Bharat Heavy Electricals Limited
भारत हेवी इलेक्ट्रिक्ल्स लिमिटेड

Corporate Digital Transformation
कॉर्पोरेट डिजिटल ट्रांसफॉर्मेशन

**2nd Floor, HRD & ESI Complex, Plot No. 25
Sector 16A, NOIDA, Uttar Pradesh 201301**

Expression of Interest (EOI)
For
Implementation of Data warehouse, Business Intelligence & Advance Analytics solution at BHEL

BHARAT HEAVY ELECTRICALS LIMITED
भारत हेवी इलेक्ट्रिक्ल्स लिमिटेड
CORPORATE DIGITAL TRANSFORMATION
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Contents

1. INTRODUCTION

BHEL is the largest engineering and manufacturing enterprise in India in the energy-related/infrastructure sector, today. BHEL was established more than 40 years ago, ushering in the indigenous Heavy Electrical Equipment industry in India - a dream that has been more than realized with a well-recognized track record of performance.

BHEL manufactures over 180 products under 30 major product groups and caters to core sectors of the Indian Economy viz., Power Generation & Transmission, Industry, Transportation, Telecommunication, Renewable Energy, etc. The wide network of BHEL's 14 manufacturing divisions, four Power Sector regional centers, over 100 project sites, eight service centers and 18 regional offices, enables the Company to promptly serve its customers and provide them with suitable products, Systems and services -- efficiently and at competitive prices. The high level of quality & reliability of its products is due to the emphasis on design, engineering and manufacturing to international standards by acquiring and adapting some of the best technologies from leading companies in the world, together with technologies developed in its own R&D centers.

BHEL's vision is to become a world-class engineering enterprise, committed to enhancing stakeholder value. The company is striving to give shape to its aspirations and fulfill the expectations of the country to become a global player.

For more information, refer BHEL's website: www.bhel.com.

BHEL intends to deploy an Advance Analytics, Data Management and Business Intelligence Solution at an enterprise level for a variety of use cases and application to use the business information available at unit/corporate database for in-depth analysis and insight for better understanding of operations and support for decision making.

Proposed System should be capable to:

- Reduce latency between data and deployment.
- Explore multiple approaches to find optimal solutions.
- Solve complex analytical problems faster.
- Quickly deploy analytics models and on the fly analytics on the staged data.

Through this Expression of Interest (EoI), BHEL seeks responses from interested OEMs and their system integrators.

2. INSTRUCTION TO INTERESTED PARTIES

2.1 Scope of Interested Party shall be limited to response and suggestions to this EOI only.

2.2 Scope of work, Deliverables, Timelines, Terms and Conditions, Eligibility/Qualification Criteria, NDA defined in this EOI will be applicable for compliance for prospective bidders **at the time of Tender**. However, in response to

EOI, Interested Party may suggest improvement wherever necessary.

2.3 Interested parties may submit their response with a Letter of Intent (LOI), detailed concept note/approach paper to address scope of work by email on or before **22-06-2021** to below mentioned recipient:

Sh. Amit Kumar
Senior Engineer
Bharat Heavy Electricals Limited,
2nd floor CDT HRDI & ESI Complex,
Film City Sector 16A Noida UP Pin:201301
Phone: 0120- 2416497
E-Mail: amitkumar@bhel.in

2.4 The details submitted by the Interested Party shall be complete in all respects and BHEL may seek clarifications/additional information as considered necessary. Such clarifications/ additional information must be provided within 3 days of BHEL request.

2.5 The Interested Parties may be called for interaction and presenting their proposal, if required. Further award of work shall be through tendering process. The criteria of selection will be detailed later in Notice inviting tender (NIT).

2.6 Any request for further information or clarification on the EOI document may be submitted to the above mentioned official within 7 days from date of issue of EOI.

2.7 Duly authorized representative(s) of the Interested Party shall sign on each page of the document and send document over e-mail to above mentioned recipient. Response to EOI should be prepared in such a way so as to provide a straight forward, detailing proposal for scope of work and concise description on Interested Party's organization and manpower capabilities.

2.8 Notwithstanding anything contained in this EOI, BHEL reserves the right to accept or reject any proposal and to annul the EOI Process in whole or part, at any time without any liability or any obligation for such acceptance, rejection or annulment, and without assigning any reasons thereof.

2.9 BHEL reserves the right to verify all statements, information and documents submitted by the Interested party in response to the EOI. Any such verification or lack of such verification by BHEL shall not relieve the Interested Party of his obligations or liabilities hereunder nor will it affect any rights of BHEL.

2.10 The EOI process shall be governed by, and construed in accordance with, the laws of India and the Courts at New Delhi shall have exclusive jurisdiction over all disputes arising under, pursuant to and/ or in connection with the EOI process.

2.11 Interested Parties should provide following details:

2.11.1 Detail concept note and approach paper to address scope of work, technical and functional specification of the proposed solution along with project milestone

timeline chart, manpower resources required and hardware sizing of solution.

2.11.2   Details as per format for Expression of Interest in **Annexure -I**.

3. PROJECT OBJECTIVE

BHEL intends to implement Data Warehouse, Business Intelligence (BI) & Advance Analytics solution to enhance and automate the information reporting and decision support system of the organization. The objective of this project is to deploy a scalable & agile advance analytics platform to have the capabilities of predictive analytics and shall cater BI & reporting for the management based on available data. i.e., ensuring the reporting framework has capabilities of high data exploration, slice & dice and availability of the reports on the mobile & tablets for quick decision making.

The Advance Analytics to help in deep insights to corporate level objectives, key performance indicators (KPIs) and in generating specific targeted results linked to these KPIs.These KPIs to be made available to concerned department in dashboard and it can be further drilled down to derive desired results. Performance monitoring will require clear targets for each of the measures as well as periodic reporting of actual results. The system to enable notification to respective metrics owners in case of exceptions or deviation from the respective targets as well as provisions for providing explanation for the deviation.

Through implementation of this project, BHEL intends to take initiatives to:
- Implementation of solution for effective decision support for the functional groups and its key stakeholders.
- Enable an automated, secured and robust platform that secure data from identified sources with no manual intervention.
- Management of Data availability for KPIs (Key Performance Indicators) from various sources - SAP, in-house applications, Oracle, etc.
- Deep drill downs of KPIs.
- Comparison of various KPIs of units/locations across BHEL.
- Effective internal communication based on BI information.
- Provide analytical capabilities through dashboards.
- Automated tracking and alerts.
- Building a modernized, new age platform and becoming an analytics driven Organization

Following are the primary users of the solution:

Top Management Team	Timely availability of reports anywhere and anytime over mobile app/laptop/desktop with drill-down / drill-thru capabilities
Business User	Ability to quickly customize a report for the management without support from the technology team
For the IT Team	Ensuring optimal use of IT resources and focusing on evolving the BI platform into valued analytics platform. Deploy Data Analytics and Data mining platform for developing advance analytics use cases.

Following are the key business benefits expected after enablement of solution:

Accountability – Assign department/function responsibility for objectives, key performance indicators, and initiatives.

Alignment – Improve performance and interprets initiatives, and metrics in time Series format.

Central KPI repository – Leverage a simplified and centralized administration of KPIs.

Collaboration – Threaded discussion in meeting view. Dashboard helps organization monitor performance by tying strategy to key objectives and measures.

Exception management – Receive automatic notification of below horizon objectives.

Performance comparisons – Compare unit wise performance with relevant benchmarks. The software should have features and functionality to compare internal and external benchmarks on KPIs. Primary objective is to compare same KPIs across BHEL units.

Advance Analytics –The offered system shall also comply to the industry standard analytics algorithm to include advance predictive analytics.
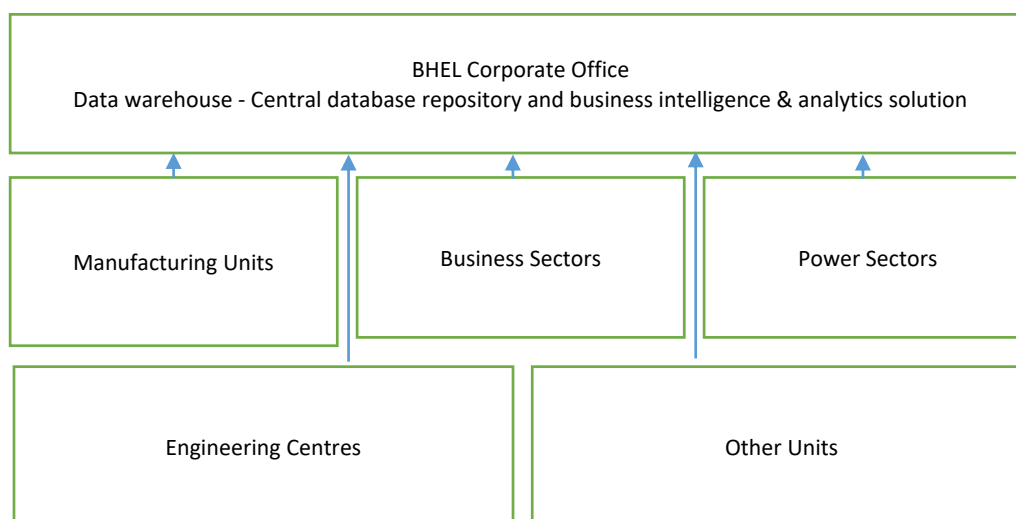
Mobility- Offered platform shall comply to the requirement of mobility for viewing of dashboards without custom development of webpages. The reports shall be accessible through all IOS or Android based devices by installation of the OEM App available free of cost on different online stores. Mobility device should enable users for annotation and share the observation with in closed user group via various multimedia sources.

Proposed solution should be capable to:
- Reduce latency between data and deployment.
- Explore multiple approaches to find optimal solutions.
- Solve complex analytical problems faster.
- Quickly deploy analytics models and on the fly analytics on the staged data.

3.1 DATA SOURCES

Data shall be aggregated from all BHEL locations to BHEL Corporate Office.

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┌─────────────────────────────────────────────────────────────────────┐
│                        BHEL Corporate Office                         │
│  Data warehouse - Central database repository and business           │
│              intelligence & analytics solution                       │
└─────────────────────────────────────────────────────────────────────┘
     ↑                    ↑                    ↑
┌──────────────┐   ┌──────────────┐   ┌──────────────┐
│ Manufacturing│   │   Business   │   │    Power     │
│    Units     │   │   Sectors    │   │   Sectors    │
└──────────────┘   └──────────────┘   └──────────────┘

┌──────────────────────┐   ┌──────────────────────┐
│  Engineering Centres │   │     Other Units      │
└──────────────────────┘   └──────────────────────┘
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Data shall be available in below mentioned formats:
-       Oracle Database

-     SAP-ERP
-     In house developed applications and reporting
-     SQL Database
-     Flat Files
-     Other software – MariaDB, MySQL,PostgreSQL, MS Excel, MS Access etc.

3.2 SYSTEM ARCHITECTURE

Solution to be deployed on-premise at BHEL CDT, Corporate office, Noida. Indicative architecture of system in 3 layers

1. Bottom layer: Data at different BHEL units/ locations spread across country.
2. Middle layer:
    a) Data Warehouse- data management from different data sources – SAP, Oracle, in-house applications, MS Excel, flat files etc.
    b) Analytics and business intelligence for presentation of data, dashboard, visualization and reporting etc.
3. Top layer: Users accessing the solution.
    a) Business/Function users who will be accessing the analytics and business intelligence reports.
    b) IT Admin users who will be managing the solution configuration, performance, security etc.

4. BROAD SCOPE OF WORK

BHEL intends to implement centralized data warehouse, business intelligence and advanced analytics solution by integrating data from multiple heterogeneous sources across BHEL to support analytical reporting, structured and/or need based queries processing and decision making. Bidder to supply shall require to perform following services as part of the overall scope:

- Supply & Installation of Software
- Supply of hardware- server, storage
- Sizing of hardware for optimized usage of software
- Implementation of Data Analytics Platform
- Implementation of tentative list of KPIs in **Annexure -II**
- Deploying resources during implementation and support manpower after installation for 5 years period.

- Bidder to supply software solution for Business Analytics, Business Intelligence and Data warehouse/management in compliance with technical specification as mentioned in **Annexure-III.**

5. TERMS AND CONDITIONS

5.1   During tender evaluation process, BHEL shall verify the authenticity of all documents submitted w.r.t eligibility criteria including experience and past performance from the customer for whom the work has been claimed to be done. The contact detail of such customers has to be submitted at the time of tender bidding.

5.2   After placement of Purchase Order (PO), successful bidder has to submit the acceptance of PO within 7 days.

5.3   **Payment Terms**

5.3.1   Payment shall be made in arrears after completion of work.

5.3.2   BHEL will make the payment within 45 days from the date of submission of invoice.

5.4   **Liquidated Damage**

Liquidated Damage/Penalty shall be at the rate of 0.5% of the total cost of project, per week of delay or part thereof subject to a maximum of 10% of the total cost of project. For this purpose, the period of delay shall be the delay attributable to the consultancy agency for the completion of work as per contract.

5.5   **Taxes & Duties**

5.5.1   Taxes (GST) shall be extra and payable as per prevailing rates. Any change in applicable taxes or imposition of any new applicable tax by GOI, the same shall be borne by BHEL on submission of documentary proof by the successful consultancy agency. However, any decrease in applicable taxes or any new tax, benefit shall be passed on to BHEL.

5.5.2   Bill prepared by the contractor should be pre-numbered and must contain inter-alia GST registration number, PAN number and GST category (as per Good & service tax act).

5.5.3   TAX deduction at source: Tax shall be deducted at source from running bill as per applicable income tax rule & other statutory requirements.

5.5.4   BHEL will claim Input Tax credit on GST.

5.5.5   Consultancy agency to ensure compliance of GST law and rules applicable on supply involved in this tender and in the event of any non-compliance by consulting agency, implication of the same if any shall be an account of consulting agency.

5.6   **Non-Disclosure Agreement:**

5.6.1   The bidder shall comply with the Information Security Management System of BHEL and work within the framework of ISMS as applicable in BHEL from time to time.

5.6.2   All the material / information sent to the consulting agency shall be treated as confidential and should not be disclosed in any matter to any unauthorized person under any circumstances. The consulting agency has to furnish a Non-Disclosure Agreement (NDA).

5.6.3   Format for NDA is attached in **Annexure-IV.**

Annexure-I
Format for Expression of Interest

1   Organization Details

Name of the organization	
Type of Organization (Pvt/ Public /Partnership/ LLP etc.)	
Date of Incorporation	
Address of Corporate / Head / Registered Office	
Phone Number of Registered office	
Website	

2   Contact Person for the Applicant

Name:		Designation:	
Address:		Email:	
Telephone	Office:	Mobile No.:	

3   Bidder work experience:

S. No.	Eligibility Criteria	Document(s) to be provided as a proof
1	The Bidder should have Positive Net worth for the last three financial years: 2018-2019, 2019-2020 and 2020-2021. *Note: In case, the bidder is following calendar year as their accounting year, the equivalent period for considering annual turnover and Net worth is 2017, 2018 & 2019.*	Audited Balance Sheet and Loss & Profit statement OR Certificate from statutory Auditors
2	The Bidder should have PAN No. and GST Registration No.	Documentary proof to be submitted
3	The Bidder should have a registered office in India.	Documentary proof to be submitted
4	The Bidder should not be currently black listed / banned for business dealings by any Govt. authority / department / agency or by any	Undertaking on Company Letterhead

	BHEL Unit / Region / Division / Office.	
5	The interested party should be OEM/SI of Data Management/Data warehouse, Advanced Business Analytics and Business Intelligence Solution	Name of OEM and name of proposed solution.
	The bidder must have supplied at least one single work order as an OEM or System Integrator duly authorized by the OEM, in preceding seven (07) years from the date of EOI period in industries namely) for implementing advance analytics based BI and Data Management solution using AI/ ML techniques to carry out analysis and forecasting based on historical data or any other database and perform processing / analysis on that data for generating actionable information	Provide value of work in Rs. Lakh Type of Industry

4 Financial credentials of the Interested Party

Financial Year	Annual Turnover (Rs. Crores)	Net Profit (Rs. Crores)	Annual Turnover (Rs. Crores)
2018-19			
2019-20			
2020-21			

5 Manpower requirements:

Interested Party may suggest best approach with cost optimization for manpower at the time of installation, configuration, deployment and post implementation support, indicative information are as mentioned below:

a. Manpower requirement for installation, configuration and deployment:

i. Project Manager (Interested Parties may provide required experience) – 1 no.
ii. Data Scientist (Interested Parties may provide required number and experience) with domain expertise

b. Manpower for post implementation support:

i. Manpower to be deployed for service support at BHEL premises for 5 years with Educational qualification of BCA/ BBA,/MCA/ MBA/ M.Tech/ M.Sc (IT/CS), B. Tech/ Graduate in any discipline/Diploma/ Post graduate in any discipline with Data Scientist certification.
ii. Should have 5 years' experience in service support on OEM solution for Analytics, Business intelligence, Data Management
iii. Responsibility of Deployed manpower shall be to configure future KPIs and administration of solution.

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6   Proposed Solution

Particulars	(Provide Responses)

Interested party to submit
  a) Response and comments on Technical specifications s per **Annexure-III**
  b) Propose specifications that needs to be added/deleted/updated
  c) Suggestive KPIs of similar industry such as Capital Goods / Manufacturing / Power sector in Indian context.
  d) Brief approach for implementation, activity with milestone
  e) Suggestive trainings for BHEL employees for proper use and management of solution	

7   Completion Period:

Tentative completion time shall be 3 months from the date of placement of PO.

8   Estimated Price

Activity	Price in Rs.Lakhs (excluding Taxes)
Total approximate cost of project with above mentioned scope:	
Total approximate Hardware cost for deployment	

Note: Mention details on taxes.

9   Hardware:

Proposed Hardware sizing of the Data Warehouse based on below indicative information:
Total Database size: 20 TB

S. No	Data Volume	Concurrent sessions	Avg. Data size
1	<=1GB	50	500 MB
2	>1 GB & <=10 GB	20	8 GB

3	>10 GB	10	20 GB

Average annual growth approximately 10%

Hardware Sizing – BI shall be based on:

i.   No. of Users: 200
ii. Concurrent users: 50
iii. Data Visualization:

S. No	Data Volume	% of dashboards
1	<=1GB	50
2	>1 GB & <=10 GB	30
3	>10 GB	10

Average annual growth approximately 10%.

10 Trainings:

Vendor shall provide required training and certifications to concerned BHEL employees for proper management and usage of Data Warehouse, BI & analytics solution.

* use additional sheets wherever required

I hereby declare that the details furnished in response to this EOI are true and correct to the best of my knowledge and belief. In case any of the above information is found to be false, I am aware that I may be held liable for it.

Place: Name & Signature:
Date: Designation:
Company Seal

Annexure-II

Key Performance Indicators (KPIs)						
Unit	SNo.	Major areas	Parameters	Description	Sources of data (if any)	Scope of identified data sources (Corporate / Division level)
CPP-Marketing	1	Order Booking	Budget Vs Actual	Exp. Order Value & exp. Qtr of FY of order Finalization	Business sector (BS) database/ IS MIR system	Division
	2	Order Booking	Past Performance	Details of order Booking of previous years	Business sector (BS) database/ IS MIR system	Division
	3	Order Booking	Market Share	Standalone STG		Division
	4	Cash Collection	Budget Vs Actual	BE target of Cash Collection	Business sector (BS) database/ IS MIR system	Division
	5	Cost Competitiveness	Cost Analysis	Details of cost incurred in the project by Units / Region	UNIT/ Region SAP	Unit/ Region
CQBE	1	CQBE	Reduction in Mfg. NCs	Non-Conformance Report (NCR) is raised when non-conformance is observed during manufacturing process with respect to specified requirements. Non-Conformity	Manufacturing Units	Shop NC/ Route card/ OPS

			Report (NCR) system includes Identification, control, segregation and disposition of non-conformities in product during manufacturing.		
	2	CQBE	Reduction in NCs during erection due to manufacturing / engineering error (SAR)	Site Action Request (SAR) is a non-conformance report raised online by project sites during erection/ pre-commissioning stage when discrepancies are observed in design/drawing, specifications, any other technical documents OR manufacturing defects are noticed in items supplied by manufacturing units and vendors OR items received are not as per drawing & specifications. Concerned manufacturing Unit provides solution to the nonconforman	Manufacturing Units/ Engineering centres	Online SAR/CAR system

			ce		
	3	CQBE	Reduction in NCs during commissioning due to manufacturing / engineering error (CAR)	Commissioning Action Request (CAR) is a non-conformance report raised online by project sites during commissioning stage when discrepancies/ failures are observed in equipment, system, components; parameters of operation not conforming to specified values corresponding to design; deficiencies in operation & maintenance instructions etc. Concerned manufacturing Unit provides solution to the non-conformance.	Manufacturing Units/ Engineering centres	Online SAR/CAR system

	4	CQBE	Reduction in NC due to error in erection & commissioning(SDR)	Site Deviation Report (SDR) is a non-conformance report raised online by project site due to deviations observed during erection & commissioning, attribute to site operations, such as deviation from technical documents issued by Power Sector, deviation on erection & commissioning processes with respect to erection/ commissioning procedures, material storage & preservation procedures, workmanship etc.	Sites	Online SDR system
	5	CQBE	Reduction in failure during warranty		PSTS/ TSX-Region	CCMS/ PSTS data
	6	CQBE	Reduction in cost of rework/rejection	System to capture cost of rework/ repair and rejection/ replacement from the stage of receipt of material followed by manufacturing/ processing at manufacturing	All Units	RW/RJ system of units

			units to installation at sites. This is the cost which is attributed to manufacturing units/ PS-Regions/ Engineering Centers due to non-conformities in products & processes or failure of products.		
7	CQBE	Reduction in failure cost due equipment failure after commissioning.	Capturing cost of product/ equipment failure after commissioning / handing over to customer and within warranty/ defect liability period.	All Units	CQBE procedure no. AA/CQ/SY/028 Rev-00
8	CQBE	Reduction in MDR	Material Discrepancy Report (MDR) is a non-conformance report raised online by project site when it is found that material received at site are having short supply, excess supply, wrong supply with respect to dispatch documents; materials received in damaged	Manufacturing Units/ Engineering centres	Online MDR system/ sites/ unit data

				condition. Concerned manufacturing unit provides solution to such discrepancies.		
	9	CQBE	Welder performance	Welder performance is performance of welder to measure the number of defective joints w.r.t. number of joints tested.	Sites	Online WPMS
	10	CQBE	Welding performance	Welding Performance is process of measuring/Monitoring of welding process right from planning of weld joints to execution, inspection and testing of weld joints at Power Sector sites	Sites	Online WPMS
	11	CQBE	Completion of protocols	Completion of protocol is number of protocol signed by customer and uploaded in Field Quality Measurement System (FQMS) with respect to No. of protocol initiated by engineer	Sites	Online FQMS system

	12	CQBE	QHI (Quality Health Index)	Quality Health Index (QHI) indicates Organization's Health with respect to Quality. QHI is calculated from the criteria like status & trend of Key Performance Indicators, Quality System Maturity score, Business Excellence/ Total Quality Management (TQM) score and Quality Image	All Units	QUAVID dashboard
IS (DABG) - Marketing & PMG	1	Order Booking	Budget Vs Actual	Orders booked by Business Sector	Business Sector/ P&MS	Business Sector/ P&MS
			Market Share	Defence Products	Business Sector/ P&MS	Business Sector/ P&MS
	2	Outstanding orders	Contractual & Planned/ actual delivery of each executable order (item wise)	For better planning of turnover & cash collection and to ensure timely delivery to avoid LD	Unit	Updation in Order Booking Liquidation System (OBLS) required
			Contractual & Planned/ actual delivery of each non executable order (item wise)	Reasons of non-execution for better decision making (to put on hold, short closing, Arbitration etc.)	Unit	Updation in Order Booking Liquidation System (OBLS) required
	3	Billing	Order wise weekly turnover	To ensure submission of bills along with supporting documents to customer	Unit	Updation in Debtors Management System (DMS)

				within 10 days of its due for timely cash realization. MRC to be arranged within 15 days after receipt of material.		required
	4	Provisions	Order wise details of provision with actual reason	To ensure timely vacation of provisions	Unit	Updation in Debtors Management System (DMS) required
	5	Bank Guarantees (BGs)	Order wise BG details with due date	To ensure timely vacation/ extension of BGs	Business Sector Finance/ Unit Finance	
	6	Liquidated orders	Details of all executed/ cancelled/ short closed orders	For better Cost estimates	Unit	
	7	Lost Orders	Details of lost orders/tenders with competitor's details.	For analysis & making better pricing strategy in line with market trend for future tenders	Business Sector/ P&MS	
IS-Project Management Group	1	Project Execution	Reduction in LD for delay imposed/withheld	Information to be recorded regarding LD imposed/withheld and Turn Over in each project year wise	Turnover Monitoring (TO) Monitoring system of COM	Corporate level
	2	Project Execution	Communication of Customer delays & delivery extension	Delays in projects due to reasons at customer end to be recorded in system along with all relevant	Project Manager and Contract Manager at Unit	Corporate level

			details, which could be utilized at the time of time extension case		
3	Project Execution	Early closure of contracts after commissioning	Records to be captured in system regarding completion of pending works after commissioning viz. description, requisite materials, cost incurred, time taken etc.	Project Manager and Contract Manager at Unit/Regions	Corporate level
4	Project Execution	Reduction in the Delays in Ordering	Details regarding Delay from schedule date in Ordering of BOIs/Raw Materials etc. to be captured through system along with key words for the reasons	SAP System of Units	Division level
5	Project Execution	Reduction in the Delays in Awarding of site work contracts	Details regarding Delay from schedule date in awarding of Site works contracts along with key words for the reasons, to be captured through system	System being followed at Regions	Division level
6	Project Execution	Reduction in the manufacturing cycle of BHEL equipments	Details to be recorded with respect to delays happening in	System of Units	Division level

				each operation/activity of all major equipment of each project		
ROD-EP & TP	1	Order Booking	Competitiveness	Product/Order wise margins analysis	Unit database/manual entries	Corp/Division
	2	Order Booking		BHEL vs Competitors rates analysis	Divisions' database	Corp/Division
	3	Order Booking	Customer Profiling	Enquiry to Order conversion ratios	Divisions' database	Corp/Division
	4	Order Booking		Sundry Debtors/Receivables - Billing to Realization ratios	Debtors Management System (DMS)	Corp/Division
	5	Execution	Contract Performance - Order Execution	Performance Delays analysis	Divisions' database/manual entries	Corp/Division
	6	Execution		Contract Closing time periods	Divisions' database/manual entries	Corp/Division
	7	Quality	Customer complaint	Equipment failure data - BHEL and others	Customer Care Management System (CCMS)	Corp/Division
	8	Quality		Customer grievance resolution periods	Customer Care Management System (CCMS)	Corp/Division
Solar Business Group	1	Marketing	Order Book Report	Budget and Actual of Current Year and previous years	MIR System	IS and Unit level
	2	Project Management	Project Cash Report	Project wise Cash Inflow vs Cash Outflow including 3 months rolling	System	IS and Unit level

				plan		
	3	Marketing	Costing	Bought Out Items procurement cost present and trend for Costing	System	Unit level
TBG	1	Order Booking	BE OB Target	Project wise list, Exp. Order Value & exp. month of order Finalization	BS database/ IS MIR system	Division
			RE OB Target	Project wise list, Exp./Act Order Value & exp./Act month of order Finalization	BS database/ IS MIR system	Division
			Actual Order Booking as on date	Project wise list, Value & Actual date of Finalization	BS database/ IS MIR system	Division
			current Market Share	Market share of BHEL &Competitors	BS data base	Division
			Past Performance	Details of order Booking of previous years	BS database/ IS MIR system	Division
	2	Operations	Order Outstanding as on date	Firm order details available for Liquidation/execution	BS data base	Corp/Division
				Details of Order on Hold	BS data base	Corp/Division
			Turn Over(TO)	BE target of Fin. TO-Project wise	BS data base	Corp/Division
				RE target of Fin. TO-Project wise	BS data base	Corp/Division
				Act. Fin. Turn Over	BS data base	Corp/Division
			Material Content	% of material Content	BS data base	Corp/Division
			Value added	Value added as % of Turn	BS data base	Corp/Division

				Over		
			Profit/Loss	Details of Profit/Loss	BS data base	Corp/Division
			Cash Flow	Details of cash Inflow	BS data base	Corp/Division
				Details of cash Outflow	BS data base	Corp/Division
				Details of Net Flow	BS data base	Corp/Division
				Details of Net Billing	BS data base	Corp/Division
			Cash Collection	BE target of Cash Collection	BS data base	Corp/Division
				RE target of Cash Collection	BS data base	Corp/Division
				Cash Collection against Net Billing	BS data base	Corp/Division
				Total Cash Collection	BS data base	Corp/Division
			Trade Receivables	Trade Receivables (Net)	BS data base	Corp/Division
				Net Trade Receivables days	BS data base	Corp/Division
	3	Man Power		Man Power in numbers	BS data base	Corp/Division
	4	Quality	Quality Parameters Identified in Quavid	Material Discrepancy Report (MDR)	SSON system	Corp. Level
				Site Action Request (SAR)	SSON system	Corp. Level
				Commissioning Action Request (CAR)	SSON system	Corp. Level
				Root Cause Analysis (RCA)	SSON system	Corp. Level
				Quick Response Notification (QRN)	SSON system	Corp. Level
				Customer Care Management System	SSON system	Corp. Level

				(CCMS)		
				Total Quality Management (TQM)	SSON system	Corp. Level
				Quality Management System Maturity model (QMER)	SSON system	Corp. Level
				Quality Health Index (QHI)	SSON system	Corp. Level
				Quality Training (QT)	SSON system	Corp. Level
				Quality Circle (QC)	SSON system	Corp. Level
Industry Sector, ESSG	1	Business Domain	Products / System being offered	Name of product / System (MUs / Executing agencies within BHEL)	BS database/ IS MIR system	Division
	2	Customers / Partners	Details of Customer / Partners	Name / Email ID / Contact Details / Site details etc	BS database/ IS MIR system	Division
	3	Vendor / Suppler Chain	Details of Vendor / Suppler Chain	Name / Email ID / Contact Details etc - Product wise	UNIT/ Region SAP	Unit/ Region
	4	Flow of Business enquiries	Details of tenders / enquiries (Monthly/Qtr/Yearly basis)	Name of tender, date of enquiry, tender/enquiry due date, Value, exp date of finalization	BS database/ IS MIR system	Division
	5	Proposal / Offer submitted to Customers	Nos of proposal submitted (Monthly/Qtr/Yearly basis)	Date of submission and Status	BS database/ IS MIR system	Division
	6	Order Booking	Budget Vs Actual (Yearly/Half Yearly/Quarterly)	Exp. Order Value & exp. Qtr of order Finalization *(Details of Firm / Anticipated order)*	BS database/ IS MIR system	Division

	7		Expanding footprint by attempting New Customers	Adding new customers to BHEL product portfolio	BS database/ IS MIR system	Division
	8		Development of New products / system for non-coal business	Nos of new product / system developed contributing to non-coal business	UNIT/ Corp. R&D Region SAP	Unit/ Corp. R&D / Region
	9		Commercialization of New product / system	Turnover/sales contribution from new product / system (Yearly)	UNIT/ Region SAP	Unit/ Region
	10		Past Performance trend	Details of product wise order Booking of previous 5-8 years	BS database/ IS MIR system	Division
	11		Market Share trend	Product wise market share trend (5-8 years)	BS database/ IS MIR system	Division
	12	Cash Collection	Budget Vs Actual	Cash Collection wrt Budget (Qtr/Yearly)	BS database/ IS MIR system	Division
	13	Liquidation of Deferred debt	Budget Vs Actual	Cash Collection wrt Budget (Qtr/Yearly)	BS database/ IS MIR system	Division
	14	Competitiveness	Product Cost Analysis	Details of cost incurred in the project/product by Units / Region (@ proposal stage & @ during execution / completion stage)	UNIT/ Region SAP	Unit/ Region

	15	Deliveries / Commissioning	Nos / MW / Lots / Unit Delivered or commissioned as per the contract	Product / Project details approved by project manager (Contractual date / actual date / delay / reasons / remarks etc)	UNIT/ Region SAP	Unit/ Region
Corporate-HR	1	Manpower	Manpower data	1.Total strength of manpower category-wise on real time basis. 2.Companywide - Executive | Supervisor | Worker - Distribution in a pie chart and Total Count with % 3. Unit wide - Executive | Supervisor | Worker - Distribution in a pie chart and Total Count with % 4. Companywide - Function-wise distribution of Manpower 5. Unit wide - Function-wise distribution of Manpower	SAP Data	To be maintained at respective Unit level
	2	HR Data	Retirement Profile	1.Year wise future projection of retirement in Executives, Supervisors and Workmen Category	SAP Data	Input from units in SAP system

			2. Further bi-furcation of employees profile wise (the work they are handling) 3. Past data on separation of employees (with reason) for last five years in Executive, Supervisor and Workmen category		
	HR Data	Induction Data	Induction of manpower in different category by recruitment, promotion during last 5 years and their work profile.		Input from units in SAP system
3	HR Data	Profile wise strength	Qualification wise / competency-wise distribution of manpower with their current work profile	SAP Data	Input from units in SAP system
4	HR Data	Succession Planning	List of potential successor for particular position	SAP Data	Input from units in SAP system
5	HR Data	Promotion data	1.Past Data (for 10 years) grade wise/function-wise/unit-wise no. of employees eligible, their categories and nos. promoted with categories 2. Future data	SAP Data	Input from units in SAP system

			(next 5 years) grade wise/function-wise/unit-wise no. of employees eligible, their categories		
	6	HR Data	Contract Labor Data	Contract labor engaged through contractors/societies at Units/Divisions and associated cost	Corporate system	Input from units in Corporate HR system
	7	HR Data	IR across BHEL	Daily Industrial Relations Report	Corporate system	Input from units in Corporate HR system
	8	HR Data	IR across BHEL	Information regarding Plant/Shop Council meetings held	Corporate system	Input from units in Corporate HR system

Annexure –III

TECHNICAL SPECIFICATION OF DATA WAREHOUSE, BUSINESS INTELLIGENCE(BI), BUSINESS ANALYTICS (BA) SOLUTION

TECHNICAL SPECIFICATIONS OF DATA WAREHOUSE, BI AND BA PLATFORM

Following are indicative technical specification of proposed BI and BA solution

Requirement	Specifications	Compliance(Yes/No)
Integrated solution for Data warehouse, Business Intelligence & Business Analytics	The proposed solution should be an integrated solution for data warehouse, business intelligence and business analytics	
	The capabilities should be available in an integrated environment from a single OEM (not as a stitched solution using components from various OEMs).	
	ii) Data Quality,	
	iii) Advanced Analytics,	
	iv) Alerting & Investigation,	
	v) Monitoring & Visualization capabilities,	
High-Performance, Scalable, Robust, Enterprise Platform	The solution should have the BI & BA ability to enable users to conduct Fast, Thorough Explorations and Analysis on data from different data sources across BHEL such as SAP, Oracle, SQL, MYSQL, PostgreSQL, MariaDB, Any Web Services, Web Links, MS Access, MS Excel, Flat files etc.	
	The solution should be able to analyze large size data and generate visualizations on the fly, without any performance degradation	
	The solution should be scalable to a greater number of dashboards in same function or more functional dashboards in the existing technology platform.	
	The solution architecture should allow integration of data sources in future which might come up as part of digitalization in BHEL	

	The offering should have integrated modules for analytics comprising data preparation, exploration, visualization and administration	
	Design specifications of complete solution should ensure minimum latency in the update of data/ refresh of dashboards. The dashboard should not take more than 10 seconds to load on a single user screen.	
	Complete solution to provide 99.9% uptime	
	Solution should be cloud compatible, same licenses to work in cloud. In case in future migration requirement, solution should be cloud portable.	
	The solution design should be modular in nature and should allow change of software/hardware in parts without impacting the entire solution.	
Self-Service Exploration and Analysis	The solution should have the capability to explore and seek correlations on data sets of any size for data analysis	
	The solution should provide interactive analytical capabilities	
	The solution should provide capability to analyze unstructured data	
	The solution should provide a clear explanation of Analytical results by providing "What does it mean" capabilities	
	The solution should allow users to produce dashboards with minimum effort/ low-code methodology using little help from IT team. It should be a self-service BI tool, for system integration and publish/share it for the consumption of department/functional users.	
	The solution should have capability that the values on dashboard should get updated on pre-defined frequency automatically by sourcing required data from various sources.	

	The solution should provide a clear explanation of Analytical results by providing "What does it mean" capabilities	
BI, Reporting, Dashboards, Analytics, Mobility in a single platform on a unified easy-to-use interface	The solution should provide a user friendly, web based , drag and drop interface for data preparation	
	The solution should provide Auto-charting Based on data selected for analysis, solution should automatically choose best visualization suited to display the type of data selected	
	The solution should allow users to change queries by selecting items to be displayed or dynamically filtering and grouping	
	The solution should provide viewable descriptive statistics, such as min, max and mean, enabling users to gain an overall sense of a particular measure	
	The solution should provide the capability to link to an external URL from a visual object with relevant context	
	The solution should allow 'On-the-fly' hierarchy creation for adding drill-down capabilities to visualizations and reports	
	The solution should provide capabilities to Slice and Dice multidimensional data by applying filters on any level of a hierarchy	
	Customization of reports should also be available as a functionality of the BI tool which will let the user design his/her own report from the data available in the intermediate system.	
	The solution should provide capabilities to Drill up and down through hierarchies, or expand and collapse entire levels	

	The system should be able to allow users and admin to define alerts and business insights at individual, Business Users or project level. Alerts will be posted via notifications in the App, notifications on Web, Email, SMS.	
	Visualization techniques and framework to empower users/ decision makers to appreciate the reports quickly and take educated decisions including (but not limited to) histograms, bar charts, geographical mapping, donut charts, trend lines, spark lines, heat maps, spider charts etc.	
	Visualization techniques and framework to empower users/ decision makers to appreciate the reports quickly and take educated decisions including (but not limited to) histograms, bar charts, geographical mapping, donut charts, trend lines, spark lines, heat maps, spider charts etc	
	BI tool should allow the users to create new dimensions, derived metrics etc. preferably with auto charting and dashboard facilities through the keywords	
	The solution should provide users the capability to save and share their analysis as exploration, report or PDF	
	The solution should provide the capability to export data to Excel and CSV/TSV document formats	
	The solution should be capable of read and write of comments in reports to aid in collaboration	
	The solution is capable of emailing a report link with comments to users	
	The solution should allow users to Capture screenshots and share comments with users	

	The solution should provide filtering and selection capabilities to reports with easy-to-integrate common action elements such as radio buttons, drop-down/combination boxes, check boxes and sliders	
	Capability to calculate new data items on the fly from existing data items using expressions	
	The solution should support distribution of Reports and Dashboards to iOS and Android devices. The Native App should be freely available for iOS devices on App Store and for Android devices on Google Play	
Data Warehouse capabilities	Database service offered in solution should have more than 99 % UPTIME and there is no compromise on performance of the application	
	Secure Data extraction from various sources from systems across organization, SAP, Oracle, SQL, MYSQL, PostgreSQL, MariaDB, Any Web Services, Web Links, MS Access, MS Excel, Flat files, unstructured information like email, website information etc.	
	Solution architecture should ensure only necessary reportable data should be loaded to data warehouse storage through Extract, Transform and Load (ETL) tool and further used for reporting needs. This is aligned with the bidder's requirement to ensure cost optimization while servicing data	
	The solution should be able to connect to Oracle & SAP-ERP environment and facilitate efficient and faster extraction of data for further processing	
	Perform automated extraction, transformation and loading of updated data on a pre-defined frequency from multiple sources into data warehouse.	

	Compatibility with different data storages like flat file storage, relational databases and big data storages, etc.	
	Ensure seamless integration with all data sources, data warehouse and the BI tool so that integration is smooth for dashboard viewing and thus enable and smoothen user decision making process.	
	Provide a layer of data governance for flat file extraction (from multiple data sources) and loading into data warehouse to ensure data is accurate and complete.	
	The Solution should be able to process ETL to provide a pre-built transformation to use SOAP (Simple Object Access Protocol) and REST (Representational State Transfer) to access webservice ,standardize data and de-duplication of data.	
Mobility	The solution should allow the analysis / explorations / reports to be pushed for offline viewing to mobile devices	
	The solution should have the ability for Interactive report viewing for information consumers on iOS and Android devices	
	The solution should support same dashboard / report created on Web to be accessed from iOS and Android devices without requiring any redesign	
	The solution should allow users to securely view reports on mobile devices while online or offline	
	Mobile device blacklisting and whitelisting through the web based security and administration interface	
	The solution should have both simple & advance variable aggregation options	
	The visualization tool should offer complete access of functionalities on webportal and handheld device in seamless fashion. Screen layouts should be configured to adapt to	

	Desktop, Laptop, Tablet and Mobile phones etc.	
GUI-based Administration	The solution should provide GUI interface to monitor Resource utilization including CPU, I/O and Memory	
	The solution should have capability for Single Sign On (SSO) and/or AD/LDAP authentication, Authorization integration with existing windows active directory	
	The solution should have capability to record session logs, access logs, process logs & design platform logs of all user and system activities. System should be able to report any faults if found in these logs.	
	The solution should have capability to monitor Mobile device logging history	
	The solution should provide server side logging for user actions – reports downloaded	
	The solution should provide usage report of Resource utilization including CPU, I/O, Memory, Data Tables, User sessions	
General	Should provide Analytics for all the BHEL business segments / areas from day one (like Integration of Manufacturing Data, Data Management of Corporate Data, Management Dashboards etc.) without the need of any extra license. If any extra license is required, bidder shall provide the same along with the solution	
	Perpetual licenses shall be supplied for all the Application Software Modules, Analytics and Management Dash boarding solution. The software should work without any subscription on annual basis. AMC should be optional for BHEL and existing application should continue to work without AMC	

	Platform licenses should be supplied only for On- Premise & No data should go out of BHEL premises. Offered Solution should be cloud ready i.e. no additional licenses shall be required to lift the software from on-Prem to Cloud. Also the offered solution should be cloud vendor agnostic	
	All Application Modules of supplied software should be from single OEM.	
	User Interface of the supplied Analytics & Optimization Platform should be Web based i.e. Users should be able to perform all functions from the Web Browser i.e. Chrome or Internet Explorer, Safari, Firefox etc (All browser) on the Desktop PC without the need of installing any client software.	
	Supplied platform shall also be accessed by users from Internet / Public Network on PC / Mobile Device (IOS / Android) connected to Internet.	
	Should provide Native Mobile App from respective OEM for seamless access of the platform from IOS / Android Mobile Device	
	Solution should provide single sign-on with mandatory Active Directory (AD) authentication.	
	Solution should allow connection by unlimited number of BHEL users and from anywhere in India	
	Offered OEM should have dedicated 24X7 service support center with industry standard ticket tracking system.	

	In future if BHEL intends to migrate to other OEM solution, the offered solution should support the migration.	

Annexure-IV
Format for Non-Disclosure Agreement to be submitted during tender process bid submission:

MUTUAL NON-DISCLOSURE AGREEMENT

This Agreement is made and entered into as of the last date signed below (the "Effective Date") by and between **Bharat Heavy Electricals Ltd.(BHEL),** a Public Sector Organization having its principal place of business at BHEL House, Siri Fort, New Delhi - 110049 and _____, a _____ corporation, hereinafter called "The Bidder", whose principal mailing address is _____.

WHEREAS in order to pursue the mutual business purpose of this particular project as specified in Bid document for Hiring Consultants for SAP-ERP assessment and review, **BHEL** and the Bidder have an interest in participating in discussions wherein either Party might share information with the other that the disclosing Party considers to be proprietary and confidential to itself ("Confidential Information"); and

WHEREAS the Parties agree that Confidential Information of a Party might include, but not be limited to that Party's:

1. business plans, methods, and practices;
2. personnel, customers, and suppliers;
3. inventions, processes, methods, products, patent applications, and other proprietary rights;

or

4. specifications, drawings, sketches, models, samples, tools, computer programs, technical information, or other related information;

NOW, THEREFORE, the Parties agree as follows:

1. Either Party may disclose Confidential Information to the other Party in confidence provided that the disclosing Party identifies such information as proprietary and confidential either by marking it, in the case of written materials, or, in the case of information that is disclosed orally or written materials that are not marked, by notifying the other Party of the proprietary and confidential nature of the information, such notification to be done orally, by e-mail or written correspondence, or via other means of communication as might be appropriate.

2. When informed of the proprietary and confidential nature of Confidential Information that has been disclosed by the other Party, the receiving Party ("Recipient") shall, for a period of three (3) years from the date of disclosure, refrain from disclosing such Confidential Information to any contractor or other third party without prior, written approval from the disclosing Party and shall protect such Confidential Information from inadvertent disclosure to a third party using the same care and diligence that the Recipient uses to protect its own proprietary and confidential information, but in no case less than reasonable care. The Recipient shall ensure that each of its employees, officers, directors, or agents who has access to Confidential Information disclosed under this Agreement is informed of its proprietary and confidential nature and is required to abide by the terms of this Agreement. The Recipient of Confidential Information disclosed under this Agreement shall promptly notify the disclosing Party of any disclosure of such Confidential Information in violation of this Agreement or of any subpoena or other legal process requiring production or disclosure of said Confidential Information.

3. All Confidential Information disclosed under this Agreement shall be and remain the property of the disclosing Party and nothing contained in this Agreement shall be

construed as granting or conferring any rights to such Confidential Information on the other Party. The Recipient shall honor any request from the disclosing Party to promptly return or destroy all copies of Confidential Information disclosed under this Agreement and all notes related to such Confidential Information. The Parties agree that the disclosing Party will suffer irreparable injury if its Confidential Information is made public, released to a third party, or otherwise disclosed in breach of this Agreement and that the disclosing Party shall be entitled to obtain injunctive relief against a threatened breach or continuation of any such breach and, in the event of such breach, an award of actual and exemplary damages from any court of competent jurisdiction.

4. The terms of this Agreement shall not be construed to limit either Party's right to develop independently or acquire products without use of the other Party's Confidential Information. The disclosing party acknowledges that the Recipient may currently or in the future be developing information internally, or receiving information from other parties, that is similar to the Confidential Information. Nothing in this Agreement will prohibit the Recipient from developing or having developed for it products, concepts, systems or techniques that are similar to or compete with the products, concepts, systems or techniques contemplated by or embodied in the Confidential Information provided that the Recipient does not violate any of its obligations under this Agreement in connection with such development.

5. Notwithstanding the above, the Parties agree that information shall not be deemed Confidential Information and the Recipient shall have no obligation to hold in confidence such information, where such information:
   5.1. Is already known to the Recipient, having been disclosed to the Recipient by a third party without such third party having an obligation of confidentiality to the disclosing Party; or
   5.2. Is or becomes publicly known through no wrongful act of the Recipient, its employees, officers, directors, or agents; or
   5.3. Is independently developed by the Recipient without reference to any Confidential Information disclosed hereunder; or
   5.4. Is approved for release (and only to the extent so approved) by the disclosing Party; or
   5.5. Is disclosed pursuant to the lawful requirement of a court or governmental agency or where required by operation of law.

6. Nothing in this Agreement shall be construed to constitute an agency, partnership, joint venture, or other similar relationship between the Parties.

7. Neither Party will, without prior approval of the other Party, make any public announcement of or otherwise disclose the existence or the terms of this Agreement.

8. This Agreement contains the entire agreement between the Parties and in no way creates an obligation for either Party to disclose information to the other Party or to enter into any other agreement.

9. This Agreement shall remain in effect for a period of one year from the Effective Date unless otherwise terminated by either Party giving notice to the other of its desire to terminate this Agreement. The requirement to protect Confidential Information disclosed under this Agreement shall survive termination of this Agreement.

IN WITNESS WHEREOF:
FOR AND ON BEHALF OF   **FOR AND ON BEHALF OF**

                                            BHARAT HEAVY ELECTRICALS LTD.
_____

Signature: _____	**Signature:** _____
Name: _____	**Name:** _____
Designation: _____	**Designation:** _____
Date: _____	**Date:** _____

Witness

   1.

2.

Witness

   1.

2.