NATIONAL SUPERCOMPUTING MISSION

INFRASTRUCTURE | APPLICATIONS | R&D | HRD

Centre for Development of Advanced Computing

A Scientific Society of Ministry of Electronics & Information Technology,

Government of India

Innovation Park, Panchavati, Pashan Road, Pune - 411008

Tel: +91-20-25868086 / 25503673-675

www.cdac.in

Tender No: CDACP/NSM-DC-IISc/20-21/318

CDAC, Pune invites `ONLINE' bids for Design, Site Preparation, Supply, Installation, Testing, Commissioning, and AMC services of Basic Infrastructure for the establishment of a Data Center at IISc, Bangalore

Prospective Bidders may download the Tender Document from www.cdac.in / https://eprocure.gov.in/eprocure/app. Bidders are advised to go through instructions provided at `Instructions for online Bid Submission' and submit duly filled bids online on the website https://eprocure.gov.in/eprocure/app as per the schedule given in the Tender Document.

TENDER SCHEDULE AND FACT SHEET
TENDER NO: CDACP/NSM-DC-IISC/20-21/318

Name of the Institute:	Centre for Development of Advanced Computing, Pune 411007.
Place of Supply, Installation & Commissioning, Support etc.	Indian Institute of Science, Bangalore
Date of Release of Tender	January 6, 2021
Site Visit	January 11-12, 2021 (14:00 hrs to 17:00 hrs)
Date & Time of Pre-bid meeting (online)	January 18, 2021 – 1100 hrs. (The link to join online meeting will be sent on e-mail upon request from the bidder for participating in the pre-bid meeting)
Start Date of submission of bids	January 29, 2021 – 15:00 hrs
Last date of submission of bids	February 02, 2021 – 15:00 hrs.
Date of opening of Technical bids	February 02, 2021 – 15:30 hrs.
Place of opening of technical bids	C-DAC, Pune 411008.
Tender Document Fee	Rs. 2000/- in the form of DD drawn in favour of C-DAC, Pune OR through on-line Transfer
Bank Account Details for Tender Fee	Bank Name : Bank of India Branch & Address: Pashan Road Branch, Pune- 411008, Maharashtra, Tel: .+91-20-25697247 IFSC CODE : BKID0000516 Type of Account : Savings Account Number: 051610110002660

Instruction for Online Bid Submission:

The bidders are required to submit soft copies of their bids electronically on the CPP Portal, using valid Digital Signature Certificates. The instructions given below are meant to assist the bidders in registering on the CPP Portal, prepare their bids in accordance with the requirements and submitting their bids online on the CPP Portal. More information useful for submitting online bids on the CPP Portal may be obtained at: https://eprocure.gov.in/eprocure/app. For any technical related queries, please call the Helpdesk. The 24 x 7 Help Desk Number 0120-4200462, 0120-4001002, 0120-4001005. Mobile: 91 8826246593. Note- Bidders are requested to kindly mention the URL of the Portal and Tender Id in the subject while emailing any issue along with the Contact details. E-Mail: support-eproc@nic.in.

SECTION I – INVITATION OF BIDS

1 Introduction

This RFP is being floated to select the most appropriate vendor to build & operate the Data Center for a period of two years. The model of the proposed Data Center (DC) should be capable of enhancing capacities by incrementally augmenting the infrastructure. The monitoring of the proposed DC is planned through an Integrated Building Management System (IBMS) and therefore, the equipment's to be installed in the proposed Data Centre should be BMS compliant. As a part of this project, C-DAC invites on-line bids from eligible bidders for supply, installation, commissioning and AMC Services of Data Centre Solutions, as per the requirements stipulated in this document, at the Locations given below.

Supercomputer Education and Research Center (SERC)
Indian Institute of Science,
Bangalore, India 560012

2 Contact information

Materials Management Group (MMG)
Centre for Development of Advanced Computing (C-DAC)
Innovation Park, Panchavati Pashan Road,
Pune - 411008, Maharashtra India
E-mail: mmg@cdac.in

3 Two Bid (e-Packet) System:

The bids must be uploaded on-line through https://eprocure.gov.in/eprocure/app, as explained below:

3.1 e-Packet No. 1: TECHNICAL BID (pdf format)

3.1.1 Section-I

a. **Annexure G**: The contents must be organized & submitted as per the Annexure G with proper page nos containing the required information/data etc.

b. Covering Letter, as per **Annexure – A.**

c. Authorization letter(on bidder's letterhead) issued by the competent authority of bidder, authorizing the signatory to sign on behalf of the bidder, as per **Annexure – B.**

d. Scanned copy of Demand Draft/On-line receipt towards payment of tender fee. If paid by DD, the original DD must reach physically at the place of opening of the Tender on or before the Due Date & Time of the Tender.

e. The Undertaking on bidder's letterhead, towards EMD as per format given in **ANNEXURE-F**

3.1.2 **Section-II:**

a. A copy of Certificate of Incorporation, Partnership Deed / Memorandum and Articles of Association / any other equivalent document showing date and place of incorporation, in India as applicable.
b. A copy of GST registration certificate.
c. Copies of at least two purchase orders or contracts completed and successful installation and completion reports in the name of bidder from the end client / end user, during last Five years for Data Centre work, as per para. 3.3 of Section II. Self-declarations will not be entertained.
d. Copy of at least one purchase order from the end client/ end user for data center facility management / O & M activities completed / ongoing as per eligibility para. No 3.3.1 of Section II.
e. The self-certified copies of audited balance sheets or the certificate/s from a Chartered Accountant for last three financial years indicating the annual sales turnover.
f. A photo copy of the commercial bid actually submitted **without prices** (prices masked) and copy of commercial terms and conditions (in detail) as included in the commercial bid. C-DAC reserves the right to reject the bid in case of any discrepancy observed in the un-priced commercial bid and the actual commercial bid.
g. Manufacturer authorization certificate as per **Annexure-C** for DG set, UPS and batteries, LT panels and associated component, Dry Cooler, PAC/PAHU, PHE, BMS Software, Pumps, etc., issued by respective OEMs.
h. The copy of registration certificate or a declaration in compliance with the provisions stipulated in office memorandum F/No/6/18/2019-PPD dated 23 July 2020 issued by public procurement Division, Dept. of Expenditure, Ministry of Finance, GoI.
i. Certificates from bidder, as per format given in **Annexure –I,** declaring the country of OEM, country of manufacture and percentage of local contents for DG set, UPS and batteries, LT panels and associated components, Chiller, PAC/PAHU, RDHX, BMS Software, Pumps, VFD Drives etc.
j. Self- certificate form the bidder towards compliance with the provisions of order No. P-45021/2/2017-PP (BE-II). Dated 4th June, 2020 issued by Public Procurement Division, Department of Investment and Internal Trade, Ministry of Commerce, GoI., as per format given in **Annexure – I.**
k. All the necessary documents in support of eligibility criteria stipulated in Section–II, Para-3 (Eligibility Criteria).

3.1.3 **Section-III:**

a. The executive summary of the bid submitted.
b. Duly filled Technical Bid (covering the details of solution, detailed bill of material, bill of quantities, technical specifications, makes and models of items, diagrams, layouts, all drawings etc.)

c. The details of electrical power consumption, foot-print, ambient temp, temperature range targeted, cable schedule along with voltage drop calculations, battery sizing and back up calculations etc.

d. Details of diesel consumption & water consumption on various loading conditions.

e. Design Basic Report along with annual average Power Usage Effectiveness (PUE) calculations for 25%, 50%, 75% and 100 % of IT load.

f. Design basis and analysis of cooling solution at full and partial load conditions including complete details, assumptions made and the specific references/standards used for the same. Applicable derations while selecting the dry cooler and bidder to submit selection of the product considering site ambient conditions as per ASHRAE.

g. Technical Compliance matrix against all details requested as per Para. 9 of Section IV.

h. The printed catalogue / leaflet/brochures published by the principal manufacturer of the items quoted to be submitted along with the Technical Bid.

i. Legal / statutory permissions required, if any.

3.2 **e-Packet 2: FINANCIAL BID : (in BOQ.xls format – online)**

The Financial Bid complete in all respects with all details filled in the `Name of the Bidder' column with name, designation and contact no. as per BOQ.xls format given in SECTION-VI.

Note:
All the documents listed in e-packet-1 (Section-I, II & III) must be arranged in the flow / in sequence as mentioned as per **Annexure-G** strictly.
C-DAC reserves the right to reject the bid, if any of the above listed documents are not submitted.

4 Pre-Bid Meeting – Date/ Time/ Venue / Online:

The pre-bid meeting will be held On-line as given in schedule to sort out/resolve queries raised by the prospective bidders regarding the tender scope, conditions, terms & conditions etc. The prospective bidders requiring any clarification of the bidding document may send their queries in writing through e-mail in the format given below. C-DAC, Pune will respond to these queries during the pre-bid meeting. The queries/doubt/clarifications etc. must be sent at least two days prior to the date of pre-bid meeting.

Name of the bidder:				
Sr.	**Section / Page**	**Clause Reference**	**Query from bidder**	**C-DAC Response**
1				
2				

5 Last Date of submission of bids:

Last date for submission of e-bids through http://eprocure.gov.in/eprocure/app shall be as per given in Tender Schedule.

6 Opening of on-line e-bids

The technical e-bids will be opened as per through www.eprocure.gov.in/eprocure/app as per the schedule given.

Opening of commercial e-bids:

Commercial e-bids of the qualified bidders only will be opened. The decision of C-DAC's bid evaluation committee in this regard will be final and binding on bidders. C-DAC's bid evaluation committee will be authorised to take appropriate decision on minor deviations, if any.

The date, time and venue of opening of commercial bids will be informed later to the qualified bidder. The financial bids will be opened `on-line' through www.eprocure.gov.in/eprocure/app.

The bidder's name, bid prices and other appropriate details will be displayed after the opening of the commercial bids.

(END OF SECTION I)

SECTION II – INSTRUCTIONS TO BIDDERS (ITB)

1 Locations for Supply, Installation, Commissioning, Warranty Services & AMC Services

The entire data centre solutions as described in Schedule of Requirements must be supplied, installed, commissioned & supported at

IISc, Bangalore - details as per the Tender Schedule.

2 Order Placements & Payment by

The orders will be placed and payments shall be released by
Centre for Development of Advanced Computing (C-DAC),
Innovation Park, Panchavati, Pashan
Pune 411008, Maharashtra, INDIA

3 Eligibility Criteria

Only the bidders complying with following eligibility criteria will qualify for opening of commercial bids and for further processing.

3.1 The bidder must submit all the documents listed at para 3 Section – I above, along with the technical bid.

3.2 The bidder should be an entity registered in India under appropriate Indian Laws. Certificate for the same should be submitted along with the bid.

3.3 The bidder must have successfully executed at end client sites at least 2 numbers of data centres in India in last five years. Each of the data centres should be with minimum of UPS feeding power of 450 KVA(excluding redundancy) and minimum feeding cooling load of 120 Tons(excluding redundancy) (UPS and cooling to be considered only for server area) along with Fire- fighting and suppression systems with high end integration of building management system and all the allied works required for successful installation & completion of the Data Centre. This order should be on the name of bidder issued by the end client.

3.3.1 The bidder should have undertaken/ completed the activities of providing on-site support and facility management / O & M services to at least one data centre. The scope of the activity should cover operation and maintenance of Electrical Systems, Cooling systems (Chillers, PAC/PAHU /In ROW/RDHX etc.) UPS and Battery, IBMS etc. Bidder to provide the documentary evidence that minimum three technical manpower had deployed at site and maintaining electrical system and cooling system. Such Data center having minimum cooling load of 50 Tons.

3.3.2 A summary of the projects implemented covering all the details must be enclosed with the Technical Bid.

3.4 Bidder should have minimum turnover of Rs. 5.0 Crores for each of the last three financial years.

3.5 If the bidder is not a principal manufacturer of Data Centre components, the undertaking/s (in original) from the respective OEMs/principal manufacturers (on the letterhead), as per format given in **Annexure-C** must be submitted for the components such as DG set, UPS and battery, LT panels and associated component, Dry Cooler, PAC/PAHU, PHE, BMS Software and Pumps (in e-packet – 1- Section-II).

3.6 The principal manufacturers/ original equipment manufacturer (OEM) of Data Centre components viz. UPS, PAC, DG Sets, Dry Cooler should have service center in the respective state of site location. Documentary evidence for the same to be provided.

3.7 The bidder must submit all the documents as per Document Checklist – **Annexure-G**, with appropriate page nos for the same. The flow of the submitted documents must be in the same order.

3.8 The bidder must not be blacklisted by any Central / State Govt. Organizations of India as on date of submission of the bids. A certificate or undertaking to this effect must be submitted **(Annexure – A)**.

3.9 The bidder must comply with the provisions of Office Memorandum: F/No/6/18/2019-PPD dated 23rd July, 2020, issued by Public Procurement Division, Department of Expenditure, Ministry of Finance, GoI.

3.10 The solution offered must comply with the provisions of Order No P-45021/2/2017-PP (BE-II). Dated 4th June, 2020 issued by Public Procurement Division, Department of Investment and Internal Trade, Ministry of Commerce, GoI, read with order number W-43/4/2019-IPHW- MeitY, dated 7th September, 2020 issued by IPWH division of MeitY, GoI.

The AMC charges quoted should not exceed 7% of the cost of all the capital equipments, which includes but not limited to DG set, All LT panels, Dry Cooler, PHE, Pumps, Thermal Storage Tank, PAC units, UPS. Batteries are not considered under AMC.

Note: The bidder should provide sufficient documentary evidence to support of the eligibility criteria and exemptions mentioned. C-DAC reserves the right to reject any bid not fulfilling the eligibility criteria.

4 Exemptions

If in the view of bidder, any exemption / relaxation is applicable to them from any of the eligibility requirements, under any Rules / process/ Guidelines/ Directives of Government of India, bidder may submit their claim for the applicable exemption /relaxation, quoting the valid Rule/ process/ Guidelines/ Directives. In this case the bidder must submit necessary and sufficient documents along with the technical bid, in support of his claim. The decision about granting the exemption/ relaxation will be taken by the bid evaluation committee which is empowered to grant exemption/relaxation.

5 Local Conditions

It will be incumbent upon each bidder to fully acquaint himself with the local conditions and other relevant factors at the proposed Data Centre site which would have any effect on the performance of the contract and / or the cost. The Bidder is expected to make a site visit to the proposed Data Centre facility to apprise them self and obtain all information that may be necessary for preparing the bid and entering into contract.

Failure to obtain the information necessary for preparing the bid and/or failure to perform activities that may be necessary for the providing services before entering into contract, will in no way relieve the successful bidder from the responsibility of performing any work in accordance with the Tender documents. It will be imperative for each bidder to diligently be informed of all legal conditions and factors which may have any effect on the execution of the contract as described in the bidding documents. C-DAC Pune shall not entertain any request for clarifications from the bidder regarding such conditions. It is the responsibility of the bidder that such factors have properly been investigated and considered while submitting the bid proposals and that no claim whatsoever including those for financial adjustment to the contract awarded under the bidding documents will be entertained by C-DAC Pune and that neither any change in the time schedule of the contract nor any financial adjustments arising thereof shall be permitted by the C-DAC Pune on account of failure of the bidder to appraise himself of local laws and site conditions or otherwise.

6 C-DAC Right to amend / cancel

6.1 At any time prior to the deadline for submission of bids, C-DAC may, for any reason, whether on its own initiative or in response to the clarification request by a prospective bidder, modify the bid document.

6.2 The amendments to the tender documents, if any, will be notified by release of Corrigendum Notice on www.eprocure.gov.in/eprocure/app / www.cdac.in/ tender against this tender. The amendments/ modifications will be binding on the bidders.

6.3 C-DAC at its discretion may extend the deadline for the submission of bids if it thinks necessary to do so or if the bid document undergoes changes during the bidding period, in order to give prospective bidders time to take into consideration the amendments while preparing their bids.

6.4 C-DAC reserves the right to cancel the entire RFP without assigning any reasons thereof

7 Precautions while preparing the Bids

Bidder should avoid, as far as possible, corrections, overwriting, erasures or postscripts in the bid documents. In case however, any corrections, overwriting, erasures or postscripts have to be made in the bids, they should be supported by dated signatures of the same authorized person signing the bid documents. In case of discrepancies and/ or calculation errors, if any, the lower of the unit prices and/or amounts shall only be considered for comparison of bids. Only Single technical solution to be submitted.

8 Earnest Money Deposit (EMD)

8.1 The bidder must submit the undertaking towards Earnest Money Deposit (EMD / bid security), as per format given in **Annexure-F subject** to the conditions stipulated therein

9 Period of validity of bids

9.1 Bids shall be valid for minimum 180 days from the date of submission. A bid valid for a shorter period shall stand rejected.

9.2 C-DAC may ask for the bidder's consent to extend the period of validity. Such request and the response shall be made in writing only. The bidder is free not to accept such request. A bidder agreeing to the request for extension will not be permitted to modify their bid.

10 Submission of Bids- Online

The Bid documents shall be neatly arranged and all pages should be numbered. They should not contain any terms and conditions, printed or otherwise, which are not applicable to the Bid. The conditional bid will be summarily rejected. Insertions, postscripts, additions and alterations shall not be recognized, unless confirmed by bidder's signature.

11 Late Bids

C-DAC shall not be responsible and liable for the delay in receiving the bid for whatsoever reason. C-DAC will not be responsible for any issues arising/pertaining with CPP Portal (www.eprocure.gov.in/eprocure/app) for non-submission, failure in submission of bids on-line. Bidders are advised to submit e-bids well in advance of the last date and time of submission so the bids. C-DAC will not be responsible for failure in submission/upload of bids for non-working of the on line portal at last day/hours of submissions of bids.

12 Evaluation of Bids

The bids will be evaluated in two steps.

12.1 The bids will be examined based on eligibility criteria stipulated at para 3, Section – II of this document, to check the eligibility of the bidders. The technical bids of only the eligible bidders will be evaluated based on technical requirements stipulated in the RFP.

12.2 Only the bidders, whose technical bid is found to meet the requirements as specified above will qualify for opening of the commercial bid and will be informed about the date and time of the opening of the commercial bid.

12.3 The decision of the TEC with respect to complete technical evaluation is final and binding on all the bidders.

12.4 During evaluation of the bids C-DAC at its discretion may ask the Bidder for clarification of its Bid. The request for clarification and the response shall be in writing, and no

change in the prices is permitted. If required C-DAC may invite the Bidders for technical presentation on the solution offered. During the process of evaluation of bids, if any discrepancies are observed in the bid submitted, the bidders may be given an opportunity to clarify on same. If in the view of bidder, any change in quantity, make or model is required or any additional items are required, for clearing the said discrepancy, the bidder has to arrange for said change and/or addition of material without any increase in the prices quoted.

12.5 If the information provided by the bidder is found to be incorrect/misleading at any stage/time during the Tendering Process, C-DAC reserves the right to reject all such incomplete bids.

13 Comparison of Bids

13.1 Only the technically qualified bids as per terms and conditions stipulated in this document shall be considered for opening and evaluation of price bid.

13.2 The total price including the GST amounts, (@rates quoted by the bidder or tariff rates, whichever are less) along with the comprehensive warranty support and Operation & maintenance charges for first two years as per price bid format will be considered for the purpose of comparison of bids and for calculating the L1 bidder. (Please refer para 1, Section- III).

13.3 The date and venue for opening of price bids will be communicated to bidders.

14 Award of Contract

C-DAC reserves the right to award the contract to the qualified bidder whose technical bid has been accepted and determined as the lowest evaluated price bid.

14.1 However, C-DAC reserves the right and has sole discretion to reject the lowest evaluated bid.

14.2 If more than one bidder happens to quote the same lowest price, C-DAC reserves the right to place the order with the bidder who has installed a Data Centre with more IT load at single site. The decision of C-DAC shall be final for awarding the contract.

15 Purchaser's Right to amend / cancel

15.1 C-DAC reserves the right to amend the eligibility criteria, commercial terms & conditions, Scope of Supply, quantities, technical specifications etc. The same shall be published on the Portals.

15.2 C-DAC reserves the right to cancel the entire or partially tender without assigning any reasons thereof.

15.3 C-DAC reserves the right to reject the bid submitted by the lowest evaluated bidder.

(End of Section - II)

SECTION III – SPECIAL CONDITIONS OF CONTRACT

1 Prices

a. The prices quoted shall remain firm and no price escalation will be permitted till completion of order.

b. Bidder must quote in INR only.

c. The prices quoted must be inclusive of comprehensive warranty charges, packing & forwarding, freight, insurance, loading, unloading charges /entry tax/road permit charges and allied charges till destination at site.

d. The group-wise prices must be quoted for all the items as per format given in **Section – V**.

e. Over and above the comprehensive warranty for first two years (para8, Section – III), the successful bidder is required to quote for the following services:

i. Operation and Maintenance for first two years.

ii. Operation and Maintenance for 3rd, 4th and 5th Years.

iii. Comprehensive Annual Maintenance services (CAMC) for 3rd, 4th and 5th Years.

The order for items 1-e(i) will be placed by C-DAC. The orders for item Sr. No 1-e(ii & iii) may be placed by IISc separately, after expiry of comprehensive warranty and O & M period of first two years. However, if the order is placed for the items at sr. no. 1-e (ii & iii), the prices quoted for same shall be binding on the successful bidder.

f. Before the placement of order, the successful bidder must submit the detailed Bill of Material, giving price for each individual line item, keeping the total price quoted un-changed. The order will be placed on the basis of this BoM. The supplier must ensure that their invoice exactly matches this BoM, so as to avoid any payment complications

2 Taxes and Duties:

2.1 This Data Centre will be used for R & D purposes. IISc, Bangalore is registered with DSIR, New Delhi and can issue the concessional GST certificate under notification No. 45-2017- Central Tax (Rate), 47/2017- Integrated Tax(Rate) both dt. 14.11.2017 & amendments thereof. The bidder should carefully examine the provisions of said notification and applicability of same to various components, sub-systems of offered solution and accordingly quote appropriate **amounts** of GST for respective items. (GST certificate will be issued by IISc based on the Purchase Order/Invoice/Proforma Invoice. GST certificate is issued only for items having HSN Code not for SAC Code.)

This GST concession is not applicable for civil works and allied items, warranty services and AMC charges.

2.2 **Bidder must indicate applicable GST AMOUNTS separately. The bidder should exercise utmost care to quote the correct amounts of GST on each item. Any revision in**

statutory tax /duty structure as on date of supply/ invoice, shall be considered, as applicable.

2.3 In case of any error/ oversight in GST amount quoted by the bidder, the bidder will not be permitted to rectify the error/oversight. The orders/ contract will be placed with the GST amounts quoted by the bidder or actual applicable amount (as on placement of order), whichever is **LOWER.** The difference amount payable, if any, between the quoted GST amount and applicable amount shall be borne by the bidder.

2.4 Notwithstanding the para 2.1 to 2.3 mentioned above, if the GST is not quoted separately and the bid is silent whether GST is included or excluded in price, for the purpose of evaluation of bids, the prices shall be taken as quoted with GST. In this case, the order will be placed with the quoted price. The GST applicable, if any will be borne by the bidder/contractor

2.5 The prices will be compared on the basis of GST rates quoted/calculated by the bidder. In case of errors, the bidders will not be permitted to change the GST percentage.

3 Project Timeline

All the items covered in the Schedule of Requirements (**Section – IV**) must be supplied, installed and commissioned within 4 months (Sixteen weeks) from the date of award of Contract / placement of order.

4 Payments (In INR only)

a. 70% amount of the cost of UPS and batteries, LT Panels, Dry Cooler and Pumps, PAC/PAHU, PHE, Rack, DG set will be released within 30 days of receipt of these components at site along with tax invoice and against physical verification and acknowledgement by C-DAC and/ or end user.

b. 20% amount of the cost of UPS and batteries, DG sets, LT Panels, Dry Cooler and Pumps, PAC/PAHU, PHE, Rack, DG Set and 90% cost of the remaining supplied items and 90% charges towards installation and commissioning of the system will be released on successful installation, commissioning of the solution. This portion of payment shall be subject to acceptance and submission of Integrated System Acceptance Test (ISAT) report to C-DAC. In case of delay in integration and commissioning of the DC with HPC system for the reasons attributed to C-DAC beyond 60 days, this portion of payment will be released against submission of bank guarantee of equivalent amount. This Bank Guarantee will be released on successful completion of installation, commissioning and ISAT of the solution.

c. Balance 10% payment will be released on successful installation & commissioning of solution against submission of PBG. The PBG must be submitted within 30 days from the date of successful installation(s) and ISAT. The penalties- if any, for delay in deliveries, will be deducted from this portion of payment.

d. The proportionate payments towards Operation and Maintenance charges for first two years will be released on quarterly basis within 15 days of the beginning of each quarter.

e. The penalties - if any, towards non/short performance will be deducted from the quarterly payments payable.

f. The applicable TDS will be deducted.

g. The payments shall be remitted through NEFT/RTGS only.

Note: All the payments are subject to submission of the valid and complete tax invoices.

5 Security Deposit (SD)

The successful bidder will be required to furnish the Security Deposit in INR equivalent to 5% of the Contract/Order value (excluding taxes) within 15 days of award of Contract / receipt of Order(s). The Security Deposit should be submitted in the form of Demand Draft drawn in favor of C-DAC payable at Pune or in the form of Bank Guarantee in the name of C-DAC, Pune. The Bank Guarantee submitted towards Security Deposit should be issued by a Scheduled Commercial Bank and must be valid for a period of 6 months. The Security Deposit will be returned within 30 days upon completion of installation, commissioning and ISAT, and on submission of Performance Security.

6 Performance Security

The successful bidder will be required to furnish the Performance Security towards the Data Centre Solutions supplied, in the form of a Bank Guarantee in INR equivalent to 3% of the invoice amount(except for O & M charges and excluding taxes), as per the format attached to this document. This bank guarantee should be submitted along with the invoice after successful installation and commissioning of the Data Centre solution. The Bank Guarantee should be from a Scheduled Commercial bank and shall remain valid for the period of 25 months from the date of installation and ISAT. The PBG must be negotiable at a branch of issuing bank in Pune.

C-DAC reserves the right to invoke the Performance Bank Guarantee(s) submitted by bidder, in case of the following:

a. The Item/Components fail to achieve the performance as stipulated in this document or
b. The bidder fails to provide the comprehensive warranty and other services in scheduled time frame, as stipulated in this document or
c. The bidder delays to provide the warranty services as stipulated in this document.

7 Completeness Responsibility

The bidders may please note that this is a contract on 'Turn-key' basis. Notwithstanding the scope of work, engineering, supply and services stated in bid document, any equipment or material, engineering or technical services which are not specifically mentioned under the scope of supply of the bidder and which are not expressly excluded there from but which – in view of the bidder - are necessary for the required performance of the datacenter solution in accordance with the RFP specifications are treated to be included in the bid and has to be implicitly performed by bidder. In no case, the bidder will be permitted to increase the prices quoted.

8 Comprehensive Warranty

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. The supplier further warrants that all Goods supplied under this contract shall have no defect arising from design, materials or workmanship (except when the design and/or material is required by the Purchaser's specifications) or from any act or omission of the supplier. The warranty should be comprehensive on site, repair/replacement basis free of cost. **Bidder has to enter into agreement / MoU with C-DAC Pune on award of contract which shall be in-line with this RFP document.**

Note: - Supplier has to do the AMC / PM of all the supplied equipment as per the standard schedule with no additional charges to C-DAC. Any consumables required shall be paid by CDAC. The supplier has to take prior approval from C-DAC before using any consumables.

All the equipments and components supplied must have **two years** onsite comprehensive warranty from date of successful installation, commissioning and signing of ISAT.

SLA and managed service scope as per **Annexure - H.**

9 Post warranty AMC

The bidder should quote for post warranty AMC services towards the integrated datacenter solution/sub-systems supplied and installed. The AMC charges should be for 3rd year, 4th year and 5th year from the date of successful installation and ISAT of datacenter solution at respective locations. The AMC charges per year should be quoted as per price format given in **Section- VI** of this document and must not be more than 7% of the cost of capital items supplied.

The post AMC charges will be binding on the bidder. C-DAC/IISc reserves the right to enter or not into the AMC after the end of warranty period.

10 Penalties

CDAC reserves the right to levy penalties for each site, as given below.

Sr. No	Parameters	Penalty
A	Penalty for Delayed Deliveries and installation	0.5% of order value per week for delay in installation and commissioning beyond schedule. If the delay is more than 10 weeks, C-DAC reserves the right to cancel the Contract/ Order. In case of in ordinate delay on the part of bidder in completing the work and cancellation of Purchase order, C-DAC will arrange to complete unfinished work through suitable contactor and expenses incurred by C-DAC in doing of such work shall be recovered from the

Sr. No	Parameters	Penalty
		bidder. Any delay because of CDAC, conditions arising out of Force Majeure will not be considered while calculating the delay period for penalties. i.e. total 5% of maximum penalty shall be levied against Delayed Deliveries and installation
B	Penalty if uptime of Data Centre components. Measured on quarterly basis is (as per calendar year)	Penalty for downtime shall be levied as given below in B.1, B.2, B.3 which will be over and above the penalty mention above in para A .
1	Less than 98.5% but more than 97.5% in a quarter	Penalty @0.2% of the order value per quarter.
2	Less than 97.5%	Penalty @1% of the order value per quarter.
3	Less than 95%	C-DAC reserves the right to terminate the contract and invoke the performance bank guarantee.
	Capping	The maximum penalty as stipulated in Para A and B above put together will be capped to 10% of the order value.

The detailed mechanism / method for arriving at the measurable parameters mentioned in table above is covered in the **Service Level Agreement (SLA) as per Annexure –H,** to be signed before award of contract/ release of Order.

11 Force Majeure

C-DAC may consider relaxing the penalty and delivery requirements, as specified in this document, if and to the extent that, the delay in performance or other failure to perform its obligations under the contract is the result of an Force Majeure. Force Majeure is defined as an event of effect that cannot reasonably be anticipated such as acts of God (like earthquakes, floods, storms etc.), acts of states / state agencies, the direct and indirect consequences of wars (declared or undeclared), Pandemic, hostilities, national emergencies, civil commotion and strikes at successful Bidder's premises or any other act beyond control of the bidder.

12 Arbitration

In case any dispute arises between the C-DAC and successful bidder with respect to this RFP, including its interpretation, implementation or alleged material breach of any of its provisions both the Parties hereto shall endeavor to settle such dispute amicably. If the Parties fail to bring about an amicable settlement within a period of 30 (thirty) days, dispute

shall be referred to the sole arbitrator mutually appointed by both parties. If the sole arbitrator is not appointed mutually by both the parties then the District Court Pune shall have exclusive jurisdiction for appointment of sole arbitrator through court. Arbitration proceedings shall be conducted in accordance with the provisions of the Arbitration and Conciliation Act, 1996 and Rules made there under, or any legislative amendment or modification made thereto. The venue of the arbitration shall be Pune. The award given by the arbitrator shall be final and binding on the Parties. The language of arbitration shall be English. The common cost of the arbitration proceedings shall initially be borne equally by the Parties and finally by the Party against whom the award is passed. Any other costs or expenses incurred by a Party in relation to the arbitration proceedings shall ultimately be borne by the Party as the arbitrator may decide. Courts in Pune only shall have the exclusive jurisdiction to try, entertain and decide the matters which are not covered under the Arbitration and conciliation Act.

13 Risk and Ownership

All risks, responsibilities and liabilities in respect of goods delivered at site shall remain with selected bidder till they are successfully installed and commissioned at site and taken over by end users. Part deliveries shall not be treated as deliveries. Only full deliveries of all items ordered will be considered as delivery. The ownership of the items delivered at site, shall be of C-DAC Pune on successful installation of items.

14 Indemnity

The successful bidder shall indemnify, protect and save C-DAC Pune from/against all claims, losses, costs, damages, expenses, action suits and other proceeding, resulting from/arising out of:

1. Infringement of any law pertaining to intellectual property, patent, trademarks, copyrights etc. by the bidder or
2. Such other statutory infringements in respect of all the equipment's supplied by successful bidder, or
3. violation of any law/rule/ act, omission/performance/under or non or part performance/failure of the bidder.

15 Assignment

Selected bidder/ Party shall not assign, delegate or otherwise deal with any of its rights or obligation to other parties under this Contract, without prior approval of C-DAC.

16 Severability

If any provision of this Contract is determined to be invalid or unenforceable, it will be deemed to be modified to the minimum extent necessary to be valid and enforceable. If it cannot be so modified, it will be deleted and the deletion will not affect the validity or enforceability of any other provision.

17 Termination

Validity of purchase order/rate contract will remain till fulfillment of all obligations (including but not limited to providing comprehensive warranty / support till completion of three years from acceptance of the entire integrated solution as a whole) by the successful bidder.

In case of the delays in providing the stipulated services, and /or defect/delay/under or non- performance pertaining to the services / products supplied by the bidder, C-DAC Pune will give written notice to the bidder directing to set the things right within 30 days of notice. If bidder fails to comply with the requirements, C-DAC Pune shall have the right to terminate the contract and / or cancel the order/s. The successful bidder agrees and accepts that he shall be liable to pay damages claimed by C-DAC, in the event of termination of contract / cancellation of order, as detailed in this RFP. The successful bidder may terminate the contract by at least 30 days' written notice, only in the event of non-payment of undisputed invoices for 90 days from the due date. Except this situation, the successful bidder shall have no right of termination.

"C-DAC Pune will release the due amount payable to successful bidder towards the material and / or services provided till the date of termination, those are accepted by C-DAC Pune. However, the amount towards penalty, if any will be deducted from the payable amounts."

C-DAC reserves the right to terminate the contract / cancel order with or without cause/ reason, by giving 90 days' notice to the successful bidder.

18 Limitation of Liability

The liability of the Bidder / Contractor arising out of breach of any terms/conditions of the tender / contract/work order and addendums/amendments thereto, misconduct, willful default will be limited to the total contract value. However, liability of the bidder in case of death/injury/damage caused to the personnel/property due to/arising out of/incidental to any act/omission/default/deficiency of bidder/contractor will be at actuals. In no event shall Party, its officers, directors, or employees be liable for any form of incidental, consequential, indirect, special or punitive damages of any kind

19 Disclaimer

The purpose of this RFP is to provide the bidder(s) with information to assist the formulation of their proposals. This RFP does not claim to contain all the information each bidder may require. Each bidder should conduct his own investigations and analysis and should check the accuracy, reliability and completeness of the information in this RFP and where necessary obtain independent advice. C-DAC Pune makes no representation or warranty and shall incur no liability under any law, statute, rules or regulations as to the accuracy, reliability or completeness of this RFP.

20 Jurisdiction

The disputes, legal matters, court matters, if any shall be subject to Pune jurisdiction only.

21 Corrupt or Fraudulent Practices

It is expected that the bidders who wish to bid for this project have highest standards of ethics.

C-DAC Pune will reject bid if it determines that the bidder recommended for award has engaged in corrupt or fraudulent practices while competing for this contract.

C-DAC Pune may declare a vendor ineligible, either indefinitely or for a stated duration, to be awarded a contract if it at any time determines that the vendor has engaged in corrupt and fraudulent practices during the award / execution of contract.

22 Interpretation of the clauses in the Tender Document / Contract Document

In case of any ambiguity/ dispute in the interpretation of any of the clauses in this Tender Document, the interpretation of the clauses by Director General, C-DAC shall be final and binding on all parties.

(End of Section- III)

SECTION IV – SCHEDULE OF REQUIREMENT

This Section covers the general and technical requirements of Data Centre components.

1 Data Centers on Turn-key Basis

The Data Centre is required to be built on 'Turn-key' basis. The successful bidder should build the entire data centre infrastructure which includes civil works, interiors, environmental controls like humidity, temperature etc., security (including access/ monitoring equipment), electrical systems, power systems, power supply, Dry Cooler, PAC, Piping , Valves , Fire alarm and suppression , BMS etc. as specified. The responsibility towards required material/items/equipment's, work, man power etc. rests with the successful bidder. The overall requirements and available information/ data/documents are included in this Section. The bidders are advised to go through same and visit the sites before working out the details in this perspective and submit the solution document complete in all respects.

2 Background

Under National Super Computing mission (NSM) Phase-2 at Indian Institute of Science Bangalore, implementing agency C-DAC is going to build data center of 2.6 PF capacity which includes server racks as well as storage rack. This data center should be energy efficient in which 95% of heat extraction from server racks is by Direct Contact Liquid Cooling (DCLC) and 5 % by room cooling. Main components in DCLC systems inside each rack are hydraulic circuit, manifold, cold plate etc. In hydraulic circuit there are primary and secondary loop. Secondary loop is connected with cold plate and coolant flow is controlled by actuator/small pump. In Hydraulic circuit indirect heat exchange from liquid to liquid takes place. Primary loop is connected to Dry cooler water circuit. Dry cooler is closed loop cooling system in which heat exchange takes place from air to water. This way use of energy consuming mechanical cooling systems like chillers are avoided and data center cooling power requirement reduced which ultimately reduces in operating power cost.

3 General Requirements:

The general requirements applicable to the data centres are given below. Other than these requirements, depending on the site conditions, the bidder may propose appropriate changes in other requirements. However, the responsibility towards successful installation and commissioning and smooth running of data centres rests with bidder only.

3.1 The solution shall comprise of supply, installation, testing, commissioning training and handing over of all materials, equipment, hardware, software, appliances and necessary labour to commission said system complete with all the required components strictly as per the latest IS, IEC, IEEE, ASHRAE, ASHRAE TC9.9 2017,NBC etc. codes.

3.2 Also, the scope includes the supply, installation & commissioning of any material or equipment including civil works that are not specifically mentioned in the specifications and design details but are required for successful commissioning of the project.

3.3 The vendor shall provide detailed design, documentation, make, and model, efficiency including user, system and operation manuals along with the necessary diagrams, design drawings and details bifurcation of Bill of Quantity (BOQ) along with details description. Design drawing should include but not limited to Single Line Diagram, Discrimination curves, Lighting drawing, P & ID (Process and Instrumentation Diagram), , equipment sizing and selection along product selection calculations etc. with clear sectional drawings for server and utility room, interior, raised flooring, false ceiling, fire rated glass partitions, complete BMS system required for data centre etc.

3.4 The vendor shall take the necessary clearance / approval of the drawings, design, quality of material, make and model of the quoted material etc. prior to the execution of the project

3.5 The Data Centre should be complete in all respects.

3.6 Electrical power and water during construction will be provided at one location. Client shall not provide any accommodation for the contractor and his staff including labor.

3.7 The scope of installation, configuration, integration and commissioning shall mean to install and configure all components and subsystems integrating the Building Management System with the required components, integrating the entire facility and make the system operational as per scope of work.

3.8 To assess the efficiency of the data centres the power usage effectiveness (PUE) will be computed as

3.8.1 $$\text{PUE (Dry Cooler)} = \frac{\text{Total Power (A+B+C+D)}}{\text{IT power (A+B)}}$$

3.8.2 $$\text{PUE (Dry Cooler + CRAC Unit)} = \frac{\text{Total Power (A+B+C+D+E+F)}}{\text{IT power (A+B)}}$$

A,B,C,D,E,F – Refer Electrical SLD for details.

3.9 The acceptance test shall cover the following scope:

3.9.1 Factory Test Reports

Bidder shall provide factory test report for all products after testing each parameter of products as per their standard test procedure.

- Electrical panels
- PAC
- Pumps
- Dry Cooler
- UPS and battery

- DG set
- Plate heat Exchanger
- Thermal Storage Tank

4 Design of Data Centre

The proposed designs and indicative drawings enclosed in the RFP document are for reference and for the purpose of bidding. The vendor so finalized would be required to make the necessary shop drawings within the layouts so as to arrive at a final scheme in line with the requirements and in accordance with the requirements of Indian standards, IEC, IS,IEEE,NBC etc. However no change whatsoever in the price schedules would be allowed after the award of the work and the price shall remain firm throughout the project and the entire works are to be executed within the quoted price schedules.

The shop drawings during execution should include the following, but is not limited to,

a) Floor plan with design layout and detailed drawings, showing necessary sections etc.

b) Layout of raised floor and false ceiling layout

c) Electrical diagrams (including UPS, SLD, Lighting, Earthing, Equipment Layout, Power Distribution etc.)

d) Cooling system layout with (P & ID, Piping layout, Equipment Layout, Schematic etc.)

e) Fire detection and suppression plan/ layout

f) Access Control Plan

g) Surveillance camera placement plan

h) Environment monitoring system placement plan

5 Design Inputs

Tables given below are the details of exact load parameters. These values are given to the bidders to come out with appropriate configuration and sizing. The major sub systems of the DC infrastructure are:

a) UPS along with Batteries

b) Dry Cooler, Piping, Pumps, Electrical Panel, Instrumentation etc.

c) Raised Flooring and False Ceiling

d) PAC units with Water cooled condenser and related work

e) I-BMS System

f) DG set and associated work

g) Electrical Panels and cables

h) Thermal Storage Tank

i) Plate Heat Exchanger

j) Pumps

k) 42 U Server Racks

l) Illumination system

The specifications and requirement of the entire solution is stipulated in the RFP with respect to the design and solution, certain indicative inputs like layout, SLD,P&ID etc. are provided. Bidder may follow the indicative inputs provided in this RFP or come out with innovative design which is optimal and cost effective without violating any of the specifications given.

5.1 The envisaged IT load for data center: 675 KW max.

Sr. No	Description	Power in Kw/Rack	Qty.
1	Server Rack	55	11
2	Storage Rack	10	4
3	Server Racks	10	2
4	Spare Rack	10	1

6 Requirements towards Civil/Interior work

6.1 Civil architecture and preparation of data center: Interiors of the data centre (including, civil works, foundation work, raised floor, false ceiling, fire rated paint, fire rated partitions, fire rated glass partition, fire rated glass doors, fire rated glass sliding door etc.)

6.2 METAL GRID CEILING: The drop ceiling shall be provided with Armstrong Lay in (Hot dipped galvanized steel) metal ceiling system 600 x 600 x 5 mm with standard 2.5 mm dia (16% open space) and fleece with NRC (Non Directional Visual) of 70 & CAC 36 (CAC is a measure for rating the performance of a ceiling system as a barrier to airborne sound transmission through a common plenum between adjacent closed spaces) to be laid on Armstrong grid system. The modular ceiling sheets with necessary fittings should be done up aesthetically to integrate with the lighting.

6.3 Raised flooring: Suitable raised false flooring as per prevailing standards should be provided as per site requirements. The entire Access floor system shall be made from high density cementatious board and provide Class O as per BS 476 PART 6 for Fire propagation index and Class 1 as per BS 476 Part 7. Fire Ratings tested as per CIRC 91/61 or BS 476 Part 6 & 7 fire resistance up to 60 min as per NFPA. System should have antistatic property and air leakage resistance. The system shall be able to withstand a minimum UDL of 2500 kg per sq meter and a point load of minimum 600 kg. and rolling load of minimum of 300 Kg.

6.4 Panel should meet the below requirements:

6.4.1 The panel shall be coated with epoxy coating on the exposed surface. Have an infill of light weight cementitious material. Insulated against heat and noise transfer. Panels shall be finished with High Performance Anti-Static Laminate.. Panels will remain flat through and stable unaffected by humidity or fluctuation in temperature throughout its normal working life. Panels will provide for impact resistance top surfaces minimal deflection, corrosion resistance properties and shall not be combustible or aid surface spread of flame. Panels will be insulated against heat and noise transfer. Panels will be

600 x 600mm and fully interchangeable with each other within the range of a specified layout. Panels shall rest on the grid formed by the stringers which are bolted on to the pedestals. Panels shall be finished with anti-static 0.9 mm Laminate and thick plastic edge material that is self-extinguishing and will be PVC free. Panel should withstand a Concentrated Load of minimum 500 Kg applied on area 25mm x 25mm in the centre of the panel which is placed on four steel blocks without deflecting more than 2.5mm and without setting permanently more than 0.20mm

6.4.2 Pedestal installed to support the panel will be suitable to achieve a finished floor height of 600mm. Pedestal design will confirm speedy assembly and removal for relocation and maintenance. Pedestal base to be permanently secured to position on the sub-floor. Pedestal assembly will provide for easy adjustment of leveling and accurately align panels to ensure lateral restrain. Pedestals will support an axial load of minimum 1500 Kgs, without permanent deflection and an ultimate load of 2500 Kgs. Pedestal head will be designed to avoid any rattle or squeaks.
. Pedestal should have GI Base plate of suitable dimensions, GI Pipe, check nut for level adjustment, threaded stud with GI pedestal head, all screws etc.

6.4.3 Understructure (US) system consists of stringers to form a grid of 600 x 600mm. These stringers are locked into the pedestal head and run both ways. The US system will provide adequate solid, rigid and quiet support for access floor panels. The US system will provide a minimum clear, uninterrupted height of 600 mm between the bottom of the floor and bottom of the access floor for electrical conducting and wiring The stringer shall be hot dipped galvanized steel cold roll construction specially designed to stabilize lateral stability and to support the panels on all sides for alignment. The channels shall have counter sunk holes at both ends to accommodate bolting of the same to the pedestal head assembly. Earthing point connections are to be part of standard design. The longitudinal ribs and flaps in the lower part should be designed to increase flexion resistance. The grid formed by the pedestal and stringer assembly will receive the floor panel.

6.4.4 Bidder to consider to providing 2 nos. 2-point panel remover, lead, lift, steps for 600mm raised floor etc.

6.5 Fire Rated Steel Door-two hours- Two hours fire rated double skin steel door constructed from 1.25mm thick galvanized steel sheet formed to provide a 46mm thick fully flush door shell with lock seam joints at stile edges and the internal construction of the door should be specially designed Honey Comb structure with reinforcements at top, bottom and stile surround. The door frames and door shutters should be primed with Zinc-Phosphate Staving Primer and finished with Polyurethane Aliphatic grade or epoxy paint as per approved manufacturer specifications. Door if used for Emergency purpose is required to be with Panic bar. The Fire Doors are to be fully insulated and shall be tested as per IS: 3809-1979, ISO: 834-1975, IS: 3614 (PART-II)- 1992 and BS 476 (PART- 20 & 22)- 1987 under live fire conditions, The wired glass is to comply with both BS 476: PART 22 and BS 6206 relating to fire resistant and impact performance.

6.6 Fire rated Partition/ Walls: Partition walls within the data centers should have 2-hour fire rated. Suitable smoke seals should be used. Fire line boards should conform to IS:2095 – 1996-Part-I. Providing and fixing minimum 132MM thick FIRE RATED gypsum board partitions with 2 Nos. x 15mm thick fire line board on both sides of 72mm GI floor channel

and 70mm Square MS Pipe stud as per specifications, including cost of chasing for electrical conduits,. This item includes all tools, tackles, material, labor, fixture adhesives sealants etc. for the complete work.

6.7 Opening for the Cables or other utility services which are coming inside the building needs to be sealed by Fire resistance board system, water soluble fire retardant solutions, fire expanding foam etc. having minimum of 2 hours' fire rating when tested in accordance with BS 476 part 20 and UL 1479 for horizontal and vertical openings in RCC slabs, Beams, walls, Brick masonry or Gypsum partitions for passing service shafts. The service lines could be of various types like electrical cables, cable trays or metal pipes etc. The foam shall have Acoustic property as per DIN 4109 and Smoke and Air Seal. The Foam should have the feature of Re penetrability for future maintenance or repair activities. Fire soluble cable coating Should be suitable for protecting against spread of flame on timber panels and tested as per IEC 332 part 3 standard for reduced spread of flame & tested as per FM Class 3971. It should have no derating effect on cables, free from fiber, asbestos, odourless and solvent free, flexible when dry after application.

6.8 Room Signage and fire evacuation map. Providing & fixing Aluminium Modular Signage using Aluminium Alloy 6063 extrusion with Anodising (The thickness of the anodization is typically 30 microns. The integrity of the anodize coating is tested to meet the international specifications ISO 2143-1981.) With lifetime Warranty in normal working condition.

6.9 Plate heat Exchanger, Pumps, thermal storage tanks, etc will be installed on ground. These equipment needs to be installed above existing water tank concrete floor. Bidder to consider chain link fencing for these equipment.

6.10 INSULATION ON ROOF AND FLOOR SLAB: Supply and installation of external thermal insulation class-"O" closed cell elastomeric nitrile rubber insulation with adhesives recommended as per the approved shop drawings/ specifications. Minimum 13 mm thick for floor and ceiling insulation is required.

6.11 Providing and fixing of tested 120 minutes fire rated - integrity and radiation control and partial insulation (EW120) - fully glazed non-load bearing fixed glass partition system with symmetrical (Bi-Directional) fire protection. The glass should be Contraflam Lite or equivalent 14 mm clear 120 min fire rated and partially insulated (EW120), Non Wired Toughened Interlayered glass having a sound reduction of minimum 30 dB and compliant to class 1(B)1 category of Impact Resistance as per EN 12600.The glass shall be able to withstand fire attack from both sides. The glass should be manufactured in UL & TUV audited Facility and including UL Certification. The profiles are manufactured from 1.6 mm galvanized steel sheet pressed and formed to a required profile of the dimension. These specifications are applicable for fire rated glass door, fire rated glass partition and fire rated glass sliding door.

6.12 Steel structure needs to be consider for the platform of the equipment's as Dry cooler , Panels, pumps, expansion tank etc. MS frame to be considered for piping installation for outside part of building. Dry cooler and associated accessories needs to be installed at terrace floor of the building i.e. above fourth floor slab not directly on the slab . At terrace floor space available is 16 X 28 meters. Bidder need to consider Tie bracing of existing column by MS structure ,so that entire weight will be transferred to column footing.

Necessary calculations and structural stability needs to be certified by certifying agency /structural consultant. Refer attached drawing for reference only.

6.13 HOUSE KEEPING: The vendor is responsible for keeping the site clean and deep cleaning by removing all the debris etc. everyday, using adequate covering/tarpaulin sheets etc to cover the any areas required (client property etc.). All cleaning equipment's like heavy duty vacuum cleaners etc to be according to the approval.

6.14 Bidder to consider in the scope removal of the existing glass partitions/ wall structure /glass door, existing raised flooring in Data center as well as in passage area, false ceiling in the existing data center area and removed material to be kept at allocated space provided by IISC Bangalore.

6.15 Power Cable entry in each rack will be from Top, Bidder need to consider boxing arrangement or cable manager or cable trunking system so that entire data center installation should look aesthetically good.

7 Requirements towards Electrical Work

7.1 Existing electrical equipment's available at site and need to be integrated in new requirement.

Sr. No.	Description	Rating	Quantity	Make
1	Transfomer-1	2500 KVA ,11/.433 KV	1	
2	Transformer-2	1500 KVA,11/.433KV	1	
3	DG Set-	750 KVA	3	Cummins
4	Main LT Panel -1 and 2 for Transformer 1 & 2		2	
5	UPS with Batteries	500 KVA	4	Riello Power India Pvt. Ltd
6	UPS and Batteries	120 KVA	2	
7	UPS input and output panels	These panels are available for 2 X 2 X 500 KVA UPS system		

7.2 Provide and commission UPS along with batteries for IT load. 415 V,3 phase 4 wire plus ground without internal isolation transformer. Design of UPS should be Insulated-gate bipolar transistor (IGBT) rectifier and 3/ 4 level 4 quadrant IGBT inverter with double conversion and capable of operating in ECO mode as per Class-1 classification of IEC 62040-3. Steady state voltage regulations will be within 1% of nominal output voltage, Linear load harmonics distortion should be less than 3% and non-liner load harmonics distortion should be less than 5%. UPS should be capable of 100% unbalanced load. Efficiency of UPS should not be less than 94% at full load condition in double conversion mode. Noise generated by UPS under normal steady state condition should not be more than 85 DB as per ISO 7779. UPS should be able to test in self-loading mode without any external dummy load. UPS should be ROHS complied product. Cable termination will be from front only. No back or side access is required. All serviceable components to be from

front. UPS display should show the battery monitoring, UPS mode, Alarm (Audio and visible), Events etc. The UPS communication capability should be able to integrate into any industry standard Building Management System (BMS). Adequate protections for UPS for rectifier, bypass, battery, battery against overload, short circuit, battery over charging, battery over discharging, transients, surges (as per IEEE 587) etc. needs to be considered as per IEC 62040-1. A Battery system shall be furnished for the UPS with sufficient backup capacity to maintain UPS output at the UPS rated capacity for duration of 10 minutes. The type of battery shall be Sealed Maintenance-free (SMF) type. Each UPS should have separate battery bank. Battery protection shall be provided by thermal-magnetic molded-case DC circuit breakers in each battery rack. There are 4 X 500 KVA existing UPS with following details

Sr. No.	Details	Description
1	Architecture	Monolithic
2	Make	Riello Power India Pvt. Ltd
3	Model	UPS MHT 500
4	Rating	500 KVA/450 KW
5	Quantity	4

Proposed 2 X 500 KVA UPS system needs to operate in synchronization with existing 4 X 500 KVA system.

7.3 Bidder to use existing 2 x 120 KVA UPS for NON IT load.

7.4 Supply, installation and commissioning of Diesel Generator Set with acoustics enclosure and the other necessary systems include power cum synchronization panel, exhaust system, earthing system, battery and battery charger along with Civil foundations for successful erection, completion of the Data centre. DG sets should be of prime rating and should be capable of operating continuously on an unbalanced system within limit described in section 6 of IEC 60034.1. Genset should be with Auto start, synchronization, auto stop controller. DG set should be with Auto Mains Failure (AMF) panel. Synchronization is to be with Auto as well as manual wherever required. DG set should be load dependent start and stop arrangement. Height of the exhaust stack has to be as per Central Pollution Control Board (CPCB) norms. Genset should be supplied with day tank of standard fuel storage capacity.. Fuel tank capacity will be as per Petroleum and Explosives Safety Organization (PESO) fuel storage guideline. Alternator insulation should be of Class H and temperature raise limit to Class H. Entire Genset to be provided with necessary engine protection system, alternator protection system and reverse active power protection system etc. Selection of LT switchgear will be as per IEC 60947 and Genset will be as per ISO 8528 part1 to 10. Alternator should be with Resistance Temperature Detectors (RTD) and Bearing temperature detector (BTD). Electrical performance of the alternator will be as per IS 4722. DG system should come automatically ON LINE in less than 40 sec. First fill of oil is part of scope of the bidders scope. At site there are 3 X 750 KVA DG set installed and operating in AMF, Auto Synchronization , Load Dependent Start and Stop . Existing Gen set are of Cummins make with model KTA-38-G2-1 with PC3.3

controller. New gen set of rating 1X 750 KVA should match above technical specification and after installation power should be seamless transfer with auto load synchronization, auto load sharing, auto load dependent start and stop provision. Existing synchronization cum DG power panel is IP65 and installed outdoor, bidder to consider extension with one incoming 4 Pole breaker and one outgoing 4 Pole breaker as per single line diagram provided.

7.5 AC wiring circuit: Main circuit Point wiring should be surface or concealed conduit system. Conduit wiring shall be as per IS-732. Conduits and conduit accessories shall be galvanized and shall conform to IS-2667, 1988. Conduit ends shall be free from sharp edges or burrs. The ends of all conduits shall be reamed and neatly bushed with Bakelite bushings. In order to minimize condensation or sweating inside the conduit system, all outlets shall be properly drained and ventilated in such manner so as to prevent entry of insects. Conduit pipes shall be fixed by 22 gauge ribbed G.I. saddles on 25 x 3 mm G.I. (Galvanized Iron) saddle bars in an approved manner at intervals of not more than 50 cms. Saddle shall be fixed on either side of couplers, bends or similar fittings, at a distance of 30 mm from the centre of such fittings. Existing point wiring before using needs to be checked and if technically found ok can be considered for use.

7.6 Lighting fixtures: -Lighting wiring between JB(Junction Box) and lighting fixtures shall be done by PVC insulated 3-core (phase neutral and earth) unarmored cable. All joints of conductors in Switch boards / JB's / Fittings shall be made only by means of approved Mechanical connectors (nylon / PVC connectors). Bare or twist joints are not permitted anywhere in the wiring system. Fixtures shall be firmly supported from the structures, support clamps etc. They may be bolted or welded to the steel work or metal inserts. In case of concrete structures, where metal inserts are not available, fixtures will be fixed to or supported from concrete surfaces with the help of anchor fastener, in such cases special care shall be taken to see that anchoring is firm. All LED fixtures shall be with high power factor, low harmonic (THD< 10%) (THD= Total Harmonics Distortion) and minimum 100 lumens/watt. All exisiting light fixture needs to be replaced.

7.7 Earthing and Earthing Pits: All Electrical Equipment must be efficiently double earthed in accordance with the requirement of IS-3043/IEEE 80 and relevant regulations of Electrical. The earth pits shall be as per IS with proper arrangement for testing. Maintenance free earth pits to be used. All Earthing conductors shall be hot dip galvanized / electrolytic grade base copper conductor. The main earthing rings shall be done as per practice laid in Indian Standard. All electrical equipment shall be connected to the earth bus at two points except the lighting fittings and junction boxes. All hardware for bolted joints shall be galvanized and the size of the bolt shall not be more than quarter of the size of earth conductor. Tinned copper lugs shall be provided where round earthing conductors are used. The 415V neutral shall be solidly earthed by means of two separate and distinct connections to earth. The earth pits shall be interconnected between themselves and the main earthing grid to form an earthing ring. All joints in the main earthing conductors shall be welded. Terminal joints on the equipment shall be bolted. Removable test links shall be provided near the earth pits to facilitate testing of earth pits. Where the earthing terminal diameter provided on equipment is larger than quarter of the size of the earth conductor, connection shall be made using a wider flag welded to the conductor. The equipment to be earthed shall be connected to a common earth grid of power system. The number of earth pits will depend upon soil resistivity and the voltage of the system. The earth pit

together with the electrode shall be constructed as per IS-3043-1987. The potential difference between neutral and earth should be less than 3 V. A bolted assembly link shall be provided in the connection between earth electrode and the main earth conductor. Existing Earth pits can not be used all should be new one. Equipotential earthing inside the data center needs to be considered with grid below raised flooring of 2 X 2 meter of 25 X 3 mm Cu strip and all end corners after covering complete room needs to be grounded. Pedstal /stringers, Rack body to be grounded to this grid sothat flooring and equipment's are at equal potential.

7.8 LT Panels (Low Tension/voltage Panels): Design, Supply, installation, testing and commissioning of all LT panels. Panels will be as per IEC 61439. Panels feeders should have rated capacity of Load manager with RS 485 communication port. This should compactable for BMS system to know the energy consumption. Bidder to submit License certificate of LT panels as per IEC 61439. Selection of switchgear should be as per IEC 60947 and bidder to submit the Discrimination chart for all the feeders. All the panels should be with Transient Voltage Surge Suppressor (TVSS) having Response time <0.5ns,Let-through Voltage 600V-800V. For selecting the source fault level bidder to consider value of transient reactance (Xd') as per IS -1180 for transformer of rating 11/.433 KV 2500 KVA and 11/.433 KV 1500 KVA and sub transient reactance (Xd") for alternator output at common bus at synchronization panel as per ISO 8528 Part 1 to 10. Extension IP65 panel for existing synchronization cum power panel CPRI approved will be accepted. List of panels as per single line diagram and location will be as per below table.

Sr. No.	Name of Panel	Purpose	Location
1	NSM UPS input Panel –IT Load	Feed the input power from substation main LT panel-1 to 2X 500 KVA new UPS	Basement
2	NSM UPS output Panel –IT load	This is common output panel of 2 X 500 KVA UPS	Basement
3	UPS Output Panel	This is common output panel of 6 X 500 KVA UPS	Basement
4	NSM Bus Bar PDB	This panel is used to feed the overhead bus bar system and ultimately to the server racks. This panel having two inputs one from UPS output panel and other from NSM UPS Output panel.	Basement
5	NSM UPS input Panel –NON IT Load	Feed the input power from substation main LT panel-2 to 2 X 120 KVA existing UPS	Basement
6	NSM UPS output Panel –NON IT load	This is common output panel of 2 X 120 KVA UPS	Basement
7	NSM PDB Panel	Feed the input power from substation main LT panel-2 to raw power load as CRAC units and others.	Basement

7.9 Exisiting adaptor panel used to feed the power to existing Data Center. From output panel of existing 4 X 500 KVA UPS cables are terminated to the adaptor panel and cables from output of this adaptor panel are for Data Center rack power. Refer Electrical SLD , cables from output panels of all UPS needs to be terminated to new UPS output panel . Bidder to

consider appropriate scope of work like removing input cables to adaptor panel, connecting to new panels etc. Cable Tray: All cable Trays shall be perforated type for indoor applications & above 300mm ladder type trays shall be used for outdoor purpose. The Trays shall be pre-fabricated hot-dipped galvanised. The Trays shall have suitable provision for clamping at an interval of 500 mm. The Earthing Strip for the earthing ring shall be run along the side of the Tray. The connection between individual equipment to the ring shall be by bracing or with lugs. Supports to the cable trays to be considered. The bending of trays shall be smooth and the curvature sufficient for each bending of cables in it. Pre-fabricated accessories such as Tees, bends, risers, couplers, reducers, etc. shall be used at all junction & branches. Cutting & welding of trays at site is not permissible. Similarly, the trays shall not be welded on the supports but bolted only.

7.10 Stainless steel (SS) cable tray to be considered above each row of the Rack if required Cable tray Grid above the rack to be provided.

7.11 Cables- All Low tension cables should be of 1.1 KV grade, All power cables from 25 Sq.mm to 400 Sq.mm should be with stranded, compact aluminum conductor, with XLPE insulated, PVC inner sheathed, galvanized steel strip armored and overall PVC sheathed conforming to IS:7098 /88. As stated in Electrical single line diagram for Cu flexible cables should be of Solid/Stranded Copper conductor, XLPE Insulated, cores laid up, PVC tape/PVC Extruded Inner sheathed for Multicore Cables, Unarmoured, extruded PVC Type ST2 Sheathed as per IS 7098 (Part 1) 1988.

7.12 Bus Duct Sandwich Type -- Aluminium Sandwich Type Construction 3P4W 100% N with body Enclosure as Integral Earth. Operating Voltage 1000V Suitable for 50 / 60 Hz with impulse withstand voltage of minimum 6 kV, Insulation Voltage 690V Rated Short time Current 20 kA for 1 Sec . Cu conductor or Al Conductor with Tin coating on entire surface or silver-plated Bi-metal cladding on Aluminum conductor through high current and high pressure, Neutral conductor shall have same cross section area that of phase conductor. The Earthing shall be Aluminum and it shall be one continuous piece, integral earth rated at min 50% of phase. Earthing shall be factory fitted factory tested and Icw rating for the earthing shall also be declared on Type Test Certificate produced by manufacturer. Bus Bar Should be insulated with red class F thermosetting plastic material and factory fitted in one side of the each trunking components. The enclosure shall provide a protection not less than IP- 55 as per IEC-60529 for indoor application. . The busbar Trunking shall comply with standard IEC 61439-6 and the rated current of the busbar trunking systems shall be referred to the average ambient temperature of 40 °C .The Bus duct enclosure consists of four C-ribbed section bars, bordered and riveted, with excellent mechanical, electric and heat loss efficiency. The sheet metal is made of 1.5 mm thick hot-galvanizes steel treated according to UNI EN 10327 and painted with RAL7035 resins with high resistance to chemical agents. Tap-off Box with Mechanical Interlocking Feature for MCB Power Isolation is required. Entire system should include but not limited to Straight Length, Flange End, Elbow 90 Deg. End cover ,Horizontal hanger, adaptor box , Copper braded flexible, tap off boxes rating as per SLD and Layout Drawing. All these fitting shall be in accordance with IEC 61439-6 and from the same manufacturer. There should not by any risk of exposure to electromagnetic fields. The busbar trunking housing shall be constructed of electro galvanized steel and aluminium to reduce hysteresis and eddy current loses and shall be provided with 7 tank cleaning & powder coating process with a suitable protective finish of ANSI 49 grey epoxy paint. The busbar trunking housing shall

be totally enclosed non-ventilated for protection against mechanical damage and dust accumulation.

8 Requirements towards Heating, ventilation, and air conditioning work

8.1 Existing cooling equipment's available at site and need to be used to integrated in new requirement.

Sr. No.	Description	Rating	Quantity	Make
1	Chiller -1 and 2 (Evaporator leaving temperature of 10 Deg C and evaporator entering temperature of 17.10 Deg C)	104 T with flow rate of 197 GPM.	2	Trane
2	Piping			
3	Pump			

This existing chiller will be used as Evaporator leaving temperature of 7 Deg C and evaporator entering temperature of 12 Deg. C.

8.2 All cooling equipment selection to be done based on American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE n=20) standard. The cooling systems should perform efficiently at variable load conditions. The overall cooling solution should be designed to achieve better cooling and low operating cost. The room air temperature should be maintained at 22 +/- 2 Deg. C and humidity as per ASHRAE TC 9.9 2017 guidelines. The cooling system in the server rack area should be designed as per layout design provided in Layout Drawings. Heating and humidifier to maintain correct operating environment throughout the data centre needs to be considered. Relative humidity to be maintained in the data center will be from 45% to 55%.

8.3 Logic of operation of cooling system will be- The dedicated temperature sensor will sense the ambient air temperature continuously. As long as the ambient temperature is less than or equal to the "set point temperature", the control system will facilitate the dry cooler to run in "dry mode without PHE". (Set point temperature is water leaving temperature from dry cooler and set point should not be more than 30 Deg. C +1 Deg.C). If the dry cooler leaving temperature increases beyond the "set point" temperature, the control system /BMS will facilitate the unit to operate in "dry mode with PHE" and enables the PHE primary side (Cold side) 2 Way valve to modulate . Valve modulation depends on the temperature of outlet of the secondary of PHE (Hot side). Valve modulation will continue till PHE secondary outlet temperature maintains the set point temperature. Water temperature leaving from PHE and entering in the PHE at primary as well as secondary side to be monitored continuously on BMS and accordingly control needs to be operated even though failure of any one temperature sensor. PHE primary will take chilled water stored in the 2 X 25 KL thermal storage tank. Pump after thermal storage tank to be operated and controlled by BMS system. Operation of existing fixed speed chillers needs to be controlled by BMS system. Existing chillers to be operated most of the time during night time and maintain water temperature in 2 X 25 KL tank and in day time as per requirement this stored water will be utilized. Dry cooler control system should able to optimize the fan power consumption continuously depending on the ambient

temperature and heat load variations. Make provision on human machine interface(HMI) of Dry cooler as well as on BMS system to change set points as required. The process water side resistance temperature detector (RTD) with temperature output signal will have to be fitted at the main water outlet header of the Dry cooler. This temperature sensor will sense the outlet water temperature and accordingly give a signal to EC fans to increase / reduce the speed of fans. At the set temperature the fans will be running at full speed and as soon as it drops then the fan speed will be reduced.

8.4 Dry Cooler: Supply, installation, testing and commissioning of a dry cooler. The finned coil heat exchangers shall consist of copper tunes and Al fins. Aluminium fins shall be with advanced rippled-corrugated fin design to create a state of continuous turbulence, with full drawn collars to maintain fin spacing and provide a continuous surface cover over the entire tube. The tubes shall be mechanically expanded into the fin collars to provide a continuous primary to secondary compression bond over the entire finned length for maximum heat transfer rates. Headers shall be made of copper tubes having steel-flanged connections as standard. Air in the dry cooler should be drawing-in laterally, blowing-out vertically upwards. The Dry cooling system shall consist of instrumentation and controls, , electrical interface, EC fans. Increased energy savings shall be achieved by using EC (electronically commutated) motors with permanent-magnet rotors. The fans selected shall be labelled as 'soft commutation'. This must involve a combination of commutation strategy and motor design. It should result in low-noise operation, without structure-borne noise. The noise level shall be limited to 70 dBA at a distance of 1 m. With the fans selected, there must be no motor noise variation across the entire speed range. When demand for cooling is low, very low operating speeds must be selected resulting to extremely reduced absorbed power. Fan shall be Axial type aero foil design with Direct Drive. Fan motors should be total enclosed fan controlled (TEFC) with degree of protection IP – 54. The dry cooler shall have a control system that senses the outdoor ambient and the leaving water temperature and varies the speed of the fans to meet the heat rejection needs of the system. Casing is a self-supporting construction. Maximum casing dimensions are adapted to the local conditions Casing material made of Galvanized steel, powder-coated RAL 7035 Casing surface receives a high quality powder coating (RAL 7035) For easy cleaning, all surfaces are smooth.

8.4.1 PRESSURE GUAGES & THERMOMETERS

Bourdon type pressure gauges with aluminium casing with a minimum 100 mm dial and appropriate range complete with needle valves shall be provided at the inlet and outlets of heat exchangers, and pump sets. Thermometers shall be of dial type weather & water proof type. Thermometer shall be provided at the inlet and outlet of dry cooler.

8.4.2 Minimum I/O Summery for Dry Cooler will be as below:

Inputs	Description
I0.0—I N.N	FAN 1---n RUN feedback
	FAN 1..n fault feedback
	FAN 1..n EC selected
	pump 1 RUN feedback
	pump 1 fault feedback
	pump 2 RUN feedback

	pump 2 fault feedback
	FLOW TRANSMITTER OUTLET
	PRESSURE TRANSMITTER INLET
	PRESSURE TRANSMITTER OUTLET
	RTD 1 UNIT OUTLET
	RTD 2 Ambient
	RTD 3 PROCESS INLET
	Environment Humidity Sensor
Outputs	
O0.0	FAN1--n start / stop command
O0.1	FAN 1--n start / stop command
	closed loop pump 1 start / stop command
	closed loop pump 2 start / stop command
	Hooter
	FAN 1 TRIP
	FAN 2 TRIP
	FAN 3 TRIP
	Alarm signal

8.5 Water Piping and accessories: Water pipe should be heavy duty Mild steel (MS) (Black steel) with all necessary fittings like bends, elbows, tees, flanges, reducers, vibration isolators, hanger, supports, PUF Gatti and fitting like flanges, bellows, union, etc. MS 'C' class water piping, cut to required length and installed with welded joints, including all necessary fittings such as elbows, tees etc. The above piping shall be provided with thermal insulation of 'O class' Nitrile insulation with protective coating on water piping with min 26G of Aluminium cladding. Minimum Insulation thickness of 25mm for pipe having diameter 0-80 mm. All pipe joints shall be welded or provided with necessary fittings. Pipe flanges shall conform to IS:1536 whereas the threads shall conform to IS:554. All piping shall be tested to hydrostatic test pressure of at least 1 ½ times the maximum operating pressure but not less than 7 Kg/Sqm for a period of not less than 24 hours. Entire system shall then be retested. After completion of the installation, the pipe lines are to be flushed thoroughly to blow out the entire dirt and muck. The system then shall be balanced to deliver the water quantities. Direction of flow shall be marked on aluminum cladding above pipelines in bold markings.

Bidder to consider tapping from existing chilled water piping as per P & ID. Hose pipe for DLC rack connection is not scope of this Tender.

8.6 Propylene Glycol- Bidder to consider a mixture of 15% Propylene Glycol and 85% pure water in the water loop circuit. It is used not only for antifreeze but also helps in lubrication of the pump what gives a much better, longer, lifetime. Also it prevent the liquid of having bacterial or micro-organism grow so don't have to exchange the liquid every period of time and gives corrosion protection.

8.7 Plate Heat Exchanger (PHE)

8.7.1 AHRI specification (Air-Conditioning, Heating, and Refrigeration Institute):The plate heat exchangers shall be AHRI-certified in accordance with the AHRI Liquid to Liquid Heat Exchangers Certification Program. The PHE specifications as selected, shall be verified and registered by AHRI before purchase.

8.7.2 Supply and implement Plate Heat Exchanger system along with piping, valves, controlling mechanism, sensors etc. Plate Heat Exchanger shall be of plate type designed, constructed, and tested in accordance with Pressure Equipment Directive (PED) standards "Equipment category IV". The Heat Exchangers shall be certified and stamped complying with PED. PHE shall consist of a package of copper metal plates with port holes allowing the two fluids to form a flow. The design shall prevent mixing of fluids and leakage to the surroundings. Each plate shall have an efficient flow distribution area, to maximize use of pumping power for efficient heat transfer. This will help reduce the heat transfer area installed and avoid dead spots for longer operation life time. All plates shall be single step pressed to secure uniform thickness, have no weak spots and give accurate seating of gasket in the gasket groove. This enables the plate pack to better handle pressure shocks, vibrations, plate fatigue, high operating pressures and high differential pressures. No multi-stage pressing of one sheet is allowed. The plates shall not have holes for attaching of the gasket. All plates shall be market with a charge number for full traceability. Fluid inlet and outlet connections should be positioned in parallel on the frame plate and not diagonal to allow ease of installation. All plates are being washed after pressing to avoid greasy plates reducing heat transfer. All gaskets shall be locked into the groove. Gaskets shall have a roof top or ribbed top cross section design to ensure superior sealing performance. Gasket profile tailored to fit the plate type and thickness – longer lifetime of gaskets and plates. All gaskets shall be marked with a colour code for identification of gasket material from the outside of an assembled plate heat exchanger. Number of plates should make up the required heat transfer area to meet the operating conditions according to performance request. Test Pressure: 1.5 times the design pressure. Units to be factory tested in accordance with Pressure Equipment Directive Standards. Lifting eyes shall be provided complete with recommendations for lifting the complete unit into position. Recommended connections are 6 inch and above size flange connections Flanges with SS material and rated with PN40 ASME flanges. Frame plate shall have flange stud bolts. Frame and pressure plate shall have side slot tilted bolt hole geometry (not holes in frame) to allow small footprint, easier and safer maintenance. The unit should have feet supplied for fixing at front and back.

8.7.3 Frame material will be as per IS 2062 , Paint will be PU paint. Incoming pipe size is as per P & ID. Design Data for selection of PHE will be as below .

		Hot Side			Cold Side	
Fluid Name		Water			Water	
OPERATING DATA		Inlet	Outlet		Inlet	Outlet
Estimated Total Liquid flow	GPM	230-260 GPM	230-260 GPM		190-200 GPM	190-200 GPM
Operating Temperature	°C	Ambient + 4 Deg. C	33 Deg +/-1		7-9 Deg C	12-15 Deg C
Pressure drop (allowed / calc.)	bar	1.00 / 0.87			1.00 / 0.75	
Total Heat Exchanged	kW			1000		

PHE inlet water at cold side will be from existing chiller of rating 2 X 104 T.

8.8 Computer room Precision air System (PAC): Supply, installation, testing and commissioning of self-contained direct expansion type Precision air conditioning units suitable for operation on R410a/R407C refrigerant & should have advanced microprocessor and electronically communicated. Modular construction Precision air conditioning unit suitable for operation on R-410a / R407C refrigerant with bottom discharge arrangement consisting of inlet filter, draw through direct drive Electronically commutated Motors and Backward curved Plug fans, fan motor assembly to deliver desired air quantity, Inverter Scroll atleast one of twin Compressor (One of the scroll will be inverter), Direct Expansion Cooling Coil, Heater banks to maintain humidity inside the space, condensate drain pan of stainless steel construction, Microprocessor panel, programmable control complete with display. The unit shall be suitable for operation on 415 V, 50 Hz, AC supply. The controller unit should also be capable of starting the standby other DX base unit in case the temperature is not able to achieve with the working units. For Basis of Design Bidder to consider site ambient data along with following parameters.

8.8.1 Equipment Parameters

Equipment air inlet	: (Input to server rack): 22 DegC +/- 2 Deg & 50% RH
Machine configuration	: Bottom discharge
Actual Capacity	: As provided
Flow Direction	: Bottom discharge
Machine Capacity control	: Return Air
Compressor type	:One of the scroll will be inverter
Evaporator Fan	: Blades with Electronically commutated (EC) motor
Humidification & De-humidification	: In built feature of humidification & dehumidification
Filters	: Filter to be provided on the Package unit, having 95% efficiency down to 5 Microns

8.8.2 Base panel shall be constructed out of sandwich panels of galvanized steel and painted with epoxy powder coated (Insulation on all 4 sides). All four side panels shall be insulated. Unit shall be complete with space for refrigeration equipment, fans, cooling coils, liquid receiver, Liquid line solenoid Valve, NRV and multistage strip heaters and modulating Humidifiers and water cooled condenser unit. Unit shall be provided with welded tubular steel floor stand with adjustable legs and requisite vibration isolation pads.

8.8.3 The units should be equipped with direct driven backward curved EC radial fans with electronically commutated brushless motors. The technology employed by these motors allows straightforward control of fan speed by means of the electronic controller in order to obtain adjustment of air flow rate and static

pressure to ensure correct distribution of the treated air. The filter chamber shall be an integral part of the system and withdraw able from the front of the unit. Low airflow and clogged filter alarm sensors consisting of two pressure switches for controlling the operating conditions of the fans and the build-up of dirt on the air filters inside the unit. The motor's high efficiency should make for less energy absorption, especially at partial loads and during starting (lowering of peak current), which means a reduction in power consumption of approximately 30% compared to AC motor. The motor shall have minimum IP54 Protection. Evaporator Coil Precision packaged unit shall comprise of cooling coil of copper tubes expanded into aluminium fins with corrugated profile and hydrophilic treatment. Face and surface areas shall be such as to assure rated capacity and the air velocity across the coil. Complete Coil should flat and should be fully accessible from front. Drain pan shall be made of stainless steel with nitrile rubber insulation

8.8.4 Scroll Compressor The compressor shall be of the high efficiency scroll design operating with R410A / R407C refrigerant and 415V/3~/50 Hz supply. The compressors are provided with integrated thermal overload protection. The compressor motor control driver is provided with integral electronic protection against over temperature, over current, over or under-voltage with absence of one or more phases.. The compressor shall be charged with mineral oil and designed for operation on environment friendly refrigerantR410a /R407C.The machine should be inbuilt with the liquid receiver & pressure relief valve, Liquid line solenoid Valve, NRV for better performance of the machine.The refrigeration system shall be of the Single/ Multiple circuit direct expansion type and incorporate hermetic scroll compressors, complete with crankcase heaters. One of the scroll compressors in each machine should be inverter.

The refrigerant circuit comprises:

- Liquid receiver inbuilt in the indoor unit
- Electronically- controlled expansion valve (EEV)
- Solenoid valve for shutting off the refrigerant liquid
- Refrigerant liquid flow indicator
- Solid cartridge freon filter
- Safety valve
- High pressure safety pressure switch with manual reset
- Low pressure switch with automatic reset
- Copper refrigerant pipes with anti-condensation insulation on the suction line
- Pipe taps on suction and delivery side and charging valve on liquid side.
- Each Compressor / refrigerant circuit to have its own independent Evaporator coil and Condenser coil.

8.8.5 Electronic Expansion Valve (EEV) The unit should have Electronic Expansion Valve and should be capable of responding to the varying load conditions.. It should be able to provide following advantages:

- Fast, high precision adjustment of refrigerant flow;
- Fast arrival of the unit at steady-state conditions;
- Superheating value remains constant in variable thermal load conditions;
- Efficient operating conditions of the compressor, especially in the presence of low room temperatures;
- Wide working range with consequent extension of the unit's operating limits. These properties result in enhanced performance of the unit and make it possible to obtain very significant energy savings.

8.8.6 Condenser shall be water-cooled type, suitable for indoor installation and shall be suitable for operating at high ambient of 40 deg C Dry Bulb Temperature (db) and at low ambient of upto 0 deg C db temperatures. The condenser shall be complete with provisions for refrigerant piping connections, shut off valves and any other standard accessories necessary with the equipment supplied. Each Circuit to have its independent set of water cooled condenser coil.. Location of water condenser unit will be inside Data Center area or in passage. Condenser shall be designed for the required indoor capacity considering Condenser water entry & exit as per P & ID drawing..

8.8.7 Electric heaters-Each packaged unit shall be provided with multi stage heating elements constructed from aluminium. Electric heaters shall be of the low temperature totally enclosed strip type fitted with radiation fins . If overheating occurs, a safety thermostat should cuts off the voltage supply to the heaters and triggers an alarm.

8.8.8 Humidifier-Boiling water in a polypropylene steam generator shall provide humidification. The humidifier shall be capable of providing continuous auto modulation in steam generation from 30-100% as per the steam requirement per hour. The humidifier shall be fully serviceable with replaceable electrodes. Waste water shall be flushed from the humidifier by initiation of water supply valve via U-trap. The microprocessor should be able to display the current drawn and actual steam output in the microprocessor.

8.8.9 De-humidification cycle shall operate by keeping the airflow constant but with the help of EEV to reduce the ADP of the coil.. The system shall be provided with relevant water detection kit which shall have sensors with wire of minimum 1.5mtrs and each of the sensor must be capable to detect individually any water below the false floor near the unit, the sensor must be connected to the unit microprocessor thus enabling the controller to give an alarm in case of wet floor. - A microprocessor shall continuously monitor operation of each Server room air-conditioning unit continuously digitally display room temperature and room relative humidity, alarm on system malfunction and simultaneously display problem. When more than one malfunction occurs, flash fault in sequence with

room temperature, remember alarm even when malfunction cleared, and continue to flash fault until reset. Microprocessor to control the following functions:

- Room Temp temperature
- Humidity (HH versions)
- Speed of the delivery fans
- Timing of compressors with automatic rotation
- Alarm signal on two levels
- Controlled automatic reset of high and low pressure alarms
- The machine should be programmable to set the rotation time between the working & standby units as per client requirement.

8.9 Differential Pressure Transmitters: Differential pressure transmitters shall be field mounted and shall transmit an isolated 4-20mA DC signal indicative of process variable to the pump logic controller via standard three wire 24 DC system with Emission/Immunity confirming to EN61000-6-2/3. Unit shall have stainless steel wetted parts with two 7/16" process connections. It shall be protected against radio frequency interference and shall have water tight, IP 55 electrical enclosure. Sensor should be capable of withstanding a burst pressure of 25 bar. Accuracy shall be within 2.5% BFSL (Best Fit Straight Line).

8.10 Supply, installation, testing & commissioning of Centrifugal Pumps of Mono block type. The pumps shall be vertical multistage, in-line design which enables installation in a horizontal one pipe system where the suction and discharge ports are in the same horizontal level and have the same pipe dimensions. The pump, electric motor, coupling and coupling guard shall be factory assembled at the pump manufacturer's facility. Pump shall be fitted with a 3-phase, fan-cooled induction motor. Motor shall Include a frequency converter VFD (PI or PID controller)i either in the motor terminal box or in separate Pump panel. The combined motor and frequency converter efficiency shall be to higher than the IE4 level defined for fixed-speed motors in IEC 60034-30-2. Pump and motor shall be of integrated and user-friendly compact design. Sound pressure level of pumps shall be according to EN ISO 3743.The design total head capacity curve shall preferably be continuously rising towards the shut off. In case of unstable (drooping) characteristic the duty point shall be well away from the unstable region. The shut off head shall be at least 110% of the total head. Pumps shall run smooth without undue noise and vibration. The noise level shall be limited to 70 dBA at a distance of 1M. Vibration shall limited to class II C of BS 4675 Part –I. Pumps of a particular category shall be identical and shall be suitable for parallel operation with equal load division. Components of identical pumps shall be interchangeable. . Flexible bellows at pump inlet and pump outlet as per suction and delivery sizes to be considered. Pump Base shall be a robust construction with integrally-cast support in order to transmit pipe load to the foundation. Liquid passages in the casing shall be smooth finish to ensure high Efficiency. Pump base shall be SS316 grade Stainless steel Flange dimensions are in accordance with EN 1092-2.Pump base shall have tapped hole provision for draining. The impeller shall be AISI 316 stainless steel enclosed type with smooth surface finishes for minimum frictional loss. This ensures high Efficiency. Impeller shall be fixed to the shaft by means of a split cone and a split cone nut/union nut. Shaft shall be AISI 316 or AISI 431 stainless steel with splined design, and shall be adequately sized to with stand all stresses, hydraulic loads, vibrations and torques coming in during operation. Shaft shall be provided with Mechanical seal as default fitment to provide leak free operation. The liquid cavity shall be sealed off at the pump shaft by an internally flushed mechanical seal with Silicon carbide seat and Silicon carbide seal ring,

suitable for continuous operation at 50 Deg C. The mechanical shaft seal shall be cartridge type for maintenance free operation and balanced. Pump base shall be EN-GJL-200 or EN-GJS-500-7 grade Cast Iron according to ASTM 25B or ASTM A536-84 70-50-05 or equivalent standard. Motor shall be suitable for operation on a 3 X 380-500V (± 10% variation), 50-60Hz ± 5%, 3phase AC supply. Motor with thermal protection against steady overload and stalled condition (IEC 34-11). Bidder may consider an integrated frequency convertor and a PI controller incorporated within the motor terminal box and also inbuild DP sensor and flow mater.

8.10.1 Replacement of existing Pumps – KDS-1040- Bidder to consider replacement of existing 2 nos. pumps by new one of same frame ,flow rate ,same power rating, same make . Details name plate of exsiting frame is as below. These pumps are used for existing chillers.

8.11 Variable Frequency Drive(VFD): The variable frequency drive(s) shall be pulse width modulation (PWM) type, microprocessor controlled design. VFD, including all factory-installed options, is tested to conform to UL standard 508. VFD shall also meet UL and be CE marked and built to ISO 9001:2000 standards. VFD shall comply EMC directives as per IEC 61800-3:2004, category C1 with 50-meter motor cable (for power less than or equal to 90 Kw) & category C2 with 50 meter motor cable (for power more than 90 Kw). VFD shall be housed in enclosures for indoor applications. Wall mounted/VFDs with plastic enclosures shall not be acceptable. For outdoor applications, VFDs shall be housed in IP 54 enclosure or if inbuild pump with frequency inverter the enclosure shall be IP55. VFD shall employ an advanced sine wave approximation and voltage vector control to allow operation at rated motor shaft output speed with no deration. This voltage vector control shall minimize harmonics to the motor to increase motor efficiency and life. Power factor shall be near unity regardless of speed or load. VFD shall have balanced DC link chokes to minimize power line harmonics. VFDs without a DC link choke shall provide a 3% impedance line reactor. VFD shall be compatible for ModBUS/any open standard protocol.

8.12 Gate and globe valves: Gate and globe valves up to 50 mm size shall be gun metal construction. Valves above 50 mm diameter shall have cast iron body and bronze/gun metal spindle valve seat. The valves shall have non rising spindle.

8.13 Butterfly valves: The butterfly valve shall be supplied along with flow control lever. The valves shall be compact in size and shall conform to BS 5155, MSS SP 67 and API 609. The valves shall be light in weight and easy to install. The body shall of close grain cast iron conforming to IS:210 and the seating shall be of Resilient black, Nitrile rubber / EPDM moulded on to the body. The disk shall be of SG iron nylon coated, whereas the shaft shall be of stainless steel A ISI 431 treated permanently for lubrication. The shaft seals shall be of Nitrile 'O' rings and rubber seals. Valves shall be suitable for a working pressure of 16.5 KSC. Care should be taken during installation to see that the disk is not damaged during installation due to the flanges being incorrectly spaced. Provide gear operated valves for sizes having 300 mm and above. For smaller sizes such as 40 mm and below diaphragm type valves are acceptable. The butterfly valve shall be supplied along with flow control lever.

8.14 Ball valves: Ball Valves shall have body of carbon steel. The ball and the shaft shall be of stainless steel. The seat shall be of PTFE. The valve shall be complete with socket weld ends.

8.15 Check Valves: Check valves for smaller sizes shall be of swing type of gun metal construction. Lift type check valves shall be used for horizontal lines. Wafer type plate check valves shall be used for bigger sizes. The check valves shall be suitable for 10.5 KSC test pressure

8.16 Auto Balancing Valve: Balancing valve shall be installed in branch pipe. These valves shall be factory calibrated. Each valve shall limit flow rates within ±5% accuracy, regardless of system pressure fluctuations. Sufficient number of flanges and unions shall be provided as required to facilities maintenance work once the piping is installed. Piping shall be properly supported on or suspended from stands, clamps, roller hangers, etc. as required. The contractor shall adequately design all brackets, saddles, clamps and hangers and shall be responsible for their structural integrity. Each support shall be isolated from the support by means of anti-vibration springs or durable liner of neoprene rubber. Pipe supports shall be of steel and shall be painted with rust preventive paint and finish coated with synthetic enamel paint of approved colour. Only factory made supports with Galvanized fully threaded rods with bands are acceptable. The chilled water pipes shall be isolated from the bands by a rubber sheet.

8.17 Expansion Tank: Closed Expansion Tank with Expansion Vessel and pressurizing Pumps with one working and one standby. Expansion tank to be of MS with Armaflex / K- Flex Insulation minimum 32 mm thick & minimum 26 Gage Aluminum Cladding with diamond finish with related piping, isolating valves, safety valves, drains, overflow. Tank Shall have Anticorrosive Coating. Close expansion tank should be provided with water capacity to suffice the capacity of volume of water contraction & expansion during operation & rest state of the system while maintaining proper system pressurization under varying operating conditions. Tank should be a closed vessel with rubber bladder/diaphragm to maintain the operating pressure inside the pipelines. System should include PRV and Air Vent also.Standby and working booster pump should be provided with selector switch for pump starting, pressure differential transmitter, pressure gauge & non return valve at discharge outlet of the pump, suction and discharge manifold.

8.18 Pressurization unit consisting of inline vertical multistage, centrifugal water pump with SS 304 casing, SS304 impeller and SS316 shaft, CI base TEFC motor, with mechanical seal, control panel and with duty cycling and dry run protection.

8.19 Thermal Storage Tank- MS tank with capacity as per P & ID to be used as thermal storage for back up supply. The tank to be of M S Construction and with anti-corrosive coating from inside with Armaflex / K- Flex Insulation 32 mm thick & 26 Gage Aluminum Cladding with diamond finish and with related piping, Isolating valves , Safety valves , Drains, Overflow and Guages. 8 mm Shell thickness and 12 mm Dish thickness. The tank shall have necessary ports with flange.Bidder to consider temperature sensor of as well as level sensor in both the tank and same to be integrated in BMS for control as well as monitoring.

8.20 Double Deflection Grilles: Grills shall be in Aluminum construction. Aluminum double deflection grilles for supply air shall be provided with vertical and horizontal adjustable bars and an approved blade damper adjustable from the front face of the grille. The finish of the grilles will be powder coated in a shade to be approved.

8.21 STRAINERS -Strainers shall be preferably of approved 'Y' type or pot type as specified in the tender schedule with GI or fabricated steel bodies. Strainers up to 50 mm shall be of gun metal type. Strainers shall have a removable bronze screen with 3 mm perforations and permanent magnet. Strainers shall be provided with flanges. They shall be designed so as to enable blowing out accumulated dirt and facilitate removal and replacement of all screen without disconnection from the main pipe. Strainers shall be provided with isolating valves so that they may be cleaned without draining the entire system.

8.22 Chemical dosing plant with dosing pumps suitable for the requirement for flushing and treating the water. This should include make up water storage tank, first charge of Dosing chemicals for the commissioning of the system, chemicals for the operation during warranty period. Treated water tank should be of adequate capacity. Entire system should include interconnecting piping, accessories, float and valves complete in all respect. Chemical Dosing System (Sodium Hypochloride) shall be provided for cooling loop. This system is used to remove mill scale, dirt etc. and provide a protective corrosion resistant layer on the inside surface of piping. Chemical dosing system shall be provided to minimize corrosion, biofilm prevention, preventing scale deposition and to control the water quality. Chemical dosing system shall maintain the water PH value 8.0 to 9.5, total dissolved solid less than 1500 ppm and sulphite concentration between 50 to 100 ppm.

8.23 Air Separators: Air separator working on basic centrifugal force and low velocity flow, complete with required inlet and outlet connections, high capacity float type air vent, pressure reducing valve, water fill connection, drain valve, flanged connections etc. The air separator shall be suitable for required water flow.

8.24 Cabinet / Ductinline type centrifugal fans for Fresh Air and exhaust air system complete with Double inlet and Double Width (DIDW) backward curved blower Air Movement and Control Association International, Inc (AMCA)certified totally enclosed, fan cooled, provided with Class F insulation. Fans shall be provided with TEFC Sq. cage direct driven , Class F insulation motor, with minimum IE3 rating suitable for 415 V+/-10 %,50 Hzs 3 phase supply. Fan must be selected for minimum consumption and maximum efficiency. Supply fresh air fan should be with two filters i.e. pre filter and fine filter minimum 10

micron HDPE washable filter. Both the fan motor should be with starter and this should be with timer control through BMS system. Fresh air and exhaust system should be with single blade, motorized fire & smoke damper with spring return actuator. Damper should be with minimum 2 hours fire rating . The damper shall be constructed out of 16 G galvanized sheet steel. Damper control and monitoring operations are thro BMS.

8.25 Bidder to consider drain pipe along with pumping arrangement in the data center floor to eliminate the leakage with an automated drain valve controlled based on the water leakage detector's alarm. Isolation valve, filter net for blocking entry from opposite side of pipe etc. to be considered. Pipe should be of uPVC material (Unplasticised Polyvinyl Chloride).

8.26 Bidder to consider removal, lifting , shifting,repositioning, installation and commissioning of existing AHU of rating 80Tr,35000 CFM capacity of Trane make from ground floor of the building to the Basement of the Building for cooling of existing and proposed UPS and Battery rooms along with GI duct for supply and return ,supply and return air grills, motorized fire dampers to be controlled by BMS system, volume control dampers, starter panel along with cabling etc. Indicative Heat load of these room are as below in the table. Bidder to work out appropriate size of the ducting. Chilled water Input connection to the AHU is already available at Basement. Location of this AHU will be at Basement only. The proposed air handling system will have a supply air plenum fitted with filters of 10 micron. Pre filter shall have capacity of 90% down to 10 micron(EU3). Supply water temperature from existing chiller at 7 Deg C with delta T of 5 Deg C. Bidder to consider tapping for chilled water piping of appropriate size.. Temperature to be maintained in the rooms as 25 Deg C +/-2 and RH as 45-55%. Bidder to consider appropriate rating of the dehumidifier in the rooms. Bidder and consider removal of the existing cooling system from existing UPS room and Battery room and replaced system to be placed at identified location.

Sr.No.	Description	Length Ft	Width Ft	Height Ft	Area Sq Ft	Volume Cubic Ft	Calculated Tons	Dehumidified Air Required-CFM
1	2 X 500 KVA Proposed UPS Room for UPS-5 and UPS-6	27	19	15	524	7742	13	8560
2	2 X 500 KVA Proposed Battery Room for UPS-5 and UPS-6	15	46	15	683	10075	3	3140
3	Battery Room for Existing UPS	17	46	15	774	11419	5	3250
4	2 X 500 KVA UPS Room for UPS-1 and UPS-2	27	19	15	524	7742	13	8250
5	2 X 500 KVA UPS Room for	13	46	15	583	8601	13	8140

	UPS-3 and UPS-4							
6	2 X 120 KVA + 40 KVA UPS room	53	20	15	1066	15737	4	2780
7	Total Tons Required						**52**	
8	Total CFM required							**34120**

8.27 Server Rack 42U having dimensions of 800 X 1200 mm, The Rack unit supported by Plinth/ Casters/ Leveller should support a static load not less than 1000 kg, total installed equipment weight. Flame Retardant blanking panels for empty 25% blank space to be provided. Rack should conform to DIN 41494 Standard, all enclosure components i.e. frame and door should be bonded together and to rack ground point. Rack should be constructed with extruded aluminum frame to provide stability and load bearing capacity. The Rack should be provided hexagonal perforated single front door with high security electronics locks. Rack should have all built-in accessories to manage cables and other devices. All the mounting hardware should be provided with rack. Rack is powder coated with Nano ceramic pre-treatment process. The Powder coating process is ROHS compliant. Powder coating thickness shall be 80 to 100 microns. Each Racks should be provided with 32A, 3 Phase, high density PDU x 02 nos with 21 Nos of C-13 Socket and 3 nos. of C-19 sockets. **Bidder to consider only three number** of 42 U server racks (Service Rack-1 and 2 Spare rack) in scope of size 800 X 1200 mm and containment and doors. **Supply of DCLC and Storage Racks are not under the scope of this tender.**

The bidder is required to do NSM Branding on the front door and side panel of racks as per the specification (Specifications / drawings will be provided by C-DAC). Bidder to consider supply and installation of 3 nos. racks as per above specifications and also consider branding for another 11 DCLC Racks and 4 Storage Racks. i.e. The Banding needs to be considered for total 18 Racks (for front door and side panel).

9 Requirements towards IBMS work

9.1 Supply and implement physical security (access controls including biometric), Motion sensors etc.

The basic function of access door control is as below.

a) Access control system (ACS) is to be deployed to allow entry for the authorized personnel only and restrict unauthorized people from entering nominated areas of premises. Access privileges to be configured as per the access data stored in Access Door Controllers (ADC). These privileges define the right of access card holder to enter the predefined area upon presenting the card at readers.

b) It shall support distributed architecture with central monitoring and control. If communication to the central control fails, the ACS shall continue providing access based on the predefined security configuration. Until communication is restored, all event logs and alarms shall be stored locally for minimum six months (based on ADC

capacity). These events shall be sent to the central control when the communication is regained.

c) It shall have multiple supervised inputs. The dynamic status of each input shall be continuously monitored and each change should be reported immediately.

d) It shall provide programmable inputs, i.e. the ability to apply a variety of conditions to the way in which these inputs are monitored. These conditions shall be expressed in definite terms. It shall be able to produce and communicate various types of outputs (Audible sirens, relay switching etc.) based on the above definition. These outputs shall be standard in terms and shall be interfaced as inputs to other Building Management System. ACS communications should support RS232/ RS485/ TCP/IP. All data over the network between the ADC and the Server end shall be encrypted. All ACS software/firmware upgrades shall be downloadable through the network to the ADC.

9.2 Supply and implement environmental Controls and other sensors(Air conditioners, humidity controls, etc.)

a) Humidity Sensor: The humidity sensor shall be in an independent housing or be combined with the room /duct type temperature sensor in the common housing as per application requirement. The sensor should be electronic type with capacitive sensing element. Relative Humidity (RH) sensors shall be of standard 0-10 VDC or 4-20 mA type, well protected against solid and liquid contaminants with a permeable coating. Range of 0-100% RH. Accuracy: +/- 3%Operating temperature range of 0 to 50 °C. Stainless steel sheath construction complete with integral shroud to enable specified operation in air streams of up to 10 m/sec. Maintenance of Sensor to be by a simple field method such as solvent or mild detergent solution washing, to remove anticipated airborne contaminants. Maximum sensor non-linearity of ±3% RH with defined curve.

b) Water Flow Meters - Water flow meter should work on Faraday's law of induction. As soon as the electrically charged particles of a fluid cross the artificial magnetic field generated by two field coils, an electric voltage is induced. This voltage, tapped by two measuring electrodes, is directly proportional to the velocity of flow and thus to the flow volume. The magnetic field is generated by a pulsed direct current with alternating polarity. This ensures a stable zero point and makes the flow measurement insensitive to multiphase or inhomogeneous liquids, as well as low conductivity. The measuring principle is virtually independent of pressure, density, temperature and viscosity. Flow meter should be communicable type and integrated with preset flow alarm. Accuracy shall be + 2% of actual reading from 0.4 to 20 feet per second flow velocities.

c) Monitoring of Water Quality –This is used for real-time measurement of water quality. This is used to optimize treatment processes, detect water contamination incidents etc.

a. Electrolytic Conductivity sensor and monitoring- Conductivity measurements are carried out to obtain information on total ionic concentrations (e.g. dissolved compounds) in in clean, noncorrosive solutions. The measuring system consists of an appropriate inline sensor directly inserted, a cable connected to a transmitter converting the received signals to a measurement result (Controller/Display Unit) and to a BMS system. The sensors have

concentric titanium electrodes separated by insulator. Sensor body should be with SS316. The sensor shall have an integral platinum RTD for temperature measurement. Conductivity measurement range will be 0 to 2,000,000 microS/cm.

b. pH Sensor and monitoring - The pH of a solution indicates how acidic or basic (alkaline) .pH sensor should have measurement range from 0-14.

c. Turbidity sensor: Turbidity has indicated the degree at which the water loses its transparency.

d. Temperature sensor:

e. Dissolve Oxygen sensor-

9.3 BMS System: - Architecture of BMS system shall be of:

- Management Level (BMS Servers/Software)
- Control Level (DDC Controllers)
- Field Level (Field Sensors)
- BMS should have capability to show real time PUE, trends and record historical data of PUE.
- BMS should generate event notifications over emails, data for events based on which uptime and downtime will be calculated.
- BMS should generate alarm signal and tripping signal at abnormal situations. This should be software generated and any one can be utilized for giving tripping command for shutting down the some servers or all.

There should be real-time reporting of

- Component wise and aggregate power consumption
- Temperature and relative humidity in the data centre and UPS room.
- Instantaneous PUE, hourly PUE, daily PUE, monthly PUE and annual PUE.
- Alarm indicators for component failures.
- GUI with SLD ,P *ID, Equipment's visuals etc.

There should be real-time monitoring and logging of all parameters of the data centre as per ASHRAE/TGG 2009 Real time energy consumption measurements in data centres guidelines (best practical). There should be facilities for periodic reports (including uptime reports) of all aspects of the data Centre. All the required hardware and software eco-system which store at least two months of historical data (High end PC, 32" LCD HD Monitor, Key Board, Mouse etc.) has to be supplied by the bidder.

9.3.1 The BMS vendor shall be certified to IEC 62443-4-1. The Integrated Control Platform shall support encrypted password authentication for all web services whether serving or consuming.

9.4 Supply and Implement fire alarm system –

The system and its components shall be Underwriters Laboratories, Inc. listed, and FM APPROVED under the appropriate testing standard, for fire alarm systems and the installation shall be in compliance with the UL 10th Edition listing. The fire alarm

system shall comply with requirements of NFPA 72 (National Fire Alarm and Signaling Code). The system shall be electrically supervised and monitor the integrity of all conductors.

When a fire alarm condition is detected and reported by one of the system indicating the affected devices, the following functions shall immediately occur:

- The System Alarm LED to be flashed.
- Built in Agent release circuit with release / Abort module of same make.
- System output programs assigned via control-by-event interlock programming to be activated by the particular point in alarm should be executed, and the associated system outputs (notification appliances and/or relays) to be activated.
- The audio portion of the system should sound the proper audio signal (consisting of tone, voice, or tone and voice) to the appropriate zones.
- Zone identification should be available on BMS system.

The publications listed below are part of this specification.

National Fire Protection Association (NFPA) - USA:

No. 70	National Electric Code (NEC)
No. 72-1996	National Fire Alarm Code
No. 90A	Air Conditioning Systems
No. 92A	Smoke Control Systems
No. 92B	Smoke Management Systems in Large Areas
No. 101	Life Safety Code

Bidder to consider fire alarm system in Data center area, UPS area (UPS 1,2,3,4 and 2 X 120 KVA+ 1X 40 KVA) – Existing and Proposed, Battery Area Existing and proposed.

9.5 Supply and Implement Video Surveillance systems:

The surveillance system shall be designed and developed to the following standards: ISO 9001 (2000), ISO/IEC 15504 Level 3 or higher
The NVR based system shall include Data storage of 4 months and any other required software, hardware etc. CCTV should cover all internal area in the server room, UPS-Existing and Proposed, Battery –Existing and Proposed entrance of server room and external utility area including Dry Cooler area and Thermal storage tank area.

9.6 Supply and implement Very Early Smoke detection system (VESDA):

Provide an air sampling smoke detection system (Very Early Smoke Detection Apparatus) for each server area. Provide a Laser Focus air sampling smoke detection system for areas as per site condition including but not limited to utility area, server area etc. in accordance with manufacturer's recommendations.

The air sampling smoke detection system shall consist of highly sensitive smoke detectors with aspirating fans, air sampling pipe network, filters, networked controllers and a high-level interface to the building Fire Alarm System, as required.

The air sampling detectors shall provide a nominal obscuration level range from .0015 to 6% /ft., adjustable through the system operator control interface.

Smoke Detector Assembly: The smoke detector, filter, and aspirating fan shall be housed in a Detector Control Assembly Enclosure and arranged in such a way that air is drawn from the protected area through the filter and detector by the aspirating fan.

The Detector Control Assembly shall house the programmable intelligent controller, which will support air flow/detector supervision, automatic and manual sensitivity adjustment, time delay and remote reset functions. Laser COMPACT detector shall communicate with the fire alarm control panel.

The system shall provide 3 field-selectable levels of alarm status: Alert Level 1 (.04% obscuration/ft.), pre-Alarm Level 2 (1.06 % obscuration/ft.) and Alarm Level 3 (2.6% obscuration/ft.). Actual sensitivity levels will be determined in the field and programmed during system commissioning. Alarm Levels 1 and 2 will initiate a Supervisory Condition on the Fire Alarm System, and Alarm Level 3 will initiate the building-wide evacuation sequence.

- Approval – UL & FM
- 18000 Event logs required.
- Output signal – 5 Relay contact for Fault / Alarm & one analogue output for smoke density
- Large flow rate fan (Max. shutoff pressure: at least 350Pa and max. flow rate: at least 170L.min

VESDA to be considered only in the Data Center Area

9.7 Supply and implement Rodent Repellent System:

The objective is to protect the entire premises viz. server area, utility area etc., all the voids against rodents. The purpose is to keep the rodents away from the floor by generating very variable high frequency sound waves which are not audible to human ear but irritate rodents. The objective is to protect all the cables below floor, above ceiling & room void from damage caused by rodents. The system proposed is to protect all the equipment's, areas with relevant type of high frequency sound producing device called satellites or transducers. Once powered up these transducers produce very high frequency variable sound waves continuously which irritate the rodents and are forced to evacuate the place. The devices can be tested periodically by means of a test switch provided on Main console. Rode dent repellant system to be considered in all areas.

9.8 Supply and implementing Water Leak Detection system:

It should include electronic alarm modules, water sensing cable, graphic display map, and auxiliary equipment. The system has to be capable of automatically detecting the presence of water at any point across the length of sensing cable. The system should

alarm and locate the point of liquid contact on the digital display. This system should capable of communicating to BMS.

9.9 Supply and implementing NOVEC 1230:

Supply, install, test and commission NOVEC 1230 (Fluro Ketone FK-5-1-12) based fire suppression system. The fire suppression system shall include and not be limited to gas release control panel, CCOE approved seamless cylinders, discharge valve (with solenoid or pneumatic actuator) as the case may be, discharge pipe, check valve and all other accessories required to make a complete operation system meeting applicable requirements of NFPA 2011 standards and installed in compliance with all applicable requirements of the local codes and standards.

Bidder to consider NOVEC suppression system in Data center area, UPS area (UPS 1,2,3,4 and 2 X 120 KVA+ 1 X 40 KVA) – Existing and Proposed, Battery Area Existing and proposed.

10 Indicative Design Schematic

Minimum rating of components at site ambient conditions (considering deration factors, taking in to account utilization of 90% under peak load) along with rating is as shown in below table.

Sr. No.	Name of Components	Rating for each unit	Qty.	Redundancy
1	Dry Cooler system along with Pump, Tank, Piping ,Control Panel, VFD,PID controller, Instrumentation as per P & ID etc.	1000 KW	1	
2	DX based PAC with Water cooler condenser unit for Data Center Area	22 Tons (Dual Compressor)	3	2+1
3	2 X 500 KVA UPS with 10 minutes SMF battery back for IT load	500 KVA	2	
4	1 X 750 KVA DG set	750	1	
5	Plate Heat Exchanger	1000 KW	1	
6	2 X 25 KL Thermal Storage Tank along with pumping system			
7	I BMS System			
8	Existing Air Handling Unit (AHU) along with new ducting, dampers, air grills etc.			

Below is the list of minimum components/systems (BOQ) bidder should consider in the offering.

Sr. No.	Description
1	Civil
1.1	Supply, Installation, Testing and Commissioning of Raised Flooring System as per specification and drawings give in this document. Bidder to refer the layout for calculating the quantity. Removal of existing raised floor in the data center area , passage area and storing the same at the identified space.
1.2	Supply, Installation, Testing and Commissioning of False Ceiling System as per specification and drawings given in this document. Bidder to refer the layout for calculating the quantity. Removal of existing false ceiling in the data center area and storing the same at identified space.
1.3	Supply, Installation, Testing and Commissioning of two hour fire rated glass Doors.
1.4	Supply, Installation, Testing and Commissioning of fire rated expandable foam , water soluble cable coating etc.
1.5	Supply, Installation, Testing and Commissioning of 2 hour fire rated GLASS PARTATION
1.6	Supply, Installation, Testing and Commissioning of 2 hour fire rated sliding glass door along with all accessories.
1.7	Any other missing civil components that's includes but not limited to opening , cut out and re closure, steel structure for Equipment's foundations and base frame, chiller foundation, thermal storage tank etc.,
1.8	Supply, Installation, Testing and Commissioning of INSULATION ON ROOF AND FLOOR SLAB.
1.9	Supply and Installation of Room Signage and fire evacuation map.
2.0	Supply and Installation of fire resistance solutions etc.
2.1	Supply, Installation, Testing and Commissioning of fire rated fire rated glass (VISION WINDOW)etc.
2.2	Supply , fabrication , installation of Steel for equipment platform, equipment base stand , maintenance stand , pipe railing , maintenance platform , etc.
2.3	Equipment's Foundation, chain link fencing for equipment at ground floor
2.4	Steel structure for the equipment's which are going to get installed at Terrace floor.
2.5	Removal of existing ducting , cooling equipment's in the area of basement as UPS room Existing and Proposed, Battery Room Existing and Proposed
2	Electrical System

Sr. No.	Description
2.1	Supply , Installation, Testing and Commissioning of LT panels, lighting DBs, Raw Power DBs, Dry Cooler Panels, Soft Starter Panel, UPS out Put Panel etc.
2.2	Supply, Installation, Testing and Commissioning of internal illumination system and external illumination. Internal Lux level to be 400-500 lux.
2.3	Supply, Installation, Testing and Commissioning cables and End terminations.
2.4	Supply, Installation, Testing and Commissioning Cu sandwich bus duct of rating 400 Amps along with end feed units , tap off boxes as per SLD.
2.5	Supply, Installation, Testing and Commissioning of perforated type Cable Trays along with Cover and supporting hangers as per Standard Engineering Practices.
2.6	Supply, Installation, Testing and Commissioning EARTH ELECTRODES AND EARTH STRIPS
2.7	Supply , Installation of First Aid Box, Shock treatment Chart, Emergency Fire evacuation Map, Shock Treatment Chart, Rubber Mat etc.
2.8	Supply, Installation, Testing and Commissioning of Rack PDUs as per rating provided in SLD with C13 and C19 sockets.
2.9	Supply, Installation, Testing and Commissioning of 2 X 500 KVA UPS along with DC and AC Cabling and individual battery bank for back up time of 10 minutes. The type of battery shall be Sealed Maintenance-free (SMF) type. Each UPS should have separate battery bank. Battery protection shall be provided by thermal-magnetic molded-case circuit breakers in each battery rack
3	Cooling System
3.1	Supply, Installation, Testing and Commissioning of complete Dry Cooler System as per P & ID and Specifications including VFD –Pumps, Piping, Valves, Instrumentations, Electrical Panel, PLC, Fans etc. Location will be at terrace floor.
3.2	Supply, Installation, Testing and Commissioning of PAC system along with water cooled condenser unit and associated piping and valves and as per specifications given. . As per Layout drawing.
3.3	Supply Installation and testing and commissioning of complete pump sets.
3.4	Replacement of existing pump sets and Supply Installation and testing and commissioning of complete new pump sets of same capacity.
3.5	Supply, Installation, Testing and Commissioning of complete PHE system along with Pump , Thermal storage tank, piping, modulating valves Instrumentations, for the equipment's at ground
3.6	Supply, Installation, Testing and Commissioning of Chemical dozing system along

Sr. No.	Description
	with tank.
3.7	Supply, Installation, Testing and Commissioning of pressurization system along with expansion tank.
3.8	Supply, Installation, Testing and Commissioning of accessories of Air Handling unit (AHU) of appropriate size which includes but not limited to GI ducting for supply and return, fire Damper with actuator/motor, volume control dampers, supply and return air grills etc. Fire Dampers operations to be control by BMS system. Removal, lifting , shifting and repositioning, installation and commissioning of existing AHU of rating 80Tr,35000 CFM capacity from Ground floor to Basement.
4	42 U racks for Master Node and Storage Rack
4.1	Supply, Installation, Testing and Commissioning of 42 U rack for service rack 1 ,2 and spare as per specification provided
5	IBMS-
5.1	IBMS – Integrated building management system should cover but not limited to, NOVEC Gas base fire suppression system, Fire alarm, Access control, Water leak Detector, Rodent Repellent, CCTV, VESDA System etc., various types of sensors etc., software, communication protocol, field Devices along with Direct digital control (DDC) , etc.
5.2	Supply, Installation, Testing and Commissioning of Intelligent Addressable Fire Alarm System (FM Approved/ UL Listed) which includes Intelligent Addressable Fire Alarm Panel, FM approved Analogue Addressable Heat Type Smoke Detector, Analogue Addressable Multi Criteria Type Smoke Detector with Inbuit Isolator Base, Addressable Manual Call Point, Sounder (85 Db), Response Indicator (For False Floor Areas), Addressable Control module for activating sounder , Gas release Panel , Access Control De-Activation, Short Circuit Isolator Module, Addressable Monitor Modules, 2 core x 1.5 sq.mm twisted pair shielded multi strand Armored FRLS cable etc.
5.3	Supply, Installation, Testing and Commissioning of Access control system which includes software, card and biometric reader, electromagnetic lock, exit push button , FRLS Cables etc.
5.4	Supply, Installation, Testing and Commissioning of CCTV system along with indoor, outdoor camera, Network Video Recorder for 16 Channel with is a full-featured high-performance H.265 NVR Equipped with a 2U 64-CH 8 Bay Rackmount network appliance and H.264 ,Video codec, Multiple Fisheye Dewarp Support, Multiple Video Search Modes, hard-drive bay design provides for a storage capacity of up to 24TBs,Support HDMI, Display Port, VGA and DVI Simultaneous Output, Graphics Decoder, USB support ,Audio Jack, Network interface-10/100/1000Mbps Ethernet (RJ-45) x2,Protocols IPv4,TCP/IP, HTTP,

Sr. No.	Description
	HTTPS, UPnP, RTSP/RTP/RTCP, SMTP, FTP, DHCP, NTP, DNS, DDNS, IP Filter, Redundant PowerPC, LVD, FCC, VCCI, C-Tick. NVR Should store Data for 4 Months. Vendors to give their Calculation. software, client work station Processor - Intel Core i-7 OS - Genuine Windows XP/7Prof RAM - 4 GB DDR2 SDRAM Memory - 500 GB HDD Graphic Card - 1GB NVIDIA Quadro 600 Graphics capability: VGA, with at least 32k colors Network: 100/1000 Mb Ethernet network card Resolution
5.5	Supply, Installation, Testing and Commissioning of VESDA system with aspiration detectors, nozzles, capillary tubes etc.
5.6	Supply, Installation, Testing and Commissioning of Rodent Repellant System
5.7	Supply, Installation, Testing and Commissioning of addressable Water Leak System
5.8	Supply, Installation, Testing and Commissioning of BMS System which includes Main Building Automation Graphic Software, BMS Machine, DDC Controllers with necessary Panels, Field Sensors, Third Party Integrations as PAC , Load Manager, Integration with fire alarm panel, Monitoring and control of cooling units , monitoring and controlling of pump and valve operations etc,
5.9	Supply, Installation, Testing and Commissioning Fire Suppression System (Novec 1230 Based - For Server Room, Electrical Room and Battery Room) this should include Cylinder and valve assembly with solenoid actuator and Accessories, NOVEC Gas, manifold, valves, piping's, Nozzles, Abort switch, manual release switch etc. Bidders to submit the Gas concentration considered along with details calculation of volume calculation as ceiling void, floor void, room void etc. Modular Gas suppression systems are not accepted.
5.10	Water Quality Sensor and Monitoring
5.11	Supply, installation, testing and commissioning of water quality sensors as pH, Conductivity, Turbidity, Dissolved oxygen etc. along with monitoring system. This monitoring system needs to be integrated with BMS system.

11 Reference Drawings

The following reference drawings have been uploaded on CPP Portal.

- Data Center Layout with Section
- Data Center Piping Layout
- Cooling P&ID
- Electrical SLD
- Basement Floor Layout-Panel , Ducting and AHU
- Terrace Floor and Ground Equipment Layout

- Conceptual Drawing Structural Platform-Terrace Floor

12 Applicable Standards but Not Limited to

Installation and materials shall also confirm to latest amendments of

a. Indian Electricity Rules
b. Indian Factories Act
c. National Electric Code
d. Petroleum rules
e. Quality and Safety Standards

Sr. No.	Code Number	Description
1	IS 2309	Protection of buildings and allied structures against lightning.
2	IS 3043 /IEEE 80	Code of practice for earthing.
3	IS 5216	Safety procedure and practices in Electrical work.
4	IS 3106	Code of practice for selection, installation and maintenance of fuses (Voltage not
5	IS 1646	Code of practice for fire safety of buildings (general) Electrical installation.
6	IS 9921	Alternating Current Dis connectors above 1000 V.
7	IS 2551	Danger notice plates.
8	IS 1248	Electrical indicating instruments.
9	IS 722	AC Electric meters.
10	IS 3156	Voltage transformers.
11	IS 10118	Installation and maintenance of switchgear.
12	IS 398 /IEC 1089-1991	ACSR conductors
13	IS 7098	Cross linked polyethylene insulated PVC sheathed cables up to 33 KV
14	IS 12943	Brass glands for PVC cables
15	IEC 99-4	Gapless Surge Arrestors
16	IS-900	Code of practice for Installation and Maintenance of Induction Motors
17	IS-1255 -1983	Codes of practice for Installation and Maintenance of Power

Sr. No.	Code Number	Description
		Cables up to and including 33 KV Rating.
18	IS-732 1989	Code of practice for Electrical Wiring Installation. (System Voltage not exceeding660 Volt).
19	IS-1913	General and Safety Requirements for Luminaries.
20	IS-1646	Code of Practice for Fire Safety of Building (General) Electrical Installation.
21	IS 8130	Conductors for insulated electrical cables and flexible cords.
22	IS 3975	Specification for mild steel wires, strips and tapes for armouring of cables
23	IS-2667	Specification for Fittings for Rigid Steel Conduits for Electrical Wiring.
24	IS 3615	Glossary of terms used in Refrigeration and Air-conditioning.
25	IS 325	Three phase induction motor.
26	IS 1239	Mild steel tubes, tubular and other wrought steel fittings.
27	IS 639	Steel pipe flanges.
28	IS 277	Galvanized sheet steel.
29	IS 5831	Specification for PVC insulation sheath for electric cables.
30	IS 655	Metal air ducts.
31	IS 732	Code of practice for electrical wiring and fittings for buildings.
32	IS 900	Code of practice for installation and maintenance of induction motors.
33	IS 1248	Direct acting electrical indicating instruments.
34	IS 6392	Steel pipe flanges.
35	IS 1367	Technical supply conditions for threaded steel fasteners.
36	IS:10462	Thickness of the PVC outer sheath
37	IS 4894	Centrifugal fan.
38	IS 1554	PVC insulated (heavy duty) electrical cables for working voltages up to and including 1100 V.
39	IS 659	Air-conditioning safety code.
40	IS 616	Mechanical refrigeration safety code.

Sr. No.	Code Number	Description
41	IS: 1554 -	PVC insulated (heavy duty) electric (Part I) Cables - Part I for working voltages up to and including 1100V.
42	IS: 1753 -	Aluminum conductors for insulated cables.
43	IS: 3961 -	Recommended current ratings for (Part II) cables: Part-II PVC insulated and PVC sheathed heavy-duty cables.
44	IS: 3975 -	Mild steel wires, formed wires and tapes for armouring of cables
45	IS: 5831 -	PVC insulation and sheath of electrical cables.
46	IEEE 519:1992	Harmonics
47	IS 277	Galvanized Steel Sheet (Plain and corrugated).
48	IS 655	Metal Air Ducts.
49	IS 737	Wrought Aluminum and Aluminum Alloy sheet and strip for general engineering purposes.
50	UL 181	Factory – Made Air ducts and connectors.
51	UL 555	Fire Dampers.
52	ASHRAE 70	Method of testing for rating the performance of Air Outlets and inlets.
53	BS 649	Diesel Engines for general purpose.
54	BS 2613	Rotating Electrical Machinery.
55	IS 4722	Electrical performance of rotating electrical machinery.
56	IS 4728	Terminal markings for rotating electrical machines.
57	IS 4729	Measurement of vibrations of rotating electrical machines.
58	IEC60034	Rotating Electrical Machines
59	IEC60034.1	Rotating Electrical Machines Part1: Rating and Performance
60	IEC60947	Low Voltage Switchgear and Control Gear
61	ISO 8528 Part 1 to 10:	Reciprocating Internal Combustion engine Driven Alternating current Generating Sets
62	IS-375	Marking and arrangement for switchgear bus bars, main connection and auxiliary wiring.
63	IS-722 Part – I	AC Electricity Meters
64		Part - I General requirements and tests

Sr. No.	Code Number	Description
65	IS-1248	Direct acting indicating analogue electrical measuring instruments and their accessories.
66	IS-1822	AC Motor starters, of voltage not exceeding 1000 volts.
67	IS-2147 IS-2208	Degrees of protection provided by enclosures for low voltage switchgear and control gear.
68		HRC cartridge fuse links for voltage above 650V.
69	IS-2419	Dimensions for panel mounting indicating and recording electrical instruments.
70	IS-2516	Circuit Breakers - Requirements and Test voltages not exceeding 1000V AC or 1200V DC.
71	IS-2607	Air break isolators for voltages not exceeding 1000 volts.
72	IS-2959	Contactors for voltages not exceeding 1000V AC or 1200V DC
73	IS-3072	Code of practice for installation and maintenance of switchgear.
74	IS-3106	Code of practice for selection, installation, maintenance of fuses (voltage not exceeding 650V).
75	IS-3156, Part - I	Voltage Transformer - General Requirements.
76	Part – II	Voltage Transformer - Measuring Voltage Transformers.
77	Part – III	Voltage Transformer - Protective Voltage Transformers.
78	IS-3231	Electrical Relays for Power System Protection.
79	IS-3914	Code of practice for selection of AC Induction Motor Starters (Voltage not exceeding 1000V)
80	IS-4047	Heavy-duty air-break switches and composite units of air-break switches and fuses for voltages not exceeding 1000 Volts.
81	IS-4064	Air break switches, air break disconnections, air break switch disconnections and fuse combination units for voltages not exceeding 1000V AC or 1200V DC.
82	Part – I	Part I - General Requirements.
83	IS-4146	Application guide for Voltage Transformers.
84	IS-4201	Application guide for Current Transformers.
85	IS-4237	General Requirements for Switchgear and Control Gear for

Sr. No.	Code Number	Description
		Voltages not exceeding 1000V AC or 1200V DC.
86	IS-4483	Preferred panel cut-out dimensions for electrical relays - flush mounting IDMTL relays.
87	IS-4794, Part- I	Push Button Switches - General Requirement and Tests.
88	IS-5082	Wrought aluminum & aluminum alloy bars, rode, tubes and sections for electrical purposes.
89	IS-5987	Code of practice for selection of switches (Voltage not exceeding 1000V).
90	IS-6236	Direct recording electrical measuring instruments.
91	IS-6875	Control switches (switching devices for control and auxiliary circuits including contactor relays) for voltages up to and including 1000V AC and 1200V DC.
92	IS-8623	Factory built assemblies of switchgear and control gear for voltages up to and including 1000V AC and 1200V DC.
93	IEC 62040-3	(International Electro technical Commission) – Uninterruptible power systems (UPS) – Part 3: Method of specifying the performance and test requirements.
94	IEEE 587 (ANSI C62.41)	Category A & B (International Electrical and Electronics Engineers) – Recommended practices on surge voltages in low voltage power circuits.
95	ANSI B 31.5	Code for Refrigeration Piping
96	ASHRAE 30	Methods of Testing Liquid Chilling Packages
97	ASHRAE 15	Safety Code for Mechanical Refrigeration

Bidder is required to submit compliance sheet in the tabular format for the selected products against above applicable code provision.

13 Recommended Makes:

List of Recommended Makes / Models of the major components/ equipment is given in **Annexure – D**. Bidders should use the makes and models having successful deployments in Data Centre applications in India. It is bidder's responsibility to comply with tender specifications and conditions, while selecting make and model of the product. However, bidder may offer equipments of any suitable make and model that complies with the tender specifications and conditions.

14 DC Acceptance Criteria:

Based on demonstration of following technical parameters, the DC implemented solution will be accepted.

14.1 Equipment's supplied and installed as per tender specifications defined in respective sections.

14.2 PUE

PUE (Dry Cooler) should not be more than 1.1 during linpack testing. (Only dry cooler is in operation)

PUE (Dry Cooler + CRAC Unit) should not be more than 1.4 during linpack testing.

14.3 Validating UPS redundancy operation for Existing system and New NSM system by switching on and OFF some breakers.

14.4 Room Temperature – Measurement at various points inside data center to work out the hot pockets.

14.5 Demonstration of UPS system on balanced as well as unbalanced load conditions along with FFT analysis which include harmonics in voltage as well as Current , voltage regulations under No load to full load. Neutral to Earthing Voltage at UPS output should not be more than 3 volts.

14.6 FAT report of equipment.

14.7 Demonstration of UPS operation under EB failure condition and EB restoration condition.

14.8 Demonstration of Battery backup under full load condition.

14.9 Demonstration of operation of Dry cooler.

14.10 Demonstration of temperature profile at Plate heat exchanger , operation of modulating valve if outlet at secondary of PHE temperature is beyond permissible limit. (Value of permissible limit should be programmable). Logic checking by changing the permissible limit parameters. Demonstration by creating false failure input of temperature sensors connected at PHE.

14.11 Demonstration of DG operations for AMF , Auto Synchronization with existing and load demand start and stop and equal load sharing with existing DG sets.

14.12 As build Drawing

14.13 Demonstration of creating false fire signal (Cross Zoning Input)and checking operation of magnetic coil on NOVEC cylinder manifold.

14.14 Demonstration of VESDA, Water Leak Detector system

14.15 Safety during Project Execution

14.16 Submission of Warranty Certificate from manufacturer of DG set, UPS , Battery , Pumps etc. as per RFP

14.17 Effective GUI in BMS screen, Effective implementation and utilization of BMS system. Monitoring of all field devices including Humidity ,temperature sensors etc. on BMS screen , Control thro BMS in Automatic mode as well as Manual mode (Manual mode should be on BMS screen as well as Hard Wiring) of all actuators equipment's etc as per operating, failure and failsafe logic..

14.18 Demonstration of operation of AHU for Basement rooms cooling along with individual rooms cooling , operation of fire Damper etc.

14.19 Demonstration of water quality sensors by checking the water quality at external lab and cross checking the parameters.

14.20 Data Center aesthetics and interiors

15 Safety Regulations

The contractor shall at his own expense, arrange for the safety provisions as per the codes of Indian Standard Institution, Indian Electricity Act / Rule and such other Rules, Regulations and Laws as may be applicable in respect of all labour, directly or indirectly employed in the work for performance of the Contractor's part of this agreement. While the Indian Electricity Rules 1956, as amended up to date, are to be followed in entirety, any installation or portion of the installation that does not comply with these Rules, should be rectified immediately.

The contractor shall be responsible for and indemnify the buyer against all injury to persons – both his own workmen and others and for all damage to structural and / or decorative part of the buyer's property during erection and commissioning of the equipment. The contractor shall repair / reinstate all such damage at his own cost.

It shall be ensured that the control switches and distribution boards are duly marked, the distribution diagrams of substations are prominently displayed, and the substation premises, main switch rooms and D.B. enclosures are kept clean. Particular care should be taken to prevent the substation being used as store for inflammable materials, broken furniture, waste materials etc.

No inflammable materials shall be stored in places other than the rooms specially constructed for this purpose in accordance with the provisions of the Indian Explosives Act. If such storage is unavoidable, it should be allowed only for short period and in addition, special precautions such as cutting off supply such places at normal times, storing materials away from wiring and switch boards, giving electric supply for a temporary period with due permission of engineer- in charge shall be taken.

Protective and safety equipment such as rubber gloves, earthing rods, line men's belt, portable respiration apparatus, necessary number of caution boards such as " Man on

Line", "Don't switch on" etc. should be provided in easily identifiable locations. Where electric welding or such other nature of work is undertaken, goggles shall be provided.

Rubber or insulating mats should be available in front of the main switchboards or any other control equipment of medium voltage or above.

Standard first Aid boxes containing materials as prescribed by Indian red cross should be provided in easily identifiable locations and should be easily available.

Periodical examination of the first aid facilities and protective and safety equipment provided should be undertaken and proper records shall be maintained for their adequacy and effectiveness.

Charts (one in English and one in regional language) displaying methods of giving artificial respiration to a recipient of electrical shock shall be prominently displayed at appropriate places.

A chart containing the names, addresses and telephone numbers of nearest authorized medical practitioners, hospitals, fire brigade and also officers in charge shall be displayed prominently along with the first Aid box.

Steps to train supervisory staff and authorized persons of the engineering staff in the first Aid practices, including various methods of artificial respiration with the help of local authorities such as fire brigade, St. John's Ambulance Brigade, Indian Red Cross or other recognized institutions equipped to impart such training shall be taken, as prompt rendering of artificial respiration can save life at the time of electric shock.

Electrical wiring and control switches should be periodically inspected and any defective wiring switches which will expose live parts should be replaced immediately to make installation safe.

No work on live L.T. bus bars or pedestal switch boards should handle by a person below the rank of a wire man and such a work should preferably be done in the presence of the Engineer in charge of the work.

- When working on or near live installation, suitable insulated tools should be used, and special care should be taken to see that these tools accidentally do not drop on live terminals causing shock or dead short.
- The electrical switchgear and distribution boards should be clearly marked to indicate the area being controlled by them.
- Before starting any work the existing installation, it should be ensured that the electric supply to that portion in which the work is undertaken is preferably cut off. Precautions like displaying "Men at Work" caution boards on the controlling switches, removing fuse carrier from these switches and these fuse carriers being kept with the person working on the installation, etc., should be taken against accidental energization. "Permit to Work" should be obtained from the Engineer-in-charge. No work on H.T. main should be undertaken unless it is made dead and discharged to earth with an earthing lead of appropriate size. The discharge operation shall be repeated several times and the installation connected to earth positively before any work is taken up.

- Before energizing any installation after the work is completed, it should be ensured that all the tools have been removed and accounted and no person is present inside any enclosure of the switchboard. Any earthing connection made for carrying out the work should be removed. "Permit to work" should be received back duly signed by the person to whom it was issued in token of having completed the work and the installation being ready for energisation and "Men at Work" caution Boards removed.

- In case of electrical accidents and shock, the electrical installation on which the accident occurred should be switched off immediately and the affected person should be immediately removed from live installation by pulling him with the help of coat, shirt, and wooden material or with any other dry cloth. He should be removed from the place of accident to a nearby safe place and artificial respiration continuously given as contained in BIS code and standard prescribed by St John Ambulance Brigade or Fire Brigade.

- While artificial respiration on the affected person is started immediately, help of Fire Brigade and Medical Practitioner should be called for an artificial respiration should be continued uninterrupted until such help arrived.

- These instructions should be explained in Hindi / local language to those staff who does not understand English.

The contractor shall ensure that all portable power tools used by the workman are rated 230 volts, double insulated and have to take through 100 mA Earth Leakage Circuit Breaker (ELCB). Also all temporary lighting shall be supplied through 30 mA ELCB. Inserting wire into the sockets without the plug tops is not allowed. The length of the extension cord for portable tools should not be more than 5 feet. Temporary cables and flexible wires of short length should be bunched up and supported at inaccessible height. Temporary lamps should be mounted at inaccessible height. If lamps are incandescent, they should be protected by wire-mesh.

All power supply / Distribution Boards shall have canopy for protection against weather if located outdoors.

While carrying out work in Vessels / AC ducts or any other confined place, hand lamps with metallic guard suitable for 24 Volts AC supply shall be used All non-current carrying metallic parts of electrical system and equipment shall be earthed with two separate earthing wires of adequate capacity.

a. GENERAL RESPONSIBILITY

The contractor shall obtain a "Work Permit" from the Site Engineer / Client before starting any work at site. The work permits are issued to prevent any one working in unauthorized areas and they are valid for specific period.

The contractor shall produce test certificates from Government approved certifying authorities for all the lifting gear & hoists (slings, chains, hooks, chain pulley blocks, winches, cranes etc.) before starting the work. The contractor's supervisor for subsequent spot checks shall retain the certificates.

The gas cylinders should be used in safe manner. They should not be dropped from heights. Acetylene cylinder should be kept upright position. Oxygen cylinders should not be kept near inflammable materials like oil etc.

The contractor is to remove all waste materials from and around the work site and leave the work spot spick and span.

Works like Gas cutting, welding etc.

Before carrying out any work like gas cutting, welding etc. the contractor shall contact the site-in -charge to ascertain about the safety of the area for welding work.

The contractor shall produce certificates for his welding sets checked by the site in charge before starting the work. The certificates shall have to be renewed every two months. A copy of the current certificate shall be displayed on the welding sets.

Only cables in good condition and insulated holders are to be used. The length of the supply cable shall not exceed 25 feet and the welding set body shall be properly earthed. Under no circumstance building structure pipeline should be used as a return path of the current.

A charged fire extinguisher of CO2 type is to be carried with each welding set.

The welder is to wear good quality insulated welding gloves, shoes & goggles while at work.

Tarpaulins are not be used in the vicinity of welding / gas cutting jobs.

b. EXCAVATION

In the event of an excavation being made, it is the responsibility of the contractor to see that any opening, sump or pit caused by them is securely fenced as required by the Factory Act.

c. WORKING AT HEIGHT

For carrying out work at heights exceeding 6 feet or over and near the opening in floors, roofs, etc the following precaution to be taken.

The written permission of the Departmental Manager is to be taken before carrying out any work. Adequate safety precautions like use of safety belts, crawling ladders etc are to be taken.

All personnel engaged on overhead work shall be men experienced in such work.

Whenever possible timber staging or platform shall be erected with planks of minimum thickness 2 inches and minimum width 12 inches when the nature of work demands staging of a greater width than plank provided then additional planks shall be added and lashed securely.

Staging shall be provided with simple safety rails or ropes throughout its length, at waist height and on each open side.

Staging supports shall be of standard steel scaffolding safely secured and supported on firm level footings or slung from overhead beams. The supports shall be situated at a maximum distance of 8 feet apart and staging shall be secured to each support.

In case the site or nature of work is unsuitable for erection of proper staging all workers shall wear safety belts around their waists and secure their lifelines to strong scaffolding or structural members.

Wherever it is not possible to put up staging and / or use safety belts, safety nets or sheets shall be slung beneath the place of work.

When working in open process vessels or tanks, safety belts or safety nets shall always be used whether or not staging and scaffolding is provided.

Safe access to all points of work should be provided in the form of suitable ladders, stairways etc.

Contractor's employee of at least status of a foreman shall examine all arrangements before starting such work is commenced and shall satisfy himself that all reasonable safety precautions have been taken.

d. FIRE INSTRUCTIONS

Before carrying out any gas cutting, welding etc, the contractor shall contact the site-in -charge to ascertain about the safety of the area for welding work.

Smoking is strictly prohibited in premises. Severe action will be taken if any of the contractor's workmen is found smoking at the work site area.

In case fire is discovered, dispatch additional force & site Engineer. Wherever possible switch off any electrical and gas apparatus near the fire.

Check the nature of fire, pick up appropriate fire extinguisher and try to put out fire. For Electrical fire use carbon dioxide fire extinguisher.

e. PERSONAL PROTECTIVE EQUIPMENT

The personal protective equipment should be worn wherever necessary.

f. REVIEW MEETINGS

Periodic safety review meeting shall be conducted to review safety and for better coordination with other agencies.

Periodically safety review will be held with Site Engineer and issues will be discussed and action points shall be monitored and recorded in a separate safety Register / File.

g. WORK AFTER NORMAL WORKING HOURS

Extra care need to be taken for jobs being carried out after normal working hours with due revalidated work permit.

h. ACCIDENTS

In case of injury or serious illness, the department should be informed immediately. All injuries are to be reported by filling in the "injury report" form, which will be available with the respective department / site engineer.

These safety conditions should not be regarded as exhaustive. These have been issued for the guidance of the contractor and will not in any way absolve the contractor from any obligations or liabilities that might incur or transfer such obligations on liabilities to the company.

(End of Section- IV)

SECTION V –TECHNICAL B.O.M. / B.O.Q.(IN DETAILS)

Name of Bidder:

Detail Address: (for release of INR order):

Contact Person with email id:

Mobile No:

DETAILED BILL OF MATERIALS WITH item wise listing and quantities required to complete the `Turn-key' project, as per the Section-IV

Detailed technical BOM/BOQ - Bid MUST be submitted in below format.

Sr. No.	Description of Item and Specification	HSN / SAC code	Qty. in Units	Applicable GST %	Remarks (Make/Model No. offered)
1	Civil and allied works				
1.1					
1.2					
1.x					
2	UPS 2 X 500 KVA				
2.1					
2.2					
2.x					
3	Batteries for 2 X 500 KVA				
3.1					
3.2					
3.x					
4	DG set with AMF and Synchronization controller				
4.1					
5	DG LT Panel				
5.1					
5.x					
6	Other Accessories as Power and Control Cabling, Terminations, Exhaust Stack, approvals, earthing etc.				
6.x					

7	LV Electrical Components , LT Panels, DBs, Bus bars, End feed unit, Tap off boxes etc.				
7.1					
7.x					
8	All LT Cabling –Power and Control, Earthing, Lighting Arrestors, Cable Trays, Supports, Cable terminations, Glands and other accessories etc				
8.1					
8.x					
9	Internal and external Illumination System along with DBs				
9.1					
9.2					
9.x					
10	Precision Air Conditioning Unit (PAC/CRAC) along with Water cooled Condenser, Cu piping and other accessories etc.				
10.1					
10.2					
10.x					
11	Removal, lifting, shifting and repositioning, installation and commissioning of existing AHU of rating 80Tr,35000 CFM capacity				
12	All accessories of AHU with GI Ducting, Fire Dampers, Volume control dampers, air grills, starter panel ,cable etc				
12.1					
12.x					
13	Dry Cooler along with associated accessories				
13.1					
13.2					
13.x					
14	PHE, Thermal storage tank and associated accessories,				
14.1					
14.2					

14.x					
15	Dry Cooler Pumping along with associated accessories, VFD/FI drive and Panel				
15.1					
15.x					
16	Pumping to primary of PHE along with associated accessories, VFD/FI drive and Panel.				
16.1					
16.x					
17	Pipes of all sizes ,Bends, valves, actuators, joints, end flanges and other hardware including accessories etc.				
17.1					
17.2					
17.x					
18	Instrumentation and Control for entire Cooling System				
18.1					
18.2					
18.x					
19	Fire Alarm system for Basement and Data Center area including Detectors, panels, cabling and associated accessories etc.				
19.1					
19.x					
20	Fire Suppression system for Data Center area including Gas release panel, cylinder, Manifold, piping and associated accessories etc.				
20.1					
20.x					
21	NOVEC Gas for Data center area				
22	Fire Suppression system for Basement area including Gas release panel, cylinder, NOVEC, Gas, Manifold, piping and associated accessories etc				
22.1					
22.2					
22.x					

23	NOVEC Gas for Basement area				
24	CCTV system including camera, switch, NVR, Cables, monitors etc.				
24.1					
24.2					
24.x					
25	IBMS software including system (Computer ,Monitor) integration of third party devices, I/O modules, all control and communication cabling etc.				
25.1					
25.2					
25.x					
26	Other IBMS including Water leak detectors, Rodent Repellent, Vesda etc. system				
26.1					
26.x					
27	Server Rack -42 U along with Duel PDU ,cable manager and blanking plates				
27.1					
27.2					
27.x					
28	Any other items, material required to complete the solution				
28.1					
28.x					
29	Removing and reconnection of cables in Existing Adaptor Panel, Removing of existing, false ceiling, raised flooring, Removing of cooling unit at Basement etc. job				
30	Operation and Maintenance –Year-1				
31	Operation and Maintenance –Year-2				

Optional Items (These items will not be considered for computing L1)

Sr. No.	Particulars	HSN / SAC code	Qty. in Units	Applicable GST %	Remarks
1	Comprehensive Annual Maintenance Contract -Year-3				
2	Comprehensive Annual Maintenance Contract -Year-4				
3	Comprehensive Annual Maintenance Contract -Year-5				
4	Operation and Maintenance – Year-3				
5	Operation and Maintenance – Year-4				
6	Operation and Maintenance – Year-5				

Note: Bidder may add rows for the items required to cover the entire scope as per the Schedule of Requirements & complete the job on `Turnkey Basis'.

(End of Section – V)

SECTION VI - PRICE SCHEDULE

Summary Format- Supply, Installation, Testing and Commissioning along with Loading, Unloading, Transport, Transit Insurance etc.

Sr. No	Particulars	Qty	Supply Price Rs.	GST Rs.	Installation /Service charges Rs	GST Rs.	Total Price Rs.
	Bidders to calculate the quantity as per Drawing Layout, SLD,P & ID and Site visit						
1	Civil and allied works	1					
2	UPS - 500 KVA	2					
3	Batteries for 2 X 500 KVA along with Battery Stand, Isolator, DC cabling etc.	1					
4	DG set with AMF and Synchronization controller	1					
5	DG LT panel	1					
6	Other Accessories as Power and Control Cabling, Terminations, Exhaust Stack, approvals, earthing etc.	1					
7	LV Electrical Components , LT Panels, DBs, Bus bars, End feed unit, Tap off boxes etc.	1					
8	All LT Cabling –Power and Control, Earthing, Lighting Arrestors, Cable Trays, Supports, Cable terminations, Glands and other accessories etc.	1					
9	Internal and external Illumination System along with DBs	1					
10	Precision Air Conditioning Unit (PAC/CRAC) along with Water cooled Condenser, Cu piping and other accessories etc.	1					
11	Removal, lifting, shifting and repositioning, installation and commissioning of existing AHU of rating 80Tr,35000 CFM capacity	1					
12	All accessories of AHU with GI Ducting, Fire Dampers, Volume	1					

	control dampers, air grills, starter panel ,cable etc.						
13	Dry Cooler along with associated accessories	1					
14	PHE, Thermal storage tank and associated accessories,	1					
15	Dry Cooler Pumping along with associated accessories, VFD/FI drive and Panel.	1					
16	Pumping to primary of PHE along with associated accessories, VFD/FI drive and Panel.	1					
17	Pipes of all sizes ,Bends, valves, actuators, joints, end flanges and other hardware including accessories etc.	1					
18	Instrumentation and Control for entire Cooling System	1					
19	Fire Alarm system for Basement and Data Center area including Detectors, panels, cabling and associated accessories etc.	1					
20	Fire Suppression system for Data Center area including Gas release panel, cylinder, Manifold, piping and associated accessories etc.	1					
21	NOVEC Gas for Data center area	1					
22	Fire Suppression system for Basement area including Gas release panel, cylinder, NOVEC, Gas, Manifold, piping and associated accessories etc	1					
23	NOVEC Gas for Basement area	1					
24	CCTV system including camera, switch, NVR, Cables, monitors etc.	1					
25	IBMS software including system (Computer ,Monitor) integration of third party devices, I/O modules, all control and communication cabling etc.	1					
26	Other IBMS including Water leak detectors, Rodent Repellent, Vesda etc. system	1					
27	Server Rack -42 U along with Duel PDU ,cable manager and blanking plates	1					
28	Any other item, material required to complete the solution	1					
29	Removing and reconnection of cables in Existing Adaptor Panel, Removing	1					

	of existing, false ceiling, raised flooring, Removing of cooling unit at Basement etc. job						
30	Operation and Maintenance –Year-1	1					
31	Operation and Maintenance –Year-2	1					
	Total Rs.						

Optional Items (These items will not be considered for computing L1)

Sr. No.	Particulars	Quoted Price Rs.	GST Rs.	Total Price Rs.
1	Comprehensive Annual Maintenance Contract -Year-3			
2	Comprehensive Annual Maintenance Contract -Year-4			
3	Comprehensive Annual Maintenance Contract -Year-5			
4	Operation and Maintenance –Year-3			
5	Operation and Maintenance –Year-4			
6	Operation and Maintenance –Year-5			

Note: The AMC charges for 3rd, 4th and 5th years should not exceed 7% of the cost of all the capital equipments, which includes but not limited to DG set, All LT panels, Dry Cooler, PHE, Pumps, Thermal Storage Tank, PAC units, UPS. Batteries are not considered under AMC.

Detailed Commercial Bid is to be submitted in the format as appearing on www.eprocure.gov.in/eprocure/app.

Notes:

1. **Prices for individual line items of the BoQ should be mandatorily submitted. CDAC Pune reserves the right to reject the bid in case bidder fails to quote all the required items**.
2. Bidder must fill the supply and installation prices separately as per the above table.
3. The prices quoted should include the charges towards testing of equipments, installations and approvals from local electricity board/PWD, electrical/ civil engineering authority, pollution control board - as applicable. The official charges required for the required testing, certification, NOC etc. are to be paid by the bidder. The certifications, NOC etc. shall be in the name of C-DAC .
4. The invoice can be raised in compliance with GST requirements, giving full bill of material.

(End of Section – VI)

ANNEXURE A – COVERING LETTER

Date:

To:
Director General,
Centre for Development of Advanced Computing(C-DAC)
S.P. Pune University Campus,
Pune – 411007.

Subject: Submission of the Technical bid for Supply of Data Centre Solutions

Dear Sir,

We, the undersigned, offer to supply Data Centre Solutions and allied services in response to your Tender No. CDACP/NSM-DC-IISc/20-21/318. We are hereby submitting our proposal for same, which includes this Technical bid and the Financial Bid through www.eprocure.gov.in/eprocure/app portal.

We hereby declare that all the information and statements made in this Technical bid are true and we accept that any misinterpretation contained in it, may lead to our disqualification.

We undertake, if our proposal is accepted, to submit a Security Deposit of 5 % of the contract / order value, as per terms stipulated in the tender.

We confirm that the deliveries, installation will be done within 4 months (16 weeks), if the order is placed.

We hereby certify that my/ our firm has not been disqualified and / or blacklisted by any Office/ Department/ Undertaking of the State Government / Central Govt. of India, PSU/ Autonomous Body of Government of India, as on the date/time of submission of this bid.

We undertake, if our proposal is accepted, to initiate the Implementation activities towards supply of material and services, as stipulated in the referred RFP.

We hereby accept the applicable protocols while delivery, installation, implementation, commissioning of the entire `Turn-key' job with regards to `COVID-19' conditions at the Institution/site. (The same will be informed in the supply/work order(s) placed, if any).

We agree to abide by all the terms and conditions of the RFP document, including corrigenda. We would hold the terms of our bid valid for 180 days as stipulated in the RFP document.

We understand you are not bound to accept any Proposal you receive.

The undersigned is authorized to sign this bid document. The authority letter to this effect is enclosed.

Yours sincerely,
Authorized Signatory:
Name and Title of Signatory:
e-mail:
Mobile No:

ANNEXURE B – AUTHORITY LETTER

Date:

To:

Director General,
Centre for Development of Advanced Computing(C-DAC)
S.P. Pune University Campus,
Pune – 411007.

Subject: Authority Letter

Reference: Tender No. CDACP/NSM-DC-IISc/20-21/318

Dear Sir,

We, M/s _____ (Name of the bidder) having registered office at _____ (address of the bidder) herewith submit our bid against the said RFP document.

Mr./Ms. _____ (Name and designation of the signatory), whose signature is appended below, is authorized to sign and submit the bid documents on our behalf against said RFP

Specimen Signature:

The undersigned is authorized to issue such authorization on behalf of us.

For M/s _____ (Name of the bidder)

Signature and company seal

Name

Designation

Email

Mobile No.

ANNEXURE C – UNDERTAKING BY PRINCIPAL MANUFACTURER

(To be submitted in Original on Letterhead- for all major equipments/devises/products – separately.)

Date:

Director General,
Centre for Development of Advanced Computing(C-DAC)
Innovation Park, Panchavati, Pashan,
Pune – 411008.

Subject: **Undertaking by Principal Manufacturer against tender no.** CDACP/NSM-DC-IISc/20-21/318 **for Supply, Installation & Commissioning of Data Centre Solutions.**

Dear Sir,

We, M/s _____ (Name of the manufacturer) having registered office at _____ (address of the manufacturer) by virtue of being manufacturer for _____ (Name of the product/s), hereby authorise M/s _____ (Name of the bidder) having their office at _____ (Address of bidder) to submit quote, supply, install and provide after sales support for our range of products quoted by them to meet the above mentioned tender requirements.

M/s _____ (Name of the manufacturer) within the scope of requirement as per the tender mentioned above undertake to provide technical & other support towards fulfilling the requirements of installation, commissioning, acceptance criteria and product warranty services of the Data Centre Solutions to be supplied and installed at site(s) by our authorised representative M/s (Name of bidder) against said tender.

The undersigned is authorised to issue such authorisation on behalf of M/s _____ (Name of the manufacturer).

For M/s _____ (Name of the manufacturer)

Signature & company seal

Name

Designation

Email

Mobile No.

ANNEXURE D - LIST OF RECOMMENDED MAKES

THE FOLLOWING LIST IS INDICATIVE ONLY. THE ITEMS OFFERED MUST COMPLY WITH THE ORDER NO. P-45021/2/2017-PP (BE-II). DATED 4TH JUNE, 2020 ISSUED BY PUBLIC PROCUREMENT DIVISION, DEPARTMENT OF INVESTMENT AND INTERNAL TRADE, MINISTRY OF COMMERCE, GOI

Sr. No	Description List of Makes - Electrical	Recommended Makes
1	UPS System	Schneider/Vertiv/Eaton/Numeric/FUJI /TMEIC/Delta/Socomec/ Riello Power India Pvt. Ltd
2	SMF Batteries for UPS	Rocket / Amar Raja / HBL /Quanta/Exide
3	LT CABLES	RPG /KEI /FINOLEX/POLYCAB/Ravin/Lapp
4	Multifunction Meter (Digital Type)/Load Manager	Schneider/Socomec/Secure Meter/HPL/Siemens/L&T
5	MS/GI CONDUITS	BEC/BHARAT/AKG/UNIVERCELL
6	PVC CONDUITS	AVON PLAST//Precision/Dimond
7	MODULAR SWITCH SOCKET WITH SWITCH BOXES	ANCHOR/Legrand/Schneider
8	BRASS DOUBLE COPRESSION GLANDS	DOWELLS/COMMET/Siemens/Phoenix
9	MCCB/MCB/ACB	Schneider/L&T/ABB/Siemens/Eaton/Legrand
10	ELCB/MCB	Siemens/ Schneider / Legrand/Eaton
11	MCB DBS	Siemens/Schneider/Legrand/L&T /Eaton/ABB
12	METAL CLAD SOCKET OUTLETS	Legrand/SALZER/HAVELLS/L&T HAGER/Schneider
13	CABLE TRAYS	PROFAB/Indiana/OBO Bettermann
14	LUMINAIRIES	PHILLIPS/WIPRO/BAJAJ/HAVELLS/Syska
15	PROTECTIVE RELAYS	Siemens/ABB/L&T/Schneider/Eaton
16	CT's	VOLTAMP/AE/KAPPA
17	SURGE PROTECTION DEVICES	Schneider/Siemens/Legrand/Eaton
18	Auto Transfer Switch (ATS)	Siemens/Socomec/Schneider (ASCO)
19	LT Switchboards	License of IEC 61439 Panel Builder
20	Power Distribution Unit (PDU-	Vertiv/APC-Schneider -

Sr. No	Description List of Makes - Electrical	Recommended Makes
	Inside the Rack)	/Raritan/Eaton/Numeric/enlogic/Dhananjay Group
21	FRLS PVC insulated stranded copper conductor wires and cables	Finolex|Lapp Kabel|Skyline|L&T|National |Echo | Havells|
22	Terminal blocks & cage clamps	Elmexx|Phoenix|Wago
23	Star Delta starter	L&T|ABB|Siemens| Schneider/Eaton
24	Soft starters/VFD Drives	ABB|Schneider|L&T/Siemens/Eaton/Danfoss/Grand foss
25	Single phase preventor	L&T|Minilec|Syntron |Beluk
26	Electric Motors	Siemens|Crompton| ABB |Bharat Bijlee|Alstom
Sr. No.	**Details of Material- Civil and Interior**	
1	Cement	ACC, L&T, Ambuja
2	WALL PUTTY	GOLDSIZE PUTTY BY SHALIMAR PAINTS LTD., J K WALL PUTTY, Birla White
3	STRUCTURAL STEEL	TISCO, SAIL, RINL, JINDAL, ESSAR, Tata Steel
4	ANCHOR FASTNER	HILTI, FISHER
5	ALUMINIUM SECTIONS	INDAL, HINDALCO, JINDAL,
6	DISTEMPER & PAINTS	ICI-Dulux, ASIAN PAINTS, BERGER PAINTS, NEROLAC, British Paint
7	GYPSUM BOARD and Fire Rated partition	INDIA GYPSUM, LAFARGE BORAL, RAMCO LTD
8	Fire Sealants	3M,Hilti,Fischer
9	GLASS	SAINT GOBAIN, Schott, Pilkington
10	FALSE CEILING	INDIA GYPSUM, ARMSTRONG,AMF
11	Raised/False Flooring	Unitile/Uniflair/ USG/Access Floor Systems/AET Flexiable
12	Fire Door	Shakti Mat, Radiant, ProMat, Godrej,
13	Insulation	Armaflex/K-FLex
Sr.	**System / Description-IBMS**	

Sr. No	Description List of Makes - Electrical	Recommended Makes
No.		
A	Intelligent Fire detection System	
1	Analogue Addressable Fire detection Panel	Tyco , Honeywell, Siemens , Schneider, Johnson Control
2	Analogue Addressable Thermal /smoke Detector	Tyco , Honeywell, Siemens , Schneider
3	Analogue Addressable Manual Call Point	Tyco , Honeywell, Siemens , Schneider
4	Analogue Addressable Abort cum Gas Release Station	Tyco , Honeywell Siemens , Schneider
5	Analogue Addressable Control / Relay / Isolator Modules	Tyco , Honeywell Siemens , Schneider
6	Building Management Interface	Tyco , Honeywell, Siemens , Schneider
7	Fire Extingusher's	Cease Fire / Minimax
8	Aspiration Smoke Detection System	Xtralis, ICAN, Tyco,Siemens
9	Response Indicators	Daksh, Polixel, Agni
10	Gas Release Modules	Tyco , Honeywell, Siemens , Ravel
11	Fire Detection Cables	Polycab, Excel, LAPP kabel
B	**IP CCTV Surveillance System**	
1	IP Dome Cameras with Varifocal lens	BOSCH, Honeywell, Siemens ,Samsung
2	IP BOX Camera	BOSCH, Honeywell, Siemens
3	IP PTZ Camera	BOSCH, Honeywell, Siemens
4	Video Management, Recording Software	Pelco, BOSCH, Axis, Indigo Vision, Polixel, Milestone
5	32” Monitors	Samsung, LG, Sony
6	Network Switch	Comnet, RuggedCom, Moxa
7	CAT 6 Cable	AMP, Molex, ,Schneider
8	OFC Cables	Finolex, Sterlite, HFCL

Sr. No	Description List of Makes - Electrical	Recommended Makes
9	Power Cables	Polycab, Excel, LAPP kabel
10	MS Conduit	BEC, AKG, Dimond
11	PVC Conduits	BEC, AKG, Precision
12	Storage Device	DELL, HP, IBM
13	Servers / Workstation	DELL, HP, IBM
C	**Access Control System**	
1	Intelligent Access Controller	Siemens, Honeywell, Daccess
2	Time and Access Management Software	Nexwatch, Software House, Siemens, Honeywell, Daccess
3	Biometric Readers	Nexwatch, HID, DDS, Siemens, Honeywell, Daccess
4	Cards	Siemens, Honeywell, Daccess
5	Proximity Readers	Nexwatch, DDS, HID, Siemens, Honeywell, Daccess
6	Electromagnetic Locks	Dafikas,BELL, Trimec, Insyn
7	Network Switch	Comnet, RuggedCom, Moxa
8	Emergency Glass Break Station	KAC
9	CAT 6 Cable	AMP, Molex, Schneider
10	OFC Cables	Finolex, Sterlite, HFCL
11	Servers / Workstation	DELL, HP, IBM
D	**UL Listed Novec 1230 Clean Agent Fire Suppression System**	
1	UL Listed & PESO Approved Seamless Cylinders	Ansul, UTC, Siemens, Tyco
2	Novec 1230	Ansul, UTC, Siemens, Tyco,Siemens
3	Nozzles	Ansul, UTC, Siemens
4	Electronic/ Pneumatic Acutators	Ansul, UTC, Siemens
5	Discharge Valves	Ansul, UTC, Siemens
6	M.S Seamless Pipes	Jindal, Tata
7	Discharge Hose	Ansul, UTC, Siemens
8	Manifold Check Valve	Ansul, UTC, Siemens

Sr. No	Description List of Makes - Electrical	Recommended Makes
9	Warning Sign Boards	Ansul, UTC, Siemens
10	Manual Abort & Release Station.	Daksh, Agni
E	**Building Management System**	
1	Main Control System/DDC Controllers	Honeywell, Schneider, Siemens, Rockwell
2	Temperature, Air humidity Sensors (Duct, Room)	Azbil (Yamatake), ALC, Sauter, Siemens, Endress-Hauser
3	Building Management Software	Honeywell, Siemens, Schneider ,
4	Differential pressure switch Air flow / Water Flow switch/water Level switch	Azbil (Yamatake), ALC, Sauter, Honeywell, Emerson Process
5	Water Flow meter	Emerson -Process/Endress-Hauser/ Honeywell/ Sontay/Forbes Marshal
6	Water Pressure Transmetter/ Level Transmitter	Invensys/Kele/ Honeywell/ Sontay/Forbes/Marshal
7	Motorized Butterfly valves/ actuators	Rapid Cool/Audco/ Johnson/Siemens/Belimo
8	Current/Voltage/Power Factor/FrequencyKWH Transducers with digital display/Electronic Meter	Situ Electro Instuments Pvt.Ltd./ Secure metres Ltd./ Enercon/L&T
9	Printer	HP/Epson
10	Switching Relays	PLA/OMRON
11	Flame proof level switch	Veksler/Minilec
12	Electromagnetic Lock	Trimec/Dafickas
13	Current Relays	Sitn/Minilec/Sentry
14	Electric Actuators for 2-way ON/OFF valves	Danfoss/ Emtrack/ Johnson/ Honeywell/ Siemens/ Trane/ Cyclon Controls.
15	Transducer/Sensors/Water Quality system--pH, Conductivity, Dissolved Oxygen etc	Emerson – Process, Endress-Hauser, Siemens, ABB, Thermax

Sr. No	Description List of Makes - Electrical	Recommended Makes
16	CAT 6 Cable	AMP, Molex, Schneider
17	OFC Cables	Finolex, Sterlite, HFCL
18	Servers / Workstation	DELL, HP, IBM
F	**Water Leak Detection System**	
1	Sensing Cables	Tracetek, Liebert, Sontay
2	WLDS Controller	Tracetek, Liebert, Sontay
3	Jumper Cables	Tracetek, Liebert, Sontay
G	**Rodent System**	-
1	Controller	MASER (Torrant Range), C Systems, Verma Craft
2	Sattelites	MASER (Torrant Range), C Systems, Verma Craft
3	GUI Software	MASER (Torrant Range), C Systems, Verma Craft
	Mechanical Components	
1	Variable Speed Pumping system with Pump sets	Grundfos | Armstrong
2	Plate Heat Exchanger (PHE)	SWEP, Tranter, Alfa Lavel
3	Variable Speed Pumping system with Pump sets	Grundfos | Armstrong
4	PAC	Schneider | Blue Box| Vertiev | Climaveneta
4.1	Fan section-Blower	Kruger| Flaktwood |Nutech|TCF Nadi|
4.2	Variable frequency drives	Danfoss |ABB/Eaton
4.3	Air Handling Unit (AHU)	Trane/Voltas/BlueStar/Blue Box
4.4	Variable Air Volume (VAV) Boxes	Caryaire-Titus| Trane| Johnson Control | Belimo
5	Racks (42 U IT and BMS)	Schneider, Valrack,,EFS,Rittal,Netrack,Dhananjay Group
6	Dry Cooler	Thermax| Paharpur | Schneider| Thermofin
7	G.I.	Jindal (Hissar)|TATA|GST
8	M.S. upto 300 mm	Jindal (Hissar)| TATA|GST
9	M.S. Above 300 mm	Maharashtra Seamless| TATA|GST
10	**Valves**	

Sr. No	Description List of Makes - Electrical	Recommended Makes
10.1	Butterfly Valves	Audco|Advance |C&R|Oventrop|TA Hydronics|Flowcon
10.2	Valve	Audco|Advance |Leader
10.3	Non Return Valve	Audco|Advance|C&R|Cim
10.4	Balancing Valves	Advance|Oventrop|Flowcon|T&A Hydronics|Honeywell|Danfoss
10.5	Ball ,Gate, Globe Valve	Audco | Emerald | Oventrop | Rapidcool |Cim|Zoloto
10.6	Ball Valves with Y Strainer	Rapidcool |Cim|Zoloto
11	**Accessories**	
11.1	Pressure Gauges	H.Guru|Fiebig|WAREE
11.2	Thermometers	Emerald| Fiebig|WAREE
11.3	Flow Switch	Anergy|Honeywell|Siemens|Johnson|Schneider
11.4	Motorized butterfly valve	Siemens|Danfoss|Schneider |Advance|Audco
11.5	Dash Fastners	Hilti|Fischer
11.6	Vibration Isolators (Bellow Type)	Resistoflex |Cori| Easyflex
11.7	Spring Mounts	Emerald| Resistoflex
11.8	Rubber Groumat/ Clamps/ Hangers	Emerald/ Resistoflex/ Kanwal
12	**Air Filters**	
12.1	Filters	Airtech|Purolator|Puromatic|Thermodyne |Spectrum|Dynafilters
13	**Insulation**	
13.1	Glass Wool	Owens Corning |U.P. Twiga|Kimmco
13.2	Mineral Wool	Lloyd Insulation
13.3	Closed Cell Elastomeric Insulation	Armaflex|Aeroflex|Vidoflex|Kflex
13.4	Aluminium Sheets	TATA|Nippon|Hindalco|Indalco
14	Balancing Valve	TA Hydronics | Danfoss |Oventrop| Flowcon

ANNEXURE E – PERFORMANCE BANK GUARANTEE

(on non-judicial paper of appropriate value)

To,

Director General,
Centre for Development of Advanced Computing(C-DAC)
S.P. Pune University Campus,
Pune – 411007.

BANK GUARANTEE NO:

DATE:

Dear Sir(S)

This has reference to the Purchase Order No. _____ Dated _____ been placed by C-DAC on M/s_____ (Name & Address of vendor) for supply, installation, commissioning warranty of _____ (description of items) at IISc, Bangalore.

The conditions of this order provide that the vendor shall,

1. Arrange to deliver the items listed in the said order to the consignee, as per details given in said order, and
2. Arrange to install and commission the items listed in said order at client's site, to the entire satisfaction of C-DAC and
3. Arrange for the comprehensive warranty service support towards the items specified in purchase order.

M/s (Name of Vendor) has accepted the said purchase order with the terms and conditions stipulated therein and have agreed to issue the performance bank guarantee on their part, towards promises and assurance of their contractual obligations vide the Supply Order No. _____ M/s. _____ (name of vendor) holds an account with us and has approached us and at their request and in consideration of the promises, we hereby furnish such guarantees as mentioned hereinafter.

C-DAC shall be at liberty without reference to the Bank and without affecting the full liability of the Bank hereunder to take any other undertaking of security in respect of the suppliers obligations and / or liabilities under or in connection with the said contract or to vary the terms vis-a – vis the supplier or the said contract or to grant time and or indulgence to the supplier or to reduce or to increase or otherwise vary the prices or the total contract value or to forebear from enforcement of all or any of the obligations of the supplier under the said contract and/or the remedies of C-DAC under any security (ies) now, or hereafter held by C-DAC and no such dealing(s) with the supplier or release or forbearance whatsoever shall have the effect of releasing the bank from its full liability of C-DAC hereunder or of prejudicing right of C-DAC against the bank.

This undertaking guarantee shall be a continuing undertaking guarantee and shall remain valid and irrevocable for all claims of C-DAC and liabilities of the supplier arising up to and until _____ (date)

This undertaking guarantee shall be in addition to any other undertaking or guarantee or security whatsoever the that C-DAC may now or at any time have in relation to its claims or the supplier's obligations/liabilities under and / or in connection with the said contract and C-DAC shall have the full authority to take recourse to or enforce this undertaking guarantee in preference to the other undertaking or security (ies) at its sole discretion and no failure on the part of C-DAC in enforcing or requiring enforcement of any other undertaking or security shall have the effect of releasing the bank from its full liability hereunder.

We _____ (Name of Bank) hereby agree and irrevocably undertake and promise that if in your (C-DAC's) opinion any default is made by M/s _____ (Name of Vendor) in performing any of the terms and /or conditions of the agreement or if in your opinion they commit any breach of the contract or there is any demand by you against M/s _____ (Name of Vendor), then on notice to us by you, we shall on demand and without demur and without reference to M/s _____ (Name of Vendor), pay you, in any manner in which you may direct, the amount of Rs. _____/- (Rupees _____ Only) or such portion thereof as may be demanded by you not exceeding the said sum and as you may from time to time require. Our liability to pay is not dependent or conditional on your proceeding against M/s _____ (Name of Vendor) and we shall be liable & obligated to pay the aforesaid amount as and when demanded by you merely on an intimation being given by you and even before any legal proceedings, if any, are taken against M/s _____ (Name of Vendor)

The Bank hereby waives all rights at any time inconsistent with the terms of this undertaking guarantee and the obligations of the bank in terms hereof shall not be anywise affected or suspended by reason of any dispute or disputes having been raised by the supplier (whether or not pending before any arbitrator, Tribunal or Court) or any denial of liability by the supplier or any order or any order or communication whatsoever by the supplier stopping or preventing or purporting to stop or prevent payment by the Bank to C-DAC hereunder.

The amount stated in any notice of demand addressed by C-DAC to the Bank as claimed by C-DAC from the supplier or as suffered or incurred by C-DAC on the account of any losses or damages or costs, charges and/or expenses shall as between the Bank and C-DAC be conclusive of the amount so claimed or liable to be paid to C-DAC or suffered or incurred by C-DAC, as the case may be and payable by the Bank to C-DAC in terms hereof.

You (C-DAC's) shall full liberty without reference to us and without affecting this guarantee, postpone for any time or from time to time the exercise of any of the powers and rights conferred on you under the contact with the said M/s _____ (Name of Vendor) and to enforce or to forbear from endorsing any power or rights or by reason of time being given to the said M/s _____ (name of Vendor) which under law relating to the sureties would but for the provisions have the effect of releasing us.

You will have full liberty without reference to us and without affecting this guarantee, postpone for any time or from time to time the exercise of any of the powers and rights conferred on you under the contract with the said M/s _____ (Name of Vendor) and to enforce or to forbear from endorsing any power or rights or by reason of time being given to the said M/s

_____ (Name of Vendor) which under law relating to the sureties would but for the provisions have the effect of releasing us.

Your right to recover the said sum of Rs. _____/- (Rupees _____ only) from us in manner aforesaid will not be affected/ or suspended by reason of the fact that any dispute or disputes have been raised the said M/s _____ (Name of Vendor) and/ or that any dispute or disputes are pending before any officer, tribunal or court or Arbitrator.

The guarantee herein contained shall not be determined or affected by the liquidation or winding up, dissolution or change of constitution or insolvency of the said M/s _____ (Name of Vendor) but shall in all respects and for all purposes be binding and operative until payment of all dues to C-DAC in respect of such liability or liabilities.

Our liability under this guarantee is restricted to Rs._____/- (Rupees _____Only). Our guarantee shall remain in force until unless a suit action to enforce a claim under guarantee is filed against us within one month from the date of expiry of guarantee, all your rights under the said guarantee shall be forfeited and we shall be relieved and discharged from all liabilities there under.

We have power to issue this guarantee in your favour under Memorandum and Articles of Association of our Bank and the undersigned has full power to do under the power of Attorney dated.

Notwithstanding anything contained herein:

A. Our liability under this guarantee shall not exceed Rs_____ (in words)
B. This bank guarantee shall be valid up to (25 months from date of installation) & unless a suit for action to enforce a claim under guarantee is filed against us within one month from the date of expiry of guarantee, all your rights under the said guarantee shall be forfeited and we shall be relieved and discharged from all liabilities there after i.e. after one month from the date of expiry of this Bank guarantee
C. We are liable to pay the guaranteed amount or any parts thereof under this bank guarantee only and only if you serve upon us a written claim or demand or before _____
D. The Bank guarantee will expire on _____

Granted by the Bank

Yours faithfully,

For (Name of Bank)

SEAL OF THE BANK

Authorised Signatory

ANNEXURE F – UNDERTAKING

Date:

To:

The Director General,
Centre for Development of Advanced Computing (C-DAC)
Innovation Park, Panchavati, Pashan Road,
Pune - 411008 Maharashtra, INDIA

Subject: Undertaking as per GFR – 2017, Rule 170(iii)

Dear Sir,

We, the undersigned, offer to carry out the `Turn-key' project including **Products/items, components etc.** as per tender at C-DAC, Pune, in response to your Tender No CDACP/NSM-DC-IISc/20-21/318. We are hereby submitting our proposal for same, which includes Technical bid and the Financial Bid through www.eprocure.gov.in. As a part of eligibility requirement stipulated in said tender document, we hereby submit a declaration in lieu of Earnest Money Deposit (EMD), as given below:

1. **Our bid shall remain valid for 180 days from the date of submission and that we will not withdraw or modify our bid during the validity period,**
2. **In case, we are declared as successful bidder and an order is placed on us, we will submit the acceptance in writing within 7 days of placement of order on us.**
3. In case, we are declared as successful bidder and an order is placed on us, we undertake, to submit a Security Deposit of 5 % of the order value, as per terms stipulated in the tender.
4. In case of failure on our part to comply with any of the above said requirements, we are aware that we shall be declared as un-eligible for said tender and /or debarred from any **future bidding process of C-DAC or any Government entity for a period of minimum one year.**
5. The undersigned is authorized to sign this undertaking.

Yours sincerely,

Authorized Signatory:

Name and Title of Signatory:
e-mail:
Mobile No:

ANNEXURE –G: DOCUMENTS CHECK –LIST

Sr. No.	Documents to be Submitted (IN THE FOLLOWING SEQUENCE ONLY).	Submitted (Yes / No) with page nos.
	e-Packet-1 (Section-I)	
1	Annexure-G duly filled and neatly arranged in the following sequence only. The bidder must submit all the documents as per Document Checklist – Annexure G, with appropriate page nos for the same. The flow of the submitted documents must be in the same order/sequence.	
2	Covering Letter as per **Annexure - A.**	
3	Authority Letter as per **Annexure – B**	
4	Demand Draft no /UTR no – (direct deposit) for Rs. 2000/- towards Tender fees (Non-exempted/non-refundable)	
5	Demand Draft / BG / Exemption documents or Annexure F towards EMD	
	e-Packet-1 (Section-II)	
6	A copy of Certificate of Incorporation, Partnership Deed / Memorandum and Articles of Association / any other equivalent document showing date and place of incorporation, as applicable.	
7	A copy of GST registration certificate.	
8	Copies of at least two purchase orders or contracts and installation reports in the name of bidder from the end client / end user, during last Five years for Data Centre work.	
9	A photo copy of the commercial bid without prices (prices blocked) and copy of commercial terms & conditions (in detail) as included in the commercial bid. C-DAC reserves the right to reject the bid in case of any discrepancy observed in the un-priced commercial bid and the actual commercial bid.	
10	The undertaking(s) from the Principal Manufacturer(s) (OEMs) of	

Sr. No.	Documents to be Submitted (IN THE FOLLOWING SEQUENCE ONLY).	Submitted (Yes / No) with page nos.
	products/ items offered as per **Annexure – C.**	
11	Undertaking to the effect that a Security Deposit of 5% of the order value will be submitted in case C- DAC decides to place the Purchase Order.	
12	Undertaking to the effect that the bidder is not black-listed or barred from participation in bidding process by any Central/ State Government, Government Department, Government Undertaking, Public Sector Unit (PSU) or autonomous institution, as on date of submission of bids.	
13	All the necessary documents in support of eligibility criteria stipulated in Eligibility Criteria.	
	e – Packet 1 (Section-III)	
14	The executive summary of the bid submitted (As per Section-V)	
15	Duly filled Technical Bid (covering the details of solution, detailed bill of material, technical specifications, makes and models of items, diagrams, layouts, all drawings etc.)	
16	The details of electrical power consumption, foot-print, ambient temp, temperature range targeted, discrimination curves, short circuit calculations, cable schedule along with voltage drop calculations, battery sizing and back up calculations etc.	
17	Details of diesel consumption & water consumption on various loading conditions.	
18	Design Basic Report along with annual average Power Usage Effectiveness (PUE) calculations for 25%, 50%, 75% and 100 % of IT load.	
19	Design basis and analysis of cooling solution at full and partial load conditions including complete details, assumptions made and the specific references/standards used for the same	
20	Legal / statutory permissions required, if any.	

Sr. No.	Documents to be Submitted (IN THE FOLLOWING SEQUENCE ONLY).	Submitted (Yes / No) with page nos.
	e –packet 2 (FINANCIAL BID- B.O.Q.xls format)	
1	Price Bid as per format given in **Section - VI**	

ANNEXURE H – SERVICE LEVEL AGREEMENT (SLA)

The successful bidder will be required to sign a SLA, at the time of issuing the works order for supply, installation and commissioning of Data Centres. The basic service requirements /conditions that would be covered in the SLA are as given below.

1. Scope of Work for Operation and Maintenance

Scope of this SLA covers the satisfactory Operations of DC, Maintenance, warranty and support, as stipulated in the Tender, Works Order, for a period of two years from the date of successful installation and commissioning of the Data Centre. One minimum 8 years experienced technician with experience in the field of O & M for Electrical and cooling equipment's per shift and one Diploma Engineer with minimum 10 year of technical + administration experience needs to be deployed.

2. Definitions

"**Uptime**" shall mean the time period for which the specified services / components with specified technical and service standards are available to the state and user departments. Uptime, in percentage, of any component (Non-IT) can be calculated as:

Uptime = {1- [(Downtime) / (Total Time – Scheduled Maintenance Time)]} * 100

"**Downtime**" shall mean the time period for which the specified services / components with specified technical and service standards are not available to the state and user departments and excludes the scheduled outages planned in advance, the link failures and reasons beyond Vendor Control.

"**Incident**" refers to any event / abnormalities in the functioning of the Data Centre Equipment / specified services that may lead to disruption in normal operations of the Data Centre services.

"**Resolution Time**" shall mean the time taken (after the incident has been reported at the helpdesk), in resolving (diagnosing, troubleshooting and fixing)

The following shall be the responsibilities of the successful bidder.

3. Uptime Requirements:

The bidder shall ensure the uptime requirements for various systems, equipments, components as per details given in the following Table.

Sr No	List of Utilities	Criticality	Redundancy	Uptime	Resolution time
1	HVAC and Cooling (Including PAC/PAHU, Dry cooler/ Pumps,)	High	N+1	98.5%	6-8 hours for minor complaints and 24-48 hours for major complaints.
2	UPS	High	N+1	98.5%	6-8 hours for minor complaints and 24-48 hours for major

Sr No	List of Utilities	Criticality	Redundancy	Uptime	Resolution time
					complaints.
3	Electrical Infrastructure	High	N+1	98.5%	6-8 hours for minor complaints and 24-48 hours for major complaints.
4	DG Sets	High		98.5%	6-8 hours for minor complaints and 24-48 hours for major complaints.
5	Fire detection and alarm systems, VESDA system, Fire suppression system,	High			Within 24 Hours
6	BMS and real-time measurements, CCTV system, Rodent control, Water leak detection system, Access control system	Medium			Within 48 Hours

4. Reporting Methodology

Understand & analyzing the products covered in the Supply, installation and commissioning scope and performance on periodic basis.

Submission of daily, weekly and monthly service performance reports in the agreed format specified as per the requirement of the infrastructure facilities.

Measurement and Monitoring with recording of readings and checking parameters of different facility equipment's.

Analyzing the readings and escalating suitably for abnormalities observed, if any. Supervise installation and maintenance work, whenever new equipment or systems are to be / being installed.

Adequate stock of onsite and offsite spare parts and spare component must be maintained by the successful bidder.

Successful bidder to ensure the commitment towards uptime requirement of the DC.

To provide this service it is important for the M/S ……. selected bidder to have back to back arrangement with the OEMs. The selected bidder would be required to provide a copy of the service level agreement signed with the respective OEMs.

Component that is reported to be down on a given date should be either fully repaired within the stipulated time frame. If breakdown is major, bidder to arrange for standby component/equipment on temporary basis (of equivalent configuration) within the time frame. In case the selected bidder fails to meet the above standards of maintenance, there will be a penalty as per clause 9 of section III.

5. **DAILY CHECKS:**

Access Control System:

- 24x 7 checking of Access System for alert and alarms.
- Monitoring of Status.
- Abnormality of System / errors
- Access Card Activity
- Report of Access to Data Center
- Report of Forceful Access (Invalid Access)
- Generation of Logs / reports and submission to Host Institute for review and necessary action.
- Testing & checking of all Doors, Magnetic locks and Sensors.

CCTV:

- Daily Checking of DVR System & Cameras
- Suspicious Action Report
- Abnormality of System
- Generation of Logs / reports and submission to Host Institute for review and necessary action/s Maintenance of reports

Fire Alarm System, Novec 1230 Gas, VESDA, Water Leak Detection (WLD), Rodent Repelled:

- Daily Checking of FAS Panel
- Immediate Action to Alarm Generated
- Monitoring of MCP
- Generation of Logs / reports and submission to Client for review and necessary action/s Maintenance of reports, Report Generation through IBMS.

Precision AC, PAHU and Comfort AC:

- Monitoring of PAC's Temperature and Humidity every half an hour physically.
- Monitoring of Alarms & Immediate Action to it Comparison of Software readings with Actual Reading.

6. **Fire Drill Test**

Maintenance Activities will be carried for the System/Devices in Coordination with Host Institute Engineer & Technician

7. **Daily Reports**

1. Hourly basis monitoring of UPS & PAC & concern System
2. Reports of Energy meter reading of all meters.
3. Readings of main LT panel.
4. Fuel in DG fuel tank.
5. Immediate response to electrical complaints by any Working staff.
6. Following of effective power consumption chart provided by Customer.
7. Maintaining Critical Electrical parts.
8. Generation of Logs / reports and submission to Host Institute for review and necessary action's Maintenance of reports

8. Weekly Reports

1. All Electrical Systems Health Check Report
2. Vendor call tracking until closure
3. UPS & DG: On load Report.
4. Fire Alarm System: Reports of False Alarm.
5. Access System: Data Backup.
6. CCTV: Backup of DVR Status.
7. WLD: Test of Water Leak Detection Sensor Cable.
8. All System Health Report.
9. PAC, Chiller and comfort AC

9. Monthly Reports

1. Follow up of schedule regarding preventive maintenance.
2. Presentation of consumption of meter units by Pie diagram.
3. Vendor Performance Reports.
4. Report of pending calls/problems.
5. MIS Report Presentation for Each Month

10. Call Logging Process with OEM/Vendors

The onsite team will get alerts on any issue in the data center. The onsite team will identify the area of problem and define problem severity into minor or major call. Call severity will be decided on basis of unit under suspect and impact on functions inside data center like - electrical power in DB, racks, cooling efficiency. Based upon this on site team will either manage to close the problem in case of minor alerts/alarms or In case of major alarms the team will raise an alarm over phone and email to OEM/Vendor with information to C-DAC /Host Institute designated team and O&M in-charge. O&M team will follow the Escalation matrix. The site team / OEM will identify problem area and will work towards resolution of problem.

11. Scheduled Maintenance

Bidder to submit the scheduled maintenance time along with frequency for the components.

12. **Bidder has to submit and present the detailed plan of execution for Operation and maintenance activities including manpower deployment along with qualification details of manpower deployed at site.**

Annexure – I: Certificate from bidder

To:
Executive Director,
Centre for Development of Advance Computing,
Pune – 411 008

Ref: Tender Ref. No: CDACP/NSM-DC-IISc/20-21/318

We hereby certify that the goods being offered by us vide our proposal, comply with the provisions of order No. Order No P-45021/2/2017-PP (BE-II), dated 4th June, 2020 issued by Public Procurement Division, Department of Investment and Internal Trade, Ministry of Commerce, GoI, read with order number W-43/4/2019-IPHW- MeitY, dated 7th September, 2020 issued by IPWH division of MeitY, GoI.

We hereby certify the details pertaining to goods offered by us, as given below:

Sr. No	Item Description	Make & Model No.	Country of origin of OEM	Country of Manufacture of item	Country of Shipment
1					
2					
3					
4					
x					

We also certify that, we are not from a country sharing land border with India as defined in order No. F/No/6/18/2019-PPD dated 23 July 2020 issued by public procurement Division, Dept. of Expenditure, Ministry of Finance, GoI and the goods offered by us comply with the provisions of said order.

For (Name of bidder)

Authorized Signatory
Name & Designation:
Mobile No:

(End of Document)