

**PUNATSANGCHHU-II HYDROELECTRIC PROJECT AUTHORITY
PROCUREMENT & CONTRACTS WING
WANGDUEPHODRANG: BHUTAN**



**STANDARD BIDDING DOCUMENT
FOR “SUPPLY OF 500KVA DIESEL GENERATOR(DG) SET WITH ATS PANEL FOR DAM
COMPLEX, PHPA-II”**

Tender No. PHPA-II/CE(P&C)/DAM/2026/27 dated 01.07.2026

July 2026



NOTICE INVITING TENDER (NIT)



DETAILED NOTICE INVITING TENDER (NIT)

Punatsangchhu-II Hydroelectric Project Authority (PHPA-II) invites sealed Bids from eligible Bhutanese/Indian suppliers for **“Supply of 500 KVA Diesel Generator(DG) set with ATS Panel for Dam Complex, PHPA-II”** at Procurement & Contracts Wing, Block, E-4, PHPA-II Bjimthangkha, Wangdue as per the information provided below.

Detailed specifications, scope of supply, and terms and conditions are given in the Bidding Documents.

Tender No. and date	PHPA-II/CE(P&C)/DAM/2026/17 dated 01.07.2026
Document available period (date & time)	01.07.2026 at 10:00 Am
Bid submission (date & time)	28.07.2026 up to 10:00 AM (Local Time)
Bid opening date, time & place	28.07.2026 at 10:30 AM (Local Time)
Bidding Documents availability	The interested Bidders may purchase the Bidding Document upon payment of non-refundable fee of Nu. /Rs. 1,000.00 (One Thousand Only) in the form of Demand Draft (DD)/Cash Warrant/Online Fund Transfer into PHPA-II O&M Account No. 102081338 maintained with bank of Bhutan, Wangdue or PHPA-II's account No. 32379019627 maintained with SBI, Jalgaon, India. OR For the purpose of wider participation, the interested Bidders may download the Bid Document from PHPA-II official website with a link https://phpa2.gov.bt/tenders. The tender fee of Nu. 1000 in any of the form stipulated above or the proof of deposit of the fee shall be submitted at the time of submission of the Bids.
Item Detail	Supply of 500 kVA Diesel Generator with ATS Panel
Bid Security	Nu. 150,000.00(Nu/ Rs. One Lakh Fifty thousand only)

1. OWNERSHIP OF THIS STANDARD BIDDING DOCUMENT (SBD)

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2. DUE DILIGENCE

The bid shall be deemed to have been submitted after careful study and examination of this SBD. The bid should be precise, complete, and in the prescribed format as per the requirement of this SBD document. Failure to furnish all information or submission of a bid not in line with this SBD will be at the bidders' risk and shall result in the rejection of the bid. Also, the grounds for rejection of the Bid should not be questioned after the final declaration of the successful Bidder.

3. The bidder is requested to carefully examine the SBD and the terms and conditions specified therein and if there appears to be any ambiguity, contradictions, inconsistency, gap, and/or discrepancy in the SBD, Bidder should seek necessary clarification.
4. Issuance of Bidding Documents shall not automatically construe that the Bidder fulfils the Qualifying Requirements which shall be determined during Bid evaluation based on data/documents submitted by the Bidder.
5. Bid Documents are not transferrable. The Purchaser reserves the right to accept or reject any Bid partly or fully or cancel the bidding process without assigning any reasons thereof and in such case, no Bidder/ intending Bidder shall have any claim arising out of such action of the Purchaser.
6. PHPA-II reserves the right to accept or reject any Bid partly or fully or cancel the bidding process without assigning any reasons thereof and in such case no Bidder/intending Bidder shall have any claim arising out of such action.

Chief Engineer,
Procurement & Contracts Wing,
PHPA-II, Bjimthangkha, Wangdue.



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CHIEF OF CONTENT

SECTION I. INSTRUCTIONS TO BIDDERS

A. General

1. Scope of Supply

- 1.1. The Purchaser, as indicated in the Bid Data Sheet (BDS), issues these Bidding Documents for the supply of Goods incidental thereto as specified in **Technical Specification & the Price Schedule**. The name, identification number, and number of lots within this procurement are provided in the BDS.
- 1.2. Throughout this Bidding Document:
the term "in writing" means communicated in written form (e.g., by mail electronic mail) with proof of receipt.
 - a) if the context so requires, "singular" means plural" and vice versa; and
 - b) "day" means calendar day.

2. Fraud and Corruption

- 2.1. As per the RGoB policy, Purchasers require that the Bidders and Suppliers observe the highest standards of ethics during the procurement and execution of contracts. The terms "Corrupt Practice", "Fraudulent practice": "Collusive practice", "Coercive practice" and "Obstructive practice" shall be as per the definition in GCC 4.2. In pursuance of this policy, the Purchaser:
 - a) will reject a proposal for award if it determines that the Bidder recommended for award has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices in competing for the contract in question.
 - b) will sanction a firm or individual, including declaring them ineligible, either indefinitely or for a stated period of time, to be awarded a contract if it at any time determines that they have, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive or obstructive practices in competing for, or in executing for the contract.
 - c) will have the right to require that a provision be included in Bidding Documents and in contracts, requiring Bidders, Suppliers, and their Subcontractors to permit the Purchaser, any organization or person appointed by the Purchaser to inspect their accounts and records, and other documents relating to their Bid submission and contract performance and to have them audited by auditors appointed by the Purchaser.
 - d) requires that Bidders, as a condition of admission to eligibility, execute and attach to their bids an Integrity Pact Statement in the form provided in Section III, Bidding Forms. Failure to provide a duly executed Integrity Pact Statement may result in disqualification of the Bid; and



- e) will report any case of corrupt, fraudulent, collusive, coercive, or obstructive practice to the relevant RGoB agencies, including but not limited to the Anti-Corruption Commission (ACC) of Bhutan, for necessary action in accordance with the statutes and provisions of the relevant agency.

2.2. Furthermore, Bidders shall be aware of the provision stated in GCC 37.

3. Eligible Bidders

- 3.1. A Bidder, and all parties constituting the Bidder, may have the nationality of any country unless otherwise specified in the BDS, subject to the restrictions specified in ITB. 4.1 a & b. A Bidder shall be deemed to have the nationality of a country if the Bidder is a citizen or is constituted, incorporated, or registered and operates in conformity with the provisions of the laws of that country. This criterion shall also apply to the determination of the nationality of proposed subcontractors or suppliers for any part of the Contract including Related Services.
- 3.2. A Bidder shall not have a conflict of interest. All Bidders found to have a conflict of interest shall be disqualified. Bidders may be considered to have a conflict of interest with one or more parties in this bidding process if they:
 - a) are associated, or have been associated in the past, with a firm or any of its affiliates that has been engaged by the Purchaser to provide consulting services for the preparation of the design, specifications, and/or other documents to be used for the procurement of the Goods and related Service to be purchased pursuant to these Bidding Documents, or
 - b) Submit more than one Bid in this bidding process, except for alternative offers permitted under ITB Clause 15. However, this does not limit the participation of subcontractors in more than one Bid.
 - c) Employ or otherwise engage, either directly or through any of their affiliates, a dependent or close relative of the Purchaser employee or has an authority over it. For the purposes of this Sub-Clause, a close relative is defined as an immediate family which includes a father, mother, brother, sister, spouse, and own children.
- 3.3. Government-owned enterprises in Bhutan shall be eligible only if they can establish that they:
 - a) Are legally and financially autonomous.
 - b) operate under commercial law; and
 - c) Are not a dependent agency (directly or indirectly) of the Purchaser.
- 3.4. A Bidder that is under a declaration of ineligibility pursuant to ITB Sub-Clause 2.1c) shall not be eligible to participate in this bidding process in any capacity.



- 3.5. Bidders shall provide such evidence of their continued eligibility satisfactory to the Purchaser as the Purchaser shall reasonably request.

4. Exclusion of Bidders

- 4.1. A Bidder shall be excluded from participating in this bidding process under the following circumstances:
- a) as a matter of law or official regulation, RGoB prohibits commercial relations with the country in which the Bidder is constituted, incorporated, or registered; or
 - b) by an act of compliance with a decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations. RGoB prohibits any import of Goods or contracting of Services from the Country in which the Bidder is constituted, incorporated, or registered or any payments to persons or entities in that country; or
 - c) Bidder is insolvent or is in receivership or is bankrupt or is in the process of being wound up; or has entered into an arrangement with creditors; or
 - d) Bidder's affairs are being administered by a court, judicial officer, or appointed liquidator; or
 - e) Bidder has suspended business or is in any analogous situation arising from similar procedures under the laws and regulations of his country of establishment; or
 - f) Bidder has been found guilty of professional misconduct by a recognized tribunal or professional body; or
 - g) Bidder has not fulfilled his obligations with regard to the payment of taxes, or other payments due in accordance with the laws of the country in which he is established or of the Kingdom of Bhutan; or
 - h) Bidder is guilty of serious misrepresentation in supplying information in this tender; or
 - i) Bidder has been convicted for fraud and/or corruption by a competent authority, or
 - j) Bidder has not fulfilled any of his contractual obligations with the Purchaser in the past based on the Vendor Performance Management System (VPMS).
 - k) Bidder has been debarred from participation in public procurement by any competent authority as per law.

5. Eligible Goods

- 5.1. All the Goods to be supplied under the Contract may have their origin in any country subject to the ITB 3 & 4 above.
- 5.2. For the purposes of this Clause, the term "Goods" includes commodities, raw materials, machinery, equipment, industrial plant etc.



- 5.3. The term “origin” means the country where the Goods have been mined, grown, cultivated, produced, manufactured, or processed; or, through manufacture, processing, or assembly, another commercially recognized article results that differ substantially in its basic characteristics from its components.

B. Contents of Bidding Document

6. Parts of the Bidding Document

- 6.1. The Bidding Document consists of Bidding Procedure and Contracts which include all the Sections indicated below and should be read in conjunction with any Addenda issued in accordance with ITB Clause 9.

Section I	Instructions to Bidders (ITB)
Section II	Bid Data Sheet (BDS)
Section III	General Conditions of Contract (GCC)
Section IV	Special Conditions of Contract (SCC)
Section V	Technical Specification
Section VI	Forms
Section VI	Price Schedule

7. General Information

- 7.1. The Invitation for Bids issued by the Purchaser is not part of the Bidding Document.
- 7.2. The Purchaser is not responsible for the completeness of the Bidding Document and their addenda if any of these were not obtained directly from the Purchaser.
- 7.3. The Bidder is expected to examine all instructions, forms, terms, and specifications in the Bidding Document. Failure to furnish all information or documentation required by the Bidding Document may result in the rejection of the Bid.

8. Clarification of Bidding Document

- 8.1. Bidders shall not be allowed to seek any clarification of the Bidding Documents in person or by telephone or other verbal means.
- 8.2. A prospective Bidder requiring any clarification of the Bidding Documents shall notify the same to Purchaser in writing at the Purchaser’s address specified in the BDS.
- 8.3. The Purchaser shall respond in writing to any such request for clarification, provided that it is received no later than the date and time specified in the BDS.
- 8.4. Copies of the Purchaser’s response shall be uploaded to the Purchaser’s or relevant website including a description of the inquiry without disclosing the name of the Bidder(s) seeking clarification. Should the Purchaser deem it necessary to amend the



Bidding Documents as a result of a clarification, it shall do so following the procedure under ITB Clause 9 and ITB Sub- Clause 26.2.

- 8.5. A pre-bid meeting shall be conducted only, if necessary, to clarify doubts and concerns of the Bidders prior to submission of Bids. The Bidders shall be invited to attend a pre-bid meeting to be held on the date, time, and location specified in BDS.
- 8.6. Non-attendance at the pre-bid meeting will not be a cause for disqualification of Bidders but at the same time shall not entitle them to raise any query at a later date.
- 8.7. The Bidders are requested to submit their questions and queries in writing no later than one week before the meeting. Clarifications to the queries raised in the pre-bid meeting, including the text of the questions raised without identifying the source, and the responses given together with any responses prepared after the meeting, shall be circulated to all Bidders and also uploaded on the Purchaser's website.
- 8.8. Any modification to the Bidding Documents that may become necessary as a result of the pre-bid meeting shall be made by the Purchaser through the issue of an addendum and not through the clarifications to the queries of the pre-bid meeting.

9. Amendment of Bidding Documents

- 9.1. At any time prior to the deadline for submission of Bids, the Purchaser may amend the Bidding Documents by issuing an addendum. This may be done either on the Purchaser's own initiative or in response to a clarification request from a prospective Bidder.
- 9.2. Any addendum thus issued shall be part of the Bidding Documents and shall be uploaded to the Purchaser's website and or relevant website such addendum shall be binding on the prospective Bidders.
- 9.3. The Purchaser may, at its discretion, extend the deadline for submission of Bids pursuant to ITB Sub-Clause 26.2 to allow prospective Bidders reasonable time in which to take the addendum into account in the preparation of their Bids.
- 9.4. It will be the responsibility of such Bidders to regularly visit the website for any addendum to the Bidding Documents until the last date of bid submission. The Purchaser shall in no way be responsible for any ignorance of the Bidder about the addendum to the Bidding Documents.

C. Preparation of Bid

10. Cost of Bidding

- 10.1. The Bidder shall bear all costs associated with the preparation and submission of its Bid, and the Purchaser shall not be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.

11. Language of Bid



- 11.1. The Bid, as well as all correspondence and documents related to the Bid exchanged by the Bidder and the Purchaser, shall be in English. Supporting documents and printed literature that are part of the Bid shall be in English and if in any other language, should be translated into English. The English translation shall prevail on the interpretation.

12. Documents comprising the Bid

The Bid shall comprise the following:

- a) Bid Submission Forms and Price Schedules in accordance with ITB Clauses 14.
- b) Bid Security, in accordance with ITB Clause 23.
- c) Written confirmation authorizing the signatory of the Bid to commit the Bidder, in accordance with ITB Clause 24.
- d) Documentary evidence in accordance with ITB Clauses 20 that the Goods conform to the Bidding Documents.
- e) Documentary evidence in accordance with ITB Clause 21 establishing the qualification of the Bidders.
- f) Alternative Bids, if permissible, in accordance with ITB Clause 15.
- g) Integrity Pact Statement, in accordance with ITB Sub-Clause 2.1.
- h) Deviation sheet in accordance with the Bidding Form: IV.
- i) Relevant Bidding forms.
- j) Any other documents required in the BDS.

13. Submission of Bid

- 13.1. The Bidder shall submit the Bid Submission Form using the form furnished in Section III. This form must be completed without any alterations to its format, and no substitutes shall be accepted. All blank spaces shall be filled in with the information requested.
- 13.2. A bid in which the Bid Submission Form is not duly filled, signed, and sealed by the Bidder shall be rejected.

14. Price Schedule

- 14.1. The Bidder shall submit the Price Schedules for Goods according to their origin as appropriate, using the forms furnished in Section III, Bidding Forms.

15. Alternative Bids

- 15.1. Unless otherwise indicated in the BDS alternative Bids shall not be considered.

16. Bid Prices and Discounts

SECTION I - ITB



- 16.1. The prices and discounts quoted by the Bidder in the Bid Submission Form and the Price Schedules shall conform to the requirements specified below:
- a) all lots and items must be listed and priced separately in the Price Schedules.
 - b) the price to be quoted in the Bid Submission Form shall be the total price of the Bid excluding any discounts offered; and
 - c) the Bidder shall quote any unconditional discounts and the methodology for their application in the Bid Submission Form.
- 16.2. The terms EXW, CIF, CIP, DDP, and other similar terms shall be governed by the rules prescribed in the current edition of Incoterms, published by the International Chamber of Commerce pursuant to GCC sub-clause 3.5
- 16.3. Unless otherwise stated in the BDS, Prices shall be quoted inclusive of all applicable taxes and levies, transportation, handling costs, and any other associated cost to fulfill the contractual obligations, as specified in the Price Schedule forms for Goods included in Section III, Bidding Forms.
- a) **For Goods manufactured in Bhutan:**
- (i) the price of the Goods quoted EXW (ex-works, ex-factory, ex-warehouse, ex-showroom, or off-the-shelf, as applicable), including all Customs duties and sales and other taxes already paid or payable on the components and raw material used in the manufacture or assembly of the Goods.
 - (ii) any Bhutan sales and other taxes which will be payable on the Goods if the contract is awarded to the Bidder.
 - (iii) the price for inland transportation, insurance, and other local services required to deliver the Goods to their final destination specified in the BDS; and
 - (iv) the total price for the item.
- (b) **For Goods manufactured outside Bhutan**
- (i) The price of Goods, quoted CIF/CIP/DDP/any other, place of Entry in Bhutan, as specified in BDS.
 - (ii) Custom Duties and any other taxes which will be payable on the Goods in Bhutan, if specified in BDS.
 - (iii) The Cost of inland transportation, insurance, and other local costs incidental to the delivery of the Goods from the Port of entry to their final destination, if specified in BDS; and
 - (iv) the total price for the item
- 16.4. Bidders wishing to offer any price reduction (discount) for the award of more than one Contract shall specify in their Bid the price reductions applicable to each package, or alternatively, to individual Contracts within the package. Price reductions or



discounts shall be submitted in accordance with ITB Sub-Clause 16.1, provided the Bids for all lots are submitted and opened at the same time.

- 16.5. If so, as indicated in ITB Sub-Clause 16.1, Bids are being invited for individual items, lots, or packages as indicated in the BDS, prices quoted shall correspond to one hundred percent (100%) of the items specified for each lot and to one hundred percent (100%) of the quantities for each item of a lot. Bidders wishing to offer any price reduction (discount) for the award of more than one Contract shall specify in their Bid the price reductions applicable to each package, or alternatively, to individual Contracts within the package. Price reductions or discounts shall be submitted in accordance with ITB Sub-Clause 16.1, provided the Bids for all lots are submitted and opened at the same time.

17. Vendor Performance Management System

- 17.1. The performance of the vendor shall be assessed as per the vendor records available on the Purchaser's official documents and relevant website for the purpose of assessing the performance of the supplier.

18. Price Variation

- 18.1. Prices quoted by the Bidder shall be fixed during the Bidder's performance of the Contract and not subject to variation on any account unless otherwise specified in the BDS. A Bid submitted with an adjustable price quotation shall be treated as non-responsive and shall be rejected pursuant to ITB Clause 34 unless adjustable price quotations are permitted by the BDS. If in accordance with the BDS, prices quoted by the Bidder shall be subject to adjustment during the performance of the Contract, a Bid submitted with a fixed price quotation shall not be rejected, but the price adjustment shall be treated as zero.

19. Currencies of Bid

- 19.1. The unit rates and prices required to be quoted by the Bidder shall be as per the currencies specified in the BDS.
- 19.2. The reference exchange rate (selling rate) prevailing on the day of Bid opening or the preceding date as posted by the Royal Monetary Authority of the Kingdom of Bhutan shall be used for the conversion of prices.
- 19.3. Bid prices shall be evaluated in accordance with ITB 38. The payments shall be made in the currency of the bid and any banking charges related to payment shall be borne by the Suppliers.

20. Documents Establishing the Conformity of the Goods

- 20.1. To establish the conformity of the Goods to the Bidding Document, the Bidder shall furnish as part of its Bid documentary evidence that the Goods conform to the technical specifications and standards.



- 35.2. Provided that a Bid is substantially responsive, the Purchaser may request that the Bidder submit the necessary information or documentation, within a reasonable period of time, to rectify nonmaterial nonconformities or omissions in the Bid related to documentation requirements. Such omission shall not be related to any aspect of the price of the Bid. Failure of the Bidder to comply with the request may result in the rejection of its Bid.
- 35.3. Provided that the Bid is substantially responsive, the Purchaser shall correct arithmetical errors on the following basis:
- a) If there is a discrepancy between the unit price and the line-item total that is obtained by multiplying the unit price by the quantity, the unit price shall prevail and the line-item total shall be corrected, unless in the opinion of the Purchaser there is an obvious misplacement of the decimal point in the unit price, in which case the line-item total as quoted shall govern and the unit price shall be corrected;
 - b) if there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail, and the total shall be corrected; and
 - c) If there is a discrepancy between words and figures, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject to ITB Sub-Clauses 35.3 (a) and (b) above.
- 35.4. If the Bidder that submitted the lowest evaluated Bid does not accept the correction of errors, its Bid shall be disqualified, and its Bid Security shall be forfeited.

36. Conversion to Single Currency

- 36.1. For evaluation and comparison purposes, the Purchaser shall convert all Bid prices expressed in amounts in various currencies into a single currency based on the Telegraphic Transfer (TT) selling rate published by the Royal Monetary Authority of Bhutan on the day of bid opening.

37. Margins of Preferences

- 37.1. A margin of preference may apply to domestic Goods manufactured in Bhutan as provided for in the BDS. To avail a margin of preference, the Bidder shall provide a value addition certificate from the Ministry of Economic Affairs.

38. Detail Evaluation and Comparison of Bids

- 38.1. The Purchaser shall evaluate each Bid that has been determined, up to this stage of the evaluation, to be substantially responsive.
- 38.2. To evaluate a Bid, the Purchaser shall only use the factors, methodologies, and criteria defined in this ITB Clause 38. No other criteria or methodology shall be permitted.



- 38.3. To evaluate a Bid, the Purchaser shall consider the following:
- a) evaluation shall be done for Items or Lots, as specified in the BDS.
 - b) the Bid Price, as quoted in accordance with ITB Clause 16.
 - c) price adjustment for correction of arithmetic errors in accordance with ITB Clause 35.3.
 - d) price adjustment due to discounts offered in accordance with ITB Clause 16.4.
 - e) adjustments due to the application of the evaluation criteria specified in the BDS; and
 - f) adjustments due to the application of a margin of preference, in accordance with ITB Clause 37, if applicable.
 - g) If required, the Purchaser may carry out the inspections of the Bidder's factories to assess the production and technical capacity of the Bidder to perform the Contract. The Purchaser shall notify in advance of the date in writing on which the inspection will be made.
- 38.4. The Purchaser's evaluation of a Bid shall exclude and not consider:
- a) in the case of Goods manufactured in Bhutan, sales and other similar taxes will be payable on the Goods if the Contract is awarded to the Bidder.
 - b) in the case of Goods manufactured outside Bhutan, already imported or to be imported, Customs duties and other import taxes levied on the imported Goods, sales, and other similar taxes which will be payable on the Goods if the Contract is awarded to the Bidder.
 - c) any allowance for price adjustment during the period of execution of the Contract, if provided in the Bid.
- 38.5. The Purchaser's evaluation of a Bid may require the consideration of other factors in addition to the Bid Price quoted in accordance with ITB Clause 16. These factors may be related to the characteristics, performance, and terms and conditions of purchase of the Goods. The effect of the factors selected, if any, shall be expressed in monetary terms to facilitate comparison of Bids, the factors, criteria, and the methodology of application shall be as specified in ITB Sub-Clause 38.3 (e).
- 38.6. If so, as specified in the BDS, these Bidding Documents shall allow Bidders to quote separate prices for one or more lots and shall allow the Purchaser to award one or multiple lots to more than one Bidder. The methodology of evaluation to determine the lowest evaluated lot combination is specified BDS.
- 38.7. The Purchaser shall compare all substantially responsive Bids to determine the lowest evaluated Bid, in accordance with ITB Sub-Clause 34.

39. Abnormally High / Low Bids

- 39.1. An abnormally low bid is one where the bid price, in combination with other elements of the bid, appears to be so low that it raises concerns as to the capability of the



Bidders to perform the contract for the offered bid price.

- 39.2. When the prices in a particular bid appear abnormally low or seriously unbalanced, the Purchaser shall revisit/ review its own estimated value. Based on the revised value, the decision shall be taken to reject/ accept the abnormally low or high bids. The Procuring Agency /TEC shall seek written clarifications from the Bidder including a detailed price analysis of its bid price in relation to the subject matter of the contract and any other requirements of the request for Bidding Documents.
- 39.3. If the Purchaser decides to accept the abnormally low bid after considering the above, the Bidder shall be required to provide additional differential security equivalent to the difference between the estimated amount and the quoted price in addition to the performance security, to a maximum of 10% of the quoted amount in the form of BG/DD enforceable in any Banks in Bhutan. The Differential security shall be retained till the completion of the supplies.
- 39.4. If the prices of all the received bids are abnormally high, then the Purchaser may negotiate with the lowest evaluated Bidder after approval of the Competent Authority. In case the negotiation fails, all bids may be rejected.

40. Purchaser's Right to Accept Any Bid, and Reject Any or All Bids

- 40.1. 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.

F. Award of Contract

41. Award Criteria

- 41.1. The Purchaser shall award the Contract to the Bidder whose offer has been determined to be the lowest evaluated Bid and is substantially responsive to the Bidding Documents, provided further that the Bidder is determined to be qualified to perform the Contract satisfactorily.

42. Purchaser's Right to vary quantities

- 42.1. At the time the Contract is awarded, the Purchaser reserves the right to increase or decrease the quantity of Goods originally specified Schedule of Supply, provided this does not exceed 25% of the total quantity of the item without any change in the unit prices or other terms and conditions of the Bid and the Bidding Documents.

43. Notification of Award/Issue of Purchase Order.

- 43.1. Prior to the expiry of the period of Bid validity, the Purchaser shall issue Purchase Order to the successful bidder, in writing, which shall include all the all the terms & conditions of the Contract and the total contract value.

- 43.2. Upon the successful Bidder furnishing the signed Contract Form and the Performance

SECTION I - ITB



Security pursuant to ITB Clause 45, the Purchaser shall promptly notify each unsuccessful Bidder and discharge its Bid Security, pursuant to ITB Sub-Clause 23.4.

- 43.3. After the issuance of Purchase Order, unsuccessful Bidders within three (3) days may request in writing to the Purchaser for a debriefing seeking explanations of the grounds on which their Bids were not selected. Where a request for debriefing has been received within the deadline, the Purchaser shall provide debriefing within five (5) days in writing to any unsuccessful Bidder.

44. Signing of Contract

- 44.1. Within time stipulated in the BDS, after the issuance of the Purchase Order, the successful bidder shall submit to the purchaser a duly signed copy of the purchase order as a token of acceptance of all the Terms & Conditions of the purchase order. The purchase order shall serve as a formal Contract agreement between the purchaser and the Contractor.
- 44.2. Within the time period specified in the BDS, on issuance of the Purchase Order the successful Bidder is required to submit performance security pursuant to clause 45 and submit a copy of duly signed Purchase Order as stipulated above at 44.1.
- 44.3. The Contract shall become effective from the date of issue of Purchase Order.
- 44.4. Failure of the successful Bidder to accept the award/ sign the Purchase Order shall constitute sufficient grounds for the annulment of the award and forfeiture of the bid security.
- 44.5. Notwithstanding ITB Sub-Clause 45.2, in case signing of the Contract Agreement/Purchase Order is prevented by any export restrictions attributable to the Purchaser, to Bhutan, or to the use of the products/Goods, systems or services to be supplied, where such export restrictions arise from trade regulations from a country supplying those Goods, systems or services, the Bidder shall not be bound by its Bid, always provided, however, that the Bidder can demonstrate to the satisfaction of the Purchaser that signing of the Contact Agreement/Purchase Order has not been prevented by any lack of diligence on the part of the Bidder in completing any formalities, including applying for permits, authorizations, and/or licenses necessary for the export of the Goods, systems or services under the terms of the Contract.

45. Performance Security

- 45.1. Within the time period specified in the BDS, on receipt of Purchase Order from the Purchaser, the Bidder shall submit the Performance Security in accordance with the GCC 16, using any of the following forms:

- a) Unconditional bank guarantee in the form provided for in Section VI, Contract Forms.
- b) Forms, or another form acceptable to the Purchaser, or
- c) Banker's certified cheque/cash warrant, or



d) Demand draft.

e) Cash deposit through Bank transfer in the Purchaser's bank account.

- 45.2. Failure by the successful Bidder to submit the above-mentioned Performance Security or to sign the Contract/Purchase Order shall constitute sufficient grounds for the annulment of the award and forfeiture of the Bid Security. In that event, the Purchaser may award the Contract to the next lowest evaluated Bidder whose offer is substantially responsive and is determined by the Purchaser to be qualified to perform the Contract satisfactorily. Such a failure shall be considered a "withdrawal" and all relevant clauses shall apply.



SECTION II -BID DATA SHEET (BDS)



SECTION II. BID DATASHEET

The Bid Data Sheet (BDS) contains information and provisions that are specific to this bidding process only. The Purchaser has specified in the BDS only information that the Instructions to Bidders (ITB) request be specified in the BDS. All information is provided, and no clause shall be left blank. For clarity in the BDS, its clauses are numbered with the same numbers as the corresponding ITB clauses. The BDS table below provides a summary of all information that is mandatory for the bidders to comply with, failure to submit any of the required documents/information within the ITB clauses mentioned below shall be considered non-responsive and shall be rejected.

ITB Clauses	Particulars
1.1	The Purchaser is: Punatsangchhu-II Hydroelectric Project Authority, Bjimthangkha, Wangdue, Bhutan, Chief Engineer (Dam), PHPA-II.
3.1	Eligible Bidders: From Bhutan and India Only.
8.2	For Bid clarification purposes, the Purchaser's address is: Attention: Chief Engineer, Procurement & Contracts Wing. Address: Punatsangchhu-II Hydroelectric Project Authority, Bjimthangkha, Wangdue Bhutan. Post Box No: 1308 Phone number: 02-471743/471713 email: contracts@phpa2.gov.bt
8.3	Bid Clarification requests will be received ON or BEFORE: Date & Time: One week before the last date of submission of Bids i.e. up to 1730 Hrs. on 21.07.06.2026 Clarification after the deadline shall not be accepted.
8.5	A pre-bid meeting shall not take place
12.(d)	The following required documents shall be submitted by bidders: 1. The Bidder should have successfully supplied at least similar equipment of the same configuration or higher. 2. Bidder shall be an Authorized Dealer/Agent of the OEM and shall have a letter of Guarantee/Manufacturer's Authorization from the OEM indicating their support for Supply of 500 Kva DG Set with ATS panel. 3. The DG set must have minimum BS-1V emission/equivalent. Note: <i>i. similar Equipment: DG Set with ATS Panel</i> <i>ii. Bidder shall submit copy of the supply orders with completion certificate or Completion certificate only.</i>
15.1	Alternative Bids Not required.
16.3	The Bidder shall quote prices using any of the following Incoterm: Latest Incoterm (DDP).



16.3 (a) (iii) & (b) (i, ii, iii)	The quoted prices shall be firm and fixed for the supply, delivery, testing, and commissioning at the Dam Complex, PHPA-II , Wangdue, Bhutan. The prices shall be inclusive of all applicable taxes and levies, transportation, handling charges, and all other costs necessary to fulfill the contractual obligations. However, the 5% Bhutan GST shall be borne separately by PHPA-II.
16.5	Bids are being invited for the Supply of 500 KVA Diesel Generator(DG) set with ATS Panel Note: Detailed requirements along with required Technical Specifications are provided in the Price Schedule & Technical Specification.
19.1	The Bidder shall quote in Rs/Nu.
20.3	The minimum period of time for which the Goods are expected to be functioning (for the purpose of spare parts or associated of the pumps) 365 days or one year after the delivery of goods at the site.
21.1	The bidders must submit a valid Trade License & Tax Clearance Certificate from the Relevant Authorities
21.2	Financial Capability: Not required
21.3	Experience and Technical Capacity: as specified in 12(d)
21.4(a)	The manufacturer's authorization or dealership certificate: required to submit
21.4(b)	After-sales maintenance, repair, spare parts stocking, and related services: Required as per warranty Terms.
21.4 (c)	Joint Venture, Consortium (JV/C) Bids are permitted: Not permitted.
22.1	The Bid validity period shall be 60 days from the last date of bid submission.
23.1	Bid Security Amount shall be Nu.150,000.00 (Nu. One Lakh Fifty Thousand Only).
23.2 (iv)	The Bid Security shall be provided in any one of the following forms: a) An unconditional and irrevocable Bank Guarantee in accordance with Form No. 3. For Indian suppliers, a confirmation letter for the issuance of the Bank Guarantee from a corresponding (linked) banks in Bhutan is also required. b) A Demand Draft c) A Banker's Cheque/Cash Warrant d) Direct Deposit in PHPA-II M Account No. 102081338 maintained with Bank of Bhutan or PHPA-II's account no. 32379019627 maintained at SBI, Jalgaon.
23.5	The Bid security shall remain valid till: 90 days from the date of bid opening
24.1 & 25.1	Only the original bid shall be submitted; copies are not required. Bids may be submitted by courier, registered post, hand delivery, or electronically by sending a password-protected file to contracts@phpa2.gov.bt . The password for the protected file shall be shared with the Bid Opening Committee at the time of bid opening.



25.2(b)	For bid submission purposes only, the Purchaser's address is: Office of the Chief Engineer, Procurement & Contracts Wing, Block E-4, PHPA-II, Bjimthangkha, Wangdue, Bhutan, P/O No.: 1308
25.3	Envelope must be marked as "Original" .
25.4 & 25.7	The bids are invited under a Single Stage – Single Envelope Method . Technical & Price bids are not required to be submitted in two separate envelopes.
25.8	The Bidders shall submit the bids by hand, courier registered post or bidders have the option of sending the bids online with password protected file. The password shall be shared to the Bid Opening Committee during the bid opening.
26.1	The deadline for the submission of the Bid is 28.7.2026. at 10:00 Hours (BST) .
27.1	Late submission: Any Bid received by the Purchaser after the deadline for submission of Bids shall be declared late, rejected, and returned unopened to the Bidder.
29.1	The bid Opening shall take place at: ▪ Address: PHPA-II, Procurement & Contracts Wing, Block E-4, Bjimthangkha. ▪ Date and Time: 28.07.2026 at 1030 Hours (BST)
37.1	A margin of 10% Domestic Preference "shall not" apply.
38.3(a)	Evaluation will be done on item wise basis.
38.3(e)	Price Adjustments due to the application of the evaluation criteria [Not Applicable]
38.5	These factors shall be related to the characteristics, performance, and terms and conditions of purchase of the Goods. Therefore, these factors refer to technical specifications.
38.6	Bidders shall not be allowed to quote prices for more than once.
41.1	Award Criteria: The award of the Contract shall be Item-Wise to the bidders whose offer has been determined to be the lowest evaluated Bid.
44.1	Within 7 days from the issue of the purchase order, the successful bidder shall return the signed copy of the purchase order as a token of acceptance of all the Terms and Conditions of the Contract as stipulated in the Purchase order.
44.2 & 45.1	Within 15 days from the date of issue of purchase order, the successful bidder shall furnish performance security of the requisite amount.



SECTION III – GENERAL CONDITIONS OF CONTRACT



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SECTION III: GENERAL CONDITIONS OF CONTRACT

1. Definition

1.1. The following words and expressions shall have the meanings hereby assigned to them:

- (i) **Affiliate** means business concerns, organizations, or individuals that control each other or that are controlled by a common third party. Control may include shared management or ownership; common use of facilities, equipment, and resources; or family interests.
- (ii) **Award of Contract** means the decision of the Purchaser to enter into a contract with a supplier for delivery of specified goods which has been conveyed to the contractor through a purchase order and/or signing of a contract.
- (iii) **Bid** an offer to execute works in accordance with the terms and conditions set out in the bid documents inviting such offers. The term “tender” is synonymous with the term “bid”;
- (iv) **BDS** means Bid Data Sheet
- (v) **Bidder** means an eligible individual or legal entity that participates in a competitive procurement process defined by this Manual.
- (vi) **Bidding Documents** means the set of documents issued by the Purchaser to potential Bidders in which the specifications, terms, and conditions of the proposed procurement are prescribed. The terms “bidding documents”, “tender documents” and “bid documents” are synonymous.
- (vii) **Contract Documents** means the documents listed in the Contract Agreement, including any amendments thereto.
- (viii) **Contract Price** means the price payable to the Supplier as specified in the Contract Agreement, subject to such additions and adjustments thereto or deductions therefrom as may be made pursuant to the Contract till the completion of the Contract, the price so adjusted shall be termed as Executed Price.
- (ix) **Purchaser** means the purchaser including its successors and permitted assigns. The terms “Purchaser” and “Purchaser” are synonymous.
- (x) **Day** means calendar day.
- (xi) **Delivery** means the transfer of the Goods from the Supplier to the Purchaser in accordance with the terms and conditions outlined in the Contract Documents.
- (xii) **GCC** means the General Conditions of Contract.
- (xiii) **Goods** means any object in solid, liquid, or gaseous form, tangible and intangible that has an economic utility or value, which can be exchanged or traded along with related services.

(xiv) **ITB** means Instructions to Bidders



- (xv) **Notification of Award** means the letter issued by The Purchaser conveying the acceptance of the Bid of the successful Bidder subject to such terms and conditions as may have been stated therein.
- (xvi) **Party** means the Purchaser or the Supplier, as the context requires, and “parties” means both of them.
- (xvii) **Price schedule:** summary of the quantities, measurement unit, and unit prices of the items to be procured under the contract. The term “Bill of Quantities” is synonymous.
- (xviii) **Final Destination** means the place named in the SCC.
- (xix) **Purchaser** means The Purchaser (specified in SCC.)
- (xx) **Related Services** means includes services such as installations, supervision, training, initial maintenance, insurance, testing, and commissioning related to the Goods.
- (xxi) **SCC** means the Special Conditions of Contract.
- (xxii) **Subcontractor** means any natural person, private or government entity, or a combination thereof, including its legal successors and permitted assigns, to whom any part of the Goods to be supplied or execution of any part of the Related Services is subcontracted by the Supplier.
- (xxiii) **Supplier** a legal entity entering into a contract with the Purchaser for the supply of Goods.
- (xxiv) **Technical Specifications** means specifications of the Goods incorporated in the bidding documents and forming part of the contract and includes any modification or amendment thereto or any addition thereto or any deduction there from, as may be made with the mutual agreement of the Purchaser and Supplier.

2. Contract Documents

- 2.1. Subject to the order of precedence set forth in the Contract Agreement, all documents forming the Contract (and all parts thereof) are intended to be correlative, complementary, and mutually explanatory. The Contract Agreement shall be read as a whole.

3. Interpretation

- 3.1 If the context so requires it, singular means plural and vice versa.
- 3.2 A “law” shall be construed as a reference to such law including its amendments or re-enactments from time to time.
- 3.3 A “person” shall be construed as a reference to any person, firm, Purchaser, corporation, society, trust, government, or agency of a government or any association or partnership (whether or not having separate legal personality) of two or more of the above and a person shall be construed as including a reference to its successors, permitted transferees and permitted assigns in accordance with their respective interests.

The words “hereof” or “herein” if and when used in the Contract Documents shall mean a reference to the Contract Documents of this Contract.



3.5 Incoterms

- (a) Unless inconsistent with any provision of the Contractor otherwise specified in the SCC, the meaning of any trade term and the rights and obligations of parties there under shall be as prescribed by Incoterms.
- (b) The terms EXW, CIF, CIP, DDP, and other similar terms as specified in SCC, when used, shall be governed by the rules prescribed in the current edition of Incoterms specified in the SCC and published by the International Chamber of Commerce in Paris, France

3.6 Amendment

No amendment or other variation of the Contract shall be valid unless it is in writing, is dated, expressly refers to the Contract, and is signed by a duly authorized representative of each party thereto.

3.7 Non-waiver

- (a) Subject to GCC3.7(a)below, no relaxation, forbearance, delay, or indulgence by either party in enforcing any of the terms and conditions of the Contract or the granting of time by either party to the other shall prejudice, affect or restrict the rights of that party under the Contract, neither shall any waiver by either party of any breach of Contract operate as a waiver of any subsequent or continuing breach of Contract.
- (b) Any waiver of a party's rights, powers, or remedies under the Contract must be in writing, dated, and signed by an authorized representative of the party granting such waiver, and must specify the right and the extent to which it is being waived.

3.8 Severability

If any provision or condition of the Contract is prohibited or rendered invalid or unenforceable, such prohibition, invalidity, or unenforceability shall not affect the validity or enforceability of any other provisions and conditions of the Contract.

3.9 Entire Agreement

The Contract constitutes the entire agreement between the Purchaser and the Supplier and supersedes all communications, negotiations, and agreements of the parties with respect thereto made prior to the date of the Contract.

4. Fraud and Corruption

- 4.1 If the Purchaser determines that the Supplier has engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices in competing for or in executing the Contract then The Purchaser may, after giving fourteen (14) days' notice to the Supplier, terminate the Supplier's employment under the Contract and cancel the Contract, and the provisions of GCC37 shall apply as if such termination has been made under GCC37.1.

For the purposes of this Sub-Clause:



- (a) "Corrupt practice" is the offering, giving, receiving or soliciting, directly or indirectly, of anything of value" to influence improperly the actions of another party.
- (b) "Fraudulent practice" is any intentional act or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation.
- (c) "Collusive practice" is an arrangement between two or more parties designed to achieve an improper purpose, including to influence improperly the actions of another party.
- (d) "Coercive practice" is impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a Party.
- (e) "Obstructive practice" is:
 - i. Deliberately destroying, falsifying, altering, or concealing of evidence material to the investigation or making false statements to investigators in order materially to impede any investigation into allegations of a corrupt, fraudulent, coercive, or collusive practice; and/or threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation; or
 - ii. Acts intended materially to impede the exercise of the inspection and audit rights of the Purchaser and/or any other relevant RGoB agency provided for under GCC21.

4.3 Should any employee of the Supplier be determined to have engaged in corrupt, fraudulent, collusive, coercive, or obstructive practice during the purchase of the Goods, then that employee shall be removed.

4.4 Any communications between the Supplier and the Purchaser related to matters of alleged fraud or corruption must be made in writing.

5. Language

5.1. The Contract, as well as all correspondence and documents relating to the Contract exchanged by the Supplier and the Purchaser, shall be written in the language specified in the SCC. Supporting documents and printed literature that are part of the Contract may be in another language provided they are accompanied by an accurate translation of the relevant passages in the language specified in the SCC, in which case, for purposes of interpretation of the Contract, the translation shall govern.

5.2. The Supplier shall bear all costs of translation to the governing language and all risks of the accuracy of such translation, for documents provided by the Supplier.

Joint Venture, Consortium

If the Supplier is a Joint Venture, Consortium (JV/C), all of the parties shall be jointly



and severally liable to the Purchaser for the fulfilment of the provisions of the Contract and shall designate one party to act as a lead with authority to bind the (JV/C). The composition or the constitution of the joint venture, the consortium shall not be altered without the prior consent of the Purchaser.

7. Notices

- 7.1. Any notice given by one party to the other pursuant to the Contract shall be in writing to the address specified in the SCC. The term "in writing" means communicated in written form, including electronic communication.
- 7.2. A notice shall be effective when delivered or on the notice's effective date, whichever is later.

8. Governing Law

- 8.1. The Contract shall be governed by and interpreted in accordance with the laws of the Kingdom of Bhutan.

9. Settlement of Disputes

- 9.1. The Purchaser and the Supplier shall make every effort to resolve amicably by direct informal negotiation any disagreement or dispute arising between them under or in connection with the Contract.
- 9.2. If, after thirty (30) days, the parties have failed to resolve their dispute or difference by such mutual consultation, either the Purchaser or the Supplier may give notice to the other party of its intention to commence arbitration, as hereinafter provided, as to the matter in dispute. No arbitration in respect of this matter may be commenced unless such notice is given. Any dispute or difference in respect of which a notice of intention to commence arbitration has been given in accordance with this Clause shall be finally settled by arbitration. Arbitration may be commenced prior to or after delivery of the Goods under the Contract. Arbitration proceedings shall be conducted in accordance with the rules of procedure specified in the SCC.
- 9.3. Notwithstanding any reference to arbitration herein,
- (a) the parties shall continue to perform their respective obligations under the Contract unless they otherwise agree; and
 - (b) the Purchaser shall pay the Supplier any monies due the Supplier.

10. Eligibility

- 10.1. The Supplier and its sub-contractors shall have the nationality of an eligible country. A Supplier and its sub-contractors shall be deemed to have the nationality of a country if it is a citizen or constituted, incorporated, or registered, and operates in conformity with the provisions of the laws of that country.

- 10.2. All Goods to be supplied under the Contract shall have their origin in Eligible Countries. For the purpose of this Clause, origin means the country where the Goods



have been grown, mined, cultivated, produced, manufactured, or processed; or through manufacture, processing, or assembly, another commercially recognized article results that differs substantially in its basic characteristics from its components.

11. Supplier's Responsibilities

- 11.1. The Supplier shall supply all the Goods included in the Scope of Supplies in accordance with GCC23, and the delivery and completion requirements as per GCC20.

12. Purchaser's Responsibilities

- 12.1. Whenever, the supply of Goods requires that the Supplier obtain permits, approvals, and/or import and other licenses or similar permissions from Bhutanese public authorities, the Purchaser shall, if so, required by the Supplier, use its best efforts to assist the Supplier in complying with such requirements in a timely and expeditious manner, but without incurring any costs.

13. Contract Price

- 13.1. The Contract Price shall be the price payable to the Supplier as specified in the Contract Agreement subject to any additions and adjustments thereto or deductions there from as may be made pursuant to the Contract.

- 13.2. Prices charged by the Supplier for the Goods supplied and the Related Services performed under the Contract shall not vary from the prices quoted by the Supplier in its Bid, with the exception of any price adjustments authorized in the SCC.

14. Terms of Payment

- 14.1. The Contract Price, including any Advance Payments, if applicable, shall be paid as specified in the SCC.
- 14.2. The Supplier shall submit to the Purchaser, the invoices describing, as appropriate, the Goods delivered and Related Services performed, and by the documents submitted pursuant to GCC20 and upon fulfilment of all the obligations stipulated in the Contract.
- 14.3. Payments shall be made promptly by the Purchaser, no later than thirty (30) days after the submission of the verified invoice or request for payment by the Supplier, and the Purchaser has accepted it.
- 14.4. The currencies in which payments shall be made to the Supplier under this Contract shall be those in which the Bid Price is expressed.

15. Taxes and Duties

- 15.1. For Goods manufactured outside Bhutan the Supplier shall bear and pay all applicable taxes, stamp duties, license fees, and other similar levies imposed outside and inside Bhutan as applicable in line with the Incoterms.



- 15.2. For Goods manufactured within Bhutan the Supplier shall bear and promptly pay all applicable taxes, duties, license fees, and other similar levies incurred until delivery of the contracted Goods to the Purchaser.
- 15.3. At the time of release of payment, tax shall be deducted at source (TDS) from Bhutanese Bidders and International Bidders as specified in the SCC from the gross amount of bills. The Purchaser shall furnish the necessary TDS Certificate to the Bidders, issued by the Department of Revenue & Customs, RGoB.
- 15.4. If any tax exemptions, reductions, allowances, or privileges are available to the Supplier in the Kingdom of Bhutan, if applicable, the Purchaser shall use its best endeavours to enable the Supplier to benefit from any such tax savings to the maximum allowable extent.
- 16. Performance Security**
- 16.1. The Supplier shall provide a Performance Security for the due performance of the Contract in the amount and currency specified in the SCC.
- 16.2. The proceeds of the Performance Security shall be payable to the Purchaser as compensation for any loss resulting from the Supplier's failure to complete its obligations under the Contract.
- 16.3. The Performance Security shall be denominated in the currency (ies) of the Contract or in a freely convertible currency acceptable to the Purchaser, shall be valid until the successful completion of the Supplier's performance obligations under the Contract, including any warranty obligations, and shall be in one of the forms stipulated by the Purchaser in the SCC.
- 16.4. The Performance Security shall be discharged by the Purchaser and returned to the Supplier on completion of the Supplier's performance obligations under the Contract, including any warranty obligations.
- 17. Copyright**
- 17.1. The copyright in all drawings, documents, and other materials containing data and information furnished to the Purchase by the Supplier shall remain vested in the Supplier, or, if they are furnished to the Purchaser directly or through the Supplier by any third party, including suppliers of materials, the copyright in such materials shall remain vested in such third party.
- 18. Confidential Information**
- 18.1. The Purchaser and the Supplier shall keep confidential and shall not, without the written consent of the other Party hereto, divulge to any third party any documents, data, or other information furnished directly or indirectly by the other Party hereto in connection with the Contract, whether such information has been furnished prior to, during or following completion or termination of the Contract. Notwithstanding the above, the Supplier may furnish to its Sub-contractors such documents, data, and other information as it receives from the Purchaser to the extent required for



the Sub- contractor to perform its obligations under the Contract, in which event the Supplier shall be under obligation to have a clause in the contracts with their sub-contractors regarding confidentiality similar to that provided herein.

- 18.2. The Purchaser shall not use such documents, data, and other information received from the Supplier for any purposes unrelated to the Contract. Similarly, the Supplier shall not use such documents, data, and other information received from the Purchaser for any purpose other than the design, procurement of plant and equipment, construction, or such other work and services as are required for the performance of the Contract.
- 18.3. The obligation of a Party under GCC18.1 and 18.2 above, however, shall not apply to information that:
- (a) the Purchaser or the Supplier needs to share with the RGoB;
 - (b) is already in the public domain now, or enters the public domain during the execution of the contract through no fault of that Party;
 - (c) can be proven to have been possessed by that Party at the time of disclosure and which was not previously obtained, directly or indirectly, from the other Party; or
 - (d) otherwise lawfully becomes available to that Party from a third party that has no obligation of confidentiality.
- 18.4. The above provisions of GCC18 shall not in any way modify any undertaking of confidentiality given by either of the Parties hereto prior to the date of the Contract in respect of the performance of the Contract or any part thereof.
- 18.5. The provisions of GCC18 shall survive completion or termination, for whatever reason, of the Contract.

19. Patent Indemnity

- 19.1. The Supplier shall, subject to the Purchaser's compliance with GCC19.2, indemnify and hold harmless the Purchaser and its employees and officers from and against any and all suits, actions or administrative proceedings, claims, demands, losses, damages, costs and expenses of any nature, including attorney's fees and expenses, which the Purchaser may suffer as a result of any infringement or alleged infringement of any patent, utility model, registered design, trademark, copyright or other intellectual property right registered or otherwise existing at the date of the Contract by reason of:
- a) the installation of the Goods by the Supplier or the use of the Goods in Bhutan; and
 - b) the sale in any country of the products produced by the Goods.
- 19.2. Such indemnity shall not cover any use of the Goods or any part thereof other than for the purpose indicated by or reasonably to be inferred from the Contract, neither any infringement resulting from the use of the Goods or any part thereof, or any products produced thereby in association or combination with any other equipment, plant or materials not supplied by the Supplier, pursuant to the Contract.



- 19.3. If any proceedings are brought or any claim is made against the Purchaser arising out of the matters referred to in GCC19.1, the Purchaser shall promptly give the Supplier notice thereof, and the Supplier may at its own expense and in the Purchaser's name conduct such proceedings or claim and any negotiations for the settlement of any such proceedings or claim.
- 19.4. If the Supplier fails to notify the Purchaser within thirty (30) days after receipt of such notice that it intends to conduct any such proceedings or claim, then the Purchaser shall be free to conduct the same on its own behalf.
- 19.5. The Purchaser shall, at the Supplier's request, afford all available assistance to the Supplier in conducting such proceedings or claim, and shall be reimbursed by the Supplier for all reasonable expenses incurred in so doing.
- 19.6. The Purchaser shall indemnify and hold harmless the Supplier and its employees, officers, and Subcontractors from and against any and all suits, actions or administrative proceedings, claims, demands, losses, damages, costs and expenses of any nature, including attorney's fees and expenses, which the Supplier may suffer as a result of any infringement or alleged infringement of any patent, utility model, registered design, trademark, copyright or other intellectual property right registered or otherwise existing at the date of the Contract arising out of or in connection with any design, data, drawing, specification or other documents or materials provided or designed by or on behalf of the Purchaser.

20. Delivery and Documents

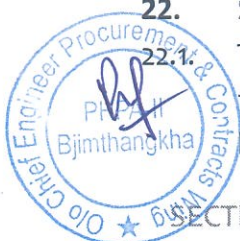
- 20.1. Subject to GCC34.1, the delivery of the Goods and completion of the Related Services shall be in accordance with the delivery and completion requirements specified in the Schedule of Supply. The details of shipping and other documents to be furnished by the Supplier are specified in the SCC.

21. Inspection and Audits

- 21.1. The Supplier shall permit the Purchaser and/or persons appointed by the Purchaser to inspect the Supplier's offices and/or the accounts and records of the Supplier and its Subcontractors relating to the performance of the Contract and to have such accounts and records audited by auditors appointed by the Purchaser if so, required by the Purchaser. The Supplier's attention is drawn to GCC4, which provides, inter alia, that acts intended materially to impede the exercise of the inspection and audit rights provided for under this GCC21.1 constitute a prohibited practice subject to contract termination(as well as to a determination of in eligibility under ITB Sub-Clause2.1(c) of the Instructions to Bidders that preceded the placement of the Contract of which these GCC form a part).

22. Subcontracting

- 22.1. The Supplier shall notify the Purchaser in writing of all subcontracts awarded under the Contract if not already specified in the Bid. Such notification, in the original Bid or later, shall not relieve the Supplier of any of its obligations, duties, responsibilities, or



liabilities under the Contract.

- 22.2. Subcontracts shall comply with the provisions of GCC4 and 10. Refer to SCC if Subcontracting is allowed.

23. Scope of Supplies

- 23.1. The Goods to be supplied shall be as specified in the Schedule of Supply.
- 23.2. Unless otherwise stipulated in the Contract, the 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 of the Goods and completion of the Related Services as if such items were expressly mentioned in the Contract.

24. Specification and Standards

24.1. Technical Specifications and Drawings:

- a) The Goods supplied under this Contract shall conform to the technical specifications and standards stipulated in the Schedule of Supply and, when no applicable standard is mentioned, the standard shall be equivalent or superior to the official standards whose application is appropriate to the goods' country of origin.
- b) the Supplier shall be entitled to disclaim responsibility for any design, data, drawing, specification, or other document, or any modification thereof provided or designed by or on behalf of the Purchaser, by giving a notice of such disclaimer to the Purchaser.
- c) Wherever references are made in the Contract to codes and standards in accordance with which it shall be executed, the editions or the revised versions of such codes and standards shall be those specified in the Schedule of Supply. During Contract execution, any changes in any such codes and standards shall be applied only after approval by the Purchaser and shall be treated in accordance with GCC34.

25. Tests and Inspections

- 25.1. At its own expense and no cost to the Purchaser, the Supplier shall carry out all such tests and/or inspections of the Goods as are specified in the SCC. The purchaser or its representative shall have the right to inspect and/or test the Goods to confirm their conformity to the specifications.
- 25.2. The inspections and tests may be conducted on the premises of the Supplier or its Subcontractor, at the point of delivery, and/or at the Goods' final destination, or in another place in Bhutan as specified in the SCC. Subject to GCC25.3, if conducted on the premises of the Supplier or its Subcontractor, all reasonable facilities and assistance, including access to drawings and production data, shall be furnished to the inspectors at no charge to the Purchaser.

The Purchaser or its designated representative shall be entitled to attend the tests



and/or inspections referred to in GCC25.1, provided that the Purchaser bears 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.

- 25.4. Whenever the Supplier is ready to carry out any such test and inspection, it shall give reasonable advance notice, including the place and time, to the Purchaser. The Supplier 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.
- 25.5. The Purchaser may require the Supplier to carry out any test and/or inspection not required by the Contract but deemed necessary to verify that the characteristics and performance of the Goods comply with the technical specifications, codes, and standards under the Contract, provided that the Supplier's reasonable costs and expenses incurred in the carrying out of such test and/or inspection shall be added to the Contract Price. Further, if such test and/or inspection impede the progress of manufacturing and/or the Supplier's performance of its other obligations under the Contract, due allowance will be made in respect of the delivery dates and completion dates and the other obligations so affected.
- 25.6. The Supplier shall provide the Purchaser with a report of the results of any such test and/or inspection.
- 25.7. 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 Supplier 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 notice pursuant to GCC25.4.
- 25.8. The Supplier 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 GCC25.6, shall release the Supplier from any warranties or other obligations under the Contract.
- 26. Packing and Documents**
- 26.1. The Supplier shall provide such packing of the Goods as is required to prevent their damage or deterioration during transit to their final destination, as indicated in the Contract. During transit, the packing shall be sufficient to withstand, without limitation, rough handling and exposure to extreme temperatures, salt and precipitation, and open storage. Packing case sizes and weights shall take into consideration, where appropriate, the remoteness of the Goods' final destination and the absence of heavy handling facilities at all transit points.

26.2.

The packing, marking, and documentation within and outside the packages shall comply strictly with such special requirements as shall be expressly provided for in



the Contract, including additional requirements, if any, specified in the SCC, and any other instructions ordered by the Purchaser.

27. Transportation

27.1. Unless otherwise specified in the SCC, responsibility for arranging transportation of the Goods shall be in accordance with the specified Incoterms.

28. Warranty

28.1. The Supplier 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.

28.2. Subject to GCC24.1(a), the Supplier further warrants that the Goods shall be free from defects arising from any act or omission of the Supplier or arising from design, materials, and workmanship, under normal use in the conditions prevailing in Bhutan.

28.3. Unless otherwise specified in the SCC, the warranty shall remain valid for twelve (12) months or 18 months from the day of supply or from the date of putting the item into use as the case may be.

28.4. Upon receipt of such notice, the Supplier shall, within the period specified in the SCC, expeditiously repair or replace the defective Goods or parts thereof, at no cost to The Purchaser.

28.5. If, having been notified, the Supplier fails to remedy the defect within the period specified in the SCC, the Purchaser may proceed to take within a reasonable period such remedial action as may be necessary, at the Supplier's risk and expense and without prejudice to any other rights which the Purchaser may have against the Supplier under the Contract.

29. Liquidated Damage

29.1. Except as provided for under GCC33, if the Supplier fails to deliver any or all of the Goods by the date(s) of delivery or fails to perform the Related Services within the period specified in the Contract, the Purchaser may, without prejudice to all its other remedies under the Contract, deduct from the Contract Price, as liquidated damages, a sum equivalent to the percentage specified in the SCC of the delivered price of the delayed Goods or unperformed Services for each day or part thereof of delay until actual delivery or performance, up to a maximum deduction of the percentage specified in those SCC. Once the maximum is reached, the Purchaser may terminate the Contract pursuant to GCC37.

30. Limitation of Liability

30.1. Except in cases of gross negligence or wilful misconduct:

a) neither party shall be liable to the other party, whether in contract, tort, or otherwise, for any indirect or consequential loss or damage, loss of use, loss of production, or loss of profits or interest costs, provided that these exclusions



shall not apply to any obligation of the Supplier to pay liquidated damages to the Purchaser; and

- b) the aggregate liability of the Supplier to the Purchaser, whether under the Contract, in tort or otherwise, shall not exceed the total Contract Price, provided that this limitation shall not apply to the cost of repairing or replacing defective equipment, or to any obligation of the Supplier to indemnify the Purchaser with respect to patent infringement.

31. Insurance

- 31.1. Unless otherwise specified in the SCC the Goods supplied under the Contract shall be fully insured, in a freely convertible currency from an eligible country, against loss or damage incidental to manufacture or acquisition, transportation, storage, and delivery, in accordance with the applicable Incoterms or the manner specified in the SCC.

32. Change in Laws and Regulations

- 32.1. If, after thirty (30) days prior to the date of Bid submission, any law, regulation, ordinance, order or bylaw having the force of law is enacted, promulgated, abrogated or changed in Bhutan (which shall be deemed to include any change in interpretation or application by the competent authorities) that subsequently affects the Delivery/Completion Schedule and/or the Contract Price, then such Delivery/Completion Schedule and/or Contract Price shall be correspondingly increased or decreased, to the extent that the Supplier has thereby been affected in the performance of any of its obligations under the Contract. Notwithstanding the foregoing, such additional or reduced cost shall not be separately paid or credited if the same has already been accounted for in the price adjustment provisions where applicable, in accordance with GCC13.2.

33. Force Majeure

- 33.1. The Supplier shall not be liable for forfeiture of its Performance Security, liquidated damages, or termination for default if and to the extent that its delays in performance or other failure to perform its obligations under the Contract is the result of an event of Force Majeure.
- 33.2. For purposes of this Clause, "Force Majeure" means an event or situation beyond the control of the Supplier that is not foreseeable, is unavoidable, and its origin is not due to negligence or lack of care on the part of the Supplier. Such events may include, but not be limited to, acts of the Purchaser in its sovereign capacity, wars or revolutions, fires, floods, epidemics, quarantine restrictions, and freight embargoes.
- 33.3. If a Force Majeure situation arises, the Supplier shall promptly notify the Purchaser in writing of such condition and the cause thereof. Unless otherwise directed by the Purchaser in writing, the Supplier shall continue to perform its obligations under the Contract as far as is reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the Force Majeure event.

34. Change Orders and Contract Amendments



- 34.1. The Purchaser may at any time order the Supplier through notice in accordance with GCC7 to make changes within the general scope of the Contract in any one or more of the following:
- a) drawings, designs, or specifications, where Goods to be furnished under the Contract is to be specifically manufactured for the Purchaser.
 - b) the method of shipment or packing; the place of delivery; and the Related Services to be provided by the Supplier.
- 34.2. If any such change causes an increase or decrease in the cost of, or the time required for, the Supplier's performance of any provisions under the Contract, an equitable adjustment shall be made in the Contract Price or in the Delivery/Completion Schedule, or both, and the Contract shall accordingly be amended. Any claims by the Supplier for adjustment under this Clause must be asserted within thirty (30) days from the date of the Supplier's receipt of the Purchaser's change order.
- 34.3. Prices to be charged by the Supplier for any Related Services that might be needed but which were not included in the Contract shall be agreed upon in advance by the parties and shall not exceed the prevailing rates charged to other parties by the Supplier for similar services.
- 34.4. Subject to the above, no variation in or modification of the terms of the Contract shall be made except by written amendment by the parties.

35. Extension of Time

- 35.1. If at any time during the performance of the Contract the Supplier or its subcontractors should encounter conditions impeding timely delivery of the Goods or completion of Related Services pursuant to GCC20, the Supplier shall promptly notify the Purchaser in writing of the delay, the likely duration, and its cause. As soon as practicable after receipt of the Supplier's notice, the Purchaser shall evaluate the situation and may at its discretion extend the Supplier's time for performance, in which case the extension shall be ratified by the parties by amendment of the Contract.
- 35.2. Except in the case of Force Majeure, as provided under GCC33, a delay by the Supplier in the performance of its Delivery and Completion obligations shall render the Supplier liable to the imposition of liquidated damages pursuant to GCC29.1, unless an extension of time is agreed upon, pursuant to GCC35.1.

36. Export Restriction

- 36.1. Notwithstanding any obligation under the Contract to complete all export formalities, any export restrictions attributable to the Purchaser, to Bhutan, or to the use of the products/Goods, systems or services to be supplied, which arise from trade regulations from a country supplying those products/Goods, systems or services, and which substantially impede the Supplier from meeting its obligations under the Contract, shall release the Supplier from the obligation to provide



deliveries or services, always provided, however, that the Supplier can demonstrate to the satisfaction of the Purchaser that it has completed all formalities in a timely manner, including applying for permits, authorizations and licenses necessary for the export of the products/Goods, systems or services under the terms of the Contract. Termination of the Contract on this basis shall be for the Purchaser's convenience pursuant to GCC37.3.

37. Terminations

37.1. Termination for Default:

- a) The Purchaser, without prejudice to any other remedy for breach of Contract, by written notice of default sent to the Supplier, may terminate the Contract in whole or in part:
 - i. If the Supplier fails to deliver any or all of the Goods within the period specified in the Contract, or within any extension thereof granted by the Purchaser pursuant to GCC35.1; or
 - ii. if the Supplier fails to perform any other obligation under the Contract; or
 - iii. if the Supplier, in the judgment of the Purchaser, has engaged in fraud and corruption, as defined in GCC4, in competing for or in executing the Contract.
- b) In the event the Purchaser terminates the Contract in whole or in part, pursuant to GCC37.1(a), the Purchaser may procure, upon such terms and in such manner as it deems appropriate, Goods or Related Services similar to those undelivered or not performed, and the Supplier shall be liable to the Purchaser for any additional costs for such similar Goods or Related Services. Wherever the Contract is terminated in part, the Supplier shall continue the performance of the Contract to the extent not terminated.

37.2. Termination for Insolvency:

The Purchaser may at any time terminate the Contract by giving notice to the Supplier if the Supplier becomes bankrupt or otherwise insolvent. In such event, termination shall be without compensation to the Supplier, provided that such termination shall not prejudice or affect any right of action or remedy that has accrued or will accrue thereafter to the Purchaser.

37.3. Termination for Convenience.

- a) The Purchaser, by notice sent to the Supplier, may terminate the Contract, in whole or in part, at any time for its convenience. The notice of termination shall specify that termination is for the Purchaser's convenience, the extent to which the performance of the Supplier under the Contract is terminated, and the date upon which such termination becomes effective.

The Goods that are complete and ready for shipment within thirty (30) days after the Supplier's receipt of notice of termination shall be accepted by the Purchaser



at the Contract terms and prices. For the remaining Goods, the Purchaser may elect:

- (i) To have any portion completed and delivered at the Contract terms and prices; and/or
- (ii) to cancel the remainder and pay the Supplier an agreed amount for partially completed Goods and for materials and parts previously procured by the Supplier.

38. Assignment

- 38.1. Neither the Purchaser nor the Supplier shall assign, in whole or in part, their obligations under this Contract, except with the prior written consent of the other party.



SECTION IV – SPECIAL CONDITIONS OF CONTRACT (SCC)



SECTION IV SPECIAL CONDITIONS OF CONTRACT

The following Special Conditions of Contract (SCC) shall supplement and/or amend the General Conditions of Contract (GCC). Whenever there is a conflict, the provisions herein shall prevail.	
Reference to the GCC is made as under:	
1.1 (xviii)	The final Delivery site is as follows: Punatsangchhu-II Hydroelectric Project Authority, Dam Complex, Wangdue Bhutan.
1.1 (xvix)	The Purchaser is: the Punatsangchhu-II Hydroelectric Project Authority (PHPA-II), Chief Engineer (Dam).
3.5 (a)	The meaning of the trade terms shall be as prescribed by Incoterms. If the meaning of any trade term and the rights and obligations of the parties there under shall not be as prescribed by Incoterms, they shall be as prescribed by: latest INCOTERM
3.5(b)	The terms EXW, CIF, DIP, DDP, and other similar terms shall be as per the version of Incoterms: DDP
5.1	The language shall be English
6.1	Joint Venture: Not permitted
7.1	For notices, the addresses shall be: For the Purchaser: Attention: Chief Engineer, Procurement & Contracts. Address: Punatsangchhu-II Hydroelectric Project Authority, Procurement & Contracts Wing, Block E-4, Bjimthangkha, Wangdue, Bhutan Post Box No.: 1308 Telephone: 02-471743/471744
9.2	The rules of procedure for arbitration proceedings pursuant to GCC Clause 9.2 shall be as follows: In the case of a dispute between the Purchaser and a Supplier, the dispute shall be referred to adjudication or arbitration in accordance with the Alternative Dispute Resolution Act of Bhutan in Thimphu.
13.2	No price adjustment shall be allowed.
14.1	Payment Terms: 100% payment shall be made Consignment wise or in a bulk after delivery & testing & commissioning of goods at the site of the Purchaser. Note: No advance payment shall be made.
15.1 & 15.2	All applicable taxes, duties, license fees, and other similar levies incurred in India & Bhutan upto the place of delivery for the contractual goods shall be borne the Purchaser. However, Bhutan GST of 5% at the point of entry in Bhutan shall be borne by the purchaser.



15.3	TDS shall be 2% for Bhutanese Supplier and no TDS shall be applicable for Indian Supplier.
16.1	The amount of the Performance Security shall be 10% of the Contract Value in BTN.
16.3	The types of acceptable Performance Securities are: (i) <i>An unconditional and irrevocable Bank Guarantee in accordance with Form No. 3. For Indian suppliers, a confirmation letter for the issuance of the Bank Guarantee from a corresponding (linked) bank in Bhutan is also required.</i> (ii) Cash warrant, or Demand Draft, or Banker's Cheque. (iii) Cash Deposit/Online Fund Transfer
16.4	The Performance Security shall be discharged by the Purchaser and returned to the Supplier after successful completing Defects Liability Period/ warranty period.
20.1	The good shall be delivered, installed, Tested and Commissioned within 90 days from the date of issuing Purchase order. The details of Shipping and other Documents to be furnished by the supplier shall be informed at a later date if required.
22.2	Subcontracting not allowed
25.2	Pre-Delivery inspection, shall be carried out and Factory Acceptance Test (FAT) is mandatory. Also, Inspection, testing and commissioning at premise of Purchaser shall be carried out during the time of delivery at site.
26.2	No additional requirements.
28.1	The Supplier 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.
28.3	The minimum period of validity of the warranty shall be 12 months after the successful delivery of goods at the site.
28.4 & 28.5	The period for repair or replacement of defective goods under warranty shall be 30 calendar days.
29.1	The applicable rate for liquidated damages (LD) for delay shall be 0.1% per day subject to the maximum 10% of the Contract Price. If deemed necessary, the Bank shall take appropriate action after reaching the maximum LD (10% of the contract price).
31.1	The insurance coverage shall be as specified in the Incoterms.



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SECTION V – TECHNICAL SPECIFICATION



SECTION V - TS

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TECHNICAL SPECIFICATIONS

Name of Work: Supply, Etraction, testing and Commissioning of One (1) Diesel-Generating set of rating 500 kVA, with generation voltage of 415 V, complete with all auxiliary equipment, common frame, vibration compensator, silencer, radiator type water cooling system, lubrication system, starting system with 24V battery system with charger, voltage regulator, speed governor etc. The D.G. set shall be stationary type, floor mounted and remote/local manual, and automatic start type with 10% continuous overload capacity at rated speed for minimum one hour.

1.1 SCOPE

1.1.1 This section of the technical specification covers the design, engineering, manufacture, testing at manufacturer's works before dispatch, supply, services for transportation, insurance, delivery at Project Site in Bhutan, handling, storage and preservation at Store/Site, transport to place of installation, complete works of site assembly, erection, testing at site and commissioning, remedial action, if any, up to defect liability period for the following scope of supply.

The detailed scope of supply shall include the following items/equipment:

- a) One (1) Diesel-Generating set of rating 500 kVA, with generation voltage of 415 V, complete with all auxiliary equipment, common frame, vibration compensator, silencer, radiator type water cooling system, lubrication system, starting system with 24V battery system with charger, voltage regulator, speed governor etc. located at DAM Top. The D.G. set shall be stationary type, floor mounted and remote/local manual, and automatic start type with 10% continuous overload capacity at rated speed for minimum one hour.
- b) One (1) AMF control panel for 500 kVA capacity D.G. set. A synchronizing panel shall also be supplied for each DG Set.
- c) One 990 litres daily service fuel tank (for 500 kVA capacity DG-set).
- e) One no. lubrication oil drum for storage of 400 litres oils along with manual pumps for 500 kVA DG set.
- f) One (01) no. - Air Intake and Exhaust System.
- g) The engine & generator shall be mounted on a robust, fabricated steel frame and with anti-vibration mounting pads.
- h) Miscellaneous equipment as per the various provisions of Technical Specifications.
- i) Special tools and plants.
- j) All auxiliary equipment, pipelines, instruments as per the Technical Specifications/drawings.
- k) Diesel fuel for the first filling of DG sets and all fuel tanks completely.
- l) Lubrication oil for the first filling of engine and all oil tanks.
- m) Cooling liquid for first filling of DG sets.



- n) One no. 11 kV metal-clad VCB Panel.
- o) 11kV power cables from 11KV VCB metal-clad switchgear panels (containing VCBs) up to 500kVA DG set
- p) Internal cables for interconnection of DG auxiliaries' equipment; cables from DG control panels up to nearest available RIO/RTU, and to central annunciation panel located in the underground central control room of power house (only for D.G. sets of power house area); cables from DG control panel up to 11 kV& 415 V switchgear.
- q) All electrical work and neutral earthing, body earthing, required for engine and alternator, main board/control and control wiring.
- r) One set of mandatory spares as per list enclosed, special tools & tackles, testing devices and consumables etc., 500 kVA capacity DG set as required and described herein shall also be included in the scope of supply.
- s) All other works incidental to and connected with the above services from delivery upto defect liability period of the equipment after successful commissioning shall also be included.

1.2 SYSTEM DETAILS & STANDARDS

1.2.1 System Details

The Project Features of the project have been specified in clause 1.3 of Section-1 of this document.

1.2.2 Standards

1.2.2.1

The equipment shall comply fully, except where specifically provided otherwise, with relevant Indian Standard specification and in their absence with any other accepted standards such as IEC etc. Where the standards adopted are other than Indian Standards, full details of the same including deviation from the Indian Standard shall be given in bid. The bidder shall supply one complete set of latest standards pertaining to the equipment along with the bid.

1.2.2.2

The list of relevant standards is given below. The latest version of these standards shall be applicable.

1.	IS: 10000 (Pt. 1 to XII)	-	Methods of tests for Internal Combustion Engines
2.	IS: 10002	-	Performance requirements for constant speed compression ignition engines for general purpose (above 20 kW)
3.	IS: 7451 (Pt. I to VI)	-	Reciprocating Internal Combustion Engines
4.	IS: 4722/ IEC-60034	-	Rotating Electrical Machines
5.	IS: 1248 (Pt. I to X)	-	Electrical Indicating Instruments



6.	VDI: 2062	-	Insulation against vibration/noise measurement on machines
7.	IEEE: 126	-	Recommended specification for speed governor of internal combustion engine generating units
8.	IS: 803	-	For cylindrical storage tank
9.	IS: 1460	-	Light diesel oil/High speed diesel
10.	IS: 1248	-	Electrical indicating instrument
11.	IS: 1554	-	PVC insulated (heavy duty) electrical cables for voltage upto including 1100 V
12.	IS: 1651	-	Stationary cells & batteries lead acid type (with tubular plates)
13.	IS: 2147	-	Degree of protection provided by enclosures for low voltage switchgear and control gear
14.	IS: 2208	-	HRC cartridge fuse links up to 650 V
15.	IS: 9385	-	Contactors for voltage not exceeding 1000V AC or 1200V DC
16.	IS: 3034/IEEE 80	-	Code of practice for earthing
17.	IS: 3231	-	Electric relays for power system protection



18.	IS: 4237	-	General requirement for switchgear & control gear for voltages not exceeding 1000 volts
19.	IS: 2705 (Part I to VI) & IEC – 185	-	Current transformers
20.	IS: 2516	-	Specification for circuit breaker
21.	IS: 3156 (Part I to VI) & IEC - 186	-	Voltage transformer
22.	IS: 13118	-	High Voltage A.C. Circuit breaker
23.	IS: 6875	-	Control Switches
24.	IS: 3034	-	Fire Safety of Industrial Buildings
25	IS: 4729	-	Measurement and evaluation of vibration of rotating electrical machines
26	IS: 4889	-	Methods of Determination of Efficiency of Rotating Electrical Machines
27	IS: 13947/ IEC 60947	-	Low-voltage Switchgear and Control gear
28	IS: 13364	-	AC Generators driven by Reciprocating Internal Combustion Engines
29	IS: 7098 (I & II)		Cross-linked Polyethylene Insulated. Thermoplastics Sheathed Cables
30	IS: 4794	-	Push buttons
31	---	-	CPCB Guidelines for Gen-set

1.3

DRAWINGS

GA Drawings form vendors.

1.4

MAIN FEATURES OF DIESEL-GENERATING SETS

1.4.1

Diesel Generating Set for Dam Area

1.4.1.1

General

One Diesel-generating set of 500 kVA, 415V shall be used as emergency power source for operation of various gates installed at Dam area. In case of loss of incoming supply from 11 kV outside source (Local sub-station), diesel generator shall be energized instantly to supply power to the essential loads. On receiving the signal of voltage loss in the network, D.G. set shall be started automatically after pre-determined time lapse and shall be automatically disconnected from the network at the voltage recovery in the network and DG set will shut down automatically.

All components of both the DG sets shall be permanently serviceable to ensure instant start of diesel-generator, whenever required. The bidder shall specify the



block loading capacity with the recovery time for each D.G set quoted.

The useful life of DG sets shall be 15 years from the date of signing of contract or 50000 hours of operation whichever is earlier.

Diesel-generating sets shall have remote and manual local operation modes. Start - shut- down in the local operation mode shall be provided from the DG Set control panel. Start- shut-down in the remote operation mode shall be provided from the operator station (OS) located at the Control Room of the Power House. The diesel-generator set shall ensure starting in response to signal of voltage loss in the station-service network. The DG operation shall have SCADA compatibility such that the system shall be complete in all respects with required accessories to function in a SCADA environment when it is realized.

On receiving a signal of voltage loss in the station-service network, one service diesel- generating set shall have capability of starting automatically. In case of non-start of service diesel-generator for any reason, the second (standby) diesel-generator should start automatically. Diesel-generating set shall be automatically disconnected from the network at voltage recovery in the station service network. This shall be achieved in co-ordination with HT/LT supplier as specified in their respective contract document. If diesel- generating station is in long-term stand-by duty, the provision shall be made for regular starting of each set to operate under load for updating the lubrication of functional surfaces and checking the workability of start-shut-down and protection circuitries.

1.4.1.2 Location

Equipment of the diesel-generating station shall be mounted in well-ventilated room, where the ambient temperature and humidity shall be within (-) 3 °C to 38 °C and 95% (max) respectively. The D.G. Sets shall be designed to operate at 50 °C without any deration. Necessary deration calculations shall be submitted along with the bid.

Equipment of the diesel-generating station and fuel storage shall be located at the DAM Top.

1.4.1.3 Scheme of Operation/ Interlocking Scheme of D. G Set (500 kVA)

500 kVA, 415 V DG set shall be interlocked with SSB-8 and operation of the DG set shall come into operation when incoming supply from SST 13 & SST 14 is faulty/ unhealthy. Interlocking of 415 V DG Set with SSB-8 (Located at Dam Site) shall be responsibility of HT/LT supplier.

1.5 TECHNICAL PARTICULARS OF EQUIPMENT

Each diesel-generating set shall consist of mechanical and electrical equipment. The mechanical equipment shall consist of engine, common frame, speed governor, air intake and exhaust systems, cooling and lubrication systems, fuel supply system with daily service & starting system. The electrical equipment shall consist of generator, voltage regulator, control cubicle etc.

1.5.1 Mechanical Equipment

1.5.1.1 Diesel Engine

The diesel engine shall be of stationary, multi-cylinder, four-cycle, direct injection, radiator cooling, and turbocharger type. The engine is to be suitable for operation on fuel (HSD) having a net calorific value as per latest Indian standards. The engine shall be capable of immediate starting and accepting block



load of about 100% of rated capacity following the extended inoperative periods. All facilities such as preheating and cycle priming necessary to achieve this requirement shall be provided.

The diesel generating set manufacturer shall be responsible for ensuring that the torsion, vibration amplitude and stresses of the diesel engine and generator shaft systems shall be within acceptable limits, both at the rated speed and transient when starting and stopping. The common frame (under base) shall be of welded profile steel. The diesel engine and generator shall be accurately aligned on the common frame. The bidder shall furnish the calculations for selection of capacity of engine after deration and shall also furnish the details of power consumed by each auxiliary of engine. The diesel engine is required to run alternator directly coupled to the engine. The alternators shall provide the A.C. supply to the emergency loads through Station Service Transformers (SSTs) connected to 11 kV & 415 V bus in case of failure of normal supply to 11 kV & 415 V bus. It shall be capable of quick starting and taking the full load all of a sudden notwithstanding the fact that engine was at rest for a very long time under complete cold conditions. The engine shall also be capable of satisfactorily driving the alternator at 10% overload at rated speed for at least one hour in a period of 12 hours of continuous running. The material of component parts of engine shall ensure a long service life and highest reliability of operation.

1.5.1.2

Speed Governor

The diesel engine shall be fitted with a speed governor with automatic and manual adjustment of load limit, speed setting and speed droop. With changing loads, there shall be no sustained oscillations of speed and power output. The electronic governor of class G3 shall be fitted with an electrically operated solenoid to enable shut down when the solenoid is energized. The governor shall also be fitted with a mechanically operated shutdown device, which will automatically operate and shut off the fuel supply to the engine on occurrence of engine over speed or low lubricating oil pressure. The devices shall be fitted with a set of normally open contacts and wired to trip the generator circuit breaker when the automatic shutdown device operates.

1.5.1.3

Air Intake and Exhaust System.

Air intake for the engine combustion shall be taken directly from the diesel-generator room. Cleanable air filters, selected for the site environment shall be fitted at the engine intakes. The engine shall be furnished with efficient exhaust silencers complete with interconnecting pipes and fittings. The design of the silencers shall comply the guidelines laid down by Central Pollution Control Board, India and as per relevant rules in Bhutan. Support for each complete system shall be of anti-vibration type and shall be so arranged that the engine shall take up no weight of the exhaust system. Expansion shall be compensated by the inclusion of expansion bellows.

At the lowest point of the exhaust system, the provision shall be made for drainage plug. The complete system including brackets shall be galvanized and shall be insulated within the building. Consistent with the standards, insulation shall be such as to limit temperature of the surface to be cooled to a



All oil piping and necessary valves and fittings shall be provided. A fuel oil filter shall be provided in the fuel supply system. The daily service fuel tank shall be provided for each engine. The capacity of daily service fuel tanks for each D.G. set shall be 990 litres. The tank shall be totally enclosed, vertical type and of welded steel construction with suitable support. The tank shall be provided with all necessary fittings, including fill, vent, drain and overflow lines, level switches and access for inspection and maintenance.

Level switches shall be provided for the following functions:

- Low-Level alarm;
- High-Level alarm;

Connections for fuel suction and return lines shall be separated as much as possible to prevent re-circulation of hot fuel and to allow for separation of any gases entrained in the fuel. The fuel suction line shall run below the minimum fuel level in the service tank. A suitable capacity heating arrangement shall be provided in each fuel tank for proper heating of tank during winters.

1.5.1.7 Starting of Engine

The engine starting system shall comprise of necessary set of heavy duty batteries 24V DC (as per manufacturer standard), and suitable starter motors, axial type gear to match with the toothed ring on the fly wheel. A timer in the control panel to protect the starter motor from excessively long cranking runs shall be suitably integrated with the engine protection system and shall be included with in the scope of the work. Battery capacity shall be suitable for meeting the needs of starting system (as three attempts starting), as well as the requirements of control panel, indications, and auxiliaries such as priming pump as applicable etc. The provision shall also be made for local and remote starting of the set from power house control room for 500 kVA capacity D.G. sets with provision of automatic and manual start.

1.5.1.8 Pipelines, Valves, and Instruments

Fuel and lubricating oil system pipelines shall be of mild steel (class C) and shall conform to IS1239. Exhaust system pipelines shall also be of mild steel (class B). The fuel pipelines shall be equipped with pressure gauges. The piping shall be supplied complete with requisite fittings, valves, air release and drainage plugs or cocks, expansion joints and other necessary instrumentation and devices to provide desired function and operation with flexibility and easy maintenance. Ball-type valves shall be of cast steel for working pressure of 0.6 MPa (testing pressure

- 0.9 MPa). Exhaust piping (inside the D.G room) shall be fitted with rock wool insulation and aluminium sheet cladding.

Suitable support system for the fuel piping and valves comprising hangers, brackets, hooks, pedestals, etc. shall be provided. Pipelines may undergo expansion or contraction under service conditions and adequate allowance shall be made for the same. All items of pipelines shall be thoroughly cleaned individually before installation and after erection, in stages/on completion, using proper method. It shall be ensured that they are perfectly clean inside before putting into use. Hot piping of exhaust system shall be thermally insulated. Insulation shall be such as to limit the surface to be cooled to temperature of maximum 60 C.



maximum of 60 °C. The exhaust fumes shall be burnt completely and free of solid matters, before escaping to the air. The equipment shall comply with pollution control laws, so that the exhaust pollution is within acceptable limits. Relevant data in this regard shall be supplied by the supplier of equipment.

1.5.1.4 Cooling System

The cooling shall be provided by closed water circuit system. The circulation of cooling liquid through the engine and radiator shall be by means of an engine-driven centrifugal pump. The cooling system of the engine shall consist of radiator with coolant inhibitor, powerful forced-draught fan and thermostat. The generator shall be cooled by built-in fan. The diesel-generator shall be so arranged that air flow first cools the generator, then the engine and thereafter it passes through the radiator. Air for forced cooling of the diesel-generator shall be taken from outside. Lubrication oil cooler and air blower, if provided, shall be cooled by the same water cooling system as well. Thermostatic control of the jacket water shall be provided for the lubrication system as well. Warm air after cooling the diesel engine and generator shall be exhausted through the exhaust fans.

1.5.1.5 Lubrication System

Lubrication of the engine shall be made by means of engine-integrated oil pump. The oil flow shall pass the sump, pump, cooler, filter, engine in the given sequence. The fine filter shall be of the simplex type and allow for change of filter elements during operation of the engine. The filter elements shall be of the disposable cartridge type. Cooler and filters shall incorporate by-pass valves, the flexible outlet, and the oil-pressure limiting valve. Service oil tank, storage oil tank and hand-operated oil pump shall be provided for lubrication system.

The bidder shall ensure that the lubrication oil system capacity shall be sufficient to enable the engine to run continuously for 12 hours at any load without oil replenishment. If priming of the lubrication system is an essential part of the starting sequence of the set, a suitable priming pump shall be provided and its control shall be linked into the automatic and "push-button" starting system to ensure that the set cannot be started without first being correctly primed. If feasible from the design viewpoint, the lubricating oil may be supplied to the crankcase by means of motorized level switch which un gates opening in the bottom part of the make-up tank on dropping the oil level in the crankcase and gates the opening at the oil level restoration. This pattern of lubrication supply is a preferable one. The bidder may suggest alternate scheme, if any, giving its merits.

1.5.1.6 Fuel Supply System

A dependable fuel supply system must assure instant availability of fuel for reliable starting and to keep the engine operating. To simplify the fuel supply system, the daily service fuel tank shall be located as near the engine as possible. The fuel supply system will include feed pump, fuel filters, fuel injection pump and injector etc. The various level switches shall be provided for indications and alarm.



The layout shall be such that valves, gauges/indicating instruments, are conveniently located to enable easy access for operation and reading. Piping may be embedded in concrete or laid in trenches where unavoidable. Otherwise piping shall be installed in ducts/openings on floors, walls or ceiling as necessary. The layout shall be such that it would not interfere with movement of Operation and Maintenance (O&M) personnel. The support system shall be rigid enough to prevent piping vibration when in operation.

For ready identification of different piping system functions, each piping system shall be painted near all operating points and also on each separate section, with two bands of colour, the wide band twice the width of the narrow one. An arrow showing the direction of flow shall also be marked, generally, the narrow band shall be in the direction of flow. The colour coding for the ground colour, the wide band and the narrow band on different pipes shall be as recommended in Indian or International Standards.

All operating valves on a piping shall be painted with the colour as per IS mentioned above. Each valve shall have a valve number, suitably fitted to it, and a name plate indicating the function of the valve. The gaskets shall be of requisite material and thickness to suit service conditions. Level switches shall be provided for the following services:

- Low-Level alarm for daily service fuel tank,
- High-Level alarm for daily service fuel tank,
- Low-Level alarm for automatic lubricating tank,

1.5.1.9 Lifting Equipment

Lifting equipment shall be provided by the supplier in the diesel-generator set rooms for installation/dismantling of D.G sets components. Capacity of equipment shall be reviewed later on depending upon the heaviest piece to be lifted.

1.5.1.10 Tools and Plants

Tools and plants, spanners etc. required for erection at site shall be arranged by the supplier and taken back by them after handing over the DG station to PHPA. However, the tools & plants, spanners, etc. required for operation, dismantling and maintenance of the equipment shall be supplied as indicated in Annexure VI of these specifications.

1.5.1.11 Flywheel

The engine shall have a suitable balanced flywheel of cast iron to meet the technical requirements and ensure safety.

1.5.1.12 Turbo-Charger

The turbo - charger shall be of robust construction, suitable for operation by engine exhaust, having a common shaft for turbine and blower. It shall draw air from oil-bath type air filter with adequate capacity to suit engine requirements.

1.5.1.13 Engine Warming

The arrangement has to be provided to supply hot water up to a temperature 60° C to 70° C into engine jacket and oil coolers of the engine for keeping it sufficiently warm for the purpose of quick starting of the engine under cold condition.



1.5.1.14

Instruments

The instruments to be supplied by the bidder shall include but not be limited to the following:

- a) LED/LCD based Digital instruments thermometer for measuring
 - i) Alternator Bearing temperature
 - ii) Jacket water temperature
 - iii) Speed indication
 - iv) Lub oil pressure
 - v) Alternator Winding temperature
- b) Pressure Gauges at lube oil cooler outlet;
- c) Pressure Switches
 - i) On the lube oil system to give an alarm, if pressure falls below pre-set value and subsequently trip the engine when the minimum safe limit has been breached.
 - ii) Over speed
- d) Thermostat
At the lube oil outlet from engine to give alarm when the temperature rises above pre-set value and subsequently trip the engine when the safe limit has been exceeded. For this, the bidder shall furnish the details of interlocks.
- e) Tachometer
- f) Primary sensing devices, control valves etc.

1.5.1.15

Consumables

All consumables required at site such as welding rods, grease, oils, fuel, coolin liquid, paints, preservatives etc. plus ten percent (10%) extra shall be supplied.

The data for guaranteed and general technical particulars shall be furnished in Annex- I & II enclosed with these specifications. Deviations from the technical specifications, if any, shall be furnished in Annex-III enclosed with these specifications.

1.5.1.16

Name Plate

A metallic name plate shall be provided on the engine at a suitable location to indicate the following:

- Rated Output in KW/HP
- Rated KVA
- Rated Voltage
- Rated frequency
- Rated current
- Weight
- Dimensions
- Insulation Class
- Engine Speed
- Fuel & Lube oil specification
- Manufacturer's Name & Trade mark
- Name of the Project

1.5.2

Electrical equipment

1.5.2.1

Generator

The generator shall be horizontal, 3-phase, A.C. synchronous, including all



auxiliary equipment with excitation system, automatic voltage regulation, complete with supervisory equipment and the air-cooling system with all accessories. The generator shall be designed and constructed in such a manner, that undue and harmful vibrations are eliminated. The generator shall be self-ventilated and self-regulated. The generator shall be protected by overcurrent and ground fault protection relays. The excitation equipment shall be of brushless self-regulating type with sufficient capacity to excite the generator up to 125% of rated kVA. The generator shall safely operate at 10% overload at rated speed for minimum one hour in 12 hours of continuous operation.

The diesel generator shall have four different control modes viz. Off, Test, Manual and Automatic.

1. Off Mode

In Off mode, the diesel generator set shall, if running, stop without time delay and remain stopped.

2. Test Mode

In Test mode, relay shall sense all inputs available to it like fuel level, water temperature sensor status, lub. oil level, pressure switch status, dg contactor, mains contactor, puller /Solenoid wiring status, operating mode. These checks are performed subsequently and message displayed on LED/LCD. It checks all driver outputs for its healthiness

3. Manual Mode

In the Manual mode, the operator shall start the engine manually by pressing the 'start' push button on the generator panel. The closing of Circuit Breakers shall be done manually. The D.G set shall be shut down manually by pressing the 'Stop' push button.

4. Automatic Mode

The system should come in operation after sensing of power failure and automatically control the start & stop of engines, depending on the predefined load setting in the PLC. In case engine does not start in the first cranking, two more auto commands should be given with proper intervals. Even then if engine fails to start, the indication must appear on HMI. In the event the engines are under loaded i.e. load sensed is less than the minimum load capability of the running DG sets then command must be given to stop. When the main supply is restored and is healthy as sensed by the line voltage monitor setting, both for under voltage and unbalance, the system shall be monitored by a suitable timer which can be set between 1 to 10 mins for the load to be transferred automatically to the main supply. The facility of synchronization will be available in both Auto & Manual mode. In normal circumstances, the auto synchronization will work

, however, if due to any reason auto-synchronizations fails repeatedly, the facility for closure of VCB/ACB must be available manually.

1.5.2.1.2

Rating

Generator shall meet the following requirements:

- Rated continuous output capacity	500 kVA,
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- Rated output voltage	415V
- Rated power factor	0.8
- Rated output frequency	50 Hz
- Insulation class of winding	Class F for stator and rotor
- Stator winding connection	Y
- Voltage regulation	□1% 10% for one hour at rated speed in every 12 hours of continuous use
Overload capacity	As defined by the engine governor (□1%)
Frequency variation	Self-excited Solidly Earthed Not less than IP23
Excitation System earthing	Not less than 93.5%
Degree of protection	
Efficiency at full load 0.8 PF	

Stator and Rotor

The stator frame shall be of rigid structure designed to ensure correct distribution of air flow over the stator core and winding. Stator case shall be built up of insulated silicon steel, pressed together rigidly by end rings. The stator core slots shall be semi-enclosed to reduce losses and skewed to give better waveform. The rotor shall have laminated poles carrying well supported windings. The pole faces shall have damper windings to facilitate parallel operation.

1.5.2.1.3 Automatic Voltage Regulator (AVR)

In order to maintain output terminal voltage constant within the regulation limits i.e +/- 1%, Automatic voltage regulator unit shall be provided as per standard practice of manufacturer.

1.5.2.1.4 Excitation System

Brushless type excitation system shall be provided. The alternator shall be self-excited, self-regulated having static excitation facility. The entire exciter shall be so placed as to permit easy replacement of parts without dismantling other parts of the generator. The entire rotor assembly shall be dynamically balanced to ensure vibration free running. The vibration of the machine shall be within specified limits specified in IS: 4729. The system shall consist of AC exciter and liberally rated silicon diode rectifier assembly with a self-contained excitation system with electric Automatic Voltage Regulator. The AVR and control gear shall be mounted in a component box on the side of the DG set using anti-vibration mounting. Electrical connection to the AVR shall be taken through a multi-way plug and socket. Voltage regulation shall be within $\pm 1\%$ under all conditions of load, power factor and temperature including cold and hot variation. Voltage drift shall be negligible. Excitation system should be such that the alternator is capable of starting up the connected load having a starting KVA of not less than 1.25 times the alternator rated KVA. The Excitation system shall



- Protection against low-speed operation.
- Volts / Hertz response feature
- Smooth Auto / Manual change- over without the charger in excitation level during change over.

The power and control cubicle shall comprise of Circuit breaker Panel, Automatic Mains Failure Panel and Synchronization Control panel. All instruments required for automatic operation shall be placed on the cubicle. Measuring instruments, protection relays, auxiliary control relays, circuit-breakers and contactors for diesel-generator set auxiliaries, electronic governor and electronic voltage regulator, push-buttons, control switches, “local/remote” selector switch, alarm equipment shall also be installed on the control panel. Power & Voltage transducers with output parameters 4-20 mA shall be provided at the panel for measuring the generator voltage, power etc. and transmitting thereof to UCS/CCS or SCADA of HT/LT system through RTU/RIO Panel. After operator’s command, all the sequences involved in the complete startup of the diesel generator set, bringing it to the rated speed and voltage shall take place automatically without the help of any operator and any other equipment of the Purchaser.

shall be of minimum thickness of 3 mm.

1.5.2.2.1 Circuit Breaker Panel



trip free and fitted with anti-pumping device.

1.5.2.2.2 Automatic Mains Failure (AMF) and Synchronization Control Panel

Automatic Mains Failure (AMF) and Synchronization Control panel shall be totally enclosed, dust, damp and vermin proof, free-standing floor mounted type & front operated. The AMF panel shall have Auto and Bypass modes of operation. It shall be made in to sections such that as far as feasible, there is no mixing of control, power, DC & AC functions in the same section and they are sufficiently segregated except where their bunching is necessary. Hinged doors shall be provided preferably double leaf for access for routine inspection from the rear. There is no objection to having single-leaf hinged door in the front with all the indication lamps, instruments meter etc. flushed in the front.

1.5.2.2.3 Equipment Requirements

The cubicle shall incorporate in assembly general equipment and systems as under:

- (a) Control system equipment and components such as relays, contactors, timers, etc. both for automatic operation on main failure and as well as for manual operation.
- (b) Equipment and components necessary for testing generating set's healthiness with test mode and with load on mains.
- (c) Necessary instruments and accessories such as volt meter, power factor meter, kW meter, KWH meter, AM meter, Frequency meter etc. in one energy analyser unit with selector switch to obtain the reading of desired parameters.
- (d) Smart metering system (which includes an Advanced Metering Infrastructure and Meter Data Management functions)
- (e) Necessary indication lamps, fuses, terminal blocks, push buttons, control switches etc. as required.
- (f) Necessary engine/generating set shut down devices due to faults/abnormalities.
- (g) Necessary visual audio alarm indication and annunciation facility as specified.
- (h) Necessary battery charger.
- (i) Necessary excitation control and voltage regulating equipment. (Alternatively provided on the Alternator itself).
- (j) Necessary terminations including all internal wiring, connections etc. as required.
- (k) Necessary accessories such as digital type temperature scanner, DC ammeter and DC voltmeter for diesel generator field circuit/battery charger.
- (l) Necessary interfacing of RTU/RIO with UCS/CCS or SCADA of HT/LT system.



1.5.2.2.4 Emergency Shutdown

Emergency shut-down for all D. G. sets shall be provided at:

- Emergency cutting off the 11 kV circuit breaker;
- Pressure of oil very low alarm & shut down;
- Temperature of cooling liquid very high alarm & shut down;
- Level of fuel very low alarm;
- At sudden increase of diesel engine speed above the allowable limits alarm & shutdown;
- Initiation of generator relay protection.
- Low frequency
- High water temperature
- Low radiator water level
- Reverse power

1.5.2.2.5 Alarm Annunciation

Alarm annunciation for all D. G. sets shall be provided at:

- High temperature of cooling liquid;
- Lubricating oil pressure – low;
- Low level of fuel oil in tank;
- At increase of diesel engine speed above the allowable limits;
- Lubricating oil tank level – low;
- Failure to start of the engine;
- Over voltage;
- Loss of DC control supply.
- Ground fault on the system
- Excitation failure
- Generator fault
- Differential fault
- Multi-phase faults in windings and at the main terminals;
- Earth faults in windings;
- External symmetrical and asymmetrical short-circuits;
- Symmetrical overloading.

All aforesaid protections shall also initiate 11 kV & 415 V circuit breaker disconnections.

1.5.2.2.6 Protection Equipment.

The control panel shall also contain all protective and auxiliary relays for electrical protections / metering recommended by the supplier for the alternator including (but not limited to) the following:

- Restricted earth fault protection for the Alternator.
- Overload protection.
- Protection against phase to phase and phase to earth faults.
- Over voltage protection.
- Differential Relay
- Over speed protection
- Reverse Power
- Under/over frequency
- Phase sequence
- Field failure



- Excitation system protection
- Interlocking relays
- Combined Earth fault and over current with IDMTL characteristics
(This can be provided in control panel or VCB panel)
- Instantaneous type differential relay for protecting alternator windings.

1.5.2.3 Terminals, Terminal Box & Connection

All six terminals i.e. three on phase side and three on neutral side shall be brought out to the separate terminal boxes. The phase side terminal box shall have sufficient space to accommodate among other equipments, the protection CTs for restricted earth fault and overload as well as metering CTs. The neutral side terminal box shall have sufficient space to accommodate CTs for combined over current and earth fault relay before formation of star and CT for REF protection after formation of star. Neutral shall be formed inside the box and shall be available for earthing.

The alternator output terminal shall be enclosed in a terminal box mounted in an accessible position on the alternator frame. Cable glands and lugs shall be provided for all power and control cables which have to be terminated on the equipment supplied under this package. As far as possible, connections between exciter and alternator shall be contained within the machine frame and connections for the A.C. and D.C. circuits shall be segregated from each other.

1.5.2.4 Generator Space Heaters

Suitably rated 240 volts single phase space heaters shall be provided on the lower part of the stator frame. The connections of the space heaters shall be brought out to a separate terminal box. When the generator is running, the space heater shall be automatically cut- off and put on when the generator is in idle position.

1.5.2.5 Cables and Their Accessories

The required cables shall be heavy duty type and suitable for continuous operation under climatic conditions prevailing at the site. The cables shall have a termite, vermin, rodent- proof covering. The cables shall be fire-retardant and flame-retardant low smoke and halogen type (FRLSH). All 11 kV AC power supplying cables shall have multi core aluminum conductors, XLPE insulated, armoured type of adequate size for interconnecting 1250 kVA DG Sets with Power cubicle (11kV VCB). All 1.1 kV power cables shall have multi core aluminum conductors and XLPE core insulation, armoured. All control and instrumentation cables shall be multi core annealed high conductivity copper conductor solid or wire stranded type, insulated with HR-PVC insulation, PVC sheathed, conforming to IS 1554 (part I or II). The outer sheath shall be of PVC compound.

All control cables (except for current circuits) shall have at least 20% spare cores. Control cables shall be standardized as much as possible in order to supply only a few different types. Control & annunciation, secondary wiring shall be by 650/1100 V grade cables for data transmission to CCS and elsewhere flexible



cables are necessary. The conductors shall be plain copper, stranded wire type with PVC core insulation and shall have braided screen of tinned steel wires. The cables for analog signals transmission to computers of Computerized Control System shall be 300 V grade, screened, twisted pair, solid multi conductor.

The contractor shall provide all power cables, control cables & special cables, cable racks, cable glands, lugs, terminals, connectors, etc. for cabling between equipment & devices covered in this contract. The contractor shall also provide the power cables between Circuit breaker panel of 500 KVA DG set and SSB-8. It is envisaged to transfer the required control & indication signals to RTU/RIO Panels (Not included in scope of these specifications). Provision shall be made for control and signal cables. The necessary co-ordination for the same shall be done during design stage. The scope shall also include co-ordination with the other suppliers, wherever required.

1.5.2.6 Earthing

Earthing terminals for equipment under these specifications shall form part of equipment supplies. The Contractor shall provide the earthing conductors from the terminals to the station earthing mat as required. Earthing of the generator shall be done in accordance with relevant provision of IS: 3043 and IEEE 80. Provision shall be made for each earth bus of the end panels for connecting purchaser's earthing grid in the vicinity of the equipment at two separate points. Necessary terminal clamps and connectors for this purpose shall be included in the scope of supply of Contractor. The earth wires or screens should be clearly bonded and earthed to the gland plate. The earthing scheme shall be approved by the purchaser. All metallic cases of relays, instruments and other panel mounted equipment including gland plates, shall be connected to the earth busby independent suitable copper wires/strip. The colour code of earthing wires shall be green. Earthing wire shall be connected on terminals with suitable clamp connectors and soldering shall not be permitted

1.5.2.7 Current Transformers

All CTs shall conform to the requirements laid down in IS: 2705/ IEC 185 and shall be of reputed make and type which shall be subject to purchaser's approval. The CTs shall have suitable short time current rating, rated transformation ratio and adequate VA burden output to suit the connected relays / instruments.

1.5.2.8 Battery and Battery Chargers

The battery chargers shall be suitable to charge number of Nickel Cadmium batteries at 24 V with at least rating of 400AH, complete with transformer, rectifier, charge rate selector switch, indicating ammeter & voltmeter etc. It shall be of adequate capacity to provide power for 10 successive starts and operation of controls without recharging the battery. The battery shall be permanently connected with the starter. The charger shall be of the automatic combined charging/recharging type to keep the battery in the best possible working conditions. Full recharge of the discharged battery shall take not more than 10 hours. The battery shall be of the high-performance maintenance free type design. Connections between the battery charger and batteries shall be



provided with suitable copper leads with lugs etc.

DG sets shall have individual battery charger and battery set of Maintenance Free type supplied in dry and uncharged condition with Battery cables and Battery stand. The batteries shall be charged after installation in site. The whole device shall be enclosed in an adequately ventilated enamelled corrosion resistant case. The battery charger shall be incorporated within the generator control panel. Battery charging shall be in action while alternator is running and shall have facility to cut – off during any emergency. 'Charger ON' indication shall be provided on panel. Charger shall at all times monitor battery condition and automatically control charging rate. When battery is operating, the charger shall automatically re-charge the battery in a shortest possible time.

1.5.3

Performance Requirements

1.5.3.1

General

The diesel generator and its accessories shall be designed to meet the following performance requirements which shall be guaranteed by the bidder:

- a) The unit shall be capable of starting from cold conditions reaching synchronous speed and taking up full load within 30 seconds from the instant of giving start impulse without wear or stress on engine.
- a) The unit shall be capable of delivering continuously at generator terminals rated output (net power) at rated power factor. This output shall be obtained after necessary de-rating of engine due to site conditions and with auxiliary power requirements considered.
- b) The unit shall be capable of delivering peak output of 10% in excess of its rated output at its rated speed for a period of one hour in any period of 12 hours of continuous running without exceeding the permissible temperature rise limits and any other mechanical trouble.
- c) With the unit running at no load voltage and speed, the transient voltage drop at its rated terminal shall not exceed 10% of rated voltage on simultaneous starting of all emergency loads.

1.5.3.2

Specific Fuel Oil Consumption

The specific fuel oil consumption at 110%, 100%, 75%, 50% and 25% of rated load shall be stated and guaranteed. Specific fuel oil consumption should not exceed the rated load operation.

1.5.3.3

Specific Lube Oil Consumption

The specific lube oil consumption per unit of power expressed in g/kWh shall also be stated and guaranteed. Specific fuel oil consumption for each of the DG set shall be as per

IS 10000.

1.5.3.4

Daily Trial Operation

The diesel generator sets shall run only when there is total AC supply failure in the power station and hence it may not be required to operate frequently.



1.6.0 GENERAL TECHNICAL REQUIREMENTS

1.6.1 Acoustic Enclosure

The complete DG set will be housed in a modular type acoustic enclosure to control noise from D G Set. The enclosure will be fabricated from 2mm thick CRCA sheets. The noise level shall be 75 dB or less at 1 metre from acoustic enclosure surface conforming to rules issued by CPCB (Central Pollution Control Board), India and as per relevant rules in Bhutan.

1.6.2 Balancing

All rotating parts of the machinery shall have their rotors well-balanced statically at the manufacturer's works. Any out of balance that may occur upon installation at site shall be rectified by the bidder at their cost. The bidder shall indicate whether rotating parts shall be balanced both statically and dynamically at the manufacturer's works.

1.6.3 Noise and vibrations

All rotating machinery shall be designed to work quietly and smoothly without undue noise and vibrations. The bidder shall indicate the measures provided in the design in this regard.

1.6.4 Rating Plates, Name Plates and Labels

A rating plate of non-corrodible material shall be attached to each item of equipment supplied. This plate shall be permanently engraved with the designed full load ratings; serial number; type; date of manufacture; and other identification as deemed necessary. Where necessary, diagram plates shall also be supplied. A nameplate shall be provided to identify the service of all items of plant supplied. The identifying inscription shall be approved by the purchaser. Devices shall be identified by nameplates on both front and rear of all desks, panels, cubicles etc. Nameplates or labels shall be manufactured of non-hygroscopic materials with engraving of a contrasting colour or alternatively for indoor use of transparent plastic material with lettering engraved on the back and filled with suitable colour. The materials used shall be non-fading, non-ageing and suitable for tropical conditions. Where the item of plant may be subject to handling, the nameplate shall be chrome-plated brass, 3 mm thick, with the engraved lettering filled with enamel.

1.6.5 Foundation Bolts

The foundation bolts for engine and alternator shall be supplied along with the machine.

Base frame, wherever necessary for equipment is also to be supplied along with machine.

1.6.6 Completeness of Equipment

All fittings and accessories of diesel-generating sets though may not have been specifically mentioned in the specifications but are usually necessary for completeness of the work shall be deemed to be covered by the specifications and shall be indicated and furnished by the bidder without any extra cost.

1.6.8 Deviation from Specifications

All deviations from the specification shall be brought out separately in Annexure-III. The deviations shall be given with full description along with clause numbers



and reasons for the same. In absence of any deviation schedule, it shall be presumed that requirements of the specification are fully complied with the bid.

1.7.0 LIST OF PREFERRED MAKES

1.7.1 The contractor while offering the complete package will select various equipment out of the purchaser's preferred makes, list of which has been amply elaborated below:

1.7.2 Although an endeavor has been made to cover most of the major electro-mechanical equipment, electrics, instrumentation, piping, valves etc., any item which have not been covered in this list will be reflected specifically in the bid considering only reputed and experienced sub vendors in respective fields.

1.7.3 The successful contractor will have to select any of the sub-vendors from the list of preferred makes only and no deviation to this effect will be entertained during the execution of the contract unless a specific approval has been sought by the contractor from the purchaser.

1.7.4 Major equipment and accessories:

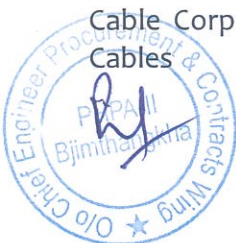
1.7.4.1 Mechanical Equipment

- | | |
|---|---|
| i) Engine | Cummins/Caterpillar |
| ii) Alternator | Kirloskar Electric /Stamford/AVK/JOTI |
| iii) Steel Pipes & Fittings | SAIL/Surya Roshni/JINDAL PIPES/Mukat/Tisci/Indus Tubes/Sivananda Pipe & Fittings/Arvind Pipes & Fittings/EBY Fasteners/ |
| iv) Valves | |
| a) Gate Valves, Golbe Valves and Non-return Valves Fouress Engg. / Indian Valve Co./ Audco/ L&T/Macneill & Magor/B.D.K./Kirloskar | |
| b) Plug and ball valves | Audco/Fuflin/B.D.K./Durametallic/ Visgo Sterova |
| v) Fuel Pumps | |
| Delta/Roto/Bornemann FiltersOtoklin/Delta/Superflow/Ultra/Parks/Thoms on / Hoke | |

1.7.4.2 Electrical Equipment

- | | |
|------------------------------------|---|
| i) Power & Control Cables | Havells/ Finolex/KEI/Polycab |
| ii) MCC | ABB/ Siemens/ L&T/ CGL/ECC/C&S/Havel ls |
| iii) Fuses | EE/Siemens/L & T |
| iv) Meters | Meco/Auto Elect/IMP/Omron/Aplab |
| ix) Contactors | Siemens/L & T/Telemecanique |
| x) Instrumentation Screened Cables | |

Cable Corporation of India Ltd./ Finolex Cable Ltd./ Toshniwal Cables/ Delton Cables



xi) Cable Glands	Dowell's Electro Werke/Cable Corporation of India Ltd./ Gland Mech Industries/ Sunil and Company.
xii) Terminal Blocks	Elmex Controls Pvt. Ltd./ Connectwell
xiii) Miniature Circuit Breaker	MDS Switchgear Ltd./ Siemens Ltd.
xiv) Instrument Transformer	Indcoil Manufacturing Company/ National Engineering Corporation/ Automatic Electric Ltd.
xv) Plug & Socket	Anchor/Havells/Orient

1.8.0 SHOP TESTS AND INSPECTIONS

1.8.1 Materials used for construction of the equipment shall be thoroughly shop-tested and inspected by the bidder at his own expense prior to dispatch.

1.8.1.1 General

Diesel engine, alternators, control panels, AVR, battery and battery chargers, cables, instrument bus bars, relays, CTs, contactors and all accessories etc., shall be subject to factory and site acceptance tests in accordance with the requirements of the latest issue of relevant Indian or equivalent standards. The type test reports of the tests shall be submitted during design stage with validity of 5 years. The Supplier shall conduct the type tests on similar rating equipment. In case type tests have not been conducted or the type test reports submitted are not found acceptable, the same will have to be conducted without any additional cost to the purchaser.

The acceptance tests shall be carried out in the presence of the Purchaser or Purchaser's representatives. The bidder shall clearly state the testing facilities available at his works for testing the complete equipment with all fittings and accessories offered. The tests to be carried out on various equipment shall include (but not limited to) the tests specified in the following clauses. The bidder may propose to perform additional tests, which he considers advisable or necessary. The cost of performing such tests shall be borne by the bidder.

1.8.1.2 Diesel Engine

The type tests conducted on diesel engine in accordance with IS: 10000 (Part - I to XII) and IS: 10002, shall be submitted with the accepted validity. The performance tests as listed in IS: 10002 shall also be carried out on each of the diesel engine in accordance with IS: 10000 (Part - I to XII). These tests shall include (but not limited to) the following:

- Power output at full throttle on auto governor;
- RPM, torque, fuel rate, fuel pressure, Lub. Oil pressure, intake manifold pressure, exhaust temperature, and smoke checks.
- Performance parameters measurements at full load, half load, 3/4 load and 1/4 load shall be noted;
- RPM and Lub. Oil Pressure at high idle and low idle speeds shall be noted;
- Engine washing for leakage check;
- Performance parameters at 10% overload;
- Test calculations for horse power at full load, 1/2 load, 3/4 load, 1/4



- load and 10% overload shall be furnished;
- Time from initiation of start command to rated speed shall be noted.
- 1.8.2** The shop tests and inspections shall be carried out on material and equipment as per the requirements of applicable standards.
- 1.8.3** The bidder shall furnish certificate of the shop tests and inspections of materials and equipment. Limit of tolerances/clearances required to be achieved during erection shall also be indicated by the manufacturers.
- 1.8.4** During the test run, water, oil, exhaust gas, temperatures, speeds, speed variations and droops, all pressures, fuel quantities, etc., shall be measured.
- 1.8.5** Prior to the trial run of the set the following test shall be performed:

1.8.5.1 Alternator

- No-load and short-circuit characteristics;
- Winding resistances;
- Insulation resistance of all windings;
- Temperature rise test;
- High voltage insulation test;
- Power frequency voltage withstand test for auxiliary equipment;
- i) Phase sequence and polarity marking tests;
- ii) Check of direction of rotation;
- iii) Vibration test;
- iv) Waveform test;
- v) 120% over speed test;
- vi) Momentary overload test;
- vii) Regulation test;
- viii) Efficiency test.

1.8.5.2. Exciter

- i) Nominal exciter response test;
- ii) Load characteristics measurements;
- iii) Momentary overload;
- iv) Temperature rise test;
- v) High voltage tests;
- vi) Measurement of resistance;
- vii) Measurement of insulation resistance;
- viii) Regulation and efficiency tests.

1.8.5.3. Voltage Regulator

- i) Response time tests;
- ii) Sensitivity tests.

1.8.5.4. Control Panel/Board

- iii) Physical dimension check;
- iv) Verification of apparatus;
- v) Control wiring verification;
- vi) A.C. and D.C. wiring check;



- vii) Functional tests;
- viii) High voltage tests;
- ix) Insulation resistance (Megger) test.

1.8.5.4 Completely Assembled D.G. Set

- i) Functional checks for local manual start, stop, speed and voltage control;
- ii) Tests to check the starting time from completely cold conditions;
- iii) Vibration and noise tests;
- iv) One hour at full load, one hour at 3/4 load running;
- v) Four hours at full load followed by one hour continuous load of 110%;
- vi) Fuel consumption tests at different loads;
- vii) Automatic starting and interlocks checks;
- vii) Governor response;
- viii) Over speed test and over speed trip.

1.8.5.5 Test Reports

Six copies of the test reports, duly signed by the purchaser's representatives who have witnessed the tests shall be furnished for approval. No material shall be dispatched to site without taking purchaser's approval. If the inspection is waived-off by the purchaser, such waiver shall not relieve the bidder, in any manner, from his entire obligation under the Contract.

1.8.6 In general the test rules stated in DIN 1941, Acceptance Tests for Internal Combustion Engines shall be observed. For the generator the IEC-Codes No 34-1, 34-2 and 34-4 shall be applied.

1.8.7 The overload will be restricted to 10% of the rated load in accordance with DIN 6270, Internal Combustion Engines, and Definitions of Output.

1.8.8 The bidder shall carry out all important tests/inspection in the presence of purchaser or his authorised representatives. A minimum of one month of notice in advance shall be given to the Purchaser to enable him to be present during the testing.

1.8.9 Equipment on which tests and inspections have been duly witnessed and approved by the purchaser, may be dispatched by the bidder.

1.8.10 Equipment on which tests and inspections have not been witnessed by the purchaser, shall be dispatched only after the shop tests and inspection certificates have been got approved from the purchaser.

1.9.0 SITE TESTS.

1.9.1 All routine / pre-commissioning checks/tests for engine, generator, starter and other associated equipment as per relevant standards/standard practice required for proper functioning of installation as a whole, shall be carried out.

1.9.2 At site a test run lasting 24 hours shall be performed under simulated and/or operating conditions. During this time all important performance values shall be within the specified limits and the correct functioning of the control equipment shall be proved.

1.9.3 Guarantee tests to prove the guaranteed performance of the diesel generating sets shall be carried out at site after proper installation. These shall include the following tests for all



D.G. sets:

- i) Functional testing for starting, safety device working;
- ii) Load test;
- iii) Temperature measurement;
- iv) Testing of all alarm, safety and protection devices;
- v) I.R. measurement;
- vi) Auto start, emergency start without A.C. supply with pre-lubrication by manually operated pump of D.G. set.

1.9.4 Tests during installation and pre-commissioning

- Installation check of all components installed according to as-built drawings and engineering
- Functional test of sub systems
- Functional test of complete system

1.9.5 Commissioning Tests

After installation of the equipment and prior to operation of the diesel generator-set, at least the following tests shall be performed:

- Megger test of insulation between windings. between each winding and ground, and between control circuit live parts and ground
- Resistance measuring of each winding
- Phase sequence test
- Measurement of temperature rise
- Load test for 2 hours at rated capacity
- Starting time test
- Functional tests of all control circuits
- Functional test of all safety devices
- Measurement of Vibration and Noise level
- Voltage regulation test

1.9.6 Re-testing

Should the results of any test indicate any defect, then the bidder shall rectify these at his own cost and retest shall be done till satisfactory results are obtained. Should the equipment ultimately fail to pass the specified tests, the purchaser has the right to reject the material/equipment.

1.9.7 Testing Equipments

All requisite testing meters, instruments and equipment for carrying out the site tests shall be arranged by the bidder.

1.9.8 Special tools

The Contractor shall supply all necessary special tools and devices for installation, repair and maintenance of each item of equipment/components supplied under this section as recommended by manufacturer(s). The list of these items including their make and Detailed specification shall be as proposed and accepted by the Employer at the time of award of the Contract and incorporated in the "Technical Data Sheets" along with the bids.



All Special Tools shall be clearly marked to identify their use and shall be made available for the installation works to be undertaken by the Contractor. Special Tools shall be shipped with the first consignment of equipment to be installed. The tools shall be delivered to the Employer prior to Taking Over, in perfect condition or be replaced, if necessary, with new tools of equal or better quality than the original ones.

1.9.9

Customary tools

The Contractor shall supply customary tools and devices for installation, repair and maintenance as specified below. The details including make of these items shall be as proposed and accepted by the Employer at the time of award of the Contract

Customary tools shall be furnished directly to the Employer in new condition. They shall in no case be used for erection and/or installation purpose during the construction of the plant. They shall serve for operation, maintenance and overhaul work after Taking Over

- One (1) set of mechanical tool kit
- One (1) set of electrical tool kit.

2.10

FINAL ACCEPTANCE TESTS

2.10.1

After site testing has been satisfactorily completed, the final acceptance tests scheduled below shall be conducted by the bidder to determine whether all manufacturer's guarantees and requirements of the specifications have been fulfilled:

- a) Equipment and all auxiliaries systems shall be operated at continuous rating and at such part loading as may be directed by the Purchaser after commissioning and prior to handing over to the purchaser.
- b) The bidder shall perform measuring of generator insulation resistance (stator, rotor and excitation circuits).
- c) All tests as per the relevant standards/technical specifications shall be deemed to be a part of final acceptance tests.
- d) A record of all performance tests shall be embodied in test reports.

2.10.2

Successful completion of the final acceptance tests shall be a condition precedent to a final acceptance certificate in respect of the equipment.

2.11.

MANDATORY SPARE PARTS

2.11.1.

The bidder shall include in the supplies the spare parts sufficient for 1000 hours of normal operation of the equipment or 5 years of service whichever is applicable. The spare parts shall be interchangeable with and shall be of the same or higher quality than the original components. The spares shall be packed for long storage period. Spare parts shall include following items for D. G. sets of different capacity as indicated below:

- i. Lubricating Oil filter element
- ii. Bypass filter element



- iii. Fuel filter element
- iv. Air cleaner
- v. Gaskets (Complete replacement of one engine)
- vi. Coolant additives
- vii. Solenoid coil for fuel oil system
- viii. Spring and Gasket for X-head valve
- ix. Hoses with adaptor
- x. Governor (Complete replacement)
- xi. AVR
- xii. DC starter assembly with clutch engaging & disengaging arrangements complete with motor
- xiii. Current transformer
- xiv. Voltage Transformers
- xv. Rectifiers
- xvi. Diode
- xvii. Diode fuses
- xviii. Control Switches
- xix. Contactors
- xx. Auxiliary Contactors
- xxi. Protection Relays
- xxii. Cards for automatic voltage regulators (set consists of one number of each type cards)
- xxiii. Indicating lamps assembly complete (with lamps and holder) with resistor
- xxiv. Indicating lamps
- xxv. Coil for contactors (for both power and Auxiliary Contactors)
- xxvi. 11 kV Vacuum Circuit Breakers
- xxvii. 415 V ACBs
- xxviii. Timer
- xxix. Control fuses
- xxx. Selector switch
- xxxi. Ammeter
- xxxii. Voltmeter
- xxxiii. Frequency meter
- xxxiv. Motorised potentiometer

Besides, the bidder shall recommend to include in the supplies any additional



spare parts, if necessary. The additional recommended spare parts shall be indicated in Annex-V.

2.11.3. WORK SCHEDULE & CONSIGNMENT DATA

The work schedule shall adhere to the schedule specified in Volume-I of bidding documents. However, the bidder shall specify the schedule for the following items from the date of awards.

- 1 Design & Engineering
- 2 Manufacturing
- 3 Tests at works
- 4 Delivery at site
- 5 Erection, testing & commissioning

2.12.0 Details pertaining to the supply and delivery of items/equipment shall be furnished in Annex-X enclosed with these specifications.

2.13.0 SCHEDULE OF REQUIREMENTS

2.13.1 Broad schedule of requirements is given below for reference. The scope of supplies and services shall be as per various clauses of the technical specification and the bidder shall be responsible to ensure completeness of supplies and services even though these are not fully covered under this Clause.

2.13.2 Any item of supply not explicitly listed but otherwise either implied by the contents of the specifications or essential for smooth operation of the equipment shall be construed as forming part of the supply and no additional charges shall be payable for the same.

2.13.3 Schedule of Requirements shall be broadly as follows:

2.13.3.1 Two numbers of Automatic-Mains-Failure Type Diesel Generating sets, each capable of continuous net output of 500 kVA at 11 kV, 0.8 power factor, 3 phase, 4 wire, 50 Hz to serve as a source of emergency power supply. Each D.G. set shall be equipped with the following:

- a) Multi cylinder, vertical, 4 stroke, radiator / water cooled with thermostat control, turbo charged, after cooler, cold starting, heavy duty industrial diesel engine rated in accordance with the latest Indian or equivalent standard, and complete with engine starting equipment, governor, air filter, lube and fuel oil filters, pressurized lubrication system, instrument panel, and all other accessories necessary for safe and trouble free operation of diesel engine.
- b) Directly coupled, 11 kV, 3 phase, 4 wire, 0.8 power factor self-ventilated, revolving field type with damper windings, continuous duty alternator conforming to IS: 4722 complete with brushless excitation system, generator protection and AVR.
- c) M.S. channel base frame provided with lifting facility suitable for installation on a prepared concrete foundation with anti-vibration foot mounting.
- d) Fully flexible power coupling complete with protective guard between the engine and the alternator for taking shock during starting and running.
- e) Exhaust pipe assembly complete with silencer, thermally insulated with



- expansion joints etc.
- f) Maintenance platform and access ladder on either side of the engine.
- 2.13.3.2** One number/Two numbers of automatic-mains-failure type diesel generating set, capable of continuous net output of 500kVA respectively at 415V, 0.8 power factor, 3 phase, 4 wire, 50 Hz to serve as a source of emergency power supply. The D. G. Sets shall be equipped with the following.
- Multi cylinder, vertical, 4 stroke, radiator / water cooled with thermo stat control, turbo charged, after cooler, cold starting, having duty industrial diesel engine rated in accordance with Indian or equivalent standard and complete with engine starting equipment, governor, air filter, lube & fuel oil filter, pressurised lubrication system, instrument panel, all other accessories necessary for safe & trouble free operation.
 - Directly coupled, 415 V, 3 phase, 4 wire, 0.8 power factor, self-ventilated, revolving field type with damper windings, continuous duty alternator conforming to IS: 4722 complete with brushless excitation system, generator protection and AVR.
 - M.S. channel base frame provided with lifting facility suitable for installation on a prepared concrete foundation with anti-vibration foot mounting.
 - Fully flexible power coupling complete with protective guard between the engine and the alternator for taking shock during starting and running.
 - Exhaust pipe assembly complete with silencer, thermally insulated with expansion joints etc.
 - Maintenance platform and access ladder on either side of the engine.
- 2.13.3.3** Five numbers (one for each D.G. set) local & indoor, floor mounted, totally enclosed, dust and vermin proof power and control cubicle containing terminal boxes for phase termination and provision of CTs & PTs for protection, metering and AVR including relays & meters, transducers etc. Terminal boxes for Neutral termination & provision of Neutral side CTs
- 2.13.3.4** Five Sets of 24 V (of required AH capacity) Nickel Cadmium batteries and battery chargers (one set for each D.G. set) for engine starting.
- 2.13.3.5** Five numbers of Air Intake and Exhaust System.
- 2.13.3.6** Five nos. Lubrication oil drums for storage of 400 Litres along with manual pump (including first oil filling)
- 2.13.3.7** Five numbers of Daily service M.S. fuel oil tank of net capacity of 990 litres D.G. sets (including first oil filling). All tanks shall be complete with inlet, outlet and return connections, drain plugs, vent pipe, level gauge, floor mounting pedestals & manhole cover.
- 2.13.3.8** Necessary interconnecting and termination of power and control cables, piping, valves and fittings, foundation bolts & nuts, earthing etc. for the D.G. sets and associated equipments.
- 2.13.3.9** One set of mandatory spare parts for normal operation for each D. G. set.
- 2.13.3.10** One set of special tools and plants for each different capacity D. G. set.
- 2.13.3.11** Any other equipment / auxiliaries required to complete the D.G. Sets installation &



for its safe and satisfactory operation.

2.13.3.12 Diesel fuel for the first filling of DG sets and all fuel tanks completely

2.13.3.13 Lubrication oil for the first filling of engine and all oil tanks

2.14 DRAWINGS TO BE FURNISHED

- a) Comprehensive list of drawings / documents required to be submitted under the contract along with submission schedule.
- b) Layout drawings showing DG sets, power and control cubicles.
- c) Wiring diagrams for all electrical and control circuits, cabling layout, list of materials and corresponding standards used for construction of major components. Schematic diagram so fall the protections, alarm systems, etc.
- d) Foundation drawings of DG Sets, all electrical panels and other equipments clearly showing the details of loading, the foundations required for these panels/equipments and for all the cut outs, ducts, trenches etc., required for cables and other accessories.
- e) Detailed drawings of various operation and protection schemes showing the interconnection between the associated relays in each scheme of operation protection complete with all necessary CTs, PTs etc. The drawings shall be sufficient to furnish a complete understanding of the design & working of the scheme.
- f) Performance characteristics of each type of relay/equipment in the form of curves/graphs etc.
- g) Provision made against vibration, shocks, seismicity etc. in each equipment.
- h) Earthing scheme of various DG Sets, electrical panels, equipments, showing earthing of metallic cases of relays, instruments, gland plates, PT/CT secondary neutral or common lead etc.
- i) Detailed list showing all the events, measurements, operation & protection settings to be read, set of parameter settings etc. to be communicated through SCADA.
- j) Cable layout drawings showing routing of all power, control and signal cables connected to DG Sets, panels, equipment along with trays and their supporting arrangements.
- k) Record so fall shop testing and inspection of materials, components, sub-assemblies, equipment, relays, machinery etc.
- l) Sequence and Procedures for erection, testing and commissioning.
- m) Technical Block details and wiring schedule for all equipments/panels.
- n) General arrangement drawings showing the overall individual dimensions and proposed arrangement of batteries.
- o) Technical literature and data for the offered batteries.
- p) Technical datasheets for cables
- q) General layout arrangement for different sizes of cables trays, racks, supports, conduits etc.

Any other drawing, literature, documents not specifically listed but considered essential and asked by the purchaser during detailed design stage.

The supplier may note that the drawings, data and leaflets listed herein are minimum requirements only. The supplier shall ensure that all other necessary



write-ups, curves and information required giving full descriptions of equipment are submitted during design stage.

2.15 OPERATION AND MAINTENANCE MANUALS

Seven (7) sets of operation and maintenance (O&M) manuals shall be furnished containing the following information in sufficient detail to enable the operating staff to properly maintain, dismantle, reassemble, adjust and operate the supplied equipment. The manual shall contain the following detail as a minimum.

- i) Introduction
- ii) Detailed description of equipment and its component
- iii) Operating principle and characteristics
- iv) Operating instructions
- v) Testing and Adjustment
- vi) Maintenance Instructions, repair and adjustment
- vii) As built drawings with write up

2.16 TRAINING OF ENGINEERS

The manufacturer shall provide training for proper operation and maintenance of DG sets covered in these specifications. The training shall be at project site.

2.17 DELIVERY SCHEDULE

The submissions of design/drawings shall be scheduled in such a way that the delivery of equipment at site, its erection, testing and commissioning gets completed within stipulated period (as indicated in Clause 24 of General Conditions of Contract Document-II).

2.18 SCHEDULE OF SHIPPING WEIGHTS AND DELIVERY

The contractor shall adhere to the delivery schedule as specified in Doc.-II of the Contract documents. However, the contractor shall state the shortest delivery period he can guarantee counting from the date of signing of the Contract. Complete details regarding the programme of manufacture, testing & delivery along

with shipping weights and dimensions of each package shall be furnished as per **Annex-X**.



ANNEXURE-I

SCHEDULE OF GUARANTEED PARTICULARS

No.	Description	Quantity
1.	DIESEL-GENERATING SET	500kVA Capacity
1.1	Engine	
a)	Power output (kVA/kW)	
b)	Overload rating for minimum 1 hr in 12 hr continuous rated load operation time- block(kVA/kW)	
c)	Speed (rpm)	
d)	Limits of governing	
e)	Permanent variation i) Full load throw-off (%) ii) Full load put-on (%)	
f)	Temporary variation i) Full load throw-off (%) ii) Full load put-on (%)	
g)	Cooling system (type)	
h)	Lubricating oil consumption (l/hr)	
i)	Fuel consumption i) At full load (g/kWh) ii) At 3/4 of full load (g/kWh) iii) At 1/2 of full load (g/kWh) iv) At 1/4 of full load (g/kWh) v) At 10% over load (g/kWh)	
j)	Electric starting (V)	
1.2	Generator	
a)	Power output (kVA/kW)	
b)	Overload rating (kVA/kW)	
c)	Rated voltage (V)	
d)	Voltage regulation (%)	
e)	Rated frequency (Hz)	
f)	Rated power factor	
g)	Rated speed (rpm)	
h)	Overspeed (rpm)	
i)	Efficiency at rated power factor and rated voltage i) At full load (%) ii) At 3/4 of full load (%) iii) At 1/2 of full load (%) iv) At 10% over load (%)	



j)	Winding insulation (at least of class 'F')	
k)	Protection class (at least of IP23)	
l)	Specified service life of DG set (hour)	
m)	Guaranteed life (year)	
1.3	Max. noise at 1 m distance from enclosure (dB)	

Place

Signature

Name of the Tenderer

Date

Seal



SCHEDULE OF GENERAL TECHNICAL PARTICULARS

Item No.	Description	Quantity.
1.	DIESEL-GENERATING SET	500 kW Capacity
a)	Manufacturer	
b)	Type	
c)	Number of sets	
d)	Dimensions:	
e)	Length (m)	
f)	Width (m)	
g)	Height (m)	
h)	Total weight (t)	
2.	MECHANICAL EQUIPMENT	
2.1	Engine	
a)	Manufacturer	
b)	Model	
c)	Type (quantity of cycle)	
d)	Aspiration	
e)	Number of cylinders	
f)	Displacement of cylinders (cu.in)	
g)	Bore/stroke (mm (in))	
h)	Compression ratio	
i)	Speed (rpm)	
j)	Max. power at rated rpm: (kW)	
k)	Emergency conditions (kW/kPa)	



l)	Continuous load (kW/kPa)	
m)	Starting time of the set (sec)	
n)	Compression pressure (Mpa)	
o)	Maximum cylinder pressure (Mpa)	
p)	Cycle variation	
q)	Direction of rotation	
r)	Quantity of water for cooling system (l/s)	
s)	Pressure of water for cooling system (Mpa)	
t)	Type of silencer	
u)	Flywheel effect (t.m ²)	
v)	Recommended specification of fuel oil	
w)	Recommended specification of lub. oil	
x)	Lube oil temperature to engine (°C)	
y)	Lube oil temperature from engine (°C)	
z)	No. of working hours after which replacement of lub. oil is recommended (hr)	
aa)	Mechanical efficiency (%)	
bb)	Thermal efficiency (%)	
cc)	Starting time (sec)	
dd)	Interval between starting impulses (sec)	
ee)	No. of starting impulses	
ff)	Time for picking up the load (sec)	

Item No.	Description	Quantity.
a)	DIESEL-GENERATING SET	500 kVA Capacity



b)	Total oil capacity (l)	
c)	Oil consumption (l/hr)	
d)	Capacity of oil tank (l)	
e)	Oil filter type	
f)	Oil cooler (if necessary)	
g)	Oil type required	
h)	No. of working hours after which replacement of lub. oil is recommended (hr)	
i)	Lubrication oil temperature to engine (°C)	
j)	Lubrication oil temperature from engine (°C)	
2.5	Fuel system	
a)	Fuel filter type	
b)	Recommended fuel	
c)	Capacity of fuel daily service tank (l)	
d)	Number of fuel daily service tanks (pcs)	
e)	Fuel consumption - At 100% load (l/hr) - At 3/4 load (l/hr) - At 1/2 load (l/hr) - At 10% over load (l/hr)	
f)	Feed Pump	
i.	Voltage	
ii.	Frequency	
iii.	Rated Power	
2.6	Starting system	
a)	Starting battery (V)	
b)	Type	

c)	Number	
2.7	Exhaust System	
a)	Exhaust temperature at normal rating (°C)	
3.	ELECTRICAL EQUIPMENT	
3.1	Generator	
a)	Manufacturer	
b)	Model	
c)	Type	
d)	Number of phases	
e)	Power output (kVA/kW)	
f)	Overload rating (kW)	
g)	Rated voltage (V)	
h)	Rated frequency (Hz)	
i)	Rated power factor	
j)	Rated speed (rpm)	
k)	Overspeed (rpm)	
l)	Cooling (type)	
m)	Type of armature winding (type)	
n)	Winding connection (type)	
o)	Winding insulation (class)	
p)	Protection class (class)	
q)	Inertia constant of generator based on the generator rated kVA	
	Moment of inertia (kgm ²)	



s)	Total weight of assembled generator	
t)	Peripheral speed of the rotor (m/s)	
u)	Critical speed of the rotor (rpm)	
v)	Direction of rotation	
w)	Characteristic curves - No load saturation curve - Full load saturation curve at 0.8 power factor lagging - Short circuit impedance	
x)	Flux density at rated voltage on no load in - Air gap (Tesla) - Stator core (Tesla) - Teeth (Tesla) - Pole body (Tesla)	
y)	Current density in stator winding (A/mm ²)	
z)	Cross-sectional area of copper winding - a) Stator (mm²) - b) Rotor (mm²)	
aa)	Total weight of copper in - Stator winding (kg) - Rotor winding (kg)	
bb)	Dimensions of generator housing (m)	
cc)	Generator weight schedule - Weight of generator stator (kg) - Weight of generator rotor (kg) - Maximum erection weight (kg) - Maximum transport weight (kg)	
dd)	Negative phase sequence capability	
ee)	Space heater in star winding - Quantity (pc) - Rated voltage (V) - Wattage of each heater (W)	



ff)	Temperature detector for stator winding - Quantity (pcs) - Type - Resistance value (Ohm)	
gg)	Average power frequency withstands for 1 minute kV rms (Hz)	
hh)	Average impulse voltage withstands value (kV)	
ii)	Short circuit ratio (SCR)	
jj)	Max. Temperature rise over an ambient temperature of 40°C at full load and rated voltage - Stator winding (°C) - Rotor winding (°C) - Bearing (°C) - Other parts (°C)	
kk)	Overall efficiency of the generator at full load (%)	
ll)	Max. efficiency at rated voltage, output and frequency (%)	
mm)	<u>Reactances</u> (referred to rated generator kVA)	
nn)	Synchronous reactances - Direct axis (pu) - Quadrature axis (pu)	
oo)	Transient reactances - Direct axis (pu) - Quadrature axis (pu)	
pp)	Sub-transient reactances - Direct axis (pu) - Quadrature axis (pu)	
qq)	Negative phase sequence reactance (pu)	
rr)	Zero sequence reactance (pu)	
ss)	Steady short circuit current to withstand (kA)	
tt)	Peak value of short circuit current to withstand (kA)	



uu)	Duration of short circuit current to withstand (sec)	
vv)	Excitation current at rated power output and 0.8 power factor (A)	
ww)	Excitation voltage at rated power output and 0.8 power factor (V)	
xx)	Resistance at operating temperature - Stator winding (Ohm) - Rotor winding (Ohm) - Total resistance of generator (Ohm)	
yy)	Losses in generator - Full load losses (kW) - Armature copper losses (kW) - Rotor copper losses (kW) - Core losses (kW) - Stray losses (kW) - Losses in static excitation system (kW)	
zz)	Speed regulator, max (from 0 to full load) (%)	
aaa)	Voltage regulator from 0 to full load (%)	
bbb)	Time to stabilize voltage after step-load charge - of □25% (sec) - of □50% (sec)	
3.2	AMF Control panel	
a)	Manufacturer	
b)	Type	
c)	Reference standard	
d)	Voltage (Nom/Max) (V)	
e)	Length (mm)	
f)	Width (mm)	
g)	Height (mm)	
h)	Rear door (yes/no)	



i)	Metal clad, floor mounting (yes/no)	
j)	Suitable for mounting against building wall (yes/no)	
k)	Minimum thickness of sheet metal (mm)	
l)	Total mass (weight) with all relays and unit (kg)	
m)	Degree of protection (not less IP54)	
n)	Finish paint colour-inside	
o)	The complete list (bill of material) of flush mounted and other equipment inside the control panel with quantity against each item	
3.2.1	Ground bus:	
a)	Material	
b)	Size (mm ²)	
c)	Rated current (A)	
d)	Short circuit current rating (kA)	
3.3	11kV and 415 V Circuit breaker panel	
a)	Type	
b)	Manufacturer	
c)	Standards	
d)	Number of cabinets (pcs)	
e)	Rated voltage (kV)	
f)	Maximum operating voltage (kV)	
g)	Rated frequency (Hz)	
h)	Rated busbar operating current (A)	



i)	Temperature rise at ambient air of +40 °C (°C)	
j)	Rated thermal short-circuit current (one second) (kA)	
k)	Rated dynamic short-circuit current (kA peak)	
l)	Cabinet dimensions:	
m)	Width (mm)	
n)	Depth (mm)	
o)	Height (mm)	
p)	Mass of heaviest cabinet (kg)	
q)	Mass of switchgear (kg)	
r)	Type, material of cabinet enclosure	
s)	Degree of protection	
3.4	Circuit breaker	
a)	Type	
b)	Rated frequency (Hz)	
c)	Rated voltage (kV)	
d)	Maximum operating voltage (kV)	
e)	Rated operating current at ambient air temperature of +40 °C (A)	
f)	Rated peak-making current (kA peak)	
g)	Rated short-time withstand current	
	- 1s (kA)	
	- 3s (kA)	
h)	Power frequency withstands voltage (kV)	
i)	Lightning impulse withstands voltage (kV)	
j)	Mechanical life in switch-off & switch-in number cycles (cycles)	



	Operating mechanism	
a)	Type	
b)	Number for three poles (pcs)	
c)	Rated voltage (V)	
d)	Rated frequency (Hz)	
e)	Motor consumed power (W)	
	Earthing device	
a)	Type	
b)	Contact coating material	
c)	Short-circuit rated current	
	- one second (kA)	
	- three seconds (kA)	
d)	Rated peak short-circuit current (kA peak)	
e)	Power frequency open-circuit voltage (one minute) withstand (kV)	
f)	Lightning impulse withstand voltage (open circuit) (kV peak)	
g)	Type of operating mechanism	
3-5	Current transformer	
a)	Make	
b)	Type	
c)	Standard	
d)	Maximum operating voltage (kV)	
e)	Type of insulation	
f)	Power frequency withstand voltage (one minute) (kV rms)	



g)	Lightning impulse withstand voltage (kV peak)	
h)	Rated primary current	
	- first core (A)	
	- second core (A)	
i)	Rated secondary current (A)	
j)	Secondary winding rating output	
	- first core (VA)	
	- second core (VA)	
k)	Secondary winding class of accuracy	
	- first core (measurements)	
	- second core (protection)	
l)	Secondary winding connections	
m)	Maximum permissible continuous current at ambient air temperature of +40 °C (A)	
n)	Rated VA burden	
o)	Class of insulation	
p)	Temperature rise over design ambient temperature (°C)	
q)	CT ratio	
r)	Magnetizing current (A)	
s)	Knee point voltage (V)	
t)	Secondary resistance (Ohm)	
u)	Accuracy limit factor	
v)	Short time current rating (thermal) (kA)	



w)	Dynamic current rating (kA)	
3.6	Voltage transformer	
a)	Manufacturer	
b)	Type	
c)	Power frequency withstand voltage (one minute) (kV _{rms})	
d)	Standards	
e)	Maximum operating voltage (kV)	
f)	Rated frequency (Hz)	
g)	Lightning impulse withstand voltage (kV peak)	
h)	Number of phases	
i)	Number and connection diagram of secondary windings	
j)	Rated voltage of primary windings (kV)	
k)	Main secondary (V)	
l)	Additional secondary (V)	
m)	Secondary winding rating output	
n)	Main core (VA)	
o)	Additional core (VA)	
p)	Secondary winding class of accuracy	
q)	Main core	
r)	additional core	
s)	Rated VA burden	
t)	Class of insulation	
u)	Temperature rise over design ambient (°C)	

v)	Over voltage factor - Continuous - 30 sec.	
w)	Total mass (kg)	
3.7	Cable type	
a)	Make	
b)	Type and size of cable	
c)	Standard applicable	
d)	Voltage rating (kV)	
e)	Voltage (%)	
f)	Frequency (%)	
g)	Combined voltage and frequency (%)	
h)	Suitable for earthed/unearthed system	
i)	Manufacturer	
j)	Material copper/aluminium (indicate grade)	
k)	Nominal cross section area (mm ²)	
l)	Form of conductor (circular/shaped)	
m)	Minimum No. of strands	
n)	Nominal dia of strand each strand (mm)	
o)	Whether strands are tinned (Yes/No)	
	Insulation	
a)	Material (type)	
b)	Minimum average thickness (mm)	
c)	Average dielectric strength (kV/mm)	
d)	Suitability with regard to moisture, ozone, acid, oil and alkaline surroundings	



e)	Recommended minimum installation radius (mm)	
f)	Material of the semi-conducting screen	
g)	Thickness of the screen (mm)	
h)	Whether extruded under triple extrusion process	
i)	Whether cooper tape screening is applied	
j)	Thickness of the copper tape (mm)	
k)	Material of braided screen	
	Outer sheath/overall covering	
a)	Material (mention type, if any)	
b)	Minimum average thickness	
c)	Whether anti-termite treatment has been given in the outer sheath	
	Electrical properties	
a)	Maximum DC conductor resistance at 20°C per km	
b)	Maximum permissible conductor temperature	
	- Under continuous full load	
	- Under transient over loading conditions	
c)	Suitability with regard to moisture, ozone, acid oil and alkaline surroundings	
	Current ratings:	



a)	In air (continuous) (A)	
b)	In duct (continuous) (A)	
c)	Short circuit current rating for 1 sec. (A)	
d)	Reference ambient temperature for the above (°C)	
	Mechanical data:	
a)	Overall dia of the cable (mm)	
b)	Weight of cable (kg)	
3.8	Excitation System	
a)	Type of excitation system	
b)	Rated continuous capacity (kW)	
c)	Short time capacity (kW)	
d)	Rated current (A)	
e)	Rated voltage (V)	
f)	Short time voltage (V)	
g)	Power factor	
h)	Frequency (Hz)	
i)	Ceiling voltage (V)	
j)	Excitation system response ratio	
k)	Weight of exciter including foundation (kg)	
l)	Whether separate source of power required for static excitation system (yes/no)	



m)	Details of power requirements - A.C. voltage current (A) - D.C. voltage current (A)	
n)	- I.S. applicable (yes/no) -	
o)	Additional information for brushless excitation system	
	Exciter	
a)	Rated speed of exciter	
b)	Type of cooling	
c)	Degree of protection	
d)	Class of insulation - Stator - Rotor	
	Rectifier Assembly	
a)	Make and type of rectifier	
b)	No. of parallel paths per bridge arm	
c)	Total no. of rectifier cells	
d)	Max. continuous forwarding current rating of each cell (A)	
e)	Max. peak inverse voltage of cell (kV)	
	Automatic Voltage Regulator (AVR)	
a)	Manufacturer	
b)	Type	
c)	Time constant	
d)	Accuracy	
e)	Response time	
f)	Sensitivity from no load to full load	
g)	Setting provided (range of voltage adjustment)	



h)	Characteristic curve for AVR	
i)	Type of manual regulation	
j)	No. of channels on auto mode	
k)	Location of voltage regulator	
l)	Weight (kg)	
m)	No. of channels on auto mode	
n)	Dimensions (cm)	
o)	I.S. applicable	
3.9	Protective Relays (separately for each type of relays)	
a)	Manufacturer	
b)	Type	
c)	Application	
d)	Coil rating - Current coil (A) - Voltage coil (V)	
e)	Settings / range - Current coil (A) - Voltage coil (V)	
f)	Burden Current coil (A) Voltage coil (V)	
g)	Reset ratio	
h)	Drawout / Non-drawout	
i)	Flush / projected	
j)	Available contacts - NO / NC - Rating - Hand / Self reset	
k)	Descriptive pamphlet reference	
l)	Flag indicator	



m)	- I.S. application	
3.10	Auxiliary Relays (for each type)	
a)	Manufacturer	
b)	Type	
c)	Burden	
d)	Time delay range (sec)	
e)	Resetting	
f)	No. of contacts - NO – Normally open - NC – Normally closed	
g)	I.S. applicable	
3.11	Push Buttons	
a)	Manufacturer	
b)	Type	
c)	Rating - Voltage (V) - Continuous current (A) - Frequency (Hz)	
d)	Colour of button - Start - Stop - Reset - Test	
e)	No. of contacts	
f)	Mounting details	
g)	Power frequency withstand voltage (kV)	
h)	- I.S. applicable	
3.12	Control / Selector Switches	
a)	Manufacturer	



b)	Type	
c)	Voltage rating (V)	
d)	Current rating (AC & DC) - Make & carrying (A) - Break (A)	
e)	Spring return	
f)	Type of handle	
g)	Number of position	
h)	No. of ways	
i)	Mechanism	
j)	Locking facility & type	
k)	I.S. applicable	
3.13	Alarm Annunciators	
a)	Manufacturer	
b)	Type	
c)	Working voltage (V)	
d)	Power consumption (W)	
e)		
f)	Initiating contacts	
g)	Window size (mm)	
h)	Response time (sec)	
i)	No. of windows (pcs)	
j)	I.S. applicable	
3.14	Indicating Instruments	
a)	Manufacturer	
b)	Type	
c)	Accuracy class	



d)	Current coil rating (A)	
e)	Voltage coil rating (V)	
f)	VA burden - Current coil (VA) - Potential coil (VA)	
g)	Application	
h)	Flush mounted / projected	
i)	Suitable for - CT ratio (Sec. Current) (A) - VT ratio (Sec.. Voltage) (V)	
j)	Case size (cm)	
k)	Scale length (mm)	
l)	I.S. applicable	
3.15	Batteries	
a)	Manufacturer	
b)	Type	
c)	Battery rated voltage (V)	
d)	No. of cells (pcs)	
e)	Voltage of each battery cell during - Full charge (V) - Floating condition (V) - Full discharge condition (V)	
f)	Location of battery	
g)	Capacity in ampere hour at 10 hour rate (A/ hr)	
h)	Charging current of battery (A)	
i)	Rated specific gravity of electrolyte when fully charged at the room temperature (g/cm ³)	



j)	Rated specific gravity of electrolyte when fully discharged at the room temperature (g/cm ³)	
k)	Average life in years (years)	
l)	I.S. applicable	
m)	Maximum recharging time for full recharge of discharged battery	
3.16	Battery Charger	
a)	Manufacturer	
b)	Type of semi-conducting material (Rectifier) used	
c)	Rated AC input voltage with percentage permissible variation (V)	
d)	Rated input current (A)	
e)	Output D.C. voltage - Normal (V) - Boost charging (V)	
f)	Continuous output rating (W)	
g)	Charging current (A)	
h)	Location	
i)	Weight of charger panel (kg)	
j)	Dimensions of charger panel (m)	
k)	I.S. applicable	
	Indicating Lamps	
a)	Manufacturer	
b)	Type	
c)	Rated voltage (V)	
d)	Rated power consumption (W)	



e)	Permissible voltage variations (V)	
f)	Whether built in series resistance provided (yes/no)	
g)	I.S. applicable	
4.1	Piping and Fittings	
a)	Material	
b)	Design pressure (Mpa)	
c)	Temperature rise (°C)	
d)	Applicable standard	
4.2	Temperature Indicators	
a)	Type & make	
b)	Accuracy	
c)	Range & least count	
d)	Nos. supplied with location details (pcs)	
e)	Type & make	
f)	Accuracy	
g)	Range & least count	
h)	Dial size (mm)	
i)	Nos. supplied with location details (pcs)	
4.3	Level Indicators	
a)	Type & make	
b)	Range	
c)	Nos. supplied with location details (pcs)	
4.4	Tachometer	
a)	Type & make	



b)	Reduction ratio	
c)	Range	
d)	Accuracy	
4.5	Weight Schedule	
a)	Weight of engine including standards accessories (t)	
b)	Weight of generator (t)	
c)	Weight of exciter (kg)	
d)	Weight of control panel (kg)	
e)	Weight of base-plate (kg)	
f)	Weight of fuel oil tank (with and without fuel oil) (t)	
g)	Heaviest single weight to be handled during erection and maintenance (t)	
	Largest Package Size	
a)	(Indicate length x width x height of largest size package for transportation from works to site) (t)	
	Maintenance Platform & Ladder	
a)	Material of construction	
b)	Dimensional details (m)	

Place

Signature

Name of the Tenderer

Date

Seal



SCHEDULE OF DEVIATIONS FROM SPECIFICATIONS

The following are the particulars of deviations from the requirements of the specifications

Sr. No.	Clause of Specifications	Description of Deviation	Reason for Deviation	Remarks (including justification / advantage)
1	2	3	4	5

Place

Signature

Name of the Tenderer

Date

Seal



SCHEDULE OF INSTALLATION, SUPPLY AND PERFORMANCE

The tenderer shall furnish the list of D.G Sets supplied by him which are presently in service.

Sr. No	Rating and brief description of installation	Order No. and date	Capacity, Voltage, rating and fault level	Name of Purchaser	Quantity	Value	Date since when the equipment supplied is in service	Remarks
1	2	3	4	5	6	7	8	9



Place

Signature

Name of the Tenderer

Date

Seal



Annex - V SCHEDULE

**OF ADDITIONAL SPARES RECOMMENDED FOR 1000 HOURS OF
SATISFACTORY OPERATION OR 5 YEARS OF SERVICE WHICHEVER IS EARLIER**

The tenderer shall furnish the list of additional spares, if any, required for 5 years of normal operation of D.G Sets.

Sr. No.	Description of spares	Make	Unit	Quantity
1	2	3	4	5

Place

Signature

Name of the Tenderer

Date

Seal



SCHEDULE OF TOOLS & PLANTS

Sr. No.	Description	Quantity
1	2	3

Place

Signature

Name of the Tenderer

Seal

Date



SCHEDULE OF APPLICABLE STANDARDS AND CODES

Sr. No.	Item Description	Reference Standards	Remarks

Signature

Name of the Tenderer

Seal

Place

Date



SCHEDULE OF TESTING DEVICES & INSTRUMENTS

Sr. No	Item/ Description	Make	Quantity	Purpose

Signature

Name of the Tenderer

Seal

Place

Date



SCHEDULE OF INSPECTION CHECKS AND TESTS ON THE EQUIPMENT AT MANUFACTURER'S WORKS

Sr. No	Item	Description of Checks/Tests	Reference Standard	Remarks

Signature

Name of the Tenderer

Seal

Place

Date



SCHEDULE OF SHIPPING, WEIGHTS & DIMENSIONS

S. No	Item	Qty	Dimensions (LxBxH)	Weight (Tonnes)

Signature

Place

Name of the Tenderer

Date

Seal



SECTION VI – FORMS



BLANK

Form I: Bidder's Information Form

The Bidder shall fill in this Form in accordance with the instructions indicated below.

Date[insert date (as day, month, and year) of Bid submission]

Tender No.[insert number of bidding process]

1. Bidder's Legal Name:..... [insert name]
2. In the case of a Joint Venture/ Consortium (JV/C) legal name of each member: Not Applicable
3. Bidder's or each member of JV/C 's Country of Registration: [insert Country of Registration]
4. Bidder's or each member of JV/C 's Year of Registration [insert t year of registration]
5. Bidder's or each member of JV/C 's Legal Address in Country of Registration:..... [insert legal address]
6. Bidder's or each member of JV/C 's Authorized Representative Information (if applicable) Name and identity No. [insert t Authorized Representative's name and identity No.] Address: [insert Authorized Representative's address] Telephone/mobile No.:..... [insert Authorized Representative's contact No.] E-mail Address: [insert Authorized Representative's email]
Attached are copies of the following original documents: [check the box(es) of the attached original documents]
☐ Articles of Incorporation or Registration of firm or valid Trade license named in 1 above,
☐ In the case of a government owned entity from Bhutan, documents establishing legal and financial autonomy and compliance with commercial law
☐ Power of attorney authorizing the signatory of the Bid to sign on behalf of the Bidder.
☐ Tax clearance certificates.



SECTION VI - SCC

Form II: Bid Submission Form

[The Bidder shall fill in this form in accordance with the instructions indicated. No alterations to its format shall be permitted and no substitutions shall be accepted.]

Date.....[insert date of Bid submission]

Tender No.:[insert number]

Alternative No.....[insert number, if this Bid is for an alternative]

To:.....[insert complete name of the Purchaser]

We, the undersigned, declare that:

- (a) We have examined and have no reservations to the Bidding Documents, including the Addenda No.....[insert the number and date of issue of each addendum];
- (b) We offer to supply in conformity with the Bidding Documents and in accordance with the Delivery Schedules specified in the SCC the following Goods: [insert a brief description of the Goods];
- (c) The total price of our Bid, excluding any discounts offered in item (d) below is:
..... [insert the Bid Price in words and figures, indicating the various amounts and their respective currencies];
- (d) The discounts offered and the methodologies for their application are:
- Discounts. If our Bid is accepted, the following discounts shall apply:
[Specify in detail each **discount offered and the specific item of the Schedule of Supply to which it applies.**]
- Methodology of Application of the Discounts. The discounts shall be applied using the following methodology: [Specify in detail the methodology that shall be used to apply the discounts];
- (e) Our Bid shall be valid for a period of[insert number] from the date fixed for the Bid submission deadline in accordance with ITB Sub-Clause 26.1, and it shall remain binding upon us and may be accepted at any time before expiry of that period;
- If our Bid is accepted, we commit to provide Performance Security in accordance with ITB Clause 45 and GCC Clause 16 for the due performance of the Contract;
- (c) We are not participating, as Bidders, in more than one Bid in this bidding process, other than any alternative offers submitted in accordance with ITB Clause 15;



- (d) We, including any subcontractors or suppliers for any part of the Contract, have nationality from eligible countries, viz: [insert the nationality of the Bidder, including that of all parties that comprise the Bidder if the Bidder is a JV/C, and the nationality each subcontractor and supplier]
- (i) We have no conflict of interest pursuant to ITB Sub-Clause 3.2.
- (j) Our firm, its affiliates, or subsidiaries - including any subcontractors or suppliers for any part of the contract - have not been declared ineligible by the Purchaser under the laws or official regulations of Bhutan, in accordance with ITB Sub-Clause 3.4.
- (k) We have read the ITB and GCC carefully, understood, and agree to comply with all the clauses which are mentioned therein. In case of any breach of any condition on our part, we shall be liable for actions as per the terms and conditions of the Contract.
- (l) We understand that this Bid, together with your written acceptance thereof included in your notification of award, shall constitute a binding contract between us until a formal contract is prepared and executed.
- (m) we accept the Vendor Performance Management System.

We understand that you are not bound to accept the lowest evaluated Bid or any other Bid that you may receive.

Signed: _____[insert signature of the person whose name and capacity are shown]

In the capacity of _____[insert legal capacity of the person signing the Bid Submission Form]

Name: _____[insert complete name of the person signing the Bid Submission Form]

Duly authorized to sign the bid for and on behalf of: _____[insert complete name of Bidder]

Dated on _____ the day of _____[insert date of signing]



Form III: Bid Security (Bank Guarantee)

[The Bank shall fill in this Bank Guarantee Form in accordance with the instructions indicated.]

.....
[insert Bank's Name, and Address of Issuing Branch or Office]

Tender No.

Beneficiary:[Name and Address of Purchaser]

Date: _____

BANK GUARANTEE No.:_____

At the request of the Bidder, we... [insert name of Bank] hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of.....
..... [insert amount in figures]

[insert amount in words] upon receipt by us of your first demand in writing accompanied by a written statement stating that the Bidder is in breach of its obligation(s) under the Bid conditions, because the Bidder:

- (a) has withdrawn its Bid during the period of Bid validity specified by the Bidder in the Form of Bid.
- or
- (b) having been notified of the acceptance of its Bid by the Purchaser during the period of Bid validity, (i) fails or refuses to execute the Contract Form; or (ii) fails or refuses to furnish the Performance Security, if required, in accordance with the Instructions to Bidders.

This guarantee will expire: (a) if the Bidder is the successful Bidder, upon our receipt of copies of the contract signed by the Bidder and the Performance Security issued to you upon the instruction of the Bidder; or (b) if the Bidder is not the successful Bidder, upon the earlier of (i) our receipt of a copy of your notification to the Bidder of the name of the successful Bidder; or (ii) thirty days after the expiration of the Bidder's Bid.

_____ Consequently, any demand for payment under this guarantee must be received by us at this office on or before that date. [signature(s)]



Form IV: Manufacturer's Authorization

[The Bidder shall require the Manufacturer to fill in this Form in accordance with the instructions indicated. This letter of authorization should be on the letterhead of the Manufacturer and be signed by a person with the proper authority to sign documents that are binding on the Manufacturer. The Bidder shall include it in its bid, if so, indicated in the BDS.]

Date[insert date of Bid Submission]

Tender No.[insert tender number]

Alternative No.....[insert identification No if this is a Bid for an alternative]

To:[insert complete name of the Purchaser]

WHEREAS

We [insert complete name of the Manufacturer], who are official manufacturers of [insert type of Goods manufactured], having factories at [insert full address(es) of the Manufacturer's factory/ies], do hereby authorize [insert complete name of Bidder] to submit a Bid in relation to the Invitation for Bids indicated above, the purpose of which is to provide the following Goods, manufactured by us, namely.....[insert name and/or brief description of the Goods], and subsequently to negotiate and sign the Contract.

We hereby extend our full guarantee and warranty in accordance with GCC Clause 28 with respect to the Goods offered by the above firm.

Signed [insert signature(s) of authorized representative(s) of the Manufacturer]

Name: [insert complete name(s) of the authorized representative(s) of the Manufacturer]

Title: [insert title(s) of the authorized representative(s) of the Manufacturer]

Duly authorized to sign this Authorization for and on behalf of [insert complete name of the Bidder]

Dated on the [insert number] day of[insert month] [insert year].



Form V: Integrity Pact Statement

This agreement should be a part of the tender document, which shall be signed and submitted along with the tender document. The head of the employing agency/or his authorized representative should be the signing authority. For the Bidders, the Bidder himself or his authorized representative must sign the Integrity Pact (IP).

1 General:

Whereas..... representing the Punatsangchhu-II Hydroelectric Project Authority, hereinafter referred to as the **“Employer”** on one part, and Mr./Mrs. representing M/s., hereinafter referred to as the **“Bidder”** on the other part hereby execute this agreement as follows:

This agreement shall be a part of the standard bidding document, which shall be signed by both parties at the time of purchase of bidding documents and submitted along with the tender document. This IP is applicable only to **“large”** scale works, goods, and services, the threshold of which will be announced by the government from time to time. The signing of the IP shall not apply to framework contracting such as annual office supplies etc.

2 Objectives:

Whereas, the Employer and the Bidder agree to enter into this agreement, hereinafter referred to as IP, to avoid all forms of corruption or deceptive practice by following a system that is fair, transparent, and free from any influence/unprejudiced dealings in the **bidding process**¹ and **contract administration**², with a view to:

- 2.1 Enabling the Employer to obtain the desired contract at a reasonable and competitive price in conformity to the defined specifications of the works or goods or services; and
- 2.2 Enabling bidders to abstain from bribing or any corrupt practice in order to secure the contract by providing assurance to them that their competitors will also refrain from bribing and other corrupt practices.

3. Scope:

The validity of this IP shall cover the bidding process and contract administration period.



4. Commitments of the Employer:

The Employer commits itself to the following: -

- 4.1 The Employer hereby undertakes that no officials of the Employer, connected directly or indirectly with the contract, will demand, take a promise for or accept, directly or through intermediaries, any bribe, consideration, gift, reward, favor, or any material, or immaterial benefit or any other advantage from the Bidder, either for themselves or for any person, organization or third party related to the contract in exchange for an advantage in the bidding process and contract administration.
- 4.2 The Employer further confirms that its officials shall not favor any prospective bidder in any form that could afford an undue advantage to that particular bidder in the bidding process and contract administration and will treat all Bidders alike.
- 4.3 Officials of the Employer, who may have observed or noticed or have reasonable suspicion shall report to the head of the employing agency or an appropriate government office any violation or attempted violation of clauses 4.1 and 4.2.
- 4.4 Following report on violation of clauses 4.1 and 4.2 by the official(s), through any source, necessary disciplinary proceedings, or any other action as deemed fit, including criminal proceedings shall be initiated by the Employer and such a person shall be debarred from further dealings related to the bidding process and contract administration.

5. Commitments of Bidders

The Bidder commits himself/herself to take all measures necessary to prevent corrupt practices, unfair means, and illegal activities during any stage of the bidding process and contract administration in order to secure the contract or in furtherance to secure it and in particular commits himself/herself to the following: -

- 5.1 The Bidder shall not offer, directly or through intermediaries, any bribe, gift, consideration, reward, favor, any material or immaterial benefit or other advantage, commission, fees, brokerage, or inducement to any official of the Employer, connected directly or indirectly with the bidding process and contract administration, or to any person, organization or third party related to the contract in exchange for any advantage in the bidding process and contract administration.
- 5.2 The Bidder shall not collude with other parties interested in the contract to manipulate in whatsoever form or manner, the bidding process and contract administration.
- 5.3 If the bidder(s) have observed or noticed or have reasonable suspicion that the provisions of the IP have been violated by the procuring agency or other bidders, the bidder shall report such violations to the head of the procuring agency.



6. Sanctions for Violation:

The breach of any of the aforesaid provisions shall result in administrative charges or penal actions as per the relevant rules and laws.

- 6.1 The breach of the IP or commission of any offense (forgery, providing false information, misrepresentation, providing false/fake documents, bid rigging, bid steering or coercion) by the Bidder, or anyone employed by him, or acting on his/her behalf (whether with or without the knowledge of the Bidder), shall be dealt with as per the terms and conditions of the contract and other provisions of the relevant laws, including Debarment Rules.
- 6.2 The breach of the IP or commission of any offense by the officials of the procuring agency shall be dealt with as per the rules and laws of the land in vogue.

7. Monitoring and Administration:

- 7.1 The respective procuring agency shall be responsible for the administration and monitoring of the IP as per the relevant laws.
- 7.2 The bidder shall have the right to appeal as per the arbitration mechanism contained in the relevant rules.

We, hereby declare that we have read and understood the clauses of this agreement and shall abide by it.

The parties hereby sign this Integrity Pact at (place) _____ on (date) _____

Affix Legal Stamp

Affix Legal Stamp

EMPLOYER -

BIDDER/REPRESENTATIVE-

CID:

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CID:

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Witness to

Employer:

Witness to Bidder:

Name:

Name:

CID:

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CID:

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SECTION VII – BILL OF QUANTITY (BoQ)

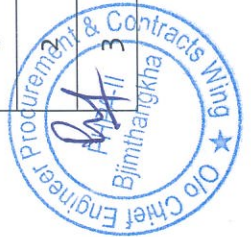


SECTION VII - BoQ

BILL OF QUANTITY

SUPPLY OF 500KVA DIESEL GENERATOR(DG) SET WITH ATS PANEL FOR DAM COMPLEX, PHPA-II

Item No.	Description of Items	Make	Unit	Qty	Rate in Figure (Nu)	Rate in Words (Nu)	Amount (Nu)
A	Supply, Erection, Testing and Commissioning of Diesel Generating Set of 500 kVA						
1	Supply, Erection, Testing & Commissioning of One(1) Diesel Generating set of rating 500KVA, with generating voltage of 415 V, complete with all auxiliary equipment, common frame, vibration compensator, silencer, radiator type water cooling system, lubrication system, starting system with 24V battery system with charger, voltage regulator, speed governor etc. The D.G shall be stationary type, floor mounted and remote/local manual, and automatic start type with 10% continuous overload capacity at rated speed for minimum one hour. Emission norms: CPCB - IV	Kirloskar/ Caterpillar/ Jaksen/ Cummins/ Mahindra/ Perkins/ or equivalent reputed Manufacture	1.00	No.			
	Sub Total (a)						
1.1	Spares for DG Set						
1	Automatic Voltage Regulator (AVR)		Nos.	1.00			
	Electronic Governor		Nos.	1.00			
	DC Starter Motor Assembly		Nos.	1.00			



Item No.	Description of Items	Make	Unit	Qty	Rate in Figure (Nu)	Rate in Words (Nu)	Amount (Nu)
4	1000A Outgoing ACB/MCCB		1.00	No.			
5	ATS Controller Premium Type		1.00	No.			
6	Mechanical Interlock System		1.00	No.			
	Sub Total (Main Equipment)						
b	Panel Fabrication						
7	Floor Standing Panel 3200x2200x1000mm		1.00	No.			
8	1000A Copper Busbar Set		1.00	No.			
9	Neutral + Earth Bar		1.00	No.			
10	Powder Coating/Internal Structure		1.00	No.			
	Sub Total (Panel Fabrication)						
c	Control & Metering						
11	Multifunction Meter		1.00	No.			
12	CT Set 800/5A		3.00	No.			
13	Selector Switches/PBs/Lamps		1.00	Lot			
14	Relays/Timers/MCB		1.00	Lot			
15	Control Transformer		1.00	No.			
16	Internal Wiring/TBs/Lugs		1.00	Lot			
	Sub Total (Control & Metering)						



Item No.	Description of Items	Make	Unit	Qty	Rate in Figure (Nu)	Rate in Words (Nu)	Amount (Nu)
4	Fuel Shut-off Solenoid		Nos.	1.00			
5	Engine Oil Filter		Nos.	6.00			
6	Fuel Filter Elements		Nos.	6.00			
7	Air Filter Element		Nos.	2.00			
8	Complete Engine Gasket Kit		Nos.	1.00			
9	Radiator Hose Set		Nos.	1.00			
10	Control Fuses		Nos.	20.00			
11	Timer Relay		Nos.	2.00			
12	Auxiliary Contactor		Nos.	2.00			
13	Contacting Coil		Nos.	2.00			
14	LED Indication Lamps		Nos.	10.00			
15	Selector Switch (Auto/Manual)		Nos.	1.00			
16	Coolant Additives		L	20.00			
17	Radiator Hose Set with Clamps		Set	1.00			
18	Fan Belt Set		Set	1.00			
	Sub Total for Spares(b)						
	TOTAL AMOUNT(NU/RS.) (a+b) - A						
B	AMF with ATS Panels and Auxiliary items for Diesel Generating set of Rating 500kVA						
a	Main Equipment						
1	800A 4P Motorized ACB-Utility 1		1.00	No.			
2	800A 4P Motorized ACB-Utility 2		1.00	No.			
3	800A 4P Motorized ACB-DG		1.00	No.			



Item No.	Description of Items	Make	Unit	Qty	Rate in Figure (Nu)	Rate in Words (Nu)	Amount (Nu)
d	Optional Items						
17	SPD Type 1+2		1.00	No.			
18	Remote Monitoring Modbus		1.00	No.			
19	Space Heater + Fan		1.00	Set			
	Sub Total (Optional Items)						
	Total Amount (a+b+c+d) - B						
	TOTAL AMOUNT (A+B)						

Amount In Words (Nu/Rs):



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