BIDDING DOCUMENT

FOR

Supply, erection, testing and commissioning of battery banks, battery chargers and DCDBs for Upper Assam Region in AEGCL

Fund: "O&M HQ UAR"

ASSAM ELECTRICITY GRID CORPORATION LIMITED

BID IDENTIFICATION NO:
AEGCL/MD/CGM(UAR)/DC-System/2025/BID

Tender Fee: Rs.2000.00

SECTION 1

INSTRUCTION TO BIDDERS

Corporate Office,
Assam Electricity Grid Corporation Limited, Bijulee Bhawan,
Paltan Bazar, Guwahati-781001
PHONE: 0361-2739520 FAX NO.0361-2739513
Web: www.aegcl.co.in Email: managing.director@aegcl.co.in

1.1.0 INTRODUCTION:

The Chief General Manager (O&M), UAR on behalf of Assam Electricity Grid Corporation Ltd (AEGCL), hereinafter referred to as AEGCL or Purchaser invites single stage two envelope e-bids for the following work from eligible firms/companies/ contractors.

a) Name of work: Supply, erection, testing and commissioning of battery banks, battery chargers and DCDBs for Upper Assam Region in AEGCL

1.2.0 INTENT OF THE TENDER ENQUIRY:

The intent of the Tender Enquiry is to invite proposals from the prospective and relevantly experienced and financially sound contractor(s) /firms to carry out the works as specified in this bidding document.

1.3.0 SCOPE OF WORK:

The major scopes of work are as follows:-

a) Design, Supply, delivery of Battery Bank, Charger and DCDB.

b) Erection, Testing and commissioning of Battery Bank, Charger and DCDB at AEGCL site.

c) Arrangements of any permits required for transportation and movement of supplied materials. However, AEGCL shall assist as far as practicable in the process.

d) Transit insurance and insurance during storage at site till commissioning shall be in the scope of the contractor.

1.4.0 TIME SCHEDULE:

The successful bidder shall have to complete the works within **7 (Seven) months** from the date of signing of contract agreement. Bidder must submit a completion schedule bar chart for activities to complete the work within this time schedule.

1.5.0 ESTIMATE:

Rs.95,18,487.00 (Rupees Ninety-Five Lakh Eighteen Thouisand Four Hundred and Eighty-Seven Only) including GST

1.6.0 ELIGIBILITY CRITERIA:

1.6.1. GENERAL

Bidder may be manufacturer of the offered products or a firm/company having authorisation from a manufacturer. In case the bidder is not a manufacturer of the offered products, bidder must submit manufacturer's authorisation using for that purpose Form-MA provided in Section-2 Bidding forms.

1.6.2. EXPERIENCE

To be qualified for the bid the bidder must compulsorily meet the following minimum criteria specified in (i), (ii) and (iii) below:

i. Bidder OR if the bidder is not a manufacturer, offered product's manufacturer must have least six years of experience in design, manufacture and supply of the equipments as on the last date of bid submission. Bidder shall submit filled up form EXP-1 along with copy of past orders to establish its eligibility.

ii. Bidder OR if the bidder is not a manufacturer, offered product's manufacturer must have supplied such equipments which are in successful operation for at least five years as on the last date of bid submission. Bidder shall submit filled up form EXP-2 along with copy of orders and performance certificates to establish its eligibility.

iii. Bidder must have experience of executing a supply order of similar electrical items in Govt agency within past six years as on the last date of bid submission. Bidder shall submit filled up form EXP-3 along with copy of past orders and completion certificate/delivery Challan with customer signature to establish its eligibility.

Participation as Joint Venture/Consortium is allowed for this bid. In case bidder is participating as JV, experience of all partners combined should meet the eligibility criteria (Experience) under clause 1.6.2.

1.6.3. FINANCIALS:

i. As a minimum, a Bidder's net worth calculated as the difference between total assets and total liabilities should be positive. As supporting document, bidder should submit audited balance sheets or other financial statements acceptable to the Purchaser, for last 3 (three) financial years to demonstrate the current soundness of the Bidders financial position and its prospective long-term profitability. Apart from audited balance sheet, bidder shall submit duly filled and signed **Form 'FIN-1**' given in Section 2. Using the 'Form LIT – 1' (Section 2, Bidding Form), bidder shall list all Pending Litigation. All pending litigation shall be treated as resolved against the Bidder and so shall in total not represent more than 50% percent of the Bidder's net worth.

ii. Bidder must have minimum **Average Annual Turnover (AAT) of Rs. 30,00,000.00 (Rupees Thirty Lakh) only**. AAT shall be calculated by averaging total certified payments received for contracts in progress or completed, for the last 3 (three) years. The bidder shall furnish, along with its bid, audited balance sheets and duly filled up Form '**FIN-2'** in support of this Clause.

iii. Bidder must demonstrate access to, or availability of, financial resources such as liquid assets, unencumbered real assets, lines of credit, and other financial means, other than any contractual advance payments to meet:

(a) the cash-flow requirement, **Rs. 13,60,00.00 (Rupees Thirteen Lakh Sixty Thousand) only** for this work. **The Cash flow statement must be submitted in the format prescribed by the Institute of Chartered Accountant of India.**

(b) the overall cash flow requirements for this contract and its current works commitment.

Bidder must submit duly filled and signed **Form FIN-3 & FIN-4** of section 2 in support of this clause.

Participation as Joint Venture/Consortium is allowed for this bid. In case bidder is participating as JV, all partners combined should meet the eligibility criteria (Financials) under clause 1.6.3.

1.6.4. TYPE TEST REPORT:

The offered product(s) must be type tested at CPRI or NABL accredited laboratory for critical performance at the time of bid submission. Bidder must submit full type test reports for the offered products along with the techmno-commercial bid.

Type Test Reports shall not be older than five (5) years as on the date of technical bid opening.

1.7.0 SITE VISIT:

The bidders are advised to visit and examine the sites of work and its surroundings and obtain for itself on its own responsibility all information that may be necessary for preparing the bid. The costs of visiting the Site shall be at the bidder's own expense.

1.8.0 QUANTUM OF WORK:

The quantum of work is stated in the PRICE SCHEDULE at the end of section 2 – bidding forms. Tentative delivery locations shall be as follows –

SL. No.	Items	Qty	Delivery Destination
1	110V, 300AH VRLA Battery Bank with Battery Stand and all other fittings and accessories as per specifications	1	132KV Pavoi GSS
		1	132KV Margherita GSS
2	48V, 165AH VRLA Battery Bank with Battery Stand and all other fittings and accessories as per specifications	1	132KV Jorhat West GSS
		1	132KV Bokakhat GSS
		1	132KV Bokajan GSS
		1	132KV Lakwa GSS
		1	132KV Bordubi GSS
		1	132KV Pavoi GSS
		1	132KV Majuli GSS
		1	132KV Dhemaji GSS
3	110V, 85A Dual FCBC Charger suitable for 300AH VRLA with all fittings and accessories	1	132KV Pavoi GSS
		1	132KV Margherita GSS
4	48V, 50A Dual FCBC Charger suitable for 165AH VRLA with all fittings and accessories	1	132KV Jorhat West GSS
		1	132KV Bokakhat GSS
		1	132KV Bokajan GSS
		1	132KV Lakwa GSS
		1	132KV Bordubi GSS
		1	132KV Pavoi GSS
		1	132KV Majuli GSS
5	110V DCDB with all fittings and accessories	1	132KV Pavoi GSS
6	48VDCDB with all fittings and accessories	1	132KV Jorhat West GSS
		1	132KV Lakwa GSS
		1	132KV Bordubi GSS
		1	132KV Pavoi GSS

1.9.0 QUERY ON THE BIDDING DOCUMENT:

Prospective bidder may submit queries, if felt necessary, requesting clarification of any bid clause. Such queries must be submitted in the etendering portal latest by the **Tender clarification end date and time**

mentioned in the Bid Data Sheet. Purchaser shall clarify to the extent felt necessary or issue corrigendum for any amendment required in the bidding document. Such corrigendum/clarification shall be made available in the etendering portal and official website of AEGCL, www.aegcl.co.in . Any query submitted outside the etender portal viz. email, or in physical letters, shall not be entertained.

1.10.0 CLARIFICATION OF BIDS

To assist in the examination, evaluation, and comparison of the Technical and Price Bids, and qualification of the Bidders, the Purchaser may, at its discretion, ask any Bidder for a clarification of its bid. Any clarification submitted by a Bidder that is not in response to a request by the Purchaser shall not be considered. The Purchaser's request for clarification and the response shall be in writing. No change in the substance of the Technical Bid or prices in the Price Bid shall be sought, offered, or permitted, except to confirm the correction of arithmetic errors discovered by the Purchaser in the evaluation of the bids. If a Bidder does not provide clarifications of its bid by the date and time set in the Purchaser's request for clarification, its bid may be rejected.

1.11.0 DEADLINE FOR SUBMISSION OF BIDS

Bids shall be received ONLINE only on or before the date and time indicated in the **Bid Data Sheet.**The Purchaser may, at its discretion, extend the deadline for the submission of bids by amending the Bidding Document, in which case all rights and obligations of the Purchaser and Bidders previously subject to the deadline shall thereafter be subject to the deadline as extended.

1.12.0 SUBMISSION OF BID:

The bidder shall submit the techno commercial & price bid through e-tendering portal **https://assamtenders.gov.in**. All documents as required by this bidding document shall be scanned and uploaded in the portal. Price schedule should be submitted in the format provided in the online portal. Bidder must go through the document checklist provided in this bidding document and submit all required document. Bidders are also requested to submit the informations in the format provided in this bidding document where applicable.

In addition to the online bid submission, (i) Duly filled and signed **Letter of technical bid** and (iii) **Authorization letter of bid signatory** must be submitted in a sealed envelope superscribed with the name of bidder, full address, IFB reference, name of work etc. at the office of the Managing Director, Assam Electricity Grid Corporation Ltd, Bijulee Bhawan, Paltan Bazar Guwahati-781001 **one hour prior to bid submission end date and time**. **In case any of these three documents are not received; the bid shall be summarily rejected.**

1.13.0 BID VALIDITY

The validity of bid shall be for **180(One Hundred Eighty) days** from the date of bid submission end date.

1.14.0 OPENING OF TECHNO-COMMERCIAL BIDS

The Purchaser shall conduct the opening of Technical Bids through online process at the address, date and time specified in the BDS. Bidders at their discretion may attend the techno-commercial bid opening.

Price bid of those bidders shall only be opened whose techno-commercial bids are found to be responsive to the requirement of the bidding document.

1.15.0 EARNEST MONEY DEPOSIT (EMD):

The bid must be accompanied with earnest money as mentioned in the **Bid Data Sheet** against the works to be deposited through online mode only in Assam e-tender portal. The EMD should be submitted along with Techno-Commercial bid. The earnest money will be released to the unsuccessful bidders on finalization of the tenders. The EMD to the successful bidder will be released on submission of Security Deposit after execution of the contract agreement.

1.16.0 PRICE BASIS:

Cost quoted by the bidder shall be inclusive of all scope of work as specified in this biding document including any related services that is implicit to carry out the work successfully. Price will be firm and no price variation will be allowed within the completion period given in the work order.

1.17.0 DEVIATIONS, RESERVATIONS, AND OMISSIONS:

During the evaluation of bids, the following definitions apply:

a) "Deviation" is a departure from the requirements specified in the Bidding Document;

b) "Reservation" is the setting of limiting conditions or withholding from complete acceptance of the requirements specified in the Bidding Document; and

c) "Omission" is the failure to submit part or all of the information or documentation required in the Bidding Document.

1.18.0 PRELIMINARY EXAMINATION OF TECHNICAL BIDS:

The Purchaser shall examine the Techno-commercial Bid to confirm that all documents and technical documentation requested in this bidding document have been provided, and to determine the completeness of each document submitted. If any of these documents or information is missing, **the Bid may be rejected.**

The Purchaser shall confirm that the following documents and information have been provided in the Technical Bid. If any of these documents or information is missing, the offer ***shall be rejected***.

(a) Duly filled and signed **Letter of technical bid** and
(b) **Written confirmation of authorization to commit the Bidder (i.e., Notarized Power of Attorney)**
(c) **Notarized JV agreement, if bidder is a JV. However, the bidder is required to submit registered JV agreement once the contract is awarded to them.**

Bidder should submit hard copies of the documents mentioned above in (a) (b) and (c) in a physical envelope prior to deadline for technical bid submission. Techno-commercial bids shall be summarily rejected if these three documents are not submitted in hard copy deadline for technical bid submission.

1.19.0 RESPONSIVENESS OF TECHNO-COMMERCIAL BID:

The Purchaser's determination of a bid's responsiveness is to be based on the contents of the bid itself. A substantially responsive Techno-commercial Bid is one that meets the requirements of the Bidding Document without material deviation, reservation, or omission. A material deviation, reservation, or omission is one that,

a) if accepted, would:
   (i). Affect in any substantial way the scope, quality, or performance of the plant and services specified in the Contract; or
   (ii). Limit in any substantial way, inconsistent with the Bidding Document, the Purchaser's rights or the Bidder's obligations under the proposed Contract; or

b) If rectified, would unfairly affect the competitive position of other Bidders presenting substantially responsive bids.

The Purchaser shall examine the Techno-commercial Proposal, to confirm that the requirement of the bidding document have been met without any material deviation or reservation.

If a bid is not substantially responsive to the requirements of the Bidding Document, it shall be rejected by the Purchaser and may not subsequently be made responsive by correction of the material deviation, reservation, or omission.

1.20.0 EVALUATION OF PRICE BIDS:

The Purchaser shall use the criteria and methodologies listed in this Clause. No other evaluation criteria or methodologies shall be used.

To evaluate a Price Bid, the Purchaser shall consider the following:

a) The bid price excluding taxes as quoted in the Price Schedules;
b) Price adjustment for correction of arithmetical errors.
c) The following methodology will be practiced for identification and treatment of the Abnormally Low Bids (ALB) in this tender process of AEGCL:
    i. Absolute Approach is to be considered when there is fewer than five substantially responsive bidders and if the bid price is 20% or more below AEGCL's cost estimate then AEGCL's tender evaluation committee should clarify the Bid price with the bidder to determine whether the Bid is Abnormally low.
    ii. Relative approach is to be considered when there are at least 5(five) nos. of substantially responsive bids and the lowest bid price is 20% or more below AEGCL's cost estimate. In this approach, first the Average bid price is determined and then by deducting the standard deviation from the Average bid price, potentially ALB may be determined.

d) In case of an ALB, the tender evaluation committee/appropriate authority of the respective tenders shall undertake the following three stage review process which is as below:
    i. To identify ALB as per the steps mentioned in Sl no. 1.20.a.(i) and 1.20.b.(ii) Whichever is applicable.
    ii. To seek and analyse the clarifications from the abnormally low Bidder in terms of resource inputs and pricing, including overheads, contingencies and profit margins. In that respect, the committee may refer to guideline of World Bank, AIIB, ADB etc. prescribed for ALB.
    iii. To decide whether to accept or reject the bid.
    iv. On acceptance of the bid, whether Additional Performance Security is to imposed on the bidder supplemented by adequate justification.

e) In case of acceptance of ALB with Additional Performance Security:
    I. If any abnormally low bid is accepted under point 1.20.d.(iii) with additional performance security, it is to be noted that the total performance security should not exceed 20% of the total contract value.
    II. The additional performance security shall be treated as part of the original performance security and shall be valid for a period similar to that applicable for defect liability period of the contract.
    III. Non submission of the additional performance security shall constitute sufficient ground for rejection of the bid and similar assessment shall then be initiated for next ranked bidder if that bidder is also identified as ALB.

1.21.0 AWARD CRITERIA:

Purchaser shall in general award the contract to the lowest substantially responsive bidder. However, the purchaser reserves the right to not award contract to the lowest substantially responsive bidder without thereby incurring any liability to Bidders.

1.22.0 PURCHASER'S RIGHT TO ACCEPT ANY BID, AND TO REJECT ANY OR ALL BIDS:

The Purchaser reserves the right to accept or reject any bid, and to annul the bidding process and reject all bids at any time prior to contract award, without thereby incurring any liability to Bidders. In case of annulment, all bids submitted and specifically, bid securities, shall be promptly returned to the Bidders.

1.23.0 NOTIFICATION OF AWARD:

Prior to the expiration of the period of bid validity, the Purchaser shall notify the successful Bidder, in writing, that its bid has been partially or fully accepted quoting acceptance of the bid. The notification letter (hereinafter called the "Notification of Award") shall specify the sum that the Purchaser will pay the Contractor (hereinafter called "Contract Price") in consideration of the execution and completion of the services. Until a formal contract is prepared and executed, the notification of award shall constitute a binding Contract.

1.24.0 PERFORMANCE SECURITY:

Within 15 (five) days of receipt of the Notification of Award from AEGCL, the successful bidder shall furnish to AEGCL a performance security in an amount of 10 (ten) percent of the Contract Price in accordance with the Conditions of Contract. The form of performance security provided in Section 3 of the bidding documents may be used or some other form acceptable to AEGCL. The performance guarantee BG shall be valid through 30 days beyond the guarantee period.

1.25.0 SIGNING OF CONTRACT AGREEMENT:

Within **15 (Fifteen) days** of receipt of the Notification of Award, the successful Bidder shall be required to sign the Contract Agreement with AEGCL using for that purpose, the contract form provided with this bidding document failing which AEGCL at its discretion may cancel the award.

Annexure to SECTION 1
BID DATA SHEET

Name of Work	Supply, erection and commissioning of battery banks, battery chargers and DCDBs for Upper Assam Region in AEGCL
Location of Work	Upper Assam Region of AEGCL
NIT No.	AEGCL/MD/CGM(UAR)/DC-System/2025/ 19 , Dated – 26.08.2025
Bid Identification No.	AEGCL/MD/CGM(UAR)/DC-System/2025/BID
Estimate (In Indian Rupees)	**Rs.95,18,487.00** (Rupees Ninety-Five Lakh Eighteen Thousand Four Hundred and Eighty-Seven Only) including GST
Earnest Money Deposit (EMD)	**Rs.1,90,370.00** (Rupees One Lakh Ninety Thousand Three Hundred and Seventy) Only
Purchase'sAddress for correspondance	**The Chief General Manager(O&M), UAR, AEGCL** **1st Floor, Bijulee Bhawan, Paltanbazar** **Guwahati (Assam)** **781001** Contact Person: AGM, O&M, UAR Facsimile number: +91 361 2739513 Electronic mail address: cgmom.uar@aegcl.co.in
Pre-bid date	Shall be notified, if any, in due course.
Bid submission mode	E-tenders shall be accepted through online portal **https://assamtenders.gov.in** only
Address for bid opening	**The Chief General Manager(O&M), UAR, AEGCL** Floor/Room number: **First Floor** Street Address: **Bijulee Bhawan, Paltanbazar** City: **Guwahati (Assam)** PIN Code: **781001** Country: **India**
Key dates	**Tender publishing date: 12:00 Hrs., 27.08.2025** **Tender submission start date: 12:00 Hrs., 08.09.2025** **Tender clarification end date: 12:00 Hrs., 08.09.2025** **Tender submission end date and time: 12:00 Hrs.,16.09.2025** **Techno-commercial bid opening date: 14:00 Hrs., 17.09.2025**

SECTION -2 BIDDING FORMS

(This Section contains the forms which are to be completed by the Bidder and submitted as part of his Bid)

Form – 1
Document checklist

SL. No.	Document to be submitted	Submitted (Yes/No)	Name of uploaded pdf
1.	Letter of technical bid (Form-2)		
2.	JV agreement/Deed of consortium (applicable only if bidder is participating as a JV/consortium)		
3.	Notarised Power of attorney for the person signing the tender		
4.	EMD		
5.	Bidders company/firm registration certificate/certificate of incorporation		
6.	Manufacturer's authorization (Form MA) (Applicable for bidder who is not manufacturer of offered product)		
7.	GST registration		
8.	Filled up Form ELI-1		
9.	Filled up Form LIT		
10.	Filled up Form FIN-1		
11.	Filled up Form FIN-2		
12.	Filled up Form FIN-3		
13.	Filled up Form FIN-4		
14.	Audited Balance sheet for last three years		
15.	Bank solvency certificate/other supporting document		
16.	Filled up Form EXP-1		
17.	Filled up Form EXP-2		
18.	Filled up Form EXP-3		
19.	Order/Contract copies establishing supplying offered product in past		
20.	Performance certificate of offered product		
21.	Document establishing manufacturing unit details		
22.	GTP and drawings		
23.	Type test reports		
24.	Completion schedule bar chart		
25.	Additional documents if any		

Note: Bidders are requested to submit all required documents in e-tender portal and **physical copies of i) Letter of technical bidand ii) Power of Attorney(notarized) for bid signatory to Tender inviting authority.**

(In bidders letterhead)

Form-2
Letter of technical bid

Date:

To

The Chief General Manager (O&M), UAR
AEGCL, 1st Floor, Bijulee Bhawan,
Paltan Bazar, Guwahati-01

Bid Identification No: AEGCL/MD/CGM(UAR)/DC-System/2025/BID

Sir,

I/We the undersigned, declare that, we, [insert name of the bidder] having registered office at [insert address of the registerd office] are established manufacturer/supplier of _____ items.

I/we have read the bid document and do not have any reservation to any of the clause therein. We offer to excute the work of:

Supply, erection and commissioning of battery bank, battery charger and DCDB for Upper Assam Region in AEGCL

in conformity with the bid specification. Our Bid shall be valid for a period of **180(One Hundred Eighty)** days from the date fixed for the bid submission deadline and it shall remain binding upon us at any time before the expiration of that period.

Common Seal and Signature of the authorised person:
Name:
Designation:

Note:
i) Insert name and address in appropriate places.
ii) Strike out which is not applicable.

Form - 3

Format for Bank Guarantee (Earnest money deposit)

(EMD to be paid in online mode only)

Form 4

Manufacturer's Authorization

(To be submitted in Manufacturer's Letterhead)

Bid No.: AEGCL/MD/CGM(UAR)/DC-System/2025/BID
To

The Chief General Manager (O&M), UAR
AEGCL, 1st Floor, Bijulee Bhawan,
Paltan Bazar, Guwahati-01

WE *[insert:* ***name of Manufacturer****]* who are established and reputable manufacturers of *[insert:* ***name and/or description of the Goods****]* having production facilities at *[insert:* ***address of factory****]* do hereby authorize *[insert:* ***name & address of Bidder****]* (hereinafter, the "Bidder") to submit a bid the purpose of which is to provide the following goods, manufactured by us, and to subsequently negotiate and sign the Contract:

1. ----------
2. ----------

We hereby extend our full guarantee and warranty in accordance with ***Clause 5.11.0*** of the Special Conditions of Contract, for the above specified Goods supporting the Supply of specified Goods and fulfilling the Related Services by the Bidder against this Bidding Documents, and duly authorize said Bidder to act on our behalf in fulfilling these guarantee and warranty obligations.

Further, we also hereby declare that we and *[insert:* ***name of the Bidder****]* have entered into a formal relationship in which, during the duration of the Contract (**including related services and warranty / defects liability**) we, the Manufacturer or Producer, will make our technical and engineering staff fully available to the technical and engineering staff of the successful Bidder to assist that Bidder, on a reasonable and best effort basis, in the performance of all its obligations to the Purchaser under the Contract.

For and on behalf of the Manufacturer

Common Seal and Signature of the authorised person:
Name:
Designation:

NOTE:
This MA should be signed by a person having either of the following-
1) Valid Power of attorney
2) Authorised by Managing Director
3) Member of Board of Directors

Form-ELI-1
Bidder's information Sheet

Sl. No.	Particulars	Bidders' response
1	Bidders name and registered address	
2	Bidders authorised representative, designation and contacts	
3	GST Registration No.	

(Signature and common seal)
Name:
Designation:
Date:

Form – LIT
Pending Litigation

Year	Matter in Dispute	Value of Pending Claim in Rupees	Value of Pending Claim as a Percentage of Net Worth

(Signature and common seal)
Name:
Designation:
Date:

Form FIN – 1
Financial Situation

Information from Balance Sheet

Financial Data for Previous 3 Years [Rupees]	Year 1 [Mention Financial Year]	Year 2 [Mention Financial Year]	Year 3 [Mention Financial Year]
Total Assets			
Total Liabilities			
Net Worth			
Current Assets			
Current Liabilities			

Information from Income Statement

Total Revenues			
Profits Before Taxes			
Profits After Taxes			

Note: To be supported by audited financial documents

(Signature and common seal)
Name:
Designation:
Date:

Form FIN – 2
Average Annual Turnover

Annual Turnover Data for the Last 3 Years		
Year	**Amount (Rupees)**	
Average Annual Turnover		

The information supplied should be the Annual Turnover of the Bidder in terms of the amounts billed to clients for each year for contracts in progress or completed.

(Signature and common seal)
Name:
Designation:
Date:

Form FIN – 3
Financial Resources

Specify proposed sources of financing, such as liquid assets, unencumbered real assets, lines of credit, and other financial means, net of current commitments, available to meet the total cash flow demands of the subject contract or contracts with necessary supporting documents.

Financial Resources		
No.	**Source of financing**	**Amount (Rupees)**
1		
2		
3		

(Signature and common seal)
Name:
Designation:
Date:

Form FIN- 4
Current Contract Commitments

Bidders should provide information on their current commitments on all contracts that have been awarded, or for which a letter of intent or acceptance has been received, or for contracts approaching completion, but for which an unqualified, full completion certificate has yet to be issued.

No.	Contract No., Customer and name of work	Contract value (Rs.)	Estimated Completion Date	Value of Outstanding Work (Rs.)
1				
2				
3				
4				
5				

Form – EXP-1

Bidder must fill this form to establish eligibility as per clasue 1.6.2(i)

Sl. No.	Customer name	Contract No. and Date	Work order value	Contractor/supplier	Details of Product supplied and manufacturer of the product

Note: Order/contract copies are to be submitted as supporting document.

(Signature and common seal)
Name:
Designation:
Date:

Form – EXP-2

Bidder must fill this form to establish eligibility as per clasue 1.6.2(ii)

Sl. No.	Equipment/ Product name	Contract No. and date	End Customer	Contractor/ supplier	Completion date	Date of issue of performance certificate

Note: Following documents are to be submitted as supporting document:

ii) Relevant order/contract copies.
iii) Performance certificate (Should be in end customer's letterhead).

(Signature and common seal)
Name:
Designation:
Date:

Form – EXP-3

Bidder must fill this form to establish eligibility as per clasue 1.6.2(iii)

Sl. No.	Customer name	Contract No. and date	Work order value	Contractor/ supplier	Brief description of work	Completion date

Note: Following documents are to be submitted as supporting document:

i) Relevant order/contract copies.
ii) Completion certificate or Delivery Challan with customer signature.

(Signature and common seal)
Name:
Designation:
Date:

Price schedule

All prices are in Indian Rupees and exclusive of taxes

PRICE SCHEDULE 1: Supply of Battery Bank

(This BOQ template must not be modified/replaced by the bidder and the same should be uploaded after filling the relevent columns, else the bidder is liable to be rejected for this tender. Bidders are allowed to enter the Bidder Name and Values only)

NUMBER #	TEXT #	NUMBER #	TEXT #	NUMBER #	NUMBER #	TEXT #
Sl. No.	Item Description	Quantity	Units	Unit ExWorks (exclusive of taxes) In Figures To be entered by the Bidder in Rs. P	TOTAL AMOUNT (Without Taxes) in Rs. P	TOTAL AMOUNT In Words(INR)
1	2	4	5	13	53	55
1.00	110V, 300AH VRLA Battery Bank with Battery Stand and all other fittings and accessories as per specifications	2.00	Nos.		0.00	INR Zero Only
2.00	48V, 165AH VRLA Battery Bank with Battery Stand and all other fittings and accessories as per specifications	8.00	Nos.		0.00	INR Zero Only
Total in Figures					0.00	INR Zero Only
Quoted Rate in Words		INR Zero Only				

PRICE SCHEDULE 2: F&I associated with supply of Battery Bank

(This BOQ template must not be modified/replaced by the bidder and the same should be uploaded after filling the relevent columns, else the bidder is liable to be rejected for this tender. Bidders are allowed to enter the Bidder Name and Values only)

NUMBER #	TEXT #	NUMBER #	TEXT #	NUMBER #	NUMBER #	TEXT #
Sl. No.	Item Description	Quantity	Units	Unit ExWorks (exclusive of taxes) In Figures To be entered by the Bidder in Rs. P	TOTAL AMOUNT (Without Taxes) in Rs. P	TOTAL AMOUNT In Words(INR)
1	2	4	5	13	53	55
1.00	110V, 300AH VRLA Battery Bank with Battery Stand and all other fittings and accessories as per specifications	2.00	Nos.		0.00	INR Zero Only
2.00	48V, 165AH VRLA Battery Bank with Battery Stand and all other fittings and accessories as per specifications	8.00	Nos.		0.00	INR Zero Only
Total in Figures					0.00	INR Zero Only
Quoted Rate in Words		INR Zero Only				

PRICE SCHEDULE 3: Supply of Battery Charger and DCDB

(This BOQ template must not be modified/replaced by the bidder and the same should be uploaded after filling the relevent columns, else the bidder is liable to be rejected for this tender. Bidders are allowed to enter the Bidder Name and Values only)

NUMBER #	TEXT #	NUMBER #	TEXT #	NUMBER #	NUMBER #	TEXT #
Sl. No.	Item Description	Quantity	Units	Unit ExWorks (exclusive of taxes) In Figures To be entered by the Bidder in Rs. P	TOTAL AMOUNT (Without Taxes) in Rs. P	TOTAL AMOUNT In Words(INR)
1	2	4	5	13	53	55
1.00	110V, 85A Dual FCBC Charger suitable for 300AH VRLA with all fittings and accessories	2.00	Nos.		0.00	INR Zero Only
2.00	48V, 50A Dual FCBC Charger suitable for 165AH VRLA with all fittings and accessories	7.00	Nos.		0.00	INR Zero Only
3.00	110V DCDB with all fittings and accessories	1.00	Nos.		0.00	INR Zero Only
4.00	48VDCDB with all fittings and accessories	4.00	Nos.		0.00	INR Zero Only
Total in Figures					**0.00**	INR Zero Only
Quoted Rate in Words		**INR Zero Only**				

PRICE SCHEDULE 4: F&I associated with supply of Battery Charger and DCDB

(This BOQ template must not be modified/replaced by the bidder and the same should be uploaded after filling the relevent columns, else the bidder is liable to be rejected for this tender. Bidders are allowed to enter the Bidder Name and Values only)

NUMBER #	TEXT #	NUMBER #	TEXT #	NUMBER #	NUMBER #	TEXT #
Sl. No.	Item Description	Quantity	Units	Unit ExWorks (exclusive of taxes) In Figures To be entered by the Bidder in Rs. P	TOTAL AMOUNT (Without Taxes) in Rs. P	TOTAL AMOUNT In Words(INR)
1	2	4	5	13	53	55
1.00	110V, 85A Dual FCBC Charger suitable for 300AH VRLA with all fittings and accessories	2.00	Nos.		0.00	INR Zero Only
2.00	48V, 50A Dual FCBC Charger suitable for 165AH VRLA with all fittings and accessories	7.00	Nos.		0.00	INR Zero Only
3.00	110V DCDB with all fittings and accessories	1.00	Nos.		0.00	INR Zero Only
4.00	48VDCDB with all fittings and accessories	4.00	Nos.		0.00	INR Zero Only
Total in Figures					0.00	INR Zero Only
Quoted Rate in Words		INR Zero Only				

PRICE SCHEDULE 5: Erection, Testing and Commissioning of Battery Bank, Battery Charger and DCDB

(This BOQ template must not be modified/replaced by the bidder and the same should be uploaded after filling the relevent columns, else the bidder is liable to be rejected for this tender. Bidders are allowed to enter the Bidder Name and Values only)

NUMBER #	TEXT #	NUMBER #	TEXT #	NUMBER #	NUMBER #	TEXT #
Sl. No.	Item Description	Quantity	Units	Unit ExWorks (exclusive of taxes) In Figures To be entered by the Bidder in Rs. P	TOTAL AMOUNT (Without Taxes) in Rs. P	TOTAL AMOUNT In Words(INR)
1	2	4	5	13	53	55
1.00	110V, 300AH VRLA Battery Bank with Battery Stand and all other fittings and accessories as per specifications	2.00	Nos.		0.00	INR Zero Only
2.00	48V, 165AH VRLA Battery Bank with Battery Stand and all other fittings and accessories as per specifications	8.00	Nos.		0.00	INR Zero Only
3.00	110V, 85A Dual FCBC Charger suitable for 300AH VRLA with all fittings and accessories	2.00	Nos.		0.00	INR Zero Only
4.00	48V, 50A Dual FCBC Charger suitable for 165AH VRLA with all fittings and accessories	7.00	Nos.		0.00	INR Zero Only
5.00	110V DCDB with all fittings and accessories	1.00	Nos.		0.00	INR Zero Only
6.00	48VDCDB with all fittings and accessories	4.00	Nos.		0.00	INR Zero Only
Total in Figures					**0.00**	INR Zero Only
Quoted Rate in Words		**INR Zero Only**				

Note: The price schedule presented here is for reference only. Bidders must submit the price using the price schedule available in e-tendring portal.

Section - 3

Purchaser's Requirements

TECHNICAL SPECIFICATION OF BATTERY BANK, CHARGER AND DCDB

3.1.0 SCOPE

The brief description of scope of scope covered under this Bidding Document is furnished below:

a) Design, manufacture, supply and delivery of Battery Bank and Charger.

b) Erection, Testing and commissioning of Battery Bank, Charger and DCDB at AEGCL site.

c) Arrangements of any permits required for transportation and movment of supplied materials. However, AEGCL shall assist as far as practicable in the process.

d) Transit insurance and insurance during storage at site till commissioning shall be in the scope of the contractor.

3.2.0 SERVICE CONDITIONS

Bidder should note the following climatic and other conditions prevailing in the location of work:

a)	Peak ambient day temperature in still air			: 45°C
b)	Minimum night temperatures			: 0°C
c)	Ground temperatures			: 40°C
c)	Reference ambient day temperature			: 45°C
d)	Relative Humidity	a)	Maximum	: 100 %
		b)	Minimum	: 10 %
e)	Altitude			: Below1000 M above MSL
f)	Maximum wind pressure			: As per IS: 802 latest code.
g)	Seismic Intensity			: ZONE-V as per IS 1893.

3.3.0 TECHNICAL SPECIFICATION

This section of the specification covers the design, manufacture, and testing at manufacturer's work, of stationary type sealed, Valve Regulated Lead Acid Battery Bank, Dual FCBC Battery Charger complete with all required accessories for various Sub-stations.

These equipments are to be complete in every respect, details to the functions designated to the entire satisfaction of the purchaser. It is required that the supplier accepting the contract agrees to furnish all apparatus, appliances and material whether specifically mentioned or not but which may be found necessary to complete, to perform and testing any of the herein specified equipment (s) for compliance with the requirements implied without extra charges. The erection/maintenance tools and specific tools if any will also form part of supply.

3.3.1. Type Tests

(i) The Battery, Battery Charger and MCCBs offered shall be fully type tested as per relevant Indian Standard/IEC. Equipment which has never been tested for critical performance by a NABL accredited testing laboratory shall not be accepted. In such cases, a promise or

agreement by a bidder to have the equipment tested after award of a contract is not acceptable.

(ii) Test reports to be acceptable must be related directly to the equipment offered. The Bidder shall furnish type test reports with the technical bid such as relevant drawings and specification so that test reports can be linked to the offered equipment. **Test reports for a similar or higher class of equipment are acceptable with a commitment to perform the type test on the particular equipment after the contract is awarded, free of any charges**.

(iii) The above said test reports submitted with the offer shall not be older than **five years**, prior to the date of opening of bid.

3.3.2. General Technical Requirement

All the materials/components used in Battery Chargers and Valve Regulated Lead Acid Battery (VRLA) shall be free from flaws and defects and shall conform to relevant standards and good engineering practices:

Bidder shall select number of cells, float and Boost voltage to achieve requirements as specified in clauses hereafter:

3.3.3. BATTERY BANK

3.3.3.1. TYPE AND RATING

A. For 110 V DC Battery Bank

i) Stationary type, sealed, valve regulated lead acid battery bank suitable for operation on 110 Volts D.C. system to meet loads like emergency lightning, control and signaling circuits, relays, breaker operations, circuit breaker spring charging, indicating circuits, etc. shall be required. The stationary battery shall comply with the provisions of IS: 15549/IEC 60896.
ii) The Ampere-hour capacity of the battery bank at 27°C at 10 hours discharge rate shall be **300 AH**.
iii) The nominal voltage of the battery bank shall be 110 Volts D.C.
iv) The number of cells in a complete battery bank set shall be 55 plus 2 spares.
v) The maximum voltage during float operation shall not be more than 121 V.
vi) Minimum voltage available when no charger is working and battery fully discharged up to 1.85 V per cell, shall not be less than 99 V.

B. For 220 V DC Battery Bank

i) Stationary type, sealed, valve regulated lead acid battery tank suitable for operation on 220 Volts D.C. system to meet loads like emergency lightning, control and signaling circuits, relays, breaker operations, circuit breaker spring charging, indicating circuits, etc. shall be required. The stationary battery shall comply with the provisions of IS: 15549/IEC 60896.
ii) The Ampere-hour capacity of the battery bank at 27°C at 10 hours discharge rate shall be **400 AH**.
iii) The nominal voltage of the battery bank shall be 220 Volts D.C.
iv) The number of cells in a complete battery bank set shall be 110 plus 2 spares.
v) The maximum voltage during float operation shall not be more than 242 V.

vi) Minimum voltage available when no charger is working and battery fully discharged up to 1.85 V per cell, shall not be less than 198 V.

3.3.3.2. **PLATES**

Positive plates shall be made of flat pasted type using lead-cadmium-antimony alloy for durability, high corrosion resistant, maintenance free, long life both in cyclic as well as in, float applications.
Negative plates shall be heavy duty, durable flat plate using lead calcium alloy pasted box grid. Negative plates shall be designed to match the life of positive plates and combination of negative and positive plates shall ensure long life, durability and trouble free operation of battery.

PLC operated equipment should be deployed for preparation of paste to ensure consistency in paste quality. Conventional / manual type of paste preparation is not allowed.

3.3.3.3. **CONTAINER AND LID**

The containers and lids shall be made of a special grade polypropylene copolymer plastic material. They shall be sufficiently robust and not liable lo deformation under internal operating pressures and within the temperature range naturally encountered, leak proof, non-absorbent and resistant to the acid with low water vapour permeability.

3.3.3.4. **VENT PLUGS**

Each cell shall be equipped with one-way safety valve with opening pressure of 5±1 psi and closing pressure 4±1 psi. The vent plug shall be made with suitable grade of fire retardant plastic material. Each valve opening shall be covered with flame barrier capable in preventing the ingress of flame into the cell interior when the valve opens and hydrogen / oxygen gas mixture is released.

3.3.3.5. **Flame Arrestors**

Each cell shall be equipped with a Flame Arrestor to defuse the Hydrogen gas escaped during charge and discharge. Material of the flame arrestor shall not affect the performance of the cell.

3.3.3.6. **SEPARATORS**

Separator shall be made of spun glass, micro porous matrix and shall be resistant to Sulphuric Acid. It shall be capable of keeping the entire electrolyte and shall be electrically insulated. Sufficient separator overlap and PVC shield protection to top and bottom edges of the plates is to be provided to prevent short circuit formation between the edges of adjacent plates.

3.3.3.7. **CONNECTORS**

The connectors shall be lead coated copper of suitable size to join the cells. The connectors shall be suitably designed and coated to withstand corrosion due to sulphuric acid. The coating should be adequate and tenacious. All the copper inter cell connectors shall be provided with heat shrinkable sleeves except at the connecting points.

3.3.3.8. **ELECTROLYTE:**

The electrolyte shall be prepared from the battery grade Sulphuric Acid confirming to IS: 266. The batteries shall be supplied in factory filled and charged condition.

3.3.3.9. **WATER**

Water required for preparation of electrolyte shall conform to IS: I069.

3.3.3.10. **PLATE CONNECTION**

Lugs of plates of like polarity shall be connected by lead burning to a horizontal strap having an upstanding terminal post adopted for connection to external circuit. Strap and post shall be caste with lead alloy. The positive and negative terminal posts shall be clearly marked for unmistakable identification.

3.3.3.11. **BOLTS AND NUTS**

Nuts and Bolts for connecting the cells shall be of superior grade passivated Stainless steel.

3.3.3.12. **TERMINALS**

Terminals shall be of integral lead terminal with solid copper core with M6 threading for fastening. The junction between terminal posts and cover and between the cover and container shall be hermetically sealed.

3.3.3.13. **BATTERY RACKS**

Batteries shall be installed on MS racks to be supplied by the Contractor to fit in the battery room. Racks/Trays shall be powder coated with anti-corrosive paint. Rack shall accommodate 55/110 cells plus 2 spares. Racks/Tray shall be suitably treated before painting for protection against fungus growth and other harmful effects due to tropical environment.
The colour of the supporting racks shall conform to shade 631 of IS: 5.

3.3.3.14. The permissible self-discharge rate shall be less than 3% of the obtained capacity per month at 27°C when tested as per the relevant clause of the IS 15549

3.3.3.15. The Ah efficiency as measured in conformance with the relevant IS shall not be less than 90%.

3.3.3.16. The Wh efficiency as measured in conformance to the relevant IS shall not be less than 80%.

3.3.3.17. The Oxygen recombination efficiency as measured in conformance with the relevant clause of IS1549 shall be not less than 95%

3.3.3.18. The charging instructions shall be provided along with the batteries.

3.3.3.19. **Capacity Requirements**

When the battery is discharged at 10 hour rate, it shall deliver 80% of C (rated capacity, corrected at 27º Celsius) before any of the cells in the battery bank reaches 1.85V/cell.
The battery shall be capable of being recharged from the fully exhausted condition (1.75V/cell) within 10 hrs up to 90% state of charge. All the cells in a battery shall be designed for continuous float operation at the specified float voltage throughout the life.
The capacity (corrected at 27ºCelcius) shall also not be less than C and not more than 120% of C before any cell in the battery bank reaches 1.75V/cell. The battery voltage shall not be less than the following values, when a fully charged battery is put to discharge at C/10 rate:

a. After Six minutes of discharge: 1.98V/cell
b. After Six hours of discharge: 1.92V/cell
c. After 8 hours of discharge: 1.85V/cell
d. After 10 hours of discharge: 1.75V/cell

Loss in capacity during storage at an average ambient temperature of 35º Celsius for a period of 6 months shall not be more than 60% and the cell/battery shall achieve 85% of its rated capacity within 3 charge/discharge cycles and full rated capacity within 5 cycles, after the storage period of 6 months. Voltage of each cell in the battery set shall be within 0.05V of the average voltage throughout the storage period. Ampere hour efficiency shall be better than 90% and watt hour efficiency shall be better than 80%.

3.3.3.20. **Expected Battery Life**

The battery shall be capable of giving 1200 or more charge/discharge cycles at 80% Depth of discharge (DOD) at an average temperature of 27º C. DOD (Depth of Discharge) is defined as the ratio of the quantity of electricity (in Ampere-Hour) removed from a cell or battery on discharge to its rated capacity.
The battery sets shall have a minimum expected life of 20 years at float operation.

3.3.3.21. **Accessories along with Battery System**

Each battery shall be supplied with following accessories and devices:

(a) Torque Wrench.
(b) Cell Test Voltmeter (-3-0-+ 3) Volts with least count of 0.01 Volt

3.3.3.22. **TYPE TEST OF BATTERY**

The Bidder/Supplier shall supply type tested battery per IS 15549: 2004/IEC 60896-21 & 22 over the range of at least one capacity per design and should have met requirement of Service Life test as per above stated IEC standards within last seven years. The Bidder shall submit necessary evidences enclosed along with tender documents.

Sr.No	Description
1	Gas Emission

2	High Current Tolerance
3	Short Circuit Current and DC internal resistance
4	Protection against internal ignition from external spark source
5	Protection against ground short propensity
6	Content & durability of required marking
7	Material Identification
8	Valve Operation
9	Flammability Rating of material
10	Intercell connector performance
11	Discharge Capacity
12	Charge Retention during storage
13	Float Service with daily discharge for reliable mains power
14	Recharge behavior
15	Service life at an operating temperature of 32 deg C for brief duration exposure time
16	Impact of stress temperature of 60^{o}C for brief duration exposure time with 3 hours discharge test
17	Abusive Over discharge
18	Thermal runway sensitivity
19	Low temperature sensitivity
20	Dimensional sensitivity at elevated internal pressure & temperature
21	Stability against mechanical abuse of units during installation

3.3.3.23. **Routine Test of Battery**

1. Physical examination test
2. Visual Inspection
3. Dimensions, Mass & Layout
4. Marking & Packing

3.3.3.24. **Acceptance Test of Battery**

1. Polarity Marking
2. Verification of Dimensions
3. Test of AH Capacity.

3.3.3.25. **Installation and Commissioning**

Contractor/Manufacturer of battery shall install Battery Bank, as recommended in O&M manual/or relevant standards. All necessary instruments, materials, tools and tackles required for installation, testing at site and commissioning are to arranged by battery Contractor/manufacturer.

3.3.3.26. **MARKING AND PACKING:**

MARKING:

The following information shall be indeligibly and durably marked on the outside of the cell.

(a) Nominal Voltage

(b) Manufacturer's name, type and model name.

(c) AH capacity at 10 hour rate.

(d) Voltage for float operation at 20 deg. C with tolerance of (+/-) 1%.
(e) Month & year of manufacturer
(f) Country of origin.
(g) S.No. of cell/cell No.

PACKING:

The cells shall be suitably packed so as to avoid any loss or damage during transit.

3.3.3.27. **INSTRUCTION MANUAL:**

The manufacturer shall supply one copy of instructions manual for initial charging (if required)/treatment, and routine maintenance during service, with each and every battery set. The manufacturer shall supply 5 copies of instructions manual to the purchaser.
The following information shall be provided on, the instruction cards.

(a) Designation of cell or battery
(b) Ampere hour capacity.
(c) Nominal voltage
(d) Manufacturer's instructions for charging
(e) Voltage for float operation at 20 deg. C with tolerance (+/-) 1%.
(f) Maintenance instructions
(g) Environmental & safety provisions required.

3.3.3.28. **DRAWINGS:**

The tenderer will submit the detailed dimensional drawings for battery sets including stands.

3.3.3.29. **GUARANTEED TECHNICAL PARTICUALRS:**

Guaranteed Technical Particualrs for battery sets as per Schedule-3.1 attached shall be furnished along with the tender.

3.3.3.30. **ACCESSORIES:**

Each battery set shall be supplied complete with all necessary accessories viz. stand, inter connections, cell no. Plates with sticker, multi meter complete with leads, spanners.

3.3.3.31. **BILL OF MATERIAL:**

The manufacturer shall also have to furnish the bill of material used in battery set.

3.3.4. BATTERY CHARGERS

3.3.4.1. SCOPE:

Battery Charger for 220V/110V/48V DC Battery Bank:

(i) **The 48V, 110V and 220V chargers shall be of Dual FCBC type which will have output connectivity to single battery bank and load.**

RATING OF BATTERY AND FUNCTION OF CHARGER:

(ii) D.C. Power Supply shall comprise a set of Battery (48V/110V/220V) of desired capacity, Dual Float cum Boost Battery Charger (minimum 85A) in parallel operation. In this mode the charger shall be required not only to continuously feed a variable load but also deliver trickle/boost charging current for the battery. Charger shall have 20%

spare capacity. Battery will be capable of feeding the DC load requirement of the Sub-station in case of failure of the charger. Ampere-hour capacity of the battery shall be designed considering the current load and expected future load due to extension of the Sub-Station (if not specified, then minimum 3 nos of future bays are to be considered for each voltage class). A detailed design calculation for both battery & charger are to be submitted for approval.

(iii) **TRICKLE / BOOST CHARGE VOLTAGE:**

(iv) The trickle and Boost charge voltage per cell shall be as follows:

(v) a) 220V Battery Bank, 110V Battery bank, 48V battery bank

(vi) i) TRICKLE CHARGE: Per Cell Voltage 2.2 V to 2.25±0.02 V

(vii) ii) Boost charge voltage should vary between 2.23 to 2.3V/cell.

The DC system for 110V and 220V DC is unearthed. The Battery Chargers as well as their automatic regulators shall be of static type and shall be compatible with liquid station lead-acid batteries. All battery chargers **shall match with the battery** and shall be capable of continuous operation at the respective rated load in float charging mode while supplying the DC load. The chargers shall also be capable of Boost charging the associated DC battery at the desired rate.

Under normal operating conditions the charger should give a D.C. output equal to the steady demand load for signal lamps, auxiliary relays etc. plus an output to trip coils and closing coils of the circuit breakers and relays as and when required as well as float charging current of the battery. Charger shall have 20% spare capability.

(ii) Battery Charger for 48V DC Battery Bank:

The charger shall be suitable for charging the battery and supplying the load simultaneously. The entire charger scheme shall be divided in two sections, "float cum boost charger section" and "float-cum-boost charger section"(minimum 50 A) in parallel operation.

The rating of the charger shall be as under:

a. **110 V DC System: 85 A.**
b. **48 V DC System: 50 A.**

3.3.4.2. GENERAL DESCRIPTION FOR CHARGERS:

a) The battery chargers shall be provided with facility for both automatic and manual control of output voltage and current. A selector switch shall be provided for selecting the mode of output voltage/current control, whether automatic or manual. When on automatic control mode during float charging, the chargers output voltage shall remain within + 1% of the set value, for AC input voltage variation of + 10%, frequency variation of + 5% a combined voltage and frequency variation of + 10% and a DC load variation from zero to full load.

b) The battery chargers shall have constant voltage characteristics throughout the range (from zero to full load) at the floating value of the voltage so as to keep the battery fully charged but without harmful overcharge and designed to provide fully automatic voltage stabilization and current limitation for charging.

c) The chargers shall have load limiters having drooping characteristics, which shall cause, when the voltage control is in automatic mode, a gradual lowering of the output voltage when the DC load current exceeds the Load limiter setting of the Charger. The Load- limiter characteristics shall be such that any sustained overload or short circuit in DC system shall not damage the Charger nor shall it cause blowing of any of the Charger fuses. The Charger shall not trip on overload or external short circuit.

d) Uniform and step less adjustments of voltage setting (in both manual and automatic modes) shall be provided on the front of the Charger panel covering the entire

float charging output range specified. Step less adjustments of the Load-limiter setting shall also be possible from 80% to 100% of the rated output current for charging mode.

e) During Boost Charging, the Battery Charger shall operate on constant voltage with current limit mode (when automatic regulator is in service) to restrict battery charging current as specified. After completion of boost charging this float cum boost converter section either goes standby mode or float mode as desired by the system.

f) The Charger manufacturer may offer an arrangement in which the voltage setting device for Float charging mode is also used as output voltage limit setting device for Boost charging mode and the Load-limiter of Float charging mode is used as current setting device in boost charging mode for Float cum Boost Converter section.

g) Suitable filter circuits shall be provided in all the chargers to limit the ripple content (Peak to Peak) in the output voltage to 1% irrespective of the DC load level, when they are not connected to a battery.

h) **MCCB**

All Battery Chargers shall have sufficient MCCBs on the input side to receive cables from two sources.

Mechanical interlock should be provided such that only one source shall be closed at a time. It shall be of P2 duty and suitable for continuous duty with breaking capacity minimum 25KA at 415V AC. MCCB's should have auxiliary contacts for annunciation.

i) **Rectifier Transformer**

The rectifier transformer shall be continuously rated, dry air cooled (A.N) an of class F insulation type. The rating of the rectifier transformer shall have 10% overload capacity. The transformer shall be of suitable rating to comply with maximum output with minimum input voltage.

j) **Rectifier Assembly**

The rectifier assembly shall be fully/half controlled bridge type and shall be designed to meet the duty as required by the respective charger. The rectifier shall be provided with heat sink having their own heat dissipation arrangements with natural air cooling. Necessary surge protection devices and rectifier type test acting HRC fuses shall be provided in each arm of the rectifier connections.

k) **Instruments**

One AC voltmeter and one AC ammeter along with selector switches shall be provided for all chargers. One DC voltmeter and DC ammeter (with shunt) shall be provided for all chargers. The instruments shall be of 96 mm X 96 mm square dial & shall be flush type, dust proof and moisture resistant. The instruments shall have easily accessible means for zero adjustment. The instruments shall be of 1.5 accuracy class. In addition to the above a centre zero voltmeter with selector switch shall also be provided for 220 V Chargers for testing purpose.

l) **Air Break Switches**

One DC output switch shall be provided in all chargers. They shall be air break type suitable for 500 Volts AC/ 250 V DC. The contacts of the switches shall open and close with a snap action. The operating handle of the switch shall be fully insulated from circuit. 'ON' and 'OFF' position on the switch shall be clearly indicated. Rating of switches shall be suitable for their continuous load. Alternatively, MCCB's of suitable ratings shall also be acceptable in place of Air Break Switch.

m) **Fuses**

All fuses shall be HRC Link type. Fuses shall be mounted on fuse carriers which are in turn mounted on fuse bases. Wherever it is not possible to mount fuses on carriers, fuses shall be directly mounted on plug-in type base. In such case one insulated fuse pulling handle shall be supplied for each charger. Fuse rating shall be chosen by the Bidder

depending on the circuit requirement. All fuses in the chargers shall be monitored. Fuse failure annunciation shall be provided on the failure of any fuse.

n) **Blocking Diode**

Blocking diode shall be provided in the positive pole of the output circuit of each charger to prevent current flow from the DC battery into the charger. All the semiconductor devices shall be protected with power transient suppressor circuit.

o) **Annunciation System**

Audio-visual indications through bright LEDs shall be provided in all Chargers for the following abnormalities: -

(i) AC Power failure.
(ii) Rectifier/chargers fuse blown (separate for Dual Float cum boost charger).
(iii) Over voltage across the battery when boost charging.
(iv) Abnormal DC Bus voltage (High/Low)
(V) Charger Failure
(v) Any other annunciation if required

Potential free NO contacts of above abnormal conditions shall also be provided for common remote indication “CHARGER TROUBLE” in Owner’s Control Board. Indication for charger in float mode and boost mode through indication lamps shall be provided for chargers. A Potential free contact for float/boost mode shall be provided for external interlocks.

p) **Name Plates and Marking**

The name plates shall be white with black engraved letters. On top of each Charger, on front as well as rear ides, larger and bold name plates shall be provided to identify the Charger. Name plates with full and clear inscriptions shall also be provided on and inside of the panels for identification of the various equipment and ease of operation and maintenance.

q). The power factor shall be better than 0.8 lagging at full load and minimum efficiency at half-load is not less than 85% at rated line voltage. It shall be ensured that the harmonics due to Silicon controlled Rectifier commutation are not reflected back into the AC power supply.

3.3.4.3. Charger Construction

The Chargers shall be indoor, floor-mounted, self-supporting sheet metal enclosed cubicle type. The Contractor shall supply all necessary base frames, anchor bolts and hardware. The Chargers shall be fabricated from 2.0mm cold rolled sheet steel and shall have folded type of construction. Removable gland plates for all cables and lugs for power cables shall be supplied by the Contractor. The lugs for power cables shall be made of electrolytic copper with tin coat. Power cable sizes shall be advised to the Contractor at a later date for provision of suitable lugs and drilling of gland plates. The Charger shall be tropicalized and vermin proof. Ventilation louvers, if provided shall be backed with screens. All doors and covers shall be fitted with synthetic rubber gaskets. The chargers shall have hinged double leaf doors provided on front and on backside for adequate access to the Charger’s internals. All the charger cubicle doors shall be properly earthed. The degree of protection of enclosure shall be at least IP-42 as per IS: 13947 Part-1.

All indicating instruments, control switches and indicating lamps shall be mounted on the front side of the Charger.

Each Charger shall be furnished completely wired up to power cable lugs and terminal blocks and ready for external connections. The control wiring shall be carried out with PVC insulated, 1.5 sq.mm. Stranded copper wires. Control terminals shall be suitable for connecting two wires, with 2.5 sq.mm stranded copper conductors. Each wire shall be continuous from end to end and shall not have any joint within itself. The insulation grade

of the wiring shall be 1100 V grade. The colour of 3 Phase, 4 Wire AC. supply shall be red, yellow, blue and black for phases and neutral. The D.C. wiring shall be of the colour other than the above (preferably grey) with the +ve and -ve marking in the ferrule. All terminals shall be numbered for ease of connections and identification. Each wire shall bare a ferrule or tag on each end for identification. At least 20% spare terminals shall be provided for control circuits.

The insulation of all circuits, except the low voltage electronic circuits shall withstand test voltage of 2 KV AC for one minute. An air clearance of at least ten(10) mm shall be maintained throughout for such circuits, right up to the terminal lugs. Whenever this clearance is not available, the live parts shall be insulated or shrouded.

3.3.4.4. Painting of Charger

The Panels shall be pre-treated using 7-Tank process and then Epoxy Powder Coated with Paint shade of RAL 7032.

The inside of the chargers shall be glossy white. Each coat of finishing synthetic enamel paint shall be properly staved. The paint thickness shall not be less than fifty (70) microns.

3.3.4.5. TESTS ON CHARGER

Battery Chargers shall conform to all type tes

ts as per relevant Indian Standard. Performance test on the Chargers shall also be carried out on each charger as per specification. Rectifier transformer shall conform to all type tests in IS: 4540 and short circuit test as per IS: 2026. Following type tests shall be carried out for compliance of specification requirements: -

a. Voltage regulation test.
b. Load limiter characteristics test
c. Efficiency tests
d. High voltage tests
e. Temperature rise test
f. Short circuit test at no load and full load at rated voltage for sustained short-circuit.
g. Degree of protection test
h. Measurement of ripple by oscilloscope.
i. Temperature compensation feature demonstration

The contractor may be required to demonstrate to the OWNER that the chargers conform to the specification particularly regarding continuous rating, ripple free output, voltage regulation and load limiting characteristic, before dispatch as well as after installation at site. At site the following tests shall be carried out: -

(i) Insulation resistance test
(ii) Checking of proper annunciation system operation

If a Charger fails to meet the specified requirements, the Contractor shall replace the same with appropriate Charger without affecting the commissioning schedule of the Sub-Station, and without any extra cost to the OWNER.

The Contractor shall present for inspection, the type and routine test certificates for the following components whenever required by the OWNER.

(i) Switches
(ii) Relays/MCCBs
(iii) Instruments
(iv) DC fuses
(v) SCR
(vi) Diodes
(vii) Condensers
(viii) Potentiometers
(ix) Semiconductor

(x) Annunciator
(xi) Control wiring
(xii) Push buttons and contactors

Makes of above equipment shall be subject to Owner's approval.

3.3.4.6. DOCUMENTATION

The successful bidder shall submit four sets of drawings for approval.

The following drawing shall be supplied with the tender: -

Outline drawings of all apparatus showing sufficient details to enable the purchaser to determine whether the design proposed can be installed satisfactorily or not. Wiring diagram of battery charger.

3.3.4.7(A): TECHNICAL SPECIFICATION FOR 220V, 110V and 48V DC BATTERY AND CHARGER

Sl. No	DESCRIPTION	PARTICULARS
1	Type	VRLA
2	Conforming Standards	IEC 60146, IEC 60478, IEC 60529, IEEE C57.12.01, ANSI C63.4, IEEE 446, NEMA
		250, NEMA PE5, NFPA 70
3	System Voltage	415V AC +/- 10% for 220V, 110V DC Battery & 240V AC +/- 10% for 48V DC Battery
4	Name of the Manufacturer	To be furnished by Bidder
5	Location of the Factory	To be furnished by Bidder
6	Type & Model of charger	To be furnished by Bidder
7	Total Dimension of Float cum Boost Charger in mm	To be furnished by Bidder
8	Minimum thickness of sheet (mm)	To be furnished by Bidder
9	Charger Characteristics	To be furnished by Bidder
10	Type of Rectifier with Model	To be furnished by Bidder
11	Capacity of Battery Charger in Amps	As per requirement
12	Float/Trickle charger current in Amps	To be furnished by Bidder
13	Boost/Quick charger current in Amps	To be furnished by Bidder
14	Voltage Regulation of Float charger (%)	To be furnished by Bidder
15	Ripple content (%)	To be furnished by Bidder
16	Schematic & GA drawings submitted	Yes/No
17	List of Alarms	To be furnished by Bidder
18	Audible noise at any point 150 centimeters from any vertical surface	Not exceeding 65dBA
19	Any other relevant information	To be furnished by Bidder

3.3.4.7 (B**):** The Battery Charger shall have Dual Source AC Input (AC Input 1 and AC Input 2) with individual MCCB and shall be provided with Auto Changeover arrangement**.**

3.3.4.7 (C): The Battery Charger shall have an IP Rating of IP42 or better. The Charger shall be type tested for IP42 or better rating.

3.5.0 TECHNICAL SPECIFICATION OF 48V BATTERY BANKS

3.5.1. ***TYPE***

3.5.1.1. **The** DC Batteries shall be VRLA (Valve Regulated Lead-Acid) type and shall be Normal Discharge type. These shall be suitable for a long life under continuous float operations and occasional discharges.

3.5.1.2. The Battery and accessories shall conform to IS: 15549/ IEC 60896 and other relevant IS/IEC standards except to the extent explicitly modified in this specification.

3.5.2. ***RATINGS***

3.5.2.1. The Ampere-hour capacity of the battery bank at **27°C at 10 hours discharge rate shall be 165 AH**.

3.5.2.2. The nominal voltage of the battery bank shall be **48 Volts D.C**.

3.5.2.3. The number of cells in a complete battery bank set shall be 24 plus 2 spares.

3.5.3. ***CAPACITY REQUIREMENTS***

3.5.3.1. When the battery is discharged at 10 hour rate, it shall deliver 80% of C (rated capacity, corrected at 27º Celsius) before any of the cells in the battery bank reaches 1.85V/cell.

3.5.3.2. The battery shall be capable of being recharged from the fully exhausted condition (1.75V/cell) within 10 hrs up to 90% state of charge. All the cells in a battery shall be designed for continuous float operation at the specified float voltage throughout the life.

3.5.3.3. The capacity (corrected at 27ºCelcius) shall also not be less than C and not more than 120% of C before any cell in the battery bank reaches 1.75V/cell. The battery voltage shall not be less than the following values, when a fully charged battery is put to discharge at C/10 rate:

(a) After Six minutes of discharge: 1.98 V/cell

(b) After Six hours of discharge: 1.92 V/cell

(c) After 8 hours of discharge: 1.85 V/cell

(d) After 10 hours of discharge: 1.75 V/cell

3.5.3.4. Loss in capacity during storage at an average ambient temperature of 35º Celcius for a period of 6 months shall not be more than 60% and the cell/battery shall achieve 85% of its rated capacity within 3 charge/discharge cycles and full rated capacity within 5 cycles, after the storage period of 6 months. Voltage of each cell in the battery set shall be within 0.05V of the average voltage throughout the storage period. Ampere hour efficiency shall be better than 90% and watt hour efficiency shall be better than 80%.

3.5.4. ***MATERIAL AND CONSTRUTIONAL REQUIREMENTS***

3.5.4.1. CONTAINER

The container shall be made of acid resistant and fire retardant grade polypropylene copolymer plastic and shall have chemical and electrochemical compatibility. The container material shall have an Oxygen Index of at least 28 %. The other requirement for plastic container shall be as per IS 1146.

3.5.4.2. CELL LIDS

The cell lids shall be made of same plastic material as that of container and permanently fixed with the container. It shall be capable to withstand internal pressure without bulging or cracking. Fixing of Pressure Regulation Valve & terminal posts in the cover shall be such that the seepage of electrolyte, gas escapes and entry of electro-static spark are prevented.

3.5.4.3. PLATES

The plates shall be of pasted construction and of good workmanship. These shall be free from cracks, white patches and other imperfections, which may affect the life and performance of the battery.

3.5.4.4. SEPARATORS

The separators used shall be of glass mat having high acid absorption capability, resistance to sulphuric acid and good insulating properties. The separator shall meet the test requirements as given in IEC/IS.

3.5.4.5. TERMINAL POSTS

Positive and negative terminals posts shall have built in lead plated copper or brass inserts. Terminals of cells shall be clearly and unmistakably identifiable and marking shall be of permanent nature. Terminal posts shall be suitably sealed at the lid to prevent leakage of any gas. Any gas escape shall be only through the venting device provided. The surface of the terminal post extending above the cell cover including bolt hole shall be coated with an acid resistant and corrosion retarding material.

3.5.4.6. FASTNERS

Nuts and bolts for connecting the cells shall be made of copper, brass or stainless steel. Copper or brass nuts and bolts shall be effectively lead coated to prevent corrosion. Stainless steel bolts and nuts shall be passivated to prevent corrosion with acid.

3.5.4.7. ELECTROLYTE

The sulphuric and water used for the preparation of electrolyte shall conform to IS 266 and IS 1069 respectively.

3.5.4.8. CONNECTORS

When it is not possible to bolt the cell terminals directly to assemble the battery, a separate lead coated copper connectors or flexible copper cable connectors of suitable cross-section shall be provided to join the cells. The lead plating on copper connectors shall not be less than 25 micron. The sulphuric and water used for the preparation of electrolyte shall conform to IS 266 and IS 1069 respectively.

3.5.4.9. VENTING DEVICE

Each cell shall be provided with a venting device (pressure regulation valve). The valve shall be self-re-sealable and flame retardant. The valve unit shall be such that it cannot be opened without a proper tool. The valve shall be capable to withstand the internal cell pressure specified by the manufacturer.

Each valve regulated venting device shall be provided with flame arrestor capable of preventing the ingress of moisture/flame into the cell interior when the valve release the gas mixture. The opening and closing pressure shall be within + 1 psi variation and manufacturer shall declare the closing and opening pressure values

3.5.5. ***BATTERY RACKS***

3.5.5.1. Batteries shall be installed on MS racks to be supplied by the Contractor to fit in the battery room. Racks/Trays shall be powder coated with acid proof, anti-corrosive paint. Rack shall accommodate 24 cells plus 2 spares. Racks/Tray shall be suitably treated before painting for protection against fungus growth and other harmful effects due to tropical environment.

3.5.5.2. The colour of the supporting racks shall conform to shade 631 of IS: 5.

3.6SPECIFICATION FOR DCDB

3.6.1 SCOPE:

a) This specification covers design, manufacture, assembly, testing, supply, and delivery at site of DC switchboard. This also includes design, supply, commissioning, laying and termination of D.C. supply cables of 1.1KV grade XLPE insulated stranded Copper cables of different sizes as per requirement for distribution of D.C. supply at different points of switchyard, control room building, Fire-fighting pump house etc. for various purpose for 400/220/132/33KV sub-station.

DC PANEL

Two numbers of D.C. Panel for distribution of D.C. supply associated with DC Supply of 400, 220,132 and 33kV System at different points in Control Room, Switch Yard and other locations as per need. The DC Panel shall have Two Incomer connected with Battery Charger -1 & BatteryCharger -2 wrt to Battery set - 1 & Battery set - 2. The DC Panel shall have one BusCoupler with proper Interlocking for independent operation of each DC System.

3.6.2 STANDARDS :

The equipment covered by this specification shall unless otherwise stated, be designed, constructed and tested in accordance with the applicable sections of the latest Indian Standard Specification and Indian Electricity Rules and as per this technical specification. The degree of protection shall not be less than IP-54. However,

Bus bar chamber having a degree of protection of IP:42 as per IS:2147 where continuous bas bar rating exceeds 1000A.

3.6.3DEVIATION :

Normally the offer should be as per Technical Specification without any deviation, **In case of any deviation taken against technical specification same are to be submitted in a separate deviation sheet for review of AEGCL.**

3.6.4MODIFICATION :

If any modification felt necessary to improve performance, efficiency and utility of equipment, the same must be mentioned in the 'Modification schedule' with reasons duly supported by documentary evidences and advantages. Such modifications suggested may or may not be accepted, but the same must be submitted along with Pre-Bid Queries. The modifications not mentioned in Schedule will not be considered.

3.6.5GENERAL SPECIFICATION OF D.C. SWITCH BOARD :

3.6.5.1 220 (+/- 10%) volt D.C. supply shall be made available from the station storage battery banks associated with battery charger. In case of existing sub-station, sub-station wise DC voltage shall be intimated to the successful bidder. The charger and battery shall be connected to the load bus of D.C. switchboard through separate 2-pole MCCB of suitable rating. There shall be interlocking arrangement through pad locks and keys so that one breaker can be closed at a time.

3.6.5.2 The D.C. switch boards shall be of multi-cubicle on multi box factory build air insulated type, fully enclosed with doors for access to the interior, 3.00 mm. thick steel sheet shall be used for the fabrication of the panels. Steel used for manufacturing shall be of reputed MAKE. Boards shall be easily extendible on both side, by addition of the vertical sections after removing the end covers. Dimension shall not be more than 1800 mm. high with channel base and 800 mm depth (or as per requirement) measured from the rear to front face. The working height of the switch board shall be minimum 450 mm. to maximum 1650 mm. The back cover of the switch board shall be provided with hinged door with locking arrangement. Length of the panel shall be determined as per no of circuits to be accommodated. All boards shall be divided into distinct vertical sections each comprising of -

(i) A completely enclosed bus bar compartment for running horizontal and vertical Copper bus bar. Bus bar chamber shall be completely enclosed with metallic portions. Bolted covers shall be provided for access to horizontal and vertical bus bars and all jointsfor repair and maintenance, which shall be feasible without disturbing feeder compartment. Proper ventilation arrangement shall have to be arranged and that shall be decided by the purchaser at the time of approval. Bus bar rating shall be as per requirement with additional 30% margin.

(ii) Completely enclosed switchgear compartments one for each circuit for housing incoming MCCB and outgoing MCCB.

(iii) A compartment for power and control cables. Door of compartment shall be hinged.Cable compartment shall have no communication with bus bar chamber.

(iv) A compartment for relays and other control devices associated with Incoming MCCB.

3.6.6 Design:

i. The D.C. switch boards shall be designed to facilitate cable entry from the bottom through entry holes of removable plates provided at the bottom of the cubicle. All the accessories required for termination of cable in the DCDB such as screwed brass cable gland, terminal block etc. shall be within the scope of supply, Gland shall project above the gland plate. Terminating cable shall be armoured and armoured rods shall be connected to earth bus. After isolation of power and control circuit connections it shall be possible to safely carryoutmaintenance in a compartment with the bus bar and adjacent circuit live. Necessary shrouding arrangement shall be provided for this purpose over the cable terminations located in cable alley.

ii. In case of providing two incomer MCCB compartment in the same vertical section, insulating barriers and shroud shall be provided in the rear cable compartment in order to avoid accidental touch with live part of one circuit when working with the other circuit.

iii. The connections from bus bars to main switch shall be fully insulated/shrouded andsecurely bolted. The partition between the feeder compartment and cable alley may be non-metallic and shall allow cable cores with lugs to be easily inserted in the feeder compartment for termination.

iv. Necessary and safe earthing arrangement with supply of all accessories required for safe earthing shall be within the scope of supply.

v. **A copper earthing bus bar** shall be provided at the bottom of each panel and shall extend through out the length of switchboard. It shall be welded/bolted to the frame work of each panel and breaker. Earthing contact bar vertical bus shall be providein each vertical section which shall in turn be bolted/welded to main horizontal ground bus.

vi. The earth bus shall have sufficient cross-section to carry momentary short circuit and short line fault currents to earth bus without exceeding the allowable temperature rise.

vii. The horizontal earth bus shall be projected out to the switchboard ends and shall have predrilled holes for bolted connection between this bus to sub-station earthing conductor.A joint spaced and taps to earth bus shall be made through at least two bolts.

viii. All non-current metal works of the switchboard shall be effectively connected to the earthbus.

ix. The switchboard shall be dust and vermin proof and suitable for use in

tropical climate. All ventilating louvers and holes shall be covered with fine non-ferrous wire mesh from inside. A suitable rust resisting primer paint shall be applied on the panel after the same is polished and the primer shall be evenly sprayed. The colour of the exterior of the panel shall be of same colour as that of the main control and relay panel. The colour of the interior panel should be as to provide a colour contrasting background for the wiring inside the cubicle.

x. The switchboards shall be mounted on channel and shall be complete with channel bottom plates, grouting bolts, earthing bolts, washers, cable glands etc. Fabrication of the channels shall be robust.

xi. All the MCCB's shall be of best quality and easy in operation.

xii. The number of outgoing feeders shall be controlled by suitably rated MCCB. Necessary arrangement shall be kept especially for emergency sub-station control building lighting particularly in Control room, ACDB room, Battery room, Fire fighting pump house, Corridor, Lobby, Stairs and oter emergency loads etc. in case of failure of AC main supply. Provision for audio visual indication with lamp and bell with facility for manual cancellation & resetting of alarm for failure of D.C. supply to the load bus or blowing of any fuse of D.C. circuit shall be made. Switchboard shall be installed in the DCDB room of control room building of 400/220/132/33KV sub-station. In case of tripping of any outgoing feeder MCCB, visual and audible alarm arrangement shall be provided in the DC Board as well as in the control room. Necessary arrangement shall also be provided for acceptance and resetting of the audible alarm. In case of tripping of Incoming feeder breaker, arrangement of both audible and visual annunciation shall be made at DC Board and control room. Acceptance and resetting arrangement is also to be provided. Visual indication of the failure of D.C. voltage at the load bus or blowing of any fuse can only be cancelled when the supply at bus will be restored or the fuse is replaced.

xiii. Adopter panels and dummy panels required to meet the various bus bar arrangements and layouts required shall be included in bidders' scope.

xiv. The temperature rise of horizontal and vertical bus bars when carrying rated current along its full run shall not exceed 55ºC with Silver plated joints and 40ºC with all other type of joints over an outside ambient temperature of 50ºC.

xv. All identical circuit breakers and module chassis of same test size shall be fully interchangeable without doing any modification work.

xvi. MCCB & MCB shall be from one of the following manufacturer's complying with technicalspecification & relevant IS & IEC

a) M/s Siemens
b) M/s L & T
c) M/s ABB
d) M/s Schneider

3.6.7 INTERNAL WIRING AND TERMINAL BLOCK :

3.6.7.1 All connection terminals shall be brought in the terminal block which shall be fixed in such a position as may be readily accessible.

3.6.7.2 All switchboards shall be supplied completely wired internally upto the terminal blocks.

3.6.7.3 All inter cubicle and inter panel wiring and connections between panels of same switchboard including all bus wiring for A.C. and D.C. supply shall be provided by the contractor.

3.6.7.4 All internal wiring shall be carried out with XLPE insulated stranded copper conductor 2.5 sq. mm. However for annunciation scheme wiring may be drawn with 1.5 sq. mm XLPE insulated stranded copper conductor.

3.6.7.5 All wiring shall be properly supported, neatly bunched, and readily accessible and securely connected to equipment terminals and terminal blocks.

3.6.7.6 There shall be ferrule marking at both ends of the connections. Red ferrule with positive marking shall be used for the positive terminals and white ferrule with negative marking for negative terminal for D.C. wiring.

3.6.7.7 Each wire shall be continuous and there shall not be any joint within itself. Wiring for meter, relays, instruments and MCCB etc. used in the switchboard shall be brought to the terminal block.

3.6.7.8 Terminal blocks shall be of 1100V grade 'Elmex' / 'Connectwell' make and have continuous rating to carry the maximum expected current on the terminals as well as short circuit current for specified duration. The terminal blocks shall be fully enclosed with removable covers of transparent, non-deteriorating type plastic material. Insulating barrier shall be provided between the terminals. The terminal blocks shall have locking arrangement to prevent its escape from the rails.

3.6.7.9 All terminal blocks shall be normally suitable for terminating on each side two nos. of 2.5 sq. mm. size stranded copper conductor.

3.6.7.10 If required TBs of other sizes shall also be provided.

3.6.7.11 All terminals shall be numbered for identification and grouped according to the function. Engraved white on black **anodized aluminum** labels shall be provided on the terminal blocks.

3.6.7.12 Terminal blocks shall be arranged with at least 200 mm

clearance between two sets of terminal block. The minimum clearance between the first row of terminal block and the associated cable gland plate shall be 250 mm.

3.6.7.13 Interlocks shall be designed for both the incomer breakers and bus coupler breaker. Interock logics shall be decided during detailed engineering.

3.6.8 NAMEPLATES AND LABELS:

D.C. distribution boards shall be provided with prominent, engraved identification plates. The module identification plate shall clearly give the feeder number and feeder designation. For single front switchboards, similar panel and board identification labels shall be provided at the rear also.

3.6.9 EQUIPMENT AND OTHER TECHNICAL INFORMATION FOR D.C. SWITCHBOARD :

3.6.9.1 One set of copper bus bar of adequate continuous rating as well as specified short circuit rating of specific duration, having continuous current density shall be provided.

3.6.9.2 Aux. Relay and contactor for alarm as well as visual indication against tripping of incoming MCCB as well as outgoing feeder MCCB shall be provided. However, indication will not go off till the restoration of failure.

3.6.9.3 ‘ON’, ‘OFF’ and ‘TRIP’ indicating lamps for both the incoming MCCB along with required number of push button shall be within the scope of supply.

3.6.9.4 Digital D.C. voltmeters having a scale range of 0-300 V.D.C. flush mounted, type having accuracy. +/- 1% of full scale, shall be provided as per requirement. The meters shall conform to the appropriate IS specification.

3.6.9.5 Digital D.C. ammeters, flush mounted, having range of 0-300 Amps. and accuracy +/- 1% of full scale, shall be provided for measurement of load current flowing to the D.C. switchboard. Rating of ammeter hall change if the load requirement is changed. Changed rating meters shall be under the scope of the successful bidder.

3.6.9.6 The ampere rating of MCCB for feeder protection shall be as per requirement of the feeder current but shall not be less than 32 Amps.

3.6.9.7 Doors at the back of the panel shall be provided for inspection with door switch for illumination of the lamp to be provided inside the panel with separate switch

fuse unit for controlling the lamp.

3.6.9.8 All the indicating lamps shall be of panel mounting cluster LED type. The lamps shall have suitable size plates marked with its function, wherever necessary. Lamps shall have translucent lamp covers of 'RED', 'GREEN' & 'WHITE' colour for indicating , 'ON', 'OFF' and 'AUTO-TRIP' indication of incoming MCCB's. One no. Indicating lamp is to be provided for tripping of outgoing feeder & DC supervision.

3.6.9.9 Space heater shall be provided for preventing harmful moisture condensation in all the D.C. Boards. The space heaters shall be suitable for continuous operation of 240V AC, 50HZ single phase supply and shall be automatically controlled by thermostats. Necessary isolating switches and HRC fuses shall be provided.

3.6.9.10 All the D.C. and A.C. HRC fuses, D.C. Aux. Relays, isolating copper links, D.C. emergency fuse,

3.6.9.11D.C. emergency & A.C. emergency contactor, A.C. bell, indicating lamp for indicating D.C. fail of main bus, D.C. contactor etc. shall be within the scope of supply of the contractor. Three nos. Push Button for testing annunciation scheme, resetting annunciation scheme and accept of fault and bell cancellation shall be provided.

3.6.9.12 Moulded case circuit breaker for both incomer circuit shall be of suitable Amp. rating (as per requirement) and double pole type. Each MCCB shall be provided with trip coil. MCCB shall be capable of safely breaking the fault current of the associated incoming feeder.

3.6.9.13 All the MCCB shall be flush mounted on D.C. Distribution boards.

3.6.9.14 MCCB's shall be provided with thermo-magnetic type release for over current and short circuit protection.

3.6.3.15 The setting range of thermal release and breaking capacity of MCCB's are to be specified and shall conform to circuit requirement.

3.6.9.16 MCCB shall have Mechanical Anti-reclosing and facilities for over load and short circuit setting adjustment. MCCB knob shall indicate the true position of the equipment. MCCB's shall conform to relevant Indian Standard.

3.6.9.17 Interlocks shall be provided such that it is possible to open the cubicle door only when the MCCB is in 'OFF' position and to close the MCCB when the door is closed.

3.6.10 GUARANTEE :

Electrical characteristics shall be guaranteed by the contractor. In case of failure of materials tomeet the guarantee, AEGCL shall have right to reject the material. Guaranteed Technical particulars are to be submitted by successful bidder during detailed engineering along with submitted drawings/documents. However, format for submission of GTP shall be handed over to intending bidders at the time of sale of tender documents.

3.6.11 PACKING AND DESPATCH :

All equipment shall have to be dispatched suitably and securely packed in wooden crates,suitable for handling during transit by rail and / or road.

3.6.12 CONTRACT DRAWINGS AND CATALOGUE :

3.6.12.1 After placement of Letter of Award four (4) copies of following drawing, G.T.P and literature shallbe submitted for approval.

(i) Single line diagram for each type of switchboard.

(ii) Dimensional drawing showing clearly the location of meter switches, MCCB etc. in the
D.C. switchboard arrangement in plan and elevation with foundation details.

(iii) Wiring diagram of D.C. switchboard showing the interconnection between terminals of various equipment and devices on and within the panel including approved schematic drawings.

(iv) Take off terminal connection arrangement.

(v) Catalogue of D.C. switchboard equipment.

3.6.13 TEST AT MANUFACTURER'S WORKS AND TEST CERTIFICATES :

Acceptance and routine test at manufacturers' works shall be carried out on each A.C. Board asper stipulation of relevant Indian Standard. The following tests on each switchboard shall be carried out and two copies of the test certificates to be submitted.

(i) Checking of wiring and continuity of the circuit.
(ii) Power frequency voltage test of 3KV for one minute between wiring and earth terminal.
(iii) Insulation resistance value of all equipment. Connected in switchboard and function of the same.

All the acceptance and routine tests shall be carried out in presence of representative of AEGCL. All tests and inspection shall be made at the place of manufacturer. The manufacturer shall provide reasonable testing and inspection facilities and co-operation without any charge to satisfy the representative that the material is being supplied is in accordance with this specification. The proto of DCDB shall be inspected & checked by Ordering

Authority or his representative for approval before commencement of supply. The entire cost of acceptance and routine tests that are to be carried out as per relevant IS shall be treated as included in quoted price of DCDB.

QAP: The bidder shall submit the standard Quality Assurance Plan mentioning all the routine test, FAT, site test etc.

3.6.14 TESTS REPORTS AND TYPE TESTS :

Type test reports of identical equipment shall be submitted in three copies.

All the Type Tests shall be carried out from laboratories which are accredited by the National Board of Testing and Calibration Laboratories (NABL) of Government of India such as CPRI/ERDA, to prove that the MCBs & other components used in DCDB meet requirements of the specification.

SPECIFIC TECHNICAL PARTICULARS OF D.C. DISTRIBUTION BOARDS

SNO	DESCRIPTION	TECHNICAL PARTICULARS
1.	Dimensions : a) Height of complete panel (mm.) b) Working height (mm.) c) Width (mm.) d) Depth	 1800 (max.) 450(min.)to 1650(max.) As per requirement. 800 mm (max.) or as per manufacturers type tested design
2.	Sheet steel thickness of panel (mm.)	3 (min.)
3.	Grade of insulation Level of equipments and wiring(KV)	1.1
4.	Annunciation for blowing of fuse or tripping of breaker	Alarm and visual indication
5.	Ammeter range	0 to **300** (or as per requirement of the load)
6.	Voltmeter range	0 to 300
7.	Accuracy class of Ammeter & Voltmeter	1% of full scale deflection
8.	Current density of Aluminium for Busbar (A/sq.mm.)	As per bus bar sizing
9.	Wiring for annunciation scheme shall be done withcopper of cross-section area (sq.mm.)	1.5 (Stranded)

10.	MCCB i) System Voltage ii) Insulating Voltage iii) Rated Imp withstand Voltage of main Ckt Uimp iv) Ambient Temperature v) Rated Continuous Current at 50°C vi) Ultimate Short Ckt Breaking Capacity Icu vii) Service Short Ckt Breaking Capacity Ics viii) Utilisation Category ix) Suitable for Isolation x) No. of Poles xi) Shunt Release Voltage xii) Permissible Variation in Voltage xiii) Termination suitable for Aluminium as per IS 13947 Part-II xiv) Insulation Material conforming to Glow Wire Test xv) Thermal Over load Settings xvi) Short Circuit Setting	 220 V DC 690 V 8 KV 50°C As per Rating 10 KA (DC Breaking) for < 100 A &30 KA for > 100 A 100% of Icu A Yes 4 Pole or 2 Pole – as perrequirement 220 V DC 85% to 110% Yes Yes Adjustable Adjustable for 4 Pole and Fixed for2 Pole

Note: The contractor is to supply DC switch board as per requirement after detailed engineering. Emergency lamp circuit in control room shall be automatically put into service through contactors when the AC supply will fail. **Catalogue of all relays with characteristic curve shall be submitted with tender documents**.

3.6.15 Sub Vendor List FOR DCDB:

Sl No.	PRODUCT	MAKE
1	**METERS DIGITALANDANALOGUE** AMMETER,VOLTMETER,	MECO,SECURE,RISHABH, VAISHNO
2	**KWHMETER**	L&T, SECURE, RISHABH
3	**FREQUENCYMETER**	RISHABH, MECO, VAISHNO
4	**FUSE FITTING &FUSELINK**	COPPERBUSHMANN, ABB, SIEMENS, L&T, GE
5	**TRANSDUCERS**VOLTAGET RANSDUCER,CURRENTTR ANSDUCER,FREQUENCY TRANSDUCERETC.	ELSTER, RISHABH, SIEMENS
6	**CONTACTORS**	L&T, SIEMENS, SCHNEIDER,GE, ABB
8	**PROTECTIONANDOTHERRELAYS**	ABB,GE,SIEMENS,Schneider
7	**SFU, MCCB,**	GE, ABB, L&T, SIEMENS,LEGRAND, SCHNEIDER
8	**MCB,**	SCHNEIDER,LEGRAND,ABB, SPRECHER &SCHUH(S&S)

9	**CT**	C&S, KAPPA, GILBERT MAXWELL, ABB,PRAGATI, GE, BHEL, SIEMENS
10	PT	C&S, KAPPA, GILBERTMAXWELL, CGL
11	**LTCONTROLSWITCHES**AMMETER, VOLTMETERSELECTOR SWITCHES,BREAKER	KAYCEE, RECOM, SWITRON, VAISHNO, GE, ABB
	CONTROLSWITCHES,ROTARYCAM / ROTARYSWITCH	
12	**ANNUNCIATOR,HOOTER,BUZZER, ELECTRONICBELL.**	PROTON,MINILEC,ALAN,VAISHNO.,PROCON,PIRI
13	**TERMINAL BLOCK,TERMINALENDPLATE**	ELMEX, CONNECTWELL
14	**SPACEHEATER**	SOFIA,GIRISH(EGO), VIKASELECT., GIRISH,APTCONTROL, KONTACT PYROS, TELELEC,HOTWELL,
15	**THERMOSTAT**	GIRISH(EGO),VIKASELECT.,APTCONTROL,KONTACTPYROS
16	**PANELTUBEFIXTURE, CHOKE, STARTER,ILLUMINATINLAMP**	PHILIPS,BAJAJ
17	**3PIN SWITCH SOCKET(INDUSTRIAL/SERVICE)/RECEPTACLE**	ANCHOR, CGL,SCHNEIDER, LEGRAND,ABB
18	**BUS BAR SUPPORTINSULATOR**	RAMANUJ,POWERMAT,VINAYAK,SUNINSULATOR, TECHNO , ESBEECONTROL
19	**PVC/FRLSWIRE**	KEI, POLYCAB, FINOLEX
20	**LUGS**	DOVELLS,COMET,JAINELECTRONICS,SJMETAL
21	**HARDWAREMS&SS**	TVS,KUNDAN,AGRWALFASTENERS,FITRIGHT
22	**POWERPACKS**	ALAN
23	**INDICATINGLAMP/LED,FILLAMENTLAMP**	L&T, GE,SIEMENS,SCHNEIDER
24	**PUSHBUTTONSWITHELEMENTS**	L&T, ABB,SIEMENS
25	**ELECTRONICTIMER**	L&T, GE, ABB, SCHNEIDER, SIEMENS
26	**RUBBERGASKET (NEOPRINE/EPDM)**	MINERVARUBBER&ENGGIND.,HANUIND.,JSONPOLYMER, RITTAL, R K PROFILE, ASP MINERVA, RKPROFILE
27	**M.S.CRCA/HRCASHEETS /COILS**	TATA,SAIL,ESSAR
28	**ALUMINIUMBUSBAR**	SUDAL,HINDALCO,JINDAL, BALCO
29	**COPPERBUSBAR**	VIJAY IND., NEW INDIA CUPROTEC, CUBEXTUBING LTD (HYDERABAD)., ALCOBEXJODHPUR(MUMBAI),,MODISONMETAL, CITIZENMETALLOYS(AHMEDABAD),RHJ EXTRUSION(DAMAN)
30	**LIMITSWITCH/DOORLIMIT SWITCH**	KAYCEE,RECOM,SIEMENS, VAISHNO, L&T
31	**ALLUMINIUM SHEET /STAINLESSSTEELSHEET/COILS**	ESSAR,BALCO, HINDALCO, SAIL, TATA
32	**OIL & WINDINGTEMPERATURE INDICATOR**	PRECIMEASURE,PERFECTCONTROL(CHENNAI)
33	**AIR CIRCUITBREAKER(ACB)**	L&T, GE, ABB, SCHNEIDER, SIEMENS
34	**TIMESWITCH**	L&T, GE, ABB, SCHNEIDER, SIEMENS

35	**2POLEAC/DCSWITCH**	GE, SCHNEIDER
36	**LIGHTING TRANSFORMER**	INDCOIL, GUJARATPLUGIN,LOGICSTAT

3.6.16 Detail Requirements of 220V/110V DCDB

The 220/110 Volts D.C. distribution boards shall be provided with the following:

1. Mains failure alarm relay.
2. Earth fault alarm relay.
3. 220/110 Volts D.C. bell to be operated by the mains failure alarm relay.
4. 220/110 Volts D.C. buzzer to be operated by the earth failure alarm relay.
5. 3 Nos. Double pole air-break circuit breaker/MCCB of 400 amp capacity with thermal overload tripping arrangement to act as follows:
   (i) One for DC Source-1 (incomer 1)
   (ii) One for DC Source-2 (incomer 2)
   (iii) One for Bus Section
6. 0-300/0-150 volts D.C. moving coil voltmeter to measure the bus-bar voltage. The display is to be in digital.
7. Pilot lamp to indicate D.C. on conditions.
8. 220/110 volts, double pole MCBs of following ratings for outgoing feeders.
   For 220 V DCDB.
   (i) 32 Amp, 4 Nos.
   (ii) 63 Amp, 2 Nos.
   For 110 V DCDB
   (i) 32 Amp, 6 Nos.
   (ii) 63 Amp, 4 Nos.
9. One terminal Board/block for all feeder outlets including cable glands.

3.6.17 Detail Requirements of 48V DCDB

The 48 Volts D.C. distribution boards shall be provided with the following:

1 Mains failure alarm relay.
2 Earth fault alarm relay.
3 48 Volts D.C. bell to be operated by the mains failure alarm relay.
4 48 Volts D.C. buzzer to be operated by the earth failure alarm relay.
5 3 Nos. Double pole air-break circuit breaker/MCCB of 200 amp capacity with thermal overload tripping arrangement to act as follows:
   a. One for DC Source-1 (incomer 1)
   b. One for DC Source-2 (incomer 2)
   c. One for Bus Section
6 0-75 volts D.C. moving coil voltmeter to measure the bus-bar voltage. The display is to be in digital.
7 Pilot lamp (LED) to indicate D.C. on conditions.
8 50 volts, double pole MCBs of following ratings for outgoing feeders.
   a. 16 Amp, 3 Nos. in each bus section.
   b. 32 Amp, 1 Nos. in each bus section.
9 One terminal Board/block for all feeder outlets including cable glands

3.7.0 SUPERVISION IN ERECTION, TESTING AND COMMISSIONING

Bidders should note that, the equipment covered under this bidding document shall be used as backups to the already existing similar equipment in existing substations. The scope includes installation of battery banks, chargers and DCDB. Erection, testing and commissioning shall also inclusive of all costs for inter connections between charger to battery, Charger to DCDB, Charger to Purchaser's AC sources etc. However, necessary cables required will be supplied by the Purchaser.

Section - 4

General Conditions of Supply and Erection of AEGCL

This Section 'General Conditions of Supply and Erection of AEGCL' supplementary to Section -5 'Special Conditions of Contract' of this document and can be downloaded from www.aegcl.co.in. Whenever there is a conflict, the provisions in SCC or the other Sections of this bid document shall prevail over those in the 'General Conditions of Supply and Erection of AEGCL'.

Section - 5

Special Conditions of Contract

5.1.0 DEFINITION OF TERMS

"Contract" means the Contract Agreement entered into between the Purchaser and the Contractor, together with the Contract Documents referred to therein; they shall constitute the Contract, and the term "the Contract" shall in all such documents be construed accordingly.

"Contract Documents" means the documents listed in Article 1.1 (Contract Document) of the Contract Agreement (including any amendments thereto).

"Contract Price" means the price payable to the Contractor as specified in the Agreement, subject to such additions and adjustments thereto or deductions therefrom, as may be made pursuant to the Contract.

"Day" means calendar day

"Year" means 365 days.

"Month" means calendar month.

"Party" means the "Purchaser" or the "Contractor", as the context requires.

"*Purchaser*" means the Assam Electricity Grid Corporation Limited (in short AEGCL) and its assignees.

The "*Contractor*" shall mean the tenderer / bidder whose tender/ bid has been accepted by the "Purchaser" and shall include the bidder's legal representatives, successors and assignees.

"Goods" means all of the commodities, raw material, machinery and equipment, and/or other materials that the Contractor is required to supply to the Purchaser under the Contract.

"Delivery" means the transfer of the Goods from the Contractor to the Purchaser in accordance with the terms and conditions set forth in the Contract.

"Completion" means the fulfilment of the Related Services by the Contractor in accordance with the terms and conditions set forth in the Contract.

"Related Services" means the services incidental to the supply of the goods, such as insurance, installation, training and initial maintenance and other similar obligations of the Contractor under the Contract.

The "Specification" shall mean the "Purchaser's Requirements".

"Contractor" means the natural person, a company/firm, or a combination of these, whose bid to perform the Contract has been accepted by the Purchaser and is named as such in the Agreement, and includes the legal successors or permitted assigns of the Contractor.

5.2.0 CONTRACT DOCUMENTS

5.2.1. Subject to Article 1.2 (Order of Precedence) of the Contract Agreement, all documents forming part of the Contract (and all parts thereof) are intended to be correlative, complementary and mutually explanatory. The Contract shall be read as a whole.

5.3.0 LEGAL JURISDITCTION

5.3.1. For any litigation arising out of the contract which cannot be resolve through mutual agreement or through Arbitration the Hon'ble Guwahati High Court will have sole jurisdiction of all settlement.

5.4.0 LANGUAGE

5.4.1. The ruling language of the Contract shall be English.

5.5.0 SCOPE OF WORK

5.5.1. The Goods and Related Services to be supplied shall be as specified in section 3- Purchaser's requirement and quantity as stated in Schedule No. 1 of Section -2, Bidding Forms.

5.5.2. **Unless otherwise stipulated in expressly limited in the *Purchaser's Requirements*, the Scope of Supply shall include all such items not specifically mentioned in the Contract but that can be reasonably inferred from the Contract as being required for attaining Delivery and Completion of the Goods and Related Services as if such items were expressly mentioned in the Contract.**

5.6.0 DELIVERY SCHEDULE

5.6.1. Contract completion sall be **7(Seven) months** from the date of signing of contract agreement.

5.6.2. The Delivery of the Goods and Completion of the Related Services shall be in accordance with the Delivery and Completion Schedule specified in the Article 3 of the Contract Agreement (Contract Forms) or within such extended time to which the Contractor shall be entitled under *SCC* ***Clause 5.16.0*** hereof.

5.7.0 CONTRACT PRICE

5.7.1. The Contract Price shall be as specified in **Article 2 (Contract Price)** of the Contract Agreement.

5.7.2. Unless an escalation clause is provided for in the **Article 2 (Contract Price)**, the Contract Price shall be a firm shall not subject to any alteration, except in the event of a Change in the scope or changes in applicable tax rates or as otherwise provided in the Contract.

5.8.0 TERMS OF PAYMENT

5.8.1. The contract price shall be paid as specified in subsequent sub-clauses, if not provided in Contract Forms, Section-6.

5.8.2. **For payment against Supply and F&I:**

A. Progressive Payments for supply items within the country:

1. Within 60 (sixty) days from the date of submission of the supply invoice, not more than 60% (sixty percent) payment of the total supply invoice value would be made on receipt and acceptance of materials in full and good condition. However, GST amount on invoice would be paid 100% or as per Govt. Rules and subject to availability of Fund.
2. Maximum, 10 (ten) Nos. of progressive supply invoices would be entertained.
3. Remaining 40% (Forty percent), retention amount would be released subject to fulfillment of the following conditions:
    a) 50% of balance supply amount would be paid on completion of 50% of the total erection works of the project.
    b) Remaining 50% of the supply amount would be paid on completion of 100% erection, testing and commissioning activities of the project, which should be certified by the project manager.

For payment against Installation and other services:

B. Progressive Payments for erection work:

1. Within 60 (sixty) days from the date of submission of invoice against foundation, erection and civil works, not more than 80% (eighty percent) of the total verified invoice would be made. However, GST amount on invoice would be paid 100% or as per Govt. Rules and subject to availability of Fund.
2. Maximum 8 (eight) Nos. of progressive erection invoice/ bills would be entertained during entire erection work.
3. The 1st progressive erection invoice/ bill would be entertained on completion of 30% of total erection cost of the project.
4. Maximum 6 nos. of additional progressive erection invoice/bills would be entertained. Minimum value of each invoice should be 10% of the total ordered value for foundation, erection and civil works.
5. Remaining 20% of the erection value would be paid on completion of 100% erection, testing and commissioning activities of the project, which should be certified by the project manager.

5.8.3. Separate invoices have to be raised for supply of battery bank and F&I associated with supply of battery bank to claim 28% GST.

5.8.4. Documents required along with invoice: Following documents need to be submitted along with invoice –

(i) Application for payment
(ii) Contractor's invoice showing LOA reference, Goods description, quantity dispatched, unit reclamation price, total amount (6 Copies)
(iii) Packing List
(iv) Railway receipt/ LR
(v) Manufacturer's guarantee certificate of Quality
(vi) Material inspection Clearance Certificate for dispatch issued by Purchaser
(vii) Insurance certificate.
(viii) Physical verification certificate of material received at site by Purchaser/Purchaser's site representative.

5.8.5. ADVANCE PAYMENT

No advance payment is applicable for this contract.

5.9.0 PERFORMANCE SECURITY DEPOSIT

5.9.1. The successful bidder shall have to deposit to the extent of 10% (ten percent) of the Contract price as performance security (Bank Guarantee), within fifteen (15) days of receipt of notification of award (NoA), duly pledged in favor of the Managing Director, AEGCL and such security deposits shall be valid up to 60(sixty) days beyond the warranty period as per clause 5.11.3.

5.9.2. In the event of the successful bidder's quoted rate is determined to be ALB (Abnormally Low Bid), AEGCL at its discretion may increase the PBG amount from 10% (as stipulated in clause 5.9.1) upto a maximum of 20% of the contract Price.

5.9.3. In the event, the successful bidder contractor fails to submit the PBG within 15 days from the issue of NoA and AEGCL shall impose a penalty @ 0.1% per day of such delay. Such penalty shall be recovered from the amounts payable against the contract. However, this shal not entitle the successful bidder to delay submission of PBG and AEGCL shall retain the right to cancel the NoA for delay in submission of PBG.

5.9.4. If the Contractor fails or neglects to observe, perform any of his obligations under the contract, it will be lawful for the "Purchaser" to forfeit either in full or in part at his absolute discretion, the security deposit furnished by the Contractor.

5.9.5. No interest shall be payable on such deposits.

5.10.0 RETENTION MONEY

5.10.1. Deduction shall be as per payment terms clause no. 5.8.2.

5.10.2. No interest shall be payable on such deductions/retentions.

5.11.0 WARRANTY

5.11.1. The Contractor/Manufacturer warrants that all the Goods are new, unused, and of the most recent or current models, and that they incorporate all recent improvements in design and materials, unless provided otherwise in the Contract.

5.11.2. The Contractor/Manufacturer further warrants that the Goods shall be free from defects arising from any act or omission of the Contractor or arising from design, materials, and workmanship, under normal use in the conditions prevailing in the country of final destination.

5.11.3. The warranty shall remain valid for **24 (Twenty-four*) months*** from the date of successful and complete delivery of materials at the final destination indicated in the clause 1.8.0.

5.11.4. If during the Period Warranty any defect should be found, the Purchaser shall give Notice to the Contractor/Manufacture stating the nature of any such defects together with all available evidence thereof, promptly following the discovery thereof. The Purchaser shall afford all reasonable opportunity for the Contractor/Manufacturer to inspect such defects.

5.11.5. If having been notified, the Contractor/Manufacturer fails to remedy the defect within a period of 15 (fifteen) days, the Purchaser may, following notice to the Contractor/Manufacturer, proceed to do such work, and the reasonable costs incurred by the Purchaser in connection therewith shall be paid to the Purchaser by the Contractor or may be deducted by the Purchaser from any monies due the Contractor or claimed under the Performance Security.

5.12.0 QUANTITY VARIATION

5.12.1. "Purchaser" shall have the right to increase/decrease the ordered quantity by 25% within 50 days of the period of completion and the same shall be carried out at the same rates /prices and terms and conditions stipulated in the contract except in regard to completion schedule, which shall be mutually agreed upon in case of enhancement of the ordered quantity.

5.13.0 INSPECTION AND TESTING

5.13.1. The Contractor shall at its own expense and at no cost to the Purchaser carry out all such tests and/or inspections of the Goods and Related Services as are specified in Sections 3, Purchaser's Requirements.

5.13.2. The inspections and tests shall generally be conducted on the premises of the Contractor/Manufacture. Subject to Sub-Clause 5.13.3, The Contractor shall furnish, all reasonable facilities and assistance, including access to drawings/process chart and production data to the inspectors at no charge to the Purchaser.

5.13.3. The Purchaser or its designated representative shall be entitled to attend the tests and/or inspections referred to in SCC Sub-Clause 5.13.2, provided that the Purchaser bear all of its own costs and expenses incurred in connection with such attendance including, but not limited to, all traveling and board and lodging expenses.

5.13.4. Whenever the Contractor is ready to carry out any such test and/or inspection, the Contractor shall give a reasonable advance notice (not less than 21 days) of such test and/or inspection and of the place and time thereof to the Purchaser. The Contractor shall obtain from any relevant third party or manufacturer any necessary permission or consent to enable the Purchaser or its designated representative to attend the test and/or inspection.

5.13.5. The Contractor/manufacture shall provide the Purchaserwith a certified report of the results of any such test and/or inspection.

5.13.6. The Purchaser may reject any Goods or any part thereof that fail to pass any test and/or inspection or do not conform to the specifications. The Contractor shall either rectify or replace such rejected Goods or parts thereof or make alterations necessary to meet the specifications at no cost to the Purchaser, and shall repeat the test and/or inspection, at no cost to the Purchaser, upon giving a notice pursuant to SCC Sub-Clause 5.13.4

5.13.7. If it is agreed between the Purchaser and the Contractor that the Purchasershall not attend thetest and/or inspection, then the Contractor may proceed with the test and/or inspection, and should provide the Purchaser with a certified report of the results thereof.

5.13.8. The Contractor agrees that neither the execution of a test and/or inspection of the Goods or any part thereof, nor the attendance by the Purchaser or its representative, nor the issue of any report pursuant to SCC Sub-Clause 5.13.5 & 5.13.7, shall release the Contractor from any warranties or other obligations under the Contract.

5.14.0 INSURANCE

5.14.1. The "Contractor" shall, have, unless, otherwise specified by the Purchaser, insure the materials through their underwrites at their cost and shall keep it insured against any loss/ damaged/ pilferage in transit, destruction or damage by fire/ flood, without exposure to vagaries of weather or through riot, civil commotion, war or rebellion, for the full value of the materials until the materials are received at the purchaser's destination store.

5.14.2. The "Contractor" shall be responsible for safe arrival at destination, unloading and receipt of the materials by the consignee. The Purchaser will discharge consignee's responsibilities only and shall not be responsible for any damage/ loss/ pilferage/ non-delivery by the carriers.

5.14.3. In case of any loss/ damage/ pilferage/ non-delivery/ short delivery by carriers etc.; the Contractor shall replace free of cost missing / damaged / lost materials within 30(thirty) days from the receipt of report thereof from the consignee(s) without waiting for settlement of their claims with their carriers / under-writers. Normally, such reports from the consignee(s) to the Contractor shall be initiated within a period of 30(thirty) days from the date of receipt of each consignment by him /them.

5.14.4. If it is considered necessary that the damage equipment either in part or in full to be sent back to the manufacturer's works for repair, the manufacturers/ Contractors will furnish the Bank Guarantee for the full value of equipment needing repairs and such Bank Guarantee shall remain valid till such time, the equipment are repaired and returned to the consignee in good condition. The to and fro freight, handling and insurance charges in such cases will be borne by the Contractor.

5.14.5. Unless, otherwise mutually agreed upon, in case of failure by the Contractor to replenish /make good of the loss /damage /short supplied quantities, within the stipulated period, the Purchaser reserves the right to forfeit the security deposit and/ or adjust any outstanding payment to the "Contractor" with the Purchaser or take any other appropriate action.

5.15.0 FORCE MAJEURE

5.15.1. "Force Majeure" shall mean any event beyond the reasonable control of the Purchaser or of the Contractor, as the case may be, and which is unavoidable notwithstanding the reasonable care of the party affected, and shall include, without limitation, the following:

(a) war, hostilities or warlike operations whether a state of war be declared or not, invasion, act of foreign enemy and civil war

(b) rebellion, revolution, insurrection, mutiny, usurpation of civil or military government, conspiracy, riot, civil commotion and terrorist acts

(c) confiscation, nationalization, mobilization, commandeering or requisition by or under the order of any government or de jure or de facto authority or ruler or any other act or failure to act of any local state or national government authority

(d) strike, sabotage, lockout, embargo, import restriction, port congestion, lack of usual means of public transportation and communication, industrial dispute, shipwreck, shortage or restriction of power supply, epidemics, quarantine and plague

(e) earthquake, landslide, volcanic activity, fire, flood or inundation, tidal wave, typhoon or cyclone, hurricane, storm, lightning, or other inclement weather condition, nuclear and pressure waves or other natural or physical disaster

(f) shortage of labor, materials or utilities where caused by circumstances that are themselves Force Majeure.

5.15.2. If either party is prevented, hindered or delayed from or in performing any of its obligations under the Contract by an event of Force Majeure, then it shall notify the other in writing of the occurrence of such event and the circumstances thereof within fourteen (14) days after the occurrence of such event.

5.15.3. The party who has given such notice shall be excused from the performance or punctual performance of its obligations under the Contract for so long as the relevant event of Force Majeure continues and to the extent that such party's performance is prevented, hindered or delayed. The Time for Completion shall be extended in accordance with ***SCC Clause 5.16.0***.

5.16.0 EXTENSION OF TIME FOR COMPLETION

5.16.1. The Time(s) for Completion specified in the Article 3 of the Contract Agreement (Contract Forms) shall be extended if the Contractor is delayed or impeded in the performance of any of its obligations under the Contract by reason of any of the following:

(a) any Change in the scope of works by the Purchaser; which justifies extension of completion time as provided in ***SCC Clause 5.12.0***; and

(b) any occurrence of Force Majeure as provided in ***SCC Clause 5.15.0***.

5.16.2. Except where otherwise specifically provided in the Contract, the Contractor shall submit to the Purchaser's Representative a notice of a claim for an extension of the Time for Completion, together with particulars of the event or circumstance justifying such extension as soon as reasonably practicable after the commencement of such event or circumstance. As soon as reasonably practicable after receipt of such notice and supporting particulars of the claim, the Purchaser and the Contractor shall agree upon the period of such extension. In the event that the Contractor does not accept the Purchaser's estimate of a fair and reasonable time extension, the Contractor shall be entitled to refer the matter to a Dispute Board, pursuant to ***SCC Sub-Clause 5.19.0***.

5.17.0 LIQUIDATED DAMAGE

5.17.1. The Contractor guarantees that it shall attain Completion of the Works within the Time for Completion specified in the Contract Agreementpursuant to ***SCC Sub-Clause 5.6.2***, or within such extended time to which the Contractor shall be entitled under ***SCC Clause 5.16.0*** hereof.

5.17.2. If the Contractor fails to attain Completion of the Works within the Time for Completion or any extension thereof under ***SCC Clause 5.16.0***, the Contractor shall pay to the Purchaser liquidated damages at the rate of ***1% (one percent)*** of the total Contract Price per week or part thereof delay. The aggregate amount of such liquidated damages shall in no event exceed ***10% (ten percent)*** of the total contract price.

However, the payment of liquidated damages shall not in any way relieve the Contractor from any of its obligations to complete the Works or from any other obligations and liabilities of the Contractor under the Contract.

5.17.3. Once the aggregated "Liquidated damage" reaches10% of the total contract price, the Purchaser may consider following actions:

(a) Procure the undelivered material/ equipment and/or complete the balance works from elsewhere giving notice to the Contractor and to recover any extra expenditure incurred thereby for having to procure these materials and works at higher price, at the risk and responsibility of the Contractor; or

(b) Cancel the contract wholly or in part and to complete the works at the full risk and cost of the Contractor and forfeit the security deposit.

(c) Declare it as a "Contractual Failure" and act in accordance with ***SCC Clause 5.18.0***.

5.18.0 CONTRACTUAL FAILURE

5.18.1. In the event of contractual failure of any respect on the part of the Contractor, the Purchaser shall be entitled to operate security deposit or any deposit or any payment due to Contractor irrespective of whether his default relates to the particular orders or not towards the Purchaser's claim for damages arising out of the failure. In addition, the Purchaser may black-list or bans the "Contractor" or pending enquiry, suspend him or take any other steps considered suitable.

5.19.0 ARBITRATION

5.19.1. If at any time, any question, dispute or difference whatsoever shall arise between the Purchaser and the Contractor in relation to or in connection with this contract, either party may, by written notice, refer the matter to the adjudication of a Sole Arbitrator to be appointed by mutual agreement of both parties in accordance with the Arbitration and Conciliation Act, 1996 and its amendments. The arbitration proceedings shall be held at Guwahati, or at any other place as may be decided by the Purchase.

5.19.2. The decision of the Sole Arbitrator shall be final and binding on both parties and the expenses of the arbitration shall be paid as may be determined by the Arbitrator. However, any dispute arising out of this contract will first be discussed and settled bilaterally between Purchaser and the Contractor.

Section 6 - Contract Forms

This Section contains the format for Notification of Award, the Contract Agreement and Appendices to the Contract Agreement which, once completed, will form the Contract along with the Section 4 and Section 5. The Bidder should note that this Section shall be completed fully at the time of Contract signing.

[AEGCL's letter head]

Notification of Award

[date]

To: [Name and address of the Contractor]

This is to notify you that your Bid dated *[date]* for execution of the *[name of the work]* against *[Bid identification number]* for the Contract Price in the aggregate of Rupees *[amounts in numbers and words]* (as per Price Schedule-1), as corrected and modified in accordance with the Instructions to Bidders is hereby accepted, and it is decide to award on you the '**Supply, erection and commissioning of battery bank, battery charger and DCDB for Upper Assam Region in AEGCL**' covering inter-alia supply of all services specified in bidding document.

You are requested to furnish the Performance Security within fifteen (15) days in accordance with the Conditions of Contract, using for that purpose one of the Performance Security Forms included in Section 6 (Contract Forms) of the Bidding Document.

[Authorized Signature]
[Name and Title of Signatory]
Assam Electricity Grid Corporation Limited

Attachment: 1) Price schedule (with arithmetic correction if any)
2) Draft Contract agreement

STAMP

1. Contract Agreement

(Supply and related services Contract)

THIS AGREEMENT made the _____ day of _____, _____,

BETWEEN

Assam Electricity Grid Corporation Limited (herein after referred to as AEGCL or Purchaser), a corporation incorporated under the laws of Company Act, 1956 and having its registered office at First Floor, Bijuli Bhawan, Paltanbazar, Guwahati-781001, Assam and [***name of Contractor***], a firm/company incorporated under the laws of Company Act, 1956 and having its principal place of business at [***address of Contractor***] (**hereinafter called "the Contractor**").

WHEREAS AEGCL desires to engage the Contractor to the 'Ex-works Supply Contract' (also referred to as the 'First Contract') covering inter-alia supply of all equipment and materials for the complete execution of '**Supply, erection and commissioning of battery bank, battery charger and DCDB for Upper Assam Region in AEGCL***'* as detailed in the Contract Document ("the Facilities"), and the Contractor has agreed to such engagement upon and subject to the terms and conditions hereinafter appearing.

NOW IT IS HEREBY AGREED as follows:

Article 1
Contract Documents

1.1 **Contract Documents** (Reference SCC Clause 5.2.0)
The following documents shall constitute the Contract between the Purchaser and the Contractor, and each shall be read and construed as an integral part of the Contract:

(a) This Contract Agreement and the Appendices hereto
(b) Letter of Price Bid and Price Schedules submitted by the Contractor
(c) Letter of Technical Bid and Technical Proposal submitted by the Contractor
(d) Special Conditions of Contract
(e) General Conditions of Supply and Erection.
(f) Specification (Purchaser's Requirements)
(g) Drawings (Purchaser's Requirements)
(h) Other completed Bidding Forms submitted with the Letters of Technical and Price Bids
(i) Guaranteed and other Technical Particulars (as submitted with the Bid).
(j) Any other documents shall be added here

1.2 **Order of Precedence** (Reference SCC Clause 5.2.0)
In the event of any ambiguity or conflict between the Contract Documents listed above, the order of precedence shall be the order in which the Contract Documents are listed in Article 1.1 (Contract Documents) above.

1.3 **Definitions** (Reference SCC Clause 5.1.0)
Capitalized words and phrases used herein shall have the same meanings as are ascribed to them in the SCC.

Article 2
Contract Price and Terms of Payment

2.1 **Contract Price** (Reference SCC Clause 5.7.0)
The Purchaser hereby agrees to pay to the Contractor the Contract Price in consideration of the performance by the Contractor of its obligations hereunder. The Contract Price shall [. . . ***amounts in rupees in words*** . . .], [. . . ***amounts in figures***. . .] as specified in Price Schedule No. 3 (Grand Summary).
The Contract Price is fixed.

2.2 **Terms of Payment** (Reference SCC Clause 5.8.0)
The terms and procedures of payment according to which the Purchaser will pay the Contractor are given in the Appendix (Terms and Procedures of Payment) hereto.

Article 3 Commencement Date and Completion Time

3.1 **Commencement Date** (Reference SCC Clause 5.6.1)
The Commencement Date upon which the period until the Time for Completion of the Works shall be counted from is the date when this Contract Document is signed.

3.2 **Completion Time** (Reference SCC Clause 5.6.2)
The whole works under the scope of this Contract shall be completed within **7** (**Seven)** months from the date of signing of contract agreement.

Article 4. Appendices

4.1 The Appendices listed in the attached List of Appendices shall be deemed to form an integral part of this Contract Agreement.

4.2 Reference in the Contract to any Appendix shall mean the Appendices attached hereto, and the Contract shall be read and construed accordingly.

IN WITNESS WHEREOF the Purchaser and the Contractor have caused this Agreement to be duly executed by their duly authorized representatives the day and year first above written.

Signed by, for and on behalf of the Purchaser	Signed by, for and on behalf of the Contractor
[***Signature***]	[***Signature***]
[***Title***]	[***Title***]
in the presence of	in the presence of
[***Signature***]	[***Signature***]
[***Title***]	[***Title***]

APPENDICES

Appendix 1 - Special Conditions of Contract
Appendix 2 - Completion schedule (bar chart)
Appendix 3 - Performance Security.
Appendix 4 - Price Schedule.
Appendix 5 - Guaranteed Technical Particulars

Appendix 4 - Form of Performance Security
Bank Guarantee

(To be stamped in accordance with Stamp Act)
(The non-Judicial Stamp Paper should be in the name of issuing Bank)

Bank's Name:
Address of Issuing Branch or Office:
Email id and phone no for correspondence:

Beneficiary: Managing Director, AEGCL
Name and Address of Purchaser

Bid Security No.:

*WHEREAS*_____ *[name and address of Contractor]* (hereinafter called "the Contractor") has undertaken, in pursuance of LoA No. _____ dated _____ to execute _____ *[name of Contract and brief description of Works]* (hereinafter called "the Contract");

AND WHEREAS it has been stipulated by you in the said Contract that the Contractor shall furnish you with a Bank Guarantee by a recognized/scheduled bank for the sum specified therein as security for compliance with its obligations in accordance with the Contract;

AND WHEREAS we have agreed to give the Contractor such a Bank Guarantee;

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible *to* you, on behalf of the Contractor, up to a total of _____ *[amount of Guarantee]* _____ *[in words],* such sum being payable in the currencies in which the Contract Price is payable, and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of _____ *[amount of Guarantee]* as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the Contractor before presenting us with the demand.

We further agree that no change or addition to or other modification of the terms of the Contract or of the Works to be performed there under or of any of the Contract documents which may be made between you and the Contractor shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such change, addition or modification.

BG expiry date:
BG clam date:

Bank's seal and authorized signature(s)

NOTE

1. *All italicized text is for use in preparing this form and shall be deleted from the final document. An amount is to be inserted by the Guarantor, representing the percentage of the Contract Price specified in the Contract.*
2. *This guarantee shall be valid upto 30 days beyond the Warranty Period as per the Contract.*
3. *For BG amount equal to or more than 50,000.00, BG should be signed by two bank officers to be valid.*
4. ***Address of the banker with email and phone number for correspondence with banker should be clearly mentioned. Any correspondence related to the BG with the banker shall be made to the address mentioned in the BG.***