

SCOPE OF WORK FOR CENTRALISE RELAY MONITORING SYSTEM

The PARTNER shall be responsible for implementing end to end solution for Balco which comprises of site assessment, design, supply, installation, configuration, integration, commissioning, support and defining how the solution impacts various business KPIs within defined SLA, deliverables and ensure the value is delivered. The selected partner also ensures the adequacy of the measurements and submit a list of additional requirements. The selected partner shall ensure the successful implementation of the proposed solution as well as provide capacity building support to plant authorities as per the scope of services described below. Any functionality not expressly stated in this document but required to meet the needs of the BALCO to ensure successful operations of the system shall essentially be under the scope of partner and for that no extra charges shall be admissible. Partner shall implement and deliver the systems and components which are described in this SOW and corrigendum. Partner's scope of work shall include but will not be limited to the following broad areas:

CENTRALIZED RELAY MONITORING SYSTEM

At present 1740MW PP Electrical system is equipped with approx. total of 350 no of Protection relays with varied Make and features. With such a vast and wide Protection Relay system, the monitoring, controlling and management of relays is cumbersome and involves manual intervention. This eventually affects overall reliability of protection system, leading to failure of Balco electrical power system, and loss to business.

Hence, it is required to have a centralized platform for annunciation of events and alarms, with Automatic Disturbance record data collection, and provision for remote parametrization of relays.

1. The key features of proposed Protection Relay Networking and management system, are as below –
2. Integration of all Protection relays at 1200MW switchgear protection, 540 MW switchgear protection, 220KV and 400KV GIS, at a common platform, under one location Central control room.
3. Centralized annunciation of alarms, and events and health monitoring of all relays, enabling timely detection of unhealthy relays.
4. Disturbance record files collection from individual relays at a common server.
5. Remote parameterization, Access control for parametrization, Parametrization archiving of connected relays.
6. Authorized, single point Access control to view and modify parameters in any relay.
7. System should provide probable root-cause with priority to troubleshoot at a faster pace.
8. Detailed history & event listing report to be provided by the system.
9. Status and data representation on an HMI or Dashboard system
10. Synchronization of relay through one configuration for correct time stamping.
11. All the supply & services requirement will be covered by Partner

12. All the facilities required for completing the scope (manpower, machines, & tools etc) to be covered in partner scope.

MANDATORY REQUIREMENTS

- a. Partner must follow Vedanta Commercial terms & conditions.
- b. Partner must follow Vedanta HR, Safety, Health and Security policies/ guidelines.
- c. Partner must follow Vedanta IT compliance, process and security policies/ guidelines.
- d. In addition to above points, other government norms /acts of Factory/IT/HR/Safety/Security to be followed during execution of project.

SOLUTION ARCHITECTURE

- a) PARTNER shall carry out detail requirement analysis and finalize the solution architecture in consultation with its consultants, other selected SI, OEM and Vedanta, to meet the required deliverables.
- b) PARTNER shall be responsible for ensuring architecture scalability to meet future demand and provide enough levels of security & interoperability and the solution is modular so that individual modules can be enabled / disabled based on requirements.
- c) PARTNER should provide the Network, Integration, and security architectures w.r.t different applications/ systems/ devices connected in this solution.
- d) PARTNER should manage and optimize the additional components and licenses required to meet additional future requirements.

IMPLEMENTATION

- a) PARTNER shall implement this solution using Industry best practices and best resources.
- b) PARTNER will be responsible for supplying all solution components and installing the same to meet the solution requirements.
- c) PARTNER should provide the overall program management with dedicated project manager assigned at site.
- d) Project Manager will coordinate all activities with Vedanta and OEM to complete project activities as per approved project plan.
- e) Project Manager will ensure smooth execution and do follow up/escalation with OEM, Vedanta and their stakeholders from time to time.
- f) Project Manager will do weekly review meeting and setup steering committee

- meetings with their and Vedanta management as per agreed frequency.
- g) PARTNER to ensure with OEM that the solution which may include multiple technologies from various OEM, to work together seamlessly as per the design goals.
 - h) PARTNER shall also supply any other tools & accessories required to make the integrated solution complete as per requirements. PARTNER shall configure and test all application development related to this solution

INTEGRATION

- a) PARTNER shall integrate all existing BALCO applications and Digital Solution's related to the project.
- b) PARTNER shall study and analyze Vedanta ecosystem and come up with integration strategy of solution in a non-disruptive manner and at the same time making sure that full IT landscape is in sync and no overlaps take place.
- c) PARTNER should be able to manage the implementation timelines as well as achieve the seamless integration with IT systems and realize all the Vedanta use cases.
- d) PARTNER shall ensure that the solution should support phase wise integration with Vedanta Systems.
- e) It should also support various interfaces such as online sync-up through API / bulk upload through FTP / message queue, RPA etc. wherever required.
- f) Integration services will also include create any script, adapters or connector / API required for integration with third party applications.

DEPLOYMENT & CUSTOMIZATION

- a) PARTNER shall provide qualified resources for deployment, integration, and commissioning of the solution as per agreed Project Schedule.
- b) PARTNER is responsible for end-to-end deployment and customization as per Vedanta requirements and agreed in BALCO.
- c) PARTNER is responsible for the System customization for all scope modules and applications.
- d) Team Mobilization for the commencement of the work.
- e) Quality control document for different modules customization should be prepared by PARTNER.
- f) All manpower supplied by the partner will be on the roles of the partner or its consortium partners only. In case of any manpower resources are outsourced to any other agency outside the consortium, the partner must take prior written approval from Vedanta.
- g) The partner will always comply to the Vedanta HR, Safety, Health and Security policies / guidelines and policies laid down as per Factory Act or as per local statutory bodies within and outside the plant premises for all manpower deputed within the plant premises.

SECURITY & CONTROL

- a) This Application/ Solution shall be secured from any virus, malwares, hacking and spamsetc.
- b) Access to Application shall be through secured authentication mechanism as per BALCO IT Security policy.
- c) Solution Platform shall comply with BALCO IT Security policy.
- d) Data exchange should abide by all laws on privacy and data protection Security Architecture. Proposed solution shall adhere to the guidelines & frameworks issued by BALCO IT policy.
- e) The basic tenets of BALCO security architecture are the design controls that protect confidentiality, integrity and availability of information and services for all the stakeholders.
- f) Procedures for data sharing need to be established. Data integrity during data synchronization needs to be ensured across the enterprise.
- g) Audit Capabilities: The system provides for a system-wide audit control mechanism that works in conjunction with the Databases.
- h) Maintaining Date/Time Stamp and User Id: Every transaction, with a date and time and User ID, is captured. The system allows generating various audit reports for verification.
- i) Audit trails or audit logs should be maintained. Log information is critical in identifying and tracking threats and compromises to the environment.
- j) A strong authentication mechanism should be considered to protect unauthorized access to the BALCO applications as per BALCO policy.
- k) This Digital Solution must comply with the Application Security guidelines of BALCO.
- l) Secure coding guidelines should be followed. Secure coding guidelines should include controls against SQL injection, command injection, input validation, cross site scripting, directory traversal, buffer overflows, resource exhaustion attacks etc. OWASP Top 10 standard should be mapped in the secure coding guidelines to cover all major vulnerabilities.
- m) Perform periodic scanning of the network to identify system level vulnerabilities.
- n) Establish processes for viewing logs and alerts which are critical to identify and track threats and compromises to the environment. The granularity and level of logging must be configured to meet the security management requirements.

NON-FUNCTIONAL REQUIREMENTS

- a) User shall be able to define multiple email ids where daily reports can be auto sent at configurable time.
- b) System shall have provision for blocking/unblocking users.
- c) System shall support testing of processes and workflows defined with test data before making it live.
- d) Predefined Templates to be made available for ease of configuration and faster integrations

TESTING AND ACCEPTANCE CRITERIA

- a) PARTNER shall demonstrate the following mentioned acceptance criteria prior to acceptance of the solution as well as during project operations phase, in respect of scalability and performance etc. PARTNER may propose further detailed Acceptance criteria which will be reviewed BALCO team. Once BALCO provides its approval, the Acceptancecriteria can be finalized. In case required, parameters might be revised by BALCO team in agreement with PARTNER and the revised parameters shall be considered for acceptance criteria. A comprehensive system should be set up that would have the capability to log & track the testing results, upload & maintain the test cases and log & track issues/bugs identified.
- b) The following table depicts the details for the various kinds of testing envisaged for theproject:

Type of Testing	Responsibility	Scope
System Testing	PARTNER	<ul style="list-style-type: none">- PARTNER to perform System testing- PARTNER to prepare test plan and test cases and maintain it. BALCO may request PARTNER to share the testcases and results- Should be performed through manual as well as automated methods- Automation testing tools to be provided by PARTNER. BALCO doesn't intend to own these tools
Integration Testing	PARTNER	<ul style="list-style-type: none">- PARTNER to perform Integration testing- PARTNER to prepare and share with BALCO the Integrationtest plans and test cases- PARTNER to perform Integration testing as per the approved plan.- Integration testing to be performed through manualas well as automated methods- Automation testing tools to be provided by PARTNER

Performance and Load Testing	PARTNER & BALCO	<ul style="list-style-type: none"> -PARTNER to do performance and load testing -Various performance parameters such as transaction response time, throughput, and page loading time should be taken into account - Load and stress testing of the Project to be performed on business transaction volume - Test cases and test results to be shared with BALCO - Performance testing to be carried out in the exact same architecture that would be set up for production - PARTNER need to use performance and load testing tool for testing. BALCO doesn't intend to own these tools
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Security Testing (including Penetration and Vulnerability testing)	PARTNER & BALCO	<ul style="list-style-type: none"> - Solution should demonstrate the compliance with security requirements as mentioned in the RFP including but not limited to security controls in the application, at the network layer, network, data center, security monitoring system deployed by PARTNER - Solution shall pass vulnerability and penetration testing for rollout of each phase. The solution should pass web application security testing for the portal, mobile app and other systems and security configuration review of the infrastructure. - PARTNER should carry out security and vulnerability testing on the developed solution. - Security testing to be carried out in the exact same environment/architecture that would be set up for production. - Security test report and test cases should be shared with BALCO - Testing tools if required, to be provided by PARTNER. - During Support phase, VAPT assessment to be conducted on half-yearly basis. - BALCO will also involve third party auditors to perform the audit/review/monitor the security testing carried out by PARTNER.
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User Acceptance Testing of Project	BALCO	<ul style="list-style-type: none"> - BALCO team will perform User Acceptance Testing - PARTNER to prepare User Acceptance Testing test cases - UAT to be carried out in the exact same environment/architecture that would be set up for production - PARTNER should fix bugs and issues raised during UAT and get approval on the fixes from BALCO team before production deployment - Changes in the application as an outcome of UAT shall not be considered as Change Request. PARTNER must rectify the observations.
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- a) PARTNER needs to provide the details of the testing strategy and approach including details of intended tools/environment to be used for testing in its technical proposal. BALCO does not intend to own the tools.
- b) PARTNER shall work in a manner to satisfy all the testing requirements and adhere to the testing strategy outlined. PARTNER must ensure deployment of necessary resources and tools during the testing phases.
- c) PARTNER shall arrange for environments and tools for testing and for training as envisaged. Post Implementation; the production environment should not be used for testing and training purpose. If any production data is used for testing, it should be masked, and it should be protected.
- d) The cost of rectification of non-compliances shall be borne by PARTNER.

POST IMPLEMENTATION OPERATION

- a) AMC for 3 years to be included in quotation
- b) Intellectual property output from this project is the sole property of Vedanta Limited, BALCO.
- c) PARTNER shall provide the support structure with onsite as well as remote support, as per the SLA committed by the partner. Both parties shall mutually agree on the commencement period of these Support Services.
- d) System Handover shall be initiated by PARTNER post the successful completion of final acceptance testing.
- e) PARTNER will operate and maintain all the components of this System (5) years or agreed time as per contract after Implementation date.
- f) During support phase, PARTNER shall ensure that service levels are monitored on continuous basis; service levels are met and are reported to BALCO.
- g) After Implementation, if any system/sub-system/appliance that is deployed during the support phase must be added in the System only after proper induction procedures are followed including hardening and security testing.
- h) PARTNER needs to implement suitable PIP in the project.

- i) Every process and procedure implemented in this project must be reviewed and updated by PARTNER at least on annual basis from the Implementation Date.
- j) Regular auditing is an inspection or examination of infrastructure to evaluate or improve its appropriateness, safety and efficiency.

GOVERNANCE

- a) The PARTNER in concurrence with VEDANTA and any assignees of Vedanta shall jointly lay down the Governance Process and execute the process for managing a time bound, quality project delivery as per Global benchmarks.
- b) The PARTNER should develop an integrated process for the end-to-end solution to be deployed and managing the overall project.
- c) The PARTNER in concurrence with Vedanta will develop a mechanism to socialize the program and develop materials for high visibility of the project with achievements and meeting success criteria.
- d) The PARTNER shall ensure that all activities shall adhere to the governance, security, legal, and regulatory framework defined by Vedanta and amended from time to time as per the changing need.

KNOWLEDGE TRANSFER AND TRAINING

- a) PARTNER is responsible for Training of all stakeholders including Technical Administrators, Designers, Support Staff, Business Users and Third-Party Users (as will be defined by Vedanta).
- b) PARTNER will provide knowledge transfer workshops and training to Vedanta team.
- c) The location of Training will be Balco.
- d) The PARTNER will be responsible for developing Training Contents/Materials and provide inputs for physical and e-format, web modules and certifications of the stakeholders. The partner will develop and submit the comprehensive training plans.

SCALABILITY & MODULARITY

- a) PARTNER shall ensure that the proposed solution architecture should be scalable enough to meet future demand of next 5 yrs and provide enough levels of security and interoperability.
- b) PARTNER should plan to meet the user loads based on the business requirements provided.
- c) PARTNER should ensure that the Solution should be modular so that individual modules can be enabled / disabled based on requirements

LEGAL AND REGULATORY

PARTNER is responsible for ensuring all activities relevant to legal, regulatory and other related government compliances defined by any global bodies or Vedanta from time to time.

DATA PRIVACY

- a) PARTNER is responsible for maintaining the data privacy of the systems used and solution deployed.
- b) PARTNER shall ensure that the client solution details and transactions should not be passed to other clients.
- c) PARTNER shall ensure that the saved user data should be encrypted and should be accessed by authorized personnel using secured user credentials.

BUSINESS CONTINUITY PLAN & BACKUP

- a) PARTNER is responsible for preparing the DR plan, to sustain entire system if primary setup goes down or doesn't work.
- b) PARTNER shall ensure that the solution should have proper data backup for sustaining the solution and historical data.
- c) PARTNER should provide details of BoM required to support archival and backup, as applicable.
- d) PARTNER shall be responsible for implementation of backup & archival policies as finalized with BALCO team. The PARTNER is responsible for getting acquainted with the storage policies of BALCO before installation and configuration. It should be noted that the activities performed by the PARTNER may be reviewed by BALCO.
- e) PARTNER shall be responsible for monitoring and enhancing the performance of scheduled backups, scheduled regular testing of backups and ensuring adherence to related retention policies.
- f) PARTNER shall be responsible for prompt execution of on-demand backups of volumes and files whenever required by BALCO or in case of upgrades and configuration changes to the system.
- g) PARTNER shall be responsible for real-time monitoring, log maintenance and reporting of backup status on a regular basis. PARTNER shall appoint administrators to ensure prompt problem resolution in case of failures in the backup processes

COMPLIANCE TO THE STANDARD AND CERTIFICATIONS

- a) For a large and complex set up such as the Project, it is imperative that the highest standards applicable are adhered to. In this context, PARTNER will ensure that the entire Project is developed in compliance with the applicable standards.

- b) During project duration, PARTNER will ensure adherence to prescribed standards as provided below:

Sno.	Component/Application/System	Prescribed Standard
1	Information Security	ISO 27001
2	Cloud Applications	SOC-2 Report
3	IT Infrastructure Management	ITIL specifications
4	Service Management	ISO 20000 specifications
5	Project Documentation	IEEE/ISO/CMMi (where applicable) specifications for documentation

- c) Apart from the above, PARTNER need to ensure compliance of the project with Government of India IT security guidelines including The Information Technology Act, 2000” and amendments thereof.
- d) No Freeware shall be proposed by PARTNER.
- e) The PARTNER should not propose any limited use products/bundle. The authority shall be able to use the respective products for various applications as may be required.
- f) The PARTNER should ensure pre-implementation cybersecurity audit of offered solution by CERT-IN empaneled agencies

COMPLIANCE TO THE SERVICE LEVEL AGREEMENT

- a) PARTNER shall ensure compliance to uptime and performance requirements of project solution as indicated in the agreed SLA and any upgrades/major changes to this System shall be accordingly planned by PARTNER for ensuring the SLA requirements.
- b) PARTNER shall be responsible for measurement of the SLAs at System level as well as at the user level with the help of the enterprise monitoring tool on a periodic basis.
- c) Reports for SLA measurement must be produced to BALCO officials as per the project requirements.

SUBMISSION / MAJOR MILESTONE DATES

- ☐ NDA Signoff Document Submission Closure Date:
- ☐ Technical Queries Submission Closure:
- ☐ Technical Proposal Submission Closure:

- ☐ Technical Discussion Closure:
- ☐ Commercial Proposal Submission Closure:
- ☐ Expected Commercial Finalization:
- ☐ Expected Bid Award Date:
- ☐ Project Initiation:

PROJECT DELIVERABLES

The deliverables for the projects will be as follows (but not limited to):

- a. Business Charter
- b. Detailed Project Plan
- c. Business Blueprint (including Data / Business Architectural Design, Technology / Landscape Design, “As-is” and “to-be” status document, Integration Design)
- d. Functional Specification (Preliminary / Final)
- e. Technical Design Specification (Preliminary / Final)
- f. User Manual
- g. Training Manual
- h. KPI based Outcomes as mutually agreed
- i. Support and Sustenance