educational qualification and work experience

The Tata Power Company Ltd	TPC TPS TATA TATA POWER	TPN TPW TATA TATA POWER	Contractor's Safety Code of Conduct
Document no TPSMS/GSP/ CSM/015/REV 07			Date of Issue: 01/08/2023

- iv. Add rows to include other specialized manpower, if any.
- v. Extend columns to cover the entire duration of the proposed contract.
- vi. If the operation is in shifts, then indicate shift in charge and / or safety officers required for each shift operation.

2. List of Tools, Tackles, Machines and Equipment: -

Bidder/ Vendor to provide the list of tools, tackles, equipment **to be used during the job / project execution**. Bidder/Vendor to ensure that all the lifting tools and tackles, pressure vessels are duly certified by the competent person authorised by the Chief Inspector of Factories of the respective state prior to start of the job

Sr. No	Description of Tools / Tackles	Capacity / Rating	Quantity	Make	Year of manufacture	Remarks
1						
2						
3						
4						
5						
.....						

3. Safety Records:

Bidder to provide the details of fatalities and lost workday cases (LWDC), occurred in last three years (data to be provided for the last completed FY and preceding 2 years).

Description	Safety Data for current and Last 3 Years			
	Current Year	Year 1 (Last FY)	Year 2	Year 3
		20__ - __	20__ - __	20__ - __
Fatalities (Nos.)				
Lost Workday Cases (Nos.)				

In case of no fatalities, LWDC during any year, the form may be filled stating NIL against the respective year. Bidders are encouraged to also submit the RCA / incident investigation reports and the learning's implemented out of the above reported incidents

4. Job Safety Plan/ Method Statement:

Bidder to provide / enclose a detailed Site/Job Safety Plan along with a Method statement detailing the execution philosophy (how the bidder intends to execute the Job/Project), identifying all key activities which are required to be performed by the contractor at Site.

The Tata Power Company Ltd	TPC DL TPS DL	 TATA TATA POWER	TPN DL TPW DL	Contractor's Safety Code of Conduct
Document no TPSMS/GSP/ CSM/015/REV 07				Date of Issue: 01/08/2023

Bidder to also list down all high-risk activities and provide the Hazard Identification and Risk Assessment (HIRA) for all such high-risk activities involved in the site work.

(Use Method Statement template attached as Appendix 9)

5. PPE Requirement -R7

Division/DISCOM Requirement	Bidders Response
The Bidder/Vendor shall ensure that all PPE of Approved standards as per CSM F8 – PPE Requirements shall be always available and shall be used by his employees with no exception whatsoever. Bidders to also ensure Standard PPE matrix of Tata Power to be followed for all activities.	
10% Buffer stock of PPEs to be provided by bidders at each circle to meet any contingency	
Bidder will ensure that sample PPEs to be submitted/approved by Safety Department along with EIC at the time of submission of Safety bids for evaluation In case bidder manpower found using substandard or any PPEs which are not approved by the Tata Power-Division /DISCOM representative, then Tata Power-Division /DISCOM will provide the same to manpower deployed at the cost of bidders.	

6. Vehicle Deployment: Bidders to provide details of all vehicles deployed during execution of work-(R7)

S. No.	Vehicle No.	Vehicle Type	Location	EV/CNG/Diesel/Petrol	Year	Whether CNG endorsed on RC

The Tata Power Company Ltd	TPC^{ODL} TPS^{ODL}	 TATA TATA POWER	TPN^{ODL} TPW^{ODL}	<i>Contractor's Safety Code of Conduct</i>
Document no TPSMS/GSP/ CSM/015/REV 07				Date of Issue: 01/08/2023

7. **Crane Deployment**-(R7): Bidders to provide details of crane to be deployed during the execution of work as and when required. Bidders to provide approved new gen crane ACE Model SX150, ACE FX150 and Escorts Model TRX 1550.

Sl No	Crane No	Location	Year

8. **Training Records**-(R7): Bidders to provide training records of employees deployed for the execution of work during last one year. These training includes OHS (Occupational Health and Safety) Training, Training on SOP/Work Procedures and Medical Emergency trainings imparted at their own facility, cost, and expenses. Bidders to provide the following details:

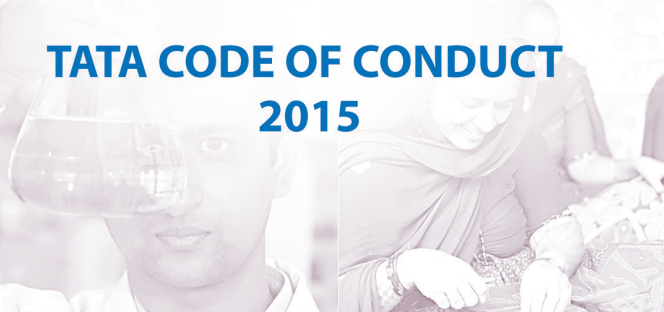
Tata Power-Division /DISCOM Requirement	Bidders Response
Training records of employees at their own facility, cost, and expenses for last one year	
Training facility available with Bidders	
Future road map for enhancing the competency of workforce	

9. **Rewards and Recognition**-(R7): Bidders to provide the details of process deployed in their organization for sharing and resolution of safety concerns raised by their employees. Also, bidders to provide the details of Rewards and Recognition process in their organization for safety to encourage the morale of their workforce.

10. **Management System Certification: -**

Sr.No	Certification	Yes / No	If Yes, Year of Certification	If No, Target date for Certification
1	ISO 9001			
2	ISO 14001			
3	ISO 45001			
4	Any other (Specify....)			

Note: Please attach certificates to support above. In case not accredited for above but applied for, application letters may be attached.



TATA CODE OF CONDUCT 2015



LEADERSHIP THAT INSPIRES

For over 100 years, the Tata group has been led by visionaries who have stayed true to the vision of the founder, Jamsetji Tata.

A vision that placed the greater good of society at par with business growth.

A vision that put into practice pioneering social initiatives that changed the way responsible business was run.

And a vision that brought into the group a strong social conscience.



We do not claim to be more unselfish, more generous or more philanthropic than other people. But we think we started on sound and straightforward business principles, considering the interests of the shareholders our own, and the health and welfare of the employees, the sure foundation of our success.

Jamsetji Tata
Founder of the Tata group
Chairman (1868 – 1904)

CONTENTS

Foreword	3
A Our values	4
B Scope and purpose of this Code	5
C Our core principles	7
D Our employees	9
E Our customers	18
F Our communities and the environment	21
G Our value-chain partners	23
H Our financial stakeholders	25
I Governments	27
J Our group companies	29
Raising concerns	30
Accountability	31
Acknowledgement sheet	33

FOREWORD

Tata companies have consistently adhered to the values and ideals articulated by the Founder for over 150 years. The Tata Code of Conduct was first formalized by Mr Ratan Tata. It articulates the Group's values and ideals that guide and govern the conduct of our companies as well as our colleagues in all matters relating to business. Today, the Code is a bedrock on which we base our individual, as well as leadership commitments to core Tata values.

The Tata Code of Conduct outlines our commitment to each of our stakeholders, including the communities in which we operate, and is our guiding light when we are sometimes faced with business dilemmas that leave us at ethical crossroads. The Code is also dynamic in that it has been periodically refreshed in order to remain contemporary and contextual to the changes in law and regulations. However it remains unaltered at its core.

Our stellar reputation and success as a business entity has been defined by the powerful commitment and adherence to the core values and principles expressed in this Code, by all our employees, directors and partners. I trust every Tata colleague and Tata company will continue to not only comply with the laws and regulations that govern our business interests around the world, but will continue to set new standards of ethical conduct that will generate deep respect and inspire emulation by others.

N. Chandrasekaran

21st February, 2017



A. OUR VALUES

TATA has always been values-driven. The five core values that underpin the way we conduct our business activities are:



These universal values serve as the foundation for the Tata Code of Conduct. They find expression within the value system of every Tata company.

B. SCOPE AND PURPOSE OF THIS CODE

1. This Code sets out how we behave with:
 - our employees, or those who work with us;
 - our customers;
 - the communities and the environment in which we operate;
 - our value-chain partners, including suppliers and service providers, distributors, sales representatives, contractors, channel partners, consultants, intermediaries and agents;
 - our joint-venture partners or other business associates;
 - our financial stakeholders;
 - the governments of the countries in which we operate; and
 - our group companies.
2. In this Code, “we or us” means our company, our executive directors, officers, employees and those who work with us, as the context may require.
3. The term “our group companies” in this Code typically means companies Tata Sons intends for this Code to apply to, and / or to whom Tata Sons has issued this Code.
4. This Code sets out our expectations of all those who work with us. We also expect those who deal with us to be aware that this Code underpins everything we do, and in order to work with us they need to act in a manner consistent with it.

REMEMBER...

It is our commitment to protect our reputation and our brand equity by adhering to the values and principles set out in this Code. By doing so, we strengthen our unique culture and identity.

OUR CORE PRINCIPLES



The Tata philosophy of management has always been, and is today more than ever, that corporate enterprises must be managed not merely in the interests of their owners, but equally in those of their employees, of the consumers of their products, of the local community and finally of the country as a whole.

J.R.D. Tata

Chairman, Tata Sons (1938 – 1991)

C. OUR CORE PRINCIPLES

1. We are committed to operating our businesses conforming to the highest moral and ethical standards. We do not tolerate bribery or corruption in any form. This commitment underpins everything that we do.
2. We are committed to good corporate citizenship. We treat social development activities which benefit the communities in which we operate as an integral part of our business plan.
3. We seek to contribute to the economic development of the communities of the countries and regions we operate in, while respecting their culture, norms and heritage. We seek to avoid any project or activity that is detrimental to the wider interests of the communities in which we operate.
4. We shall not compromise safety in the pursuit of commercial advantage. We shall strive to provide a safe, healthy and clean working environment for our employees and all those who work with us.
5. When representing our company, we shall act with professionalism, honesty and integrity, and conform to the highest moral and ethical standards. In the countries we operate in, we shall exhibit culturally appropriate behaviour. Our conduct shall be fair and transparent and be perceived as fair and transparent by third parties.
6. We shall respect the human rights and dignity of all our stakeholders.
7. We shall strive to balance the interests of our stakeholders, treating each of them fairly and avoiding unfair discrimination of any kind.
8. The statements that we make to our stakeholders shall be truthful and made in good faith.
9. We shall not engage in any restrictive or unfair trade practices.
10. We shall provide avenues for our stakeholders to raise concerns or queries in good faith, or report instances of actual or perceived violations of our Code.
11. We shall strive to create an environment free from fear of retribution to deal with concerns that are raised or cases reported in good faith. No one shall be punished or made to suffer for raising concerns or making disclosures in good faith or in the public interest.
12. We expect the leaders of our businesses to demonstrate their commitment to the ethical standards set out in this Code through their own behaviour and by establishing appropriate processes within their companies.
13. We shall comply with the laws of the countries in which we operate and any other laws which apply to us. With regard to those provisions of the Code that are explicitly dealt with under an applicable law or employment terms, the law and those terms shall take precedence. In the event that the standards prescribed under any applicable law are lower than that of the Code, we shall conduct ourselves as per the provisions of the Code.

REMEMBER...

“Good faith” means having a reasonable belief that the information you have provided is truthful. It does not mean having ‘all the evidence’ about the potential violation or case reported.

OUR EMPLOYEES



Once you got the best people, the people who shared our values and ideals, we left them free to act on their own. We do not fetter them. We encourage them and give them opportunities for leadership.

J.R.D. Tata

Chairman, Tata Sons (1938 – 1991)

D. OUR EMPLOYEES

Equal opportunity employer

1. We provide equal opportunities to all our employees and to all eligible applicants for employment in our company. We do not unfairly discriminate on any ground, including race, caste, religion, colour, ancestry, marital status, gender, sexual orientation, age, nationality, ethnic origin, disability or any other category protected by applicable law.
2. When recruiting, developing and promoting our employees, our decisions will be based solely on performance, merit, competence and potential.
3. We shall have fair, transparent and clear employee policies which promote diversity and equality, in accordance with applicable law and other provisions of this Code. These policies shall provide for clear terms of employment, training, development and performance management.

Q&A

A job requirement entails extensive travel. One of the candidates has excellent relevant experience and qualifications. However, this candidate is a single parent. As a result, I feel such a situation would significantly hinder this candidate's ability to cope with the job requirement. What should I do?

In accordance with the Code, the decision to recruit an employee should be based upon merit. We cannot make a presumption that the candidate would not be able to meet the travel requirements of the job. All eligible candidates should be provided with equal opportunity to demonstrate or justify that they can cope with the travel requirements of the job. Being a single parent cannot be a ground to be discriminated against at any stage of recruitment or ongoing employment in our company.

REMEMBER...

We do not tolerate harassment in any form and therefore we expect every employee to discourage such misdemeanours in the workplace.

Dignity and respect

4. Our leaders shall be responsible for creating a conducive work environment built on tolerance, understanding, mutual cooperation and respect for individual privacy.
5. Everyone in our work environment must be treated with dignity and respect. We do not tolerate any form of harassment, whether sexual, physical, verbal or psychological.
6. We have clear and fair disciplinary procedures, which necessarily include an employee's right to be heard.
7. We respect our employees' right to privacy. We have no concern with their conduct outside our work environment, unless such conduct impairs their work performance, creates conflicts of interest or adversely affects our reputation or business interests.

Human rights

8. We do not employ children at our workplaces.
9. We do not use forced labour in any form. We do not confiscate personal documents of our employees, or force them to make any payment to us or to anyone else in order to secure employment with us, or to work with us.

Bribery and corruption

10. Our employees and those representing us, including agents and intermediaries, shall not, directly or indirectly, offer or receive any illegal or improper payments or comparable benefits that are intended or perceived to obtain undue favours for the conduct of our business.

REMEMBER...

Violation by even a single employee of any law relating to anti-bribery, anti-corruption, anti-competition, data privacy, etc. could result in severe financial penalties and cause irreparable reputational damage to the company.

Gifts and hospitality

11. Business gifts and hospitality are sometimes used in the normal course of business activity. However, if offers of gifts or hospitality (including entertainment or travel) are frequent or of substantial value, they may create the perception of, or an actual conflict of interest or an 'illicit payment'. Therefore, gifts and hospitality given or received should be modest in value and appropriate, and in compliance with our company's gifts and hospitality policy.

Freedom of association

12. We recognise that employees may be interested in joining associations or involving themselves in civic or public affairs in their personal capacities, provided such activities do not create an actual or potential conflict with the interests of our company. Our employees must notify and seek prior approval for any such activity as per the 'Conflicts of Interest' clause of this Code and in accordance with applicable company policies and law.

REMEMBER...

As a general rule, we may accept gifts or hospitality from a business associate, only if such a gift:

- has modest value and does not create a perception (or an implied obligation) that the giver is entitled to preferential treatment of any kind;
- would not influence, or appear to influence, our ability to act in the best interest of our company;
- would not embarrass our company or the giver if disclosed publicly.

The following gifts are never appropriate and should never be given or accepted:

- gifts of cash or gold or other precious metals, gems or stones;
- gifts that are prohibited under applicable law;
- gifts in the nature of a bribe, payoff, kickback or facilitation payment*;
- gifts that are prohibited by the gift giver's or recipient's organisation; and
- gifts in the form of services or other non-cash benefits (e.g. a promise of employment).

(*Facilitation' payment is a payment made to secure or speed up routine legal government actions, such as issuing permits or releasing goods held in customs.)

Working outside employment with us

13. Taking employment, accepting a position of responsibility or running a business outside employment with our company, in your own time, with or without remuneration, could interfere with your ability to work effectively at our company or create conflicts of interest. Any such activity must not be with any customer, supplier, distributor or competitor of our company. Our employees must notify and seek prior approval for any such activity as per the 'Conflicts of Interest' clause of this Code and in accordance with applicable company policies and law.

Integrity of information and assets

14. Our employees shall not make any wilful omissions or material misrepresentation that would compromise the integrity of our records, internal or external communications and reports, including the financial statements.
15. Our employees and directors shall seek proper authorisation prior to disclosing company or business-related information, and such disclosures shall be made in accordance with our company's media and communication policy. This includes disclosures through any forum or media, including through social media.
16. Our employees shall ensure the integrity of personal data or information provided by them to our company. We shall safeguard the privacy of all such data or information given to us in accordance with applicable company policies or law.
17. Our employees shall respect and protect all confidential information and intellectual property of our company.
18. Our employees shall safeguard the confidentiality of all third party intellectual property and data. Our employees shall not misuse such intellectual property and data that comes into their possession and shall not share it with anyone, except in accordance with applicable company policies or law.
19. Our employees shall promptly report the loss, theft or destruction of any confidential information or intellectual property and data of our company or that of any third party.

Q&A

I am an accountant in the finance department of my company. Due to my artistic skills, I received an offer to pen cartoons for a children's publication for which I would receive compensation. I plan to undertake this activity during week-ends. What should I do before accepting this offer?

Before accepting the offer, you should ascertain whether the company policies and rules require you to make a disclosure to your supervisor so that the company may determine whether your undertaking this activity adversely affects our company's interests. On confirmation from the company that it does not do so, you would be free to take up the activity. It is also your duty to bring to the attention of the company whenever there is any change in the situation you have disclosed.

20. Our employees shall use all company assets, tangible and intangible, including computer and communication equipment, for the purpose for which they are provided and in order to conduct our business. Such assets shall not be misused. We shall establish processes to minimise the risk of fraud, and misappropriation or misuse of our assets.
21. We shall comply with all applicable anti-money laundering, anti-fraud and anti-corruption laws and we shall establish processes to check for and prevent any breaches of such laws.

Insider trading

22. Our employees must not indulge in any form of insider trading nor assist others, including immediate family, friends or business associates, to derive any benefit from access to and possession of price sensitive information that is not in the public domain. Such information would include information about our company, our group companies, our clients and our suppliers.

Q&A

Our company has recently announced the launch of a new business initiative. In connection with this, your friend who is a journalist with a leading business newspaper has asked you to provide some information that he could cover in his forthcoming article. He has promised not to quote you, or reveal your identity. Should you be giving him this information?

No. You should not be sharing information of this nature with the media, even if it is assured that the source would remain anonymous. Only authorised personnel in the company are permitted to speak to the media and provide information of this nature.

Our company has a “Use of Social Media” policy that lays down the “dos and don’ts” for use of social media even if you may access such media on your own time. Why is there such a policy?

External communication is a serious matter. It must be carefully managed because information put out with reference to our company or its businesses needs to be clear, truthful and not violate any undertakings we have given to other parties. In each business there are managers nominated to authorise and make different types of statements to the outside world. These managers should be consulted about any request for information you may receive or information you think we should give out.

In using social media, in particular blogs or social networking sites, you should exercise great caution while talking about our company or the business we do. It may feel like you are chatting with friends or expressing a personal opinion but even while doing so you cannot share any confidential information of our company.

REMEMBER...

We must respect the property rights of others by never misusing their assets, intellectual property or trade secrets, including the copying or downloading of unauthorised software, trademarks, copyrighted material or logos. We should never make unauthorised copies of computer software programs or use unlicensed personal software on company computers.

Prohibited drugs and substances

23. Use of prohibited drugs and substances creates genuine safety and other risks at our workplaces. We do not tolerate prohibited drugs and substances from being possessed, consumed or distributed at our workplaces, or in the course of company duties.

Conflicts of interest

24. Our employees and executive directors shall always act in the interest of our company and ensure that any business or personal association *including close personal relationships* which they may have, does not create a conflict of interest with their roles and duties in our company or the operations of our company. Further, our employees and executive directors shall not engage in any business, relationship or activity, which might conflict with the interest of our company or our group companies.
25. Should any actual or potential conflicts of interest arise, the concerned person must immediately report such conflicts and seek approvals as required by applicable law and company policy. The competent authority shall revert to the employee within a reasonable time as defined in our company's policy, so as to enable the concerned employee to take necessary action as advised to resolve or avoid the conflict in an expeditious manner.
26. In the case of all employees other than executive directors, the Chief Executive Officer / Managing Director shall be the competent authority, who in turn shall report such cases to the Board of Directors on a quarterly basis. In case of the Chief Executive Officer / Managing Director and executive directors, the Board of Directors of our company shall be the competent authority.

Q&A

You are responsible for maintaining our company's customer database. One of your friends is starting a business venture and requests you to share a few particulars from this database for marketing purposes of his business. He assures you that he would keep the data as well as his source confidential. Should you do so?

No. You should respect the confidentiality of customer information and not share any part of the database with any person without due authorisation.

You have access to revenue numbers of different business units of our company. While having a conversation with you over evening drinks, your friend enquires about the financial performance of our company. You do not share detailed information with your friend, but share approximate revenue figures. Is this conduct of yours correct?

No, it is not. You are not permitted to share financial information of our company with others who do not need to know this information. Financial information should always be safeguarded and disclosed only on a need-to-know basis after obtaining requisite approvals. Sharing of any price sensitive information that is not generally available with the public could also lead to violation of applicable insider trading laws.

27. Notwithstanding such or any other instance of conflict of interest that exists due to historical reasons, adequate and full disclosure by interested employees shall be made to our company's management. At the time of appointment in our company, our employees and executive directors shall make full disclosure to the competent authority, of any interest leading to an

actual or potential conflict that such persons or their immediate family (including parents, siblings, spouse, partner, children) or persons with whom they enjoy close personal relationships, may have in a family business or a company or firm that is a competitor, supplier, customer or distributor of, or has other business dealings with, our company.

REMEMBER...

A conflict of interest could be any known activity, transaction, relationship or service engaged in by an employee, his/her immediate family (including parents, siblings, spouse, partner, and children), relatives or a close personal relationship, which may cause concern (based upon an objective determination) that the employee could not or might not be able to fairly perform his/her duties to our company.

Examples of Potential Conflicts of Interest

A conflict of interest, actual or potential, arises where, directly or indirectly, an employee or executive director:

- (a) engages in a business, activity or relationship with anyone who is party to a transaction with our company;
- (b) is in a position to derive an improper benefit, personally or for any family member or for any person in a close personal relationship, by making or influencing decisions relating to any transaction;
- (c) conducts business on behalf of our company or is in a position to influence a decision with regard to our company's business with a supplier or customer where a relative of, or a person in close personal relationship with, an employee or executive director is a principal officer or representative, resulting in a personal benefit or a benefit to the relative;
- (d) is in a position to influence decisions with regard to award of benefits such as increase in salary or other remuneration, posting, promotion or recruitment of a relative or a person in close personal relationship employed in our company or any of our group companies;
- (e) undertakes an activity by which the interest of our company or our group companies can be compromised or defeated; or
- (f) does anything by which an independent judgement of our company's or our group companies' best interest cannot be exercised.

28. If there is a failure to make the required disclosure and our management becomes aware of an instance of conflict of interest that ought to have been disclosed by an employee or executive director, our management shall take a serious view of the

matter and consider suitable disciplinary action as per the terms of employment. In all such matters, we shall follow clear and fair disciplinary procedures, respecting the employee's right to be heard.

Examples of activities normally approved (post-disclosure) as per applicable company policy

Acceptance of a position of responsibility (whether for remuneration or otherwise) in the following cases would typically be permitted, provided the time commitments these demand do not disturb or distract from the employee's primary duties and responsibilities in our company, and are promptly disclosed to the relevant competent authority:

- (a) Directorships on the Boards of any of our group companies, joint ventures or associate companies.
- (b) Memberships/positions of responsibility in educational/professional bodies, where such association will promote the interests of our company.
- (c) Memberships or participation in government committees/bodies or organisations.

Q&A

You are in a relationship with a colleague who has been recently moved into your team and would now be reporting to you. What should you do?

Romantic or close personal relationships with another employee where a reporting relationship exists and one is responsible for evaluating the other's performance, is likely to create a conflict of interest. In such a situation, you would need to report the potential conflict to your supervisor.

Your company is submitting a proposal to a company in which you were previously employed. You have confidential information pertaining to your previous employer, which you believe will help your present employer in winning the contract. Should you share this information?

No. You should not share this information with your company since it relates to confidential information of a third party. Your company respects its employees' duty to protect confidential information that they may have relating to their previous employers.

You are the purchasing manager in the procurement department of your company. You receive an invitation from a supplier to attend a premier sporting event as her guest. This particular supplier is one of the vendors who has submitted a proposal for an open tender issued by your company. Should you accept the invitation?

No. You should not accept the invitation in this instance. Since you are in a key decision-making role for the tender, any unusual benefit that you receive could be perceived as an inducement that could compromise your objectivity.

OUR CUSTOMERS



We have continued to enjoy prosperity, even with adverse times to fight against. Our relations with all concerned are the most friendly. We have maintained the same character for straight-forward dealing with our constituents and customers. Our productions have continued to be of the same high quality, and therefore command the best reputation and realise the highest prices. ... I mention these facts only to point out that with honest and straight-forward business principles, close and careful attention to details, and the ability to take advantage of favourable opportunities and circumstances, there is a scope for success.

Jamsetji Tata

Founder of the Tata group
Chairman, Tata Sons (1868 – 1904)

E. OUR CUSTOMERS

Products and services

1. We are committed to supplying products and services of world-class quality that meet all applicable standards.
2. The products and services we offer shall comply with applicable laws, including product packaging, labelling and after-sales service obligations.
3. We shall market our products and services on their own merits and not make unfair or misleading statements about the products and services of our competitors.

Export controls and trade sanctions

4. We shall comply with all relevant export controls or trade sanctions in the course of our business.

Fair competition

5. We support the development and operation of competitive open markets and the liberalisation of trade and investment in each country and market in which we operate.
6. We shall not enter into any activity constituting anti-competitive behaviour such as abuse of market dominance, collusion, participation in cartels or inappropriate exchange of information with competitors.
7. We collect competitive information only in the normal course of business and obtain the same through legally permitted sources and means.

Dealings with customers

8. Our dealings with our customers shall be professional, fair and transparent.
 9. We respect our customers' right to privacy in relation to their personal data. We shall safeguard our customers' personal data, in accordance with applicable law.
-

Q&A

You are the Regional Sales Manager of our company. You have become a member of an “informal group”, on an instant messaging service, whose members are the regional sales heads of our company’s competitors. The administrator of the group has requested an in-person meeting to informally discuss market conditions and brainstorm on “pricing strategy” from an industry perspective. What should you do?

Any meeting with competitors, especially to discuss “pricing strategy”, could be an attempt to promote an anti-competitive practice or manipulate prices. You should respond by declining this invitation and exiting the “informal group”. You should also report this incident to your supervisor and your Legal department.

You are attending a customer meeting with a colleague, and your colleague makes an untruthful statement about the company’s services. What should you do?

You should assist your colleague in correcting the inaccuracy during the meeting if possible. If this is not possible, raise the issue with your colleague after the meeting to enable him/her or the company to correct any misrepresentation made to the customer.

While working on a customer project, you receive a call from your colleague. He used to manage that customer account before you took over his role. He recalls that he had worked with the customer on developing a new ordering system which he thinks would be beneficial for another customer and requests you to send him the project details. What should you do?

You must not share this information without specific approval of the customer; you are not permitted to use a customer’s assets, including software, for another customer or for any personal use.

REMEMBER...

Striving for excellence in the standards of our work and in the quality of our goods and services is a core Tata value. It is the unwavering practice of this value that builds and sustains customer trust in our brand.

OUR COMMUNITIES AND THE ENVIRONMENT



In a free enterprise, the community is not just another shareholder in business but is in fact the very purpose of its existence.

Jamsetji Tata

Founder of the Tata group
Chairman, Tata Sons (1868 – 1904)

F. OUR COMMUNITIES AND THE ENVIRONMENT

Communities

1. We are committed to good corporate citizenship, and shall actively assist in the improvement of the quality of life of the people in the communities in which we operate.
 2. We engage with the community and other stakeholders to minimise any adverse impact that our business operations may have on the local community and the environment.
 3. We encourage our workforce to volunteer on projects that benefit the communities in which we operate, provided the principles of this Code, where applicable, and in particular the 'Conflicts of Interest' clause are followed.
-

The environment

4. In the production and sale of our products and services, we strive for environmental sustainability and comply with all applicable laws and regulations.
5. We seek to prevent the wasteful use of natural resources and are committed to improving the environment, particularly with regard to the emission of greenhouse gases, consumption of water and energy, and the management of waste and hazardous materials. We shall endeavour to offset the effect of climate change in our activities.

OUR VALUE-CHAIN PARTNERS



If we had done some of the things that some other groups have done, we would have been twice as big as we are today.
But we didn't, and I would not have it any other way.

J.R.D. Tata

Chairman, Tata Sons (1938 – 1991)

(on the pace of expansion of the Tata group in the 1960s and 70s)

G. OUR VALUE-CHAIN PARTNERS

1. We shall select our suppliers and service providers fairly and transparently.
2. We seek to work with suppliers and service providers who can demonstrate that they share similar values. We expect them to adopt ethical standards comparable to our own.
3. Our suppliers and service providers shall represent our company only with duly authorised written permission from our company. They are expected to abide by the Code in their interactions with, and on behalf of us, including respecting the confidentiality of information shared with them.
4. We shall ensure that any gifts or hospitality received from, or given to, our suppliers or service providers comply with our company's gifts and hospitality policy.
5. We respect our obligations on the use of third party intellectual property and data.

Q&A

You head the procurement function in our company. You have tight budgetary constraints for a project that you are working on. In order to complete the project within the targeted costs, you intend to request your supplier to provide you an exceptional discount on this project order on the understanding that you would “make it up to him” in future orders. Would you be violating the Code?

Yes, you would. Inducement in any form, including future benefits to the supplier, could compromise your ability to act objectively and in the best interests of the company and therefore must be avoided.

REMEMBER...

Our value-chain partners would include our suppliers and service providers, distributors, sales representatives, contractors, channel partners, consultants, intermediaries and agents; joint-venture partners and other business associates.

OUR FINANCIAL STAKEHOLDERS



Ethical behaviour in business – in every sphere and with all constituents – has been the bedrock on which the Tata group has built, and operates, its enterprises. This has been an article of faith for the group ever since its inception, a fundamental element of our cherished heritage and the essence of our way of life.

Ratan Tata

Chairman, Tata Sons (1991 – 2012)

H. OUR FINANCIAL STAKEHOLDERS

1. We are committed to enhancing shareholder value and complying with laws and regulations that govern shareholder rights.
 2. We shall inform our financial stakeholders about relevant aspects of our business in a fair, accurate and timely manner and shall disclose such information in accordance with applicable law and agreements.
 3. We shall keep accurate records of our activities and shall adhere to disclosure standards in accordance with applicable law and industry standards.
-

GOVERNMENTS



Business, as I have seen it, places one great demand on you; it needs you to impose a framework of ethics, values, fairness and objectivity on yourself at all times. It is not easy to do this; you cannot impose it on yourself forcibly because it has to become an integral part of you.

Ratan Tata

Chairman, Tata Sons (1991 – 2012)

I. GOVERNMENTS

Political non-alignment

1. We shall act in accordance with the constitution and governance systems of the countries in which we operate. We do not seek to influence the outcome of public elections, nor to undermine or alter any system of government. We do not support any specific political party or candidate for political office. Our conduct must preclude any activity that could be interpreted as mutual dependence/favour with any political body or person, and we do not offer or give any company funds or property or other resources as donations to any specific political party, candidate or campaign.

Any financial contributions considered by our Board of Directors in order to strengthen democratic forces through a clean electoral process shall be extended only through the Progressive Electoral Trust in India, or by a similar transparent, duly-authorised, non-discriminatory and non-discretionary vehicle outside India.

Government engagement

2. We engage with the government and regulators in a constructive manner in order to promote good governance. We conduct our interactions with them in a manner consistent with our Code.
3. We do not impede, obstruct or improperly influence the conclusions of, or affect the integrity or availability of data or documents for any government review or investigation.

OUR GROUP COMPANIES



I do not think anyone was on par with Jamsetji as an industrial visionary. But that is not the sole reason why I have been an admirer of Jamsetji.

The major reason was his sense of values, sterling values, which he imparted to this group. If someone were to ask me, what holds the Tata companies together, more than anything else, I would say it is our shared ideals and values which we have inherited from Jamsetji Tata.

J.R.D. Tata

Chairman, Tata Sons (1938 – 1991)

J. OUR GROUP COMPANIES

1. We seek to cooperate with our group companies, including joint ventures, by sharing knowledge, physical resources, human and management resources and adopting leading governance policies and practices in accordance with applicable law including adherence to competition law, where relevant.
2. We shall strive to achieve amicable resolution of any dispute between us and any of our group companies, through an appropriate dispute resolution mechanism so that it does not adversely affect our business interests and stakeholder value.
3. We shall have processes in place to ensure that no third party or joint venture uses the TATA name/brand to further its interests without proper authorisation.
4. Our Board of Directors shall consider for adoption policies and guidelines periodically formulated by Tata Sons and circulated to group companies.

Q&A

You are in the process of selecting potential vendors for an IT project in our company. In the final shortlist of two companies, one is a new start-up with limited references and a lower price-quotation, while the other is a Tata company with thirty years of implementation experience and good references, but a marginally higher quote for the same job. With all other parameters of choice being nearly equal, which company should you select for the job?

While price is undoubtedly an important criterion for decision making, it is clearly not the only one to be evaluated. You may also need to consider good customer references, proven track record and shared value systems in order to decide on your IT partner.

You are in the process of selecting potential vendors for a project. One of the three finalists is a group company. In reviewing the final proposals, you rank the group company second out of the three proposals based on pricing and total cost of ownership, and select the first-ranked vendor. Is this the right decision?

Yes. You should select the vendor that, on its own merits, is the vendor that is most appropriate for your company's requirements. You should not select a group company only because of its affiliation.

RAISING CONCERNS

We encourage our employees, customers, suppliers and other stakeholders to raise concerns or make disclosures when they become aware of any actual or potential violation of our Code, policies or law. We also encourage reporting of any event (actual or potential) of misconduct that is not reflective of our values and principles.

Avenues available for raising concerns or queries or reporting cases could include:

- immediate line manager or the Human Resources department of our company
- designated ethics officials of our company
- the 'confidential reporting' third party ethics helpline (if available)
- any other reporting channel set out in our company's 'Whistleblower' policy.

We do not tolerate any form of retaliation against anyone reporting legitimate concerns. Anyone involved in targeting such a person will be subject to disciplinary action.

If you suspect that you or someone you know has been subjected to retaliation for raising a concern or for reporting a case, we encourage you to promptly contact your line manager, the company's Ethics Counsellor, the Human Resources department, the MD/CEO or the office of the group's Chief Ethics Officer.

Q&A

My supervisor has asked me to do something which I believe may be illegal. I am afraid if I do not do what I am told, I could lose my job. Should I do it?

No. Breaking the law is never an option. Discuss the situation with your supervisor to be certain that you both understand the facts. If your concerns are not resolved, contact a higher level supervisor, the Ethics Counsellor, the Legal department or report them via the company's confidential reporting system, if available.

I feel that my supervisor is treating me unfairly for reporting a concern to the Ethics Counsellor. What should I do?

Retaliation against anyone who raises a concern is a violation of the Code. You should therefore promptly report this action of your supervisor to the Ethics Counsellor or the MD/CEO of your company or via the company's confidential reporting system, if available.

ACCOUNTABILITY

This Code is more than a set of prescriptive guidelines issued solely for the purpose of formal compliance. It represents our collective commitment to our value system and to our core principles.

Every person employed by us, directly or indirectly, should expect to be held accountable for his/her behaviour. Should such behaviour violate this Code,

they may be subject to action according to their employment terms and relevant company policies.

When followed in letter and in spirit, this Code is *'lived'* by our employees as well as those who work with us. It represents our shared responsibility to all our stakeholders, and our mutual commitment to each other.

SPEAK UP...

If you are unsure whether a particular action you are about to take is consistent with the principles set forth in the Code, ask yourself:

- Could it directly or indirectly endanger someone or cause them injury?
- Is it illegal/unlawful or out of line with our policies and procedures?
- Does my conscience reject it? Does it conflict with my personal values?
- Would I feel uncomfortable if the story appeared in the media? Would it shame my company, spouse, partner, parent or child?
- Does it 'feel' wrong?

If the answer to any of these questions is "Yes", please stop and consult your reporting manager, the Ethics Counsellor, the Human Resource department, the Legal department or any member of the senior management team, to assist you in making the decision.

When faced with a dilemma: Stop, Think, Act Responsibly

NOTE

The Code does not provide a comprehensive and complete explanation of all expectations from a company standpoint or obligations from a stakeholder standpoint.

Our employees have a continuing obligation to familiarise themselves with all applicable law, group-level advisories and policies, company-level policies, procedures and work rules as relevant. For any guidance on interpretation of the Code, we may seek support from our company's Ethics Counsellor or from the group's Chief Ethics Officer, as appropriate.

All joint ventures are encouraged to adopt the Tata Code of Conduct (TCOC) or a code of conduct that incorporates all elements of the TCOC.

This version of the Tata Code of Conduct supersedes all earlier versions and associated documents and stands effective from 29th July, 2015.

For any query or clarification on the Code, please contact the office of the group's Chief Ethics Officer via email at: ethicsoffice@tata.com.



TATA CODE OF CONDUCT – 2015

I acknowledge that I have received the Tata Code of Conduct.

I have read the Tata Code of Conduct and I acknowledge that as a Tata employee, I am required to comply with the guidelines described therein and failure to do so may subject me to action as per my employment terms and relevant company policies.

If I have a concern about a violation, or a potential violation of the Tata Code of Conduct, I understand that there are channels available to me in my company to report such concerns. By making use of these channels when necessary, I will play my part in maintaining the high ethical standards to which we hold ourselves.

Signature: _____

Date: _____

Name: _____

Department: _____

Address: _____

(Please submit this declaration to your Ethics Counsellor or the Human Resource department of your company.)

NOTES

[illegible]

NOTES

This image shows a single page of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins or other markings on the paper.



For further information on the Code please contact:
The Ethics Office,
Tata Sons Ltd.,
Bombay House,
24, Homi Mody Street,
Mumbai – 400001, India.
Email: ethicsoffice@tata.com

HEALTH AND SAFETY POLICY

We, at Tata Power, reaffirm our belief that the health and safety of our stakeholders is of the utmost importance and takes precedence in all our business decisions. In pursuit of this belief and commitment, we strive to:

- Maintain and proactively improve our management systems to minimize health and safety hazards to our stakeholders and all others influenced by our activities.
- Comply and endeavour to exceed all applicable occupational health & safety legal and other requirements by setting the highest standards.
- Integrate health & safety procedures and best practices into every operational activity with assigned line-functional responsibilities at all levels, for improving and sustaining health & safety performance.
- Involve our employees in maintaining a safe and healthy work environment through risk assessments, periodic reviews of operational procedures, safe work methods and adoption of new technology.
- Develop a culture of safety through active leadership and provide appropriate training at all levels to enable employees developing their skills to work safely.
- Incorporate appropriate health & safety criteria into business decisions for selection of plant and technology, performance appraisal of individuals and appointments in key positions.
- Ensure availability at all times of appropriate resources to fully implement the health & safety policy of the company.
- Promptly report incidents, investigate for root causes and ensure lessons learnt shared and deployed across the company.
- Ensure service providers and their workmen align with company's safety codes and practices for the health and safety of personnel working with us.
- Set safety & health metrics as indicators of excellence, monitor progress and continually improve performance.

We shall actively communicate this policy to all stakeholders by suitable means and periodically review its relevance in continuously changing business environment.

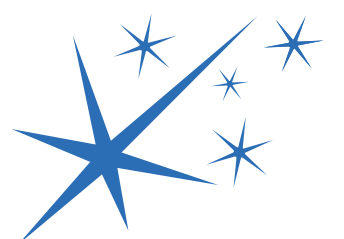


(Praveer Sinha)
CEO & Managing Director

Date: 15th June, 2018

TATA POWER

Lighting up Lives!



CORPORATE ENVIRONMENT POLICY

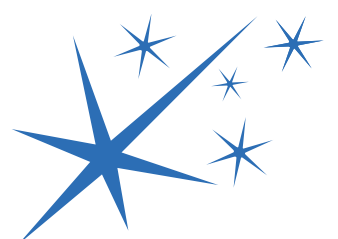
Tata Power is committed to a clean, safe and healthy environment, and we shall operate our facilities in an environmentally sensitive and responsible manner. Our commitment to environmental protection and stewardship will be achieved by:

- Complying with the requirements and spirit of applicable environmental laws and striving to exceed required levels of compliance wherever feasible
- Ensuring that our employees are trained to acquire the necessary skills to meet environmental standards
- Conserving natural resources by improving efficiency and reducing wastage
- Making business decisions that aim towards sustainable development
- Engaging with stakeholders to create awareness on sustainability



(Praveer Sinha)
CEO & Managing Director

Date: 15th June, 2018



FORMAT OF EMD – Bid Guarantee BG

FORMAT OF EMD – Bid Guarantee BG

Note: a) Format shall be followed in toto

b) Claim period of six months must be kept. In case of Bank is not ready to give BG for six months and claim period of six months EMD BG valid of one year to be given

c) The guarantee to be accompanied by the covering letter from the bank confirming the signatories to the guarantee on the Bank's letter head.

The Tata Power Co Ltd
34, Sant Tukaram Road
Carnac Bunder,
Mumbai 400 009

Whereas (Name of the Contractor), a Company incorporated under the Indian Companies Act 1956, having its Registered office at _____, (hereinafter called the "BIDDER") has in response to your Invitation to Bid against Enquiry No. _____ dated _____, for (name of work), offered to supply and/or execute the works as contained in Employers letter dated _____.

AND WHEREAS BIDDER is required to furnish to you a Bank Guarantee for the sum of Rs. _____/-(Rupees ____ only) as Earnest Money against Bidder's offer as aforesaid.

AND WHEREAS we, (name of the bank) having our Registered Office at _____ and Branch office at _____, have at the request of Bidder, agreed to give you this Guarantee as hereinafter contained.

NOW THEREFORE, in lieu of earnest money deposit, we, the undersigned, hereby covenant that the aforesaid Bid of the BIDDER shall remain open for acceptance by you during the period of validity as mentioned in the Bid Document or any extension thereof as requested by you and if Bidder shall for any reason back out, whether expressly or impliedly, from this said Bid during the period of its validity or any extension thereof as aforesaid, we hereby guarantee to you the payment of the sum of Rs. _____/-(Rupees ____ only) on demand and without demur and notwithstanding the existence of any dispute between you and the BIDDER in this regard and we hereby further agree as follows:

- (a) You shall have the right to file/make a claim on us under the Guarantee for a further period of six months from the said date of expiry.
- (b) That this guarantee shall not be revoked during its currency without your written express consent.
- (c) That you may without affecting this guarantee grant time or other indulgence to or negotiate further with BIDDER in regard to the conditions contained in the said Bid document and thereby modify these conditions or add thereto any further conditions as may be mutually agreed upon between you and BIDDER.
- (d) That the guarantee hereinbefore contained shall not be affected by any change in the constitution of our Bank or in the constitution of BIDDER.

- (e) That any account settled between you and BIDDER shall be conclusive evidence against us of the amount due hereunder and shall not be questioned by us.
- (f) That this guarantee commences from the date hereof and shall remain in force till BIDDER, if his Bid is accepted by you, furnishes the Contract Performance Guarantee as required under the said specifications and executes formal Contract Agreement as therein provided or till ____Days (__ days) from the date of submission of the Bid by the BIDDER i.e. (expiry date), whichever is earlier.
- (g) That the expression, BIDDER and Bank, and OWNER herein used shall, unless such an interpretation is repugnant to the subject or context, include their respective successors and assignees.
- (h) Notwithstanding anything herein contained, our liability under this guarantee is limited to Rs._____/-(Rupees _____ only) and the Guarantee will remain in force upto and including and shall be extended from time to time for such period or periods as may be desired by you. Unless a demand or claim under this Guarantee is received by us in writing within six months from (expiry date), i.e. on or before (claim period date), we shall be discharged from all liabilities under this guarantee thereafter.
- (i) Any claim/extension under the guarantee can be lodgeable at issuing outstation bank or at Mumbai branch and claim will also be payable at Mumbai Branch. **(To be confirmed by Mumbai Branch by a letter to that effect)**

Notwithstanding anything contained hereinabove :

- a) Our liability under this Bank Guarantee shall not exceed Rs._____/-(Rupees _____ only).
- b) This Bank Guarantee shall be valid upto ----- 200.
- c) Our Liability to make payment shall arise and we are liable to pay the guaranteed amount or any part there of under this Bank Guarantee only and only if you serve upon us a written claim or demand on or before ----- 200.

MANUFACTURER AUTHORIZATION FORM

(To be submitted on OEM's Letter Head)

Date:

Tender Enquiry No.:

To,
Head Contracts
The Tata Power Company Limited,
Smart Center of Procurement Excellence,
Sahar Receiving Station,
Sahar Airport Road,
Andheri East, Mumbai-400059

Sir,
WHEREAS M/s. [name of OEM], who are official manufacturers of having factories at [address of OEM] do hereby authorize M/s [name of bidder] to submit a Bid in relation to the Invitation for Bids indicated above, the purpose of which is to provide the following Goods, manufactured by us

.....
and to subsequently negotiate and sign the Contract.

We hereby extend our full guarantee and warranty in accordance with the Special Conditions of Contract or as mentioned elsewhere in the Tender Document, with respect to the Goods offered by the above firm in reply to this Invitation for Bids.

We hereby confirm that in case, the channel partner fails to provide the necessary services as per the Tender Document referred above, M/s [name of OEM] shall provide standard warranty on the materials supplied against the contract. The warranty period and inclusion / exclusion of parts in the warranty shall remain same as defined in the contract issued to their channel partner against this tender enquiry.

Yours Sincerely,

For

Authorized Signatory