

Section 6. Procuring Entity's Requirements

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6.1 Scope of Supply of Plant and Installation Services by the Contractor

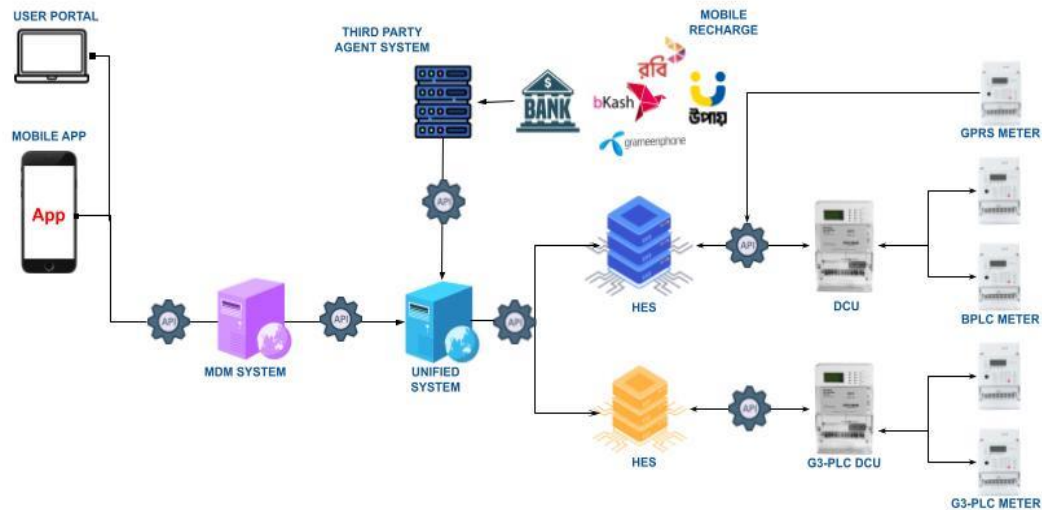
WZPDCL System Upgradation (for pre-paid system, Part-1)

6.1.1.1 General Scope

WZPDCL needs to upgrade the system running the Pre-Payment system. The main reason to upgrade the system is to increase the capacity, productivity and robustness to provide support to its customers. Below are the systems that needs to upgrade or develop:

1. Design, development and installation of Meter Data Management (MDM) System (New System).
2. Upgrade of Unified Pre-Payment Vending System (Existing System).
3. Upgrade of Agent Management System (AMS) (Existing System).
4. Design, development and installation of User Portal for Users (New System)
5. Design, development and installation of Mobile App (Android & iOS) Users (New System).

WZPDCL SYSTEM AND API STRUCTURE



Below is the description of the system.

6.1.1.2 Meter Data Management (MDM) System:

This is a new web-based system. This system will facilitate WZPDCL to take proactive actions from various type of business dash board providing meaningful information. This system shall have scalability and compatibility to integrate with WZPDCL's existing systems as well as advance systems and application platforms.

6.1.1.2.1 Basic Functions Requirement of Upgradation of Existing Smart Pre-payment metering system Software:

- Design, Supply, Installation, Testing, Commissioning of updated Smart Prepayment Metering System Software with Up-gradation of Unified Prepaid System, HES/MDM and Third-Party Agent Management System (AMS) on Turnkey Basis with 05 (Five) Years" Service (Operation & Maintenance) Agreement.
- Remote Meter data reading at configurable intervals (push/pull).
- Pre-paid functionality following Bangladesh Energy Regulatory Commission (BERC) rules and existing Unified prepaid metering system business logic.
- Net Metering, Mother-Child Metering Scheme.
- Alarm/Event detection, notification and reporting.
- Remote Load Limiter and connection/ disconnection at defined/ on demand conditions (Load Management).
- Remote firmware upgrade (both meter and DCU).
- Integration with other existing systems like unified prepaid metering system, Agent Management System (AMS), Head-End-System (HES)/ MDM System, online new connection system, WZPDCL's Postpaid Billing System.
- Security features to prevent unauthorized access to the Smart metering system including Smart meter & meter data etc.
- The proposed solution should allow the consumers to buy energy and recharge their smart meters through multi-channels like Web, mobile, Kiosk etc. When the threshold is reached solution should triggers notification to customer to recharge.
- The proposed solution should support all the WZPDCL's existing meter and new upcoming meters. It should have all the features and business logic to recharge and manage all the WZPDCL's existing meter and new upcoming meters.
- System architecture shall support 20 lakh meters initially and scalable up to 40 lakh meters.
- System shall be capable of collecting data from all the consumers at least once in a day under the utility defined frequency (15 min/30 min/1 hour etc.) The system shall collect the customer data at least once in a day; however, the data download frequency and integration period shall be depending on Utility business requirements.
- The proposed technology solution shall maintain information and relationships between the current installed meter location (apartment, shop, industry/ address etc.), Consumer information (Name, NID, Phone Number etc.), Consumer account no, Meter ID, Type of Meter (type of consumer, 1 phase/3phase, etc.), Meter configuration (Demand integration period, Load profile capture period etc.), GIS supplied information (longitude, latitude, connection with feeder/ transformer/ pole etc.) etc.
- Exception Generation - System shall generate exceptions based on configurable business rules including but not limited to the following:
 - a. Meter tamper alerts
 - b. If the consumption is less/more than pre-defined average consumption
 - c. Negative Consumption

- d.* Power outage indications received from the Smart meter
- Updated System shall facilitate programming of following meter parameters like and not limiting to:
 - a.* Setting of parameters for Tariff
 - b.* Prepaid parameter details on meter display
 - c.* Clock setting/time synchronization
 - d.* Load curtailment limit
 - e.* Event setting for connect/disconnect
 - f.* Number of auto reconnection attempt
 - g.* Time interval between auto reconnection attempt
 - h.* Remote firmware upgrade
 - i.* Push schedule for updating new tariff to meter
 - j.* Provision for adding more programming features in future
- Logs must be maintained for all attempts to log on (both successful and unsuccessful), any privilege change requests (both successful and unsuccessful), user actions affecting security (such as password changes), attempts to perform actions not authorized by the authorization controls, all configuration changes etc.

6.1.1.2.2 Integration Requirements of upgraded Smart Pre-payment metering system Software:

- Proposed technology solution shall support integration web-services and APIs to exchange data with other systems like postpaid billing system, online new connection system, Call center application, AMS, GIS and SCADA etc.
- Different Manufacturer's HES shall be integrated with MDM to transfer meter billing data, interval data and events data or instantaneous data.
- As a part of project solution there will be data collected from smart meters. Solution should ensure that there is scalability and compatibility to integrate with advance application platforms so that various type of business dash board providing meaningful information to take proactive actions can be made available.
- Proposed solution shall be able to integrate different manufacturer's meter for recharging and managing meter data.
- Proposed technology solution shall be able to integrate with various advance analytical tools and provide processing capabilities such as big data analytics.
- Solution should be capable to integrate with various mobile applications to provide proactive and real time operational alerts.
- Solution should have the capability to integrate with SMS and Email gateways to send various alarms and notifications. Group, prioritize, filter and send system generated alarms and events to defined email addresses, cellular text messages to phone numbers.
- Bidder will supply the network management software with requisite licenses and integrate with Updated Meter Data Management (MDM) System. HES shall perform the acquisition of data from the nodes, across the communication infrastructure automatically avoiding any human intervention and monitor parameters acquired from smart meters.
- Proposed technology solution shall have standard interfaces like CIM IEC 61968 (CIM 2.0) or any other open standard to integrate different manufacturer's HES.
- MDM system shall preferably interface with other systems on standard interfaces and the data exchange models and interfaces shall comply with CIM IEC 61968 (CIM 2.0) or any other open standard.
- Proposed system integration with other systems shall include but not limited to the following:
 - Integration with existing interfaces of Unified prepaid system

- Agent Management System for third party vending/ Integration with payment vendors
- HES for data exchange.
- Support of interface with HHU or manual reading system etc.
- Integration with Kiosk, online portal/Mobile/call center recharge of prepaid to buy energy from utility company.
- Online new connection application,
- Call center Application
 - Interactive Voice Record (IVR) system,
 - CRM,
 - Consumer Portal
- Supervisory Control and Data Acquisition (SCADA)
- GIS Systems integration

6.1.1.2.3 Analysis Requirements of upgraded Smart Pre-payment metering system Software:

The Proposed technology solution shall have analysis capability based on configurable business rules including but not limited to the following:

- Display consumption/load profiles by configurable period (15/30 min, hour, day, month, year etc.) day type (weekday, weekend, holiday, festival wise etc.) and by tariff, customer type, or any user specified collection of meters.
- Generate peak, off-peak & Super off-peak load patterns by aggregating all loads of Distribution Transformer (DT)/ Feeder/ consumer group.
- Perform DT/feeder wise energy audit.
- Perform load analysis for different groups and categories of consumers.
- Ability to provide the data to load forecasting, load research or demand response applications and perform error management like: Missed reads and intermittent meter reads before taking into forecasting, load research or demand response.
- Analyzing data to identify new patterns of usage, Setting fraud alert / transformer overload alerts / demand – supply gap alert etc.
- Ability to receive and store outage and restoration event data from smart meters and outage systems and to log all such events for analysis.
- The system shall have the ability to selectively choose which data to be maintained and which to be purged or archived as per requirement of Utility (user selectable).

6.1.1.2.4 Online portal Requirements of upgraded Smart Pre-payment metering system Software:

- Consumers shall be provided facility to recharge their account by logging on user interface using Mobile Apps and Web interface. User interface shall require consumer id., mobile number & password with OTP for secure login. This user interface shall be integrated with the present online payment gateway of utility.
- Can buy energy online and recharge their prepaid meter using third party vending system
- Consumers can view recharge history & present balance.
- Can initiate service requests for maximum demand updating, meter checking etc.

6.1.1.2.5 Reporting Requirements of upgraded Smart Pre-payment metering system Software:

The proposed solution should support the required reports to manage the prepaid customers. It should support the report requirement from both Utility and customers. Below are some of the required reports but not limiting to:

- Consumption (kwh) based monthly operational data (MOD) report
- Customer due for recharging the meter
- Connect/disconnect reports
- Revenue reports
- Customer reports
- Daily data collection report
- Usage exceptions reports
- Missing interval Read date and times (on hourly, daily, weekly & monthly basis)
- Physical meter events (install, remove, connect, disconnect) & meter reset report
- Meter flags (Tamper/ Overload etc.)
- Meter inventory
- Defective meters
- Threshold Exception
- SAIDI/ SAIFI Calculation report

System shall support users modifying standard reports to better meet specific reporting requirements.

- The system shall enable the Utility to deliver reports in standard digital format such as PDF, CSV, Excel, etc.
- All queries shall be generated through user driven drop down menu in GUI. As a reporting tool BI Publisher or updated technology shall be used for generation customizable report.

6.1.1.2.6 Advanced Security Features Requirement of upgraded Smart Pre-payment metering system Software:

- Use of Security Association (SA) hardware security module (HSM)/ software security module (SSM) appliance to store the utility key pair and DPM AES key-encryption-key (or KEK) in a highly secure environment.
- Use of RSA Data Protection Manager (DPM) appliance to store each endpoint's AES key, encrypted with the KEK, in a secure environment.
- Segments Keys which are utilized to secure broadcast mechanisms within the system.
- Individual Keys used for all direct communication between Command Center and the endpoint.
- Downstream Message Authentication where Command Center will digitally sign commands using the Utility Private Key stored securely in a HSM/SSM at the head end.
- Mobile Administration Tool Authentication to provide additional security measures around the mobile administration tools.

Data Migration existing System to New System: Migrate all data from existing system to new system without lost any type of data. After migration of data must perform User Acceptance Test (UAT) so that WZPDCL ensure all data available in the system.

6.1.1.3.0 Technical Specifications for WZPDCL MDM, HES & Unified Prepaid System Modernization

6.1.1.3.1 Architectural Modernization: Cloud-Native and Scalable Architecture

- The proposed solution shall adopt a modern cloud-native and distributed architecture capable of supporting high transaction volume, horizontal scalability, high availability, and future expansion.
- The proposed system shall support cloud-native or hybrid deployment architecture using microservices-based design principles and containerized deployment technologies such as Docker and Kubernetes or equivalent.

The system architecture shall:

- Support minimum 2 million smart meters initially.
- Be scalable up to 4 million meters without major architectural redesign.
- Support horizontal scaling for application, database, analytics, and integration layers.
- Support distributed processing architecture.
- Support active-active clustering architecture.
- Support automatic failover and self-healing capabilities.
- Support deployment in on-premise, private cloud, public cloud, or hybrid cloud environments.
- Ensure minimum 99.95% system availability.

6.1.1.3.2 Real-Time Streaming and Event Processing: Event Streaming Platform

- The proposed solution shall support real-time ingestion and processing of meter events, alarms, outage notifications, vending transactions, and operational telemetry.
- The proposed solution shall support event-driven architecture using streaming technologies such as Apache Kafka or equivalent enterprise-grade event streaming platform.
- The streaming platform shall support:
 - Real-time event ingestion.
 - Real-time alarm processing.
 - Meter event correlation.
 - Fraud and tamper analytics.
 - Real-time outage notification.
 - Streaming integration with analytics platforms.
 - Event replay and persistence.
 - Distributed event processing.
 - Minimum 20,000 events per second processing capability.

6.1.1.4.0 MDM Functional Requirements:

6.1.1.4.1 Validation, Estimation and Editing (VEE)

- The MDM shall include configurable Validation, Estimation and Editing (VEE) functionality for interval, billing, and event data.
- The proposed MDM solution shall include configurable Validation, Estimation and Editing (VEE) capabilities for ensuring data quality and completeness.
- The VEE engine shall support:

- Missing data validation.
- Duplicate data detection.
- Interval data estimation.
- Rule-based validation.
- Threshold validation.
- Historical profile estimation.
- Manual and automatic editing workflows.
- Audit trail of edited records.
- Exception management workflows.

6.1.1.4.2 Advanced Analytics and AI/ML Capability

- The proposed system shall support advanced analytics and AI/ML-driven operational intelligence.
- The proposed solution shall support AI/ML-enabled analytics capabilities including but not limited to:
 - Electricity theft detection.
 - Consumption anomaly detection.
 - Transformer overload prediction.
 - Demand forecasting.
 - Load pattern analysis.
 - Consumer segmentation.
 - Predictive maintenance.
 - Revenue leakage analysis.
 - Meter health scoring.
 - Energy balancing analytics.

The system shall support integration with enterprise analytics and big data platforms.

6.1.1.4.3 Dynamic Tariff Support

The proposed system shall support:

- Time-of-Use (TOU) tariff.
- Critical peak pricing.
- Dynamic tariff configuration.
- Net metering settlement.
- Prepaid and postpaid tariff models.
- Multi-tier tariff configuration

6.1.1.5.0 Cybersecurity

6.1.1.5.1 Utility-Grade Cybersecurity Framework

- The system shall comply with modern utility cybersecurity standards.
- The proposed solution shall comply with the following cybersecurity standards and frameworks:
 - IEC 62351.
 - ISO 27001.
 - OWASP Top 10.

- NIST Cybersecurity Framework.
- CIS Security Controls.
- The system shall support:
 - Zero Trust Architecture.
 - Multi-factor authentication (MFA).
 - Role-based access control (RBAC).
 - Attribute-based access control (ABAC).
 - End-to-end encryption using TLS 1.3 or higher.
 - PKI-based device authentication.
 - Secure API gateway.
 - Security Information and Event Management (SIEM) integration.
 - Security Operations Center (SOC) integration.
 - Immutable audit logs.
 - Ransomware protection.
 - Database encryption at rest.
 - Intrusion detection and prevention.
 - Centralized log monitoring.

6.1.1.5.2 Security Logging and Audit Trails

- The system shall maintain immutable audit trails for:

- User logins.
- Failed authentication attempts.
- Configuration changes.
- Privilege changes.
- Meter parameter changes.
- Firmware upgrade activities.
- API transactions.
- Data modifications.
- Security events.

Audit logs shall be retained for minimum 10 years.

6.1.1.6.0 API and Integration

6.1.1.6.1 API-First Architecture

- The proposed solution shall adopt modern API-first integration architecture.

- All system integrations shall support RESTful API architecture with OpenAPI/Swagger documentation standards.

The integration framework shall support:

- REST APIs.
- SOAP APIs.
- OAuth2 authentication.
- OpenID Connect.
- API gateway integration.

- Message queue integration.
- JSON/XML data formats.
- Webhooks.
- Event-driven integration.

All APIs shall be version-controlled and documented.

6.1.1.6.2 Utility Interoperability Standards

- The proposed solution shall support utility interoperability standards including:
 - CIM IEC 61968.
 - CIM IEC 61970.
 - DLMS/COSEM.
 - IEC 62056.
 - MQTT.
 - Multi-vendor HES interoperability.
 - Open Smart Grid Protocols.

The bidder shall ensure interoperability with multi-vendor smart meters and HES platforms.

6.1.1.7.0 Performance and Scalability Requirements

System Performance KPIs:

- The system shall meet defined utility-grade performance SLAs.
- The proposed system shall meet the following minimum performance requirements:

Performance Parameter	Minimum Requirement
Supported Smart Meters	2 Million Initially
Scalable Capacity	4 Million Meters
Daily Meter Reads	20 Million Reads
Event Processing	10,000 Events/Hour
Vending Transactions	10,000 Transactions/ Hour

- The proposed architecture shall allow future expansion up to the target meter capacity without requiring replacement of core software platforms.

6.1.1.8.0 Data Storage and Big Data Platform

- The proposed solution shall support enterprise-grade time-series data storage architecture.
- The data platform shall support:
 - Hot and cold data storage.
 - Distributed databases.

- High-speed interval data ingestion.
- Long-term archival.
- Data compression.
- Historical analytics.
- Data partitioning.
- Data replication.
- Backup and recovery.

The system shall support minimum 10 years retention of interval, billing, event, and audit data.

6.1.1.9.0 High Availability and Disaster Recovery

The proposed system shall support enterprise-grade high availability and disaster recovery architecture.

The bidder shall provide:

- Geo-redundant architecture.
- Automatic failover capability.
- Backup automation.
- Data replication.
- Periodic DR drills.

- The solution shall support:

Parameter	Requirement
Recovery Point Objective (RPO)	Maximum 15 Minutes
Recovery Time Objective (RTO)	Maximum 2 Hours
Backup Frequency	Hourly Incremental
Full Backup	Daily

6.1.1.10.0 Multi-Vendor HES Integration

The proposed MDM solution shall support integration with multiple HES platforms from different meter manufacturers and upcoming unified HES platform.

The solution shall:

- Support simultaneous multi-HES integration including upcoming unified HES integration.
- Support standard communication protocols.
- Support secure data exchange.
- Support real-time event ingestion.
- Support firmware upgrade coordination.
- Support remote meter management.
- Support scalable communication infrastructure.

6.1.1.11.0 Consumer Portal and Mobile Application

The proposed consumer portal and mobile applications shall support:

- Android and iOS platforms.
- Bangla and English language support.
- Push notifications.
- Low balance alerts.
- Outage alerts.
- Consumption analytics.
- Live balance display.
- QR code recharge.
- Digital wallet integration.
- Recharge history.
- Complaint registration and tracking.
- AI chatbot support.
- Secure OTP-based authentication.
- Biometric authentication support.
- E-bill and e-receipt generation.
- Real-time vending updates.

6.1.1.12.0 GIS and SCADA and Other system Integration

The proposed system shall support integration with:

- Geographic Information System (GIS).
- Supervisory Control and Data Acquisition (SCADA).
- Enterprise Resource Planning (ERP).
- Postpaid Billing System

The proposed solution shall support:

- Distribution transformer energy balancing.
- Outage analytics.
- Real-time feeder monitoring.
- Demand response readiness.

6.1.1.13.0 Open Standards Requirement

The bidder shall ensure that the proposed solution does not create operational dependency or proprietary lock-in preventing WZPDCL from independently operating, maintaining, upgrading, or integrating the system in the future.

The bidder shall provide:

- Complete system documentation
- Open API documentation.
- Database schema documentation.
- Interface specifications.
- Configuration documentation.
- Data export capability.
- Standard communication interfaces.

- Administrative access rights
- System backup and restoration procedures

WZPDCL shall retain ownership of all operational and historical data.

6.1.1.14.0 Data Governance Framework

The proposed solution shall support data governance and regulatory compliance requirements.

The system shall support:

- Data ownership controls.
- Data classification.
- Data retention policies.
- Consumer privacy protection.
- Secure data archival.
- Regulatory audit support.
- Digital evidence preservation.
- Data sovereignty requirements.

All consumer and operational data shall remain the property of WZPDCL.

6.1.1.15.0 System Monitoring Framework

The proposed solution shall include centralized monitoring and observability capabilities.

The monitoring platform shall support:

- Infrastructure monitoring.
- Application monitoring.
- API monitoring.
- Database monitoring.
- Real-time health dashboards.
- Alert management.
- SLA monitoring.
- Performance analytics.
- Predictive operational alerts.

6.1.1.16.0 System Testing Requirements

The following test shall be required (performed by bidder) :

- Factory Acceptance Test (FAT).
- Site Acceptance Test (SAT).
- User Acceptance Test (UAT).
- Performance Testing.
- Load Testing.
- Stress Testing.
- Penetration Testing.
- Vulnerability Assessment.
- Failover Testing.

- Disaster Recovery Testing.

All testing reports shall be submitted to WZPDCL for approval.

6.1.1.17.0 Training and Knowledge Transfer

The bidder shall provide comprehensive training and knowledge transfer programs for:

- System administrators.
- Database administrators.
- Security teams.
- Operations teams.
- Field engineers.

Training materials, operational manuals, API documentation, architecture diagrams, and maintenance procedures shall be handed over to WZPDCL.

6.1.1.18.0 Warranty, Support and Maintenance

The bidder shall provide minimum five (5) years comprehensive operation and maintenance support including:

- 24x7 technical support.
- Security patch management.
- Software updates.
- Database maintenance.
- Performance tuning.
- DC/DR support.
- Cybersecurity monitoring.
- Incident response support.
- Preventive maintenance.
- The bidder shall define SLA response and resolution timelines.
- The proposed solutions license shall be perpetual.
- Expiry of warranty, support, or O&M agreement shall not restrict WZPDCL from continuing operation of the system using the perpetual licenses provided under the contract.

6.1.1.19.0 Perpetual Licensing Requirement: Ownership and Licensing Model

The proposed solution shall be supplied under a perpetual licensing model for all software components supplied as part of the project.

The perpetual license shall include, but not be limited to:

- Meter Data Management (MDM) System
- Head-End System (HES) interfaces
- Unified Prepaid Vending System
- Agent Management System (AMS)
- Mobile Applications
- Consumer Web Portal
- Integration Middleware
- Reporting Tools
- Analytics Modules
- Database Licenses (if supplied by bidder)

- Monitoring and Management Tools
- API Gateway Components
- Security Management Components

The perpetual license shall grant WZPDCL:

- Unlimited and irrevocable rights to use the software permanently.
- Rights to operate the system without recurring annual license dependency.
- Rights to install and use the software in production, DR, testing, staging, and development environments.
- Rights to scale the system up to the specified meter capacity without requiring additional core platform license fees.
- Rights to continue operation after completion or expiration of the Operation & Maintenance (O&M) period.
- No Usage limitation, No Meter number limitation, No User limitation, No Renewal requirements.
- Subscription-only licensing models shall not be acceptable.

6.1.1.20.0 Deliverables

The bidder shall additionally provide:

- Detailed Solution Architecture.
- Network Architecture Diagram.
- Cybersecurity Architecture.
- Data Flow Diagram.
- Integration Design Document.
- API Documentation.
- Database Design Document.
- Capacity Planning Report.
- High Availability Design.
- Disaster Recovery Plan.
- Performance Benchmark Report.
- Cybersecurity Compliance Report.
- The Tenderer shall hand over the latest updated source code of the entire system to the Employer. The source code shall become the property of the Employer.

6.1.1.21.0 Data Sharing Scope Through API

The system shall have the capability to provide the following data through APIs.

- Distribution Transformer data (Phase voltages, Phase Currents, KW, KVAR, KWH & KVARH (Monthly/Weekly)
- Post Paid Energy Meter data (Phase voltages, Phase Currents, KW, KVAR, KWH & KVARH (Monthly/Weekly)
- Pre Paid Energy Meter data (Phase voltages, Phase Currents, KW, KVAR, KWH & KVARH (Monthly/Weekly)
- Data from Billing Server

6.1.1.22.0 Mutual Cooperation During Execution

A project titled “Modernization of Power Distribution Smart Grids Phase-I Project” is currently being implemented under WZPDCL. The scope of this project includes the implementation of SCADA and GIS systems. In the interest of WZPDCL's operational requirements, any data required for the execution of these activities shall be provided as and when requested. To ensure the smooth execution of the integration activities, a formal coordination mechanism, including joint meetings and an interface management plan, may be established.

6.1.2 Technical Term of Reference for Upgradation of Existing Smart Pre-Payment Metering System

TECHNICAL TERMS OF REFERENCE (TOR)
FOR
UPGRADATION OF EXISTING SMART PRE-PAYMENT METERING SYSTEM
ON TURNKEY BASIS INCLUDING 5 YEARS OPERATION & MAINTENANCE SUPPORT

1. INTRODUCTION AND BACKGROUND

West Zone Power Distribution Company Limited (WZPDCL), under the Government of the People's Republic of Bangladesh, is responsible for electricity distribution in the western zone of the country. In line with its commitment to modernizing power distribution infrastructure and improving operational efficiency, WZPDCL has implemented a Smart Pre-payment Metering System to enhance billing accuracy, reduce commercial losses, and improve customer service.

The existing system currently serves a significant customer base and comprises Unified Prepaid System, Head End System and Meter Data Management (HES/MDM), Agent Management System (AMS), and various integration modules with internal and external systems. However, due to technological advancements, increased customer base, evolving regulatory requirements from the Bangladesh Energy Regulatory Commission (BERC), and the need for enhanced security and functionality, WZPDCL intends to upgrade the existing smart metering ecosystem.

This Technical Terms of Reference (TOR) defines the comprehensive requirements, scope of work, deliverables, timelines, and performance criteria for the upgradation project to be executed on a turnkey basis, including supply, installation, testing, commissioning, data migration, system integration, and five years of operational and maintenance support.

2. OBJECTIVES OF THE ASSIGNMENT

The primary objective of this assignment is to upgrade the current smart pre-payment metering system into a unified, scalable, secure, and multi-functional platform that meets current and future operational requirements of WZPDCL. The upgraded system shall achieve the following specific objectives:

1. Ensure reliable, accurate, and timely acquisition of meter data from all connected smart meters across the WZPDCL distribution network.
2. Enable seamless online and offline energy vending mechanisms to ensure uninterrupted service to consumers.
3. Support automated billing processes, real-time alerts, event notifications, and comprehensive analytics capabilities for operational efficiency.
4. Enhance consumer experience through improved mobile applications, web portals, and self-service capabilities.
5. Ensure full compliance with BERC rules, regulations, and WZPDCL business logic and operational requirements.
6. Strengthen system security through implementation of modern cryptographic measures, Hardware Security Modules (HSM), and secure key management protocols.
7. Integrate comprehensively with all existing WZPDCL internal systems including meter management, Customer Information System (CIS), SCADA, GIS, CRM, mobile applications, and third-party payment systems.
8. Provide scalability to support up to 20 lakh (2 million) meters initially with capability to expand to 40 lakh (4 million) meters.
9. Enable advanced features including Net Metering, Mother-Child Metering configuration, remote disconnection, firmware upgrade capabilities, and comprehensive fraud detection mechanisms.

3. Additional SCOPE OF WORK for MDM

The selected bidder shall execute all activities described in this section on a comprehensive turnkey basis. The scope encompasses design, development, supply, installation, integration, testing, commissioning, data migration, training, documentation, and five-year operational and maintenance support.

3.1 Smart Pre-payment System Upgrade Requirements

3.1.1 Core System Components

The bidder shall design, supply, install, test, and commission an upgraded Smart Pre-payment Metering System Software including the following components:

- Unified Prepaid System with centralized management capabilities
- Head End System (HES) with advanced data acquisition and device management
- Meter Data Management (MDM) system with comprehensive analytics
- Agent Management System (AMS) for vending agent administration
- Command center interface for centralized monitoring and control

3.1.2 Remote Meter Management

The system shall provide comprehensive remote meter management capabilities:

- Remote meter reading using configurable push and pull intervals
- Data acquisition frequency minimum once per day, configurable for 15 minutes, 30 minutes, or 1 hour intervals
- Remote firmware upgrade capability for both smart meters and Data Concentrator Units (DCU)
- Remote connect and disconnect functionality with automated reconnection capabilities
- Time synchronization across all meters and network devices

3.1.3 Pre-payment Operations

The upgraded system shall support comprehensive pre-payment operations in accordance with BERC rules and WZPDCL business logic:

- Online and offline token-based vending mechanisms
- Multiple payment channel integration (mobile banking, internet banking, agent network, kiosks)
- Real-time balance updates and low balance alerts to consumers
- Tariff-based energy calculation and credit management
- Emergency credit functionality as per utility policies

3.1.4 Advanced Metering Features

The system shall enable the following advanced metering functionalities:

- Net Metering configuration and management for solar and renewable energy integration
- Mother-Child Metering setup for multi-tenant buildings and commercial complexes
- Load curtailment limit setting and enforcement
- Comprehensive alarm and event management system
- Tamper detection and anti-tampering measures
- Power quality monitoring and voltage level tracking

3.1.5 System Scalability and Performance

The upgraded system must meet the following scalability and performance requirements:

- Support for up to 20 lakh (2 million) meters initially
- Scalability architecture to expand up to 40 lakh (4 million) meters without major system redesign
- System response time of less than 3 seconds for meter data retrieval

- Concurrent user support for at least 500 active users
- High availability architecture with minimum 99.5 percent system uptime

3.1.6 Data Storage and Management

The system shall provide comprehensive data storage and management capabilities:

- Customer and meter configuration data storage including complete consumer profiles
- Geographic Information System (GIS) data integration for spatial representation
- Historical consumption data retention as per BERC guidelines (minimum 5 years)
- Selective archiving and purging based on utility-defined retention policies
- Database backup and disaster recovery mechanisms

3.2 System Parameter Configuration and Management

The upgraded system shall support comprehensive parameter configuration and management capabilities to ensure operational flexibility and regulatory compliance.

3.2.1 Meter Parameter Programming

The system shall enable remote programming of the following meter parameters:

- Tariff structure configuration including time-of-use (TOU) tariffs, seasonal tariffs, and multi-tier tariffs
- Prepaid parameter display settings and consumer interface configuration
- Load curtailment limit setting based on sanctioned load and consumer category
- Event configuration for connect and disconnect operations
- Auto-reconnection settings with configurable delays and conditions
- Time synchronization settings with NTP server configuration

3.2.2 Exception Management

The system shall provide comprehensive exception management features including:

- Meter tamper alert generation and notification with event classification
- Over-consumption and under-consumption pattern detection
- Outage indication and restoration tracking at meter and distribution transformer level
- Missing interval data identification and notification
- Communication failure alerts and network health monitoring
- Threshold exception notifications for voltage, current, and power factor deviations

3.2.3 Firmware and Software Management

The system shall support firmware and software management capabilities:

- Firmware upgrade scheduler for meters and DCUs with batch processing
- Rollback mechanisms in case of failed firmware updates
- Version control and tracking of all deployed firmware versions
- Push schedule configuration for automated data collection

3.2.4 System Logging and Audit Trail

All system activities must be logged and maintained for audit purposes. The system shall maintain comprehensive logs for:

- Successful and unsuccessful login attempts with user identification, timestamp, and IP address
- Privilege changes and role modifications
- Password changes and security credential updates
- Unauthorized access attempts and security violations
- System configuration changes including parameter updates
- Data modification and deletion activities
- Critical system events and error conditions

3.2.5 Future Upgrade Provisions

The system architecture shall provide provisions for future upgrade features including integration with emerging technologies, support for new meter types, enhanced analytics capabilities, and integration with smart grid infrastructure as may be required by WZPDCL in the future.

3.3 System Integration Requirements

The upgraded system must integrate seamlessly with all existing and planned WZPDCL systems through standard Application Programming Interfaces (APIs) and industry-standard protocols. Integration is critical for ensuring data consistency, operational efficiency, and unified business processes.

3.3.1 Integration with Internal WZPDCL Systems

The system shall integrate with the following internal WZPDCL systems:

- Online New Connection System for automated meter assignment and service provisioning
- Call Center Application for customer service representative access to real-time meter and account information
- Agent Management System (AMS) for vending agent network management
- Customer Information System (CIS) for bi-directional data exchange on customer accounts, billing, and service requests
- Supervisory Control and Data Acquisition (SCADA) system for operational monitoring and control
- Customer Relationship Management (CRM) system for complaint tracking and service request management
- Consumer Portal and mobile applications for self-service capabilities
- Geographic Information System (GIS) - optional integration for spatial data visualization
-

3.3.2 Integration with External Systems

The system shall support integration with the following external systems and service providers:

- Third-party vending and payment systems including mobile financial services (bKash, Nagad, Rocket, etc.)
- Mobile applications for both Android and iOS platforms
- Web-based applications and consumer portals
- SMS gateways for alert and notification delivery
- Email gateways for official communication and reporting
- Hand Held Unit (HHU) and manual reading systems for backup data collection
- Interactive Voice Response (IVR) systems for automated customer service
- Kiosk and mobile recharge centers for offline vending
-

3.3.3 Standards Compliance

All integration interfaces must comply with the following industry standards:

- Common Information Model (CIM) IEC 61968 (CIM 2.0) or equivalent open standards
- RESTful API architecture for web service integration
- JSON or XML data interchange formats
- OAuth 2.0 or similar secure authentication protocols
- TLS 1.2 or higher for encrypted communication
-

3.3.4 Standard API Requirements

The bidder shall provide standard, well-documented APIs for the following functional areas:

- Vending operations - token generation, validation, and transaction processing
- Meter Data Management (MDM) - data retrieval, meter commands, and configuration
- Payment processing - payment confirmation, reconciliation, and settlement
- Outage management - outage detection, notification, and restoration tracking
- Billing operations - consumption data, billing determinants, and bill calculation

- Analytics and reporting - data extraction, report generation, and dashboard services

3.3.5 Bidder Responsibilities for Integration

The selected bidder shall be responsible for:

- Supplying all required Head End System (HES) licenses and network management software licenses
- Integration with the updated Meter Data Management (MDM) system
- Configuration and optimization of automated node data acquisition processes
- Comprehensive integration testing and validation
- Documentation of all integration interfaces with detailed API specifications
- Training of WZPDCL staff on integration management and troubleshooting

3.4 Analytics and Business Intelligence Requirements

The upgraded system shall provide comprehensive analytics and business intelligence capabilities to support operational decision-making, fraud detection, demand-side management, and regulatory compliance reporting.

3.4.1 Consumption and Load Profile Analytics

The system shall support the following consumption and load profile analytics:

- Consumption and load profiles by configurable time periods including 15-minute, 30-minute, hourly, daily, monthly, and yearly intervals
- Load pattern analysis categorized by peak hours, off-peak hours, and super off-peak hours
- Consumer-wise consumption trends and comparative analysis
- Consumer category-wise aggregated consumption patterns
- Seasonal consumption variation analysis

3.4.2 Distribution Transformer Monitoring

The system shall provide distribution transformer (DT) level monitoring and analysis:

- Real-time and historical load monitoring at transformer level
- Transformer loading analysis with overloading identification
- Energy balance calculation at transformer level
- Technical and commercial loss estimation per distribution transformer
- Load curve visualization and analysis tools

3.4.3 Tamper, Outage, and Event Analytics

The system shall provide comprehensive event analytics capabilities:

- Tamper event analysis with classification by tamper type
- Outage event tracking and restoration time analysis
- System Average Interruption Duration Index (SAIDI) calculation
- System Average Interruption Frequency Index (SAIFI) calculation
- Geographic and temporal distribution of outage events
- Customer interruption analysis and reliability metrics

3.4.4 Fraud Detection and Revenue Protection

The system shall include advanced fraud detection capabilities using pattern recognition and machine learning techniques:

- Abnormal consumption pattern detection algorithms
- Tamper event correlation and fraud scoring
- Zero consumption or low consumption anomaly detection
- Reverse energy flow detection
- Sudden consumption change detection
- Peer group comparison for outlier identification

3.4.5 Demand Response Analytics

The system shall support demand-response program management and analytics:

- Load curtailment program effectiveness measurement
- Time-of-use (TOU) tariff impact analysis
- Peak demand reduction measurement
- Consumer participation tracking and incentive calculation

3.4.6 Data Archiving and Purging

The system shall provide selective archiving and purging capabilities based on utility-defined requirements. Historical data retention policies shall comply with BERC regulations and WZPDCL business requirements. The system shall support automated archiving of aged data while maintaining query capabilities for archived information.

3.5 Consumer Online Portal and Mobile Application Requirements

The upgraded system shall include a comprehensive consumer-facing web portal and mobile applications for Android and iOS platforms to enhance consumer experience and enable self-service capabilities.

3.5.1 Core Consumer Portal Features

The consumer portal and mobile applications must provide the following functionalities:

- Online energy recharge and top-up functionality with multiple payment options
- Real-time account balance and credit status display
- Daily, monthly, and historical consumption data visualization
- Purchase history and transaction records with detailed breakdown
- Token purchase and recharge history
- Real-time alerts and notifications for low balance, high consumption, and system messages
- Estimated remaining days of electricity based on consumption patterns

3.5.2 Service Request Management

Consumers shall be able to submit and track the following service requests through the portal:

- Meter checking and verification requests
- Load increase or decrease applications
- New service connection requests
- Complaint registration and tracking
- Service request status tracking with automated updates

3.5.3 Security and Authentication

The consumer portal shall implement robust security measures:

- Secure login using consumer ID, registered mobile number, and password
- One-Time Password (OTP) based two-factor authentication
- Encrypted communication using TLS 1.2 or higher
- Session timeout and automatic logout mechanisms
- Password strength requirements and periodic change enforcement

3.5.4 Payment Gateway Integration

The portal must integrate with existing WZPDCL-approved payment gateways supporting:

- Credit and debit card payments (Visa, MasterCard, American Express)
- Mobile financial services (bKash, Nagad, Rocket, etc.)
- Internet banking from all major banks in Bangladesh
- Digital wallets and other emerging payment methods

3.5.5 User Interface and Experience

The consumer portal and mobile applications shall provide:

- Intuitive and user-friendly interface design
- Support for Bengali and English languages
- Responsive design for various screen sizes and devices
- Fast loading times and optimized performance
- Accessibility features for users with disabilities

3.6 Reporting and Business Intelligence Requirements

The upgraded system shall provide comprehensive reporting capabilities with a flexible report builder interface and business intelligence tools to support operational, financial, and regulatory reporting requirements.

3.6.1 Standard Reports

The system shall provide the following standard reports (but not limited to):

Consumption and Billing Reports:

- Consumption (kWh) reports by consumer, consumer category, distribution transformer, feeder, and circle
- Customer recharge and top-up reports with payment method breakdown
- Revenue reports with collection efficiency analysis
- Customer-wise detailed consumption and payment history

Operational Reports:

- Daily data collection status report with communication success rates
- Connect and disconnect reports from Customer Information System
- Missing interval and event data reports
- Communication infrastructure health reports

Exception and Alert Reports:

- Usage exception reports identifying abnormal consumption patterns
- Tamper event reports with classification and geographic distribution
- Overload and threshold exception reports
- Defective meter identification reports

Reliability and Quality Reports:

- System Average Interruption Duration Index (SAIDI) reports
- System Average Interruption Frequency Index (SAIFI) reports
- Power quality reports including voltage level analysis
-

3.6.2 Report Export Capabilities

The utility must be able to export all reports in multiple formats:

- Portable Document Format (PDF) for official documentation
- Comma-Separated Values (CSV) for data analysis
- Microsoft Excel format (XLS/XLSX) for detailed analysis
- HTML format for web-based viewing
-

3.6.3 Report Builder and Ad-hoc Query Interface

The system shall provide a comprehensive report builder interface with the following capabilities:

- User-driven custom report creation without programming knowledge
- Drag-and-drop interface for field selection and layout design
- Flexible filtering, sorting, and grouping options
- Calculated fields and aggregation functions
- Report template saving and sharing capabilities

- Scheduled report generation and automated email delivery

3.6.4 Dashboard and Visualization

The system shall include interactive dashboards with real-time data visualization:

- Executive dashboard with key performance indicators (KPIs)
- Operational dashboard for monitoring system health and performance
- Financial dashboard for revenue tracking and collection monitoring
- Geographic visualization using map-based interfaces
- Interactive charts, graphs, and heat maps
- Drill-down capabilities for detailed analysis

3.7 Advanced Security and Key Management Requirements

Security is of paramount importance for the smart metering system. The upgraded system must implement state-of-the-art security measures to protect against unauthorized access, data breaches, cyberattacks, and fraudulent activities.

3.7.1 Cryptographic Key Management

The system shall implement comprehensive cryptographic key management infrastructure:

Hardware Security Module (HSM):

- FIPS 140-2 Level 3 or higher certified Hardware Security Module
- Secure generation, storage, and management of cryptographic keys
- Tamper-evident and tamper-resistant physical security

Software Security Module (SSM):

- Backup key management through Software Security Module
- Secure key distribution and lifecycle management

Encryption Standards:

- Advanced Encryption Standard (AES) with minimum 128-bit key length
- Key Encryption Key (KEK) management for master key protection
- Security Association (SA) management for device authentication

Message Authentication:

- Downstream message authentication to prevent command injection
- Digital signatures for critical commands and firmware updates
-

3.7.2 Communication Security

All communication channels must be secured using industry-standard protocols:

- End-to-end encrypted communication between command center and smart meters
- Segmented broadcast keys for group communication security
- Individual unicast keys for direct meter-to-system communication
- Transport Layer Security (TLS) 1.2 or higher for web-based communication
- Virtual Private Network (VPN) support for remote access
- Certificate-based authentication for system components

3.7.3 Access Control and User Management

The system shall implement robust access control mechanisms:

- Role-Based Access Control (RBAC) with granular permission management
- Multi-factor authentication for administrative access
- Separation of duties and least privilege principles

- Account lockout mechanisms after failed login attempts
- Session management with automatic timeout
- Privileged access monitoring and recording
-

3.7.4 Mobile Administration Security

Mobile administration tools must implement enhanced security:

- Device authentication and authorization
- Secure mobile admin tool with encrypted storage
- Certificate-based authentication for mobile devices
- Remote wipe capability for lost or stolen devices
- Activity logging and audit trail for mobile operations
-

3.7.5 Security Compliance and Standards

The system security architecture must comply with the following standards:

- ISO/IEC 27001 Information Security Management
- NIST Cybersecurity Framework
- IEC 62351 Power Systems Management and Information Exchange Security
- NERC CIP (Critical Infrastructure Protection) standards where applicable
- Bangladesh government cybersecurity guidelines and regulations
-

3.7.6 Security Monitoring and Incident Response

The system shall include comprehensive security monitoring capabilities:

- Real-time security event monitoring and alerting
- Intrusion detection and prevention systems
- Security Information and Event Management (SIEM) integration
- Incident response procedures and automated containment mechanisms
- Vulnerability assessment and penetration testing capabilities
- Regular security audits and compliance reporting
-
- 3.8 Data Migration Requirements

The successful bidder must migrate all data from the existing smart metering system to the new upgraded system without any data loss or corruption. Data migration is a critical component of this project and must be executed with utmost care and precision.

3.8.1 Data Migration Scope

The following data categories must be migrated:

- Master data including all customer information, account details, and consumer profiles
- Meter inventory data including meter serial numbers, configurations, and installation details
- Historical consumption data for minimum past 5 years or as available
- Transaction history including all recharge and payment records
- Event logs, tamper records, and alarm history
- Network infrastructure data including DCU and communication node configurations
- Geographic Information System (GIS) data and spatial references
- User accounts, roles, and permission configurations

3.8.2 Data Migration Process

The bidder must follow a structured data migration process:

- 1.Data Assessment and Profiling: Comprehensive assessment of existing data structure, quality, and volume
- 2.Data Mapping and Transformation: Detailed mapping between old and new data structures with transformation rules
- 3.Data Cleansing and Validation: Identification and correction of data quality issues
- 4.Pilot Migration: Test migration using a subset of data to validate process
- 5.Full Migration Execution: Complete data migration in phases as approved by WZPDCL
- 6.Post-Migration Verification: Comprehensive verification of migrated data accuracy and completeness
- 7.Data Synchronization: Ensure clean and accurate synchronization of all meter and consumer data

3.8.3 Data Migration Quality Assurance

The following quality assurance measures must be implemented:

- Zero data loss guarantee with 100 percent record migration
- Data integrity verification using checksums and hash validations
- Reconciliation reports comparing source and target data volumes
- Sample data accuracy testing across all data categories
- End-to-end business process testing post-migration
-

3.8.4 Rollback and Contingency Planning

The bidder must prepare comprehensive rollback and contingency plans:

- Complete backup of existing system before migration
- Documented rollback procedures with clear triggers and timelines
- Parallel operation period where both old and new systems run simultaneously
- Business continuity measures to ensure uninterrupted customer service

3.8.5 User Acceptance Testing (UAT) After Migration

After completion of data migration, comprehensive User Acceptance Testing must be conducted:

- UAT scenarios covering all business processes and use cases
- Involvement of WZPDCL subject matter experts in testing
- Performance testing under peak load conditions
- Security testing and penetration testing
- Formal UAT sign-off by WZPDCL before go-live
- Data migration validation report documenting all verification activities

4. DELIVERABLES

The selected bidder must deliver the following items as part of this turnkey project:

1. Upgraded Pre-payment Software Suite including Unified Prepaid System, Head End System (HES), Meter Data Management (MDM) system, and Agent Management System (AMS)
2. Consumer-facing Mobile Applications for Android and iOS platforms with source code
3. Web-based Consumer Portal with responsive design
4. Complete integration with all internal WZPDCL systems (CIS, SCADA, CRM, GIS, Call Center, AMS, Online Connection System)
5. Integration with external third-party payment gateways and mobile financial services
6. Hardware Security Module (HSM) and Software Security Module (SSM) with complete key management infrastructure
7. Complete database migration with all historical data successfully transferred
8. Comprehensive Documentation Package including:

- System Design Document detailing architecture, components, and workflows
 - Integration API Documentation with detailed specifications and examples
 - User Manual for end users and consumers
 - Administrator Manual for system administrators
 - Security Key Management Policy and Procedures
 - Operations and Maintenance Manual
 - Troubleshooting and Diagnostic Guide
9. User Acceptance Testing (UAT) Report with test cases, results, and sign-off
 10. Data Migration Validation Report documenting migration process and verification
 11. Comprehensive training for all WZPDCL staff categories as detailed in Section 9
 12. All necessary software licenses for 30 lakh meters initially, scalable to 40 lakh meters
 13. Five-year Operation and Maintenance (O&M) Support as specified in Section 8
 14. Source code or source code escrow arrangement as per WZPDCL requirements

5. IMPLEMENTATION TIMELINE AND PHASING

The project shall be executed in five distinct phases with clearly defined activities, deliverables, and timelines. The total implementation period excluding the five-year operation and maintenance support is seven months.

PHASE	KEY ACTIVITIES	DURATION
PHASE 1 System Assessment and Design	• Comprehensive assessment of existing system • Data profiling and migration strategy • System architecture design • Integration design documentation • Security architecture design • Project plan finalization	All work must be completed within the stipulated time mentioned in GCC-29.1.
PHASE 2 Development and Customization	• Software development and customization • Security module implementation • Consumer portal and mobile app development • Integration module development • Testing in development environment • Code review and quality assurance	
PHASE 3 Integration and Migration	• System deployment in production environment • Integration with internal and external systems • Data migration execution • HSM/SSM setup and key management • Network configuration and optimization	
PHASE 4 Testing and UAT	• System testing and integration testing • Performance and load testing • Security testing and penetration testing • User Acceptance Testing (UAT) • Issue resolution and fine-tuning • UAT sign-off by WZPDCL	
PHASE 5 Go-Live and O&M	• Go-live preparation and cutover • Hypercare support period • Operation and Maintenance (O&M) • Continuous monitoring and support • Regular system health checks • Security updates and patches	5 Years

6. QUALIFICATION REQUIREMENTS FOR BIDDER

Bidders must meet the following minimum qualification requirements to be eligible for this tender:

1. Experience integrating Head End System (HES) and Meter Data Management (MDM) with major Utility Customer Information Systems
2. Demonstrated expertise in data migration and cyber security implementation experience and key management.
3. Proven cyber security implementation experience including HSM/SSM deployment and key management
4. Valid manufacturer authorization or partnership agreement for all required software modules and components
5. ISO 9001:2015 Quality Management System certification
6. ISO/IEC 27001 Information Security Management certification (preferred)
7. Financial capacity to execute a project of this magnitude with bank solvency certificate
8. Dedicated project team with qualified professionals including project managers, system architects, developers, and support staff

7. PERFORMANCE AND SERVICE LEVEL REQUIREMENTS

The upgraded system must meet the following performance and service level requirements:

1. System Uptime: Minimum 99.5% availability excluding planned maintenance windows
2. Response Time: Less than 3 seconds for meter data retrieval and command execution
3. Data Collection Success Rate: Minimum 95% daily data collection success rate
4. Support Availability: 24×7 operation helpdesk with multilingual support (Bengali and English)
5. Fault Restoration Time: Maximum 4 hours for critical system failures
6. Non-Critical Issue Resolution: Maximum 24 hours for non-critical issues
7. Scalability: System must handle 20% growth in user base without performance degradation
8. Concurrent Users: Support for minimum 500 concurrent users without performance impact
9. Transaction Processing: Handle minimum 10,000 vending transactions per hour during peak times
10. Backup and Recovery: Daily automated backups with maximum 4-hour Recovery Time Objective (RTO)

8. WARRANTY AND OPERATION & MAINTENANCE SUPPORT

The bidder must provide comprehensive five-year Operation and Maintenance (O&M) support including:

- Corrective Maintenance: Resolution of all system bugs, errors, and functional issues
- Preventive Maintenance: Regular system health checks, optimization, and performance tuning
- Security Patch Updates: Timely application of security patches and vulnerability fixes
- Version Upgrades: Minor and major version upgrades as released by vendors
- 24×7 Helpdesk Support: Dedicated helpdesk for incident reporting and resolution
- On-site Support: Regular on-site visits and emergency on-site support when required
- Remote Support: Remote access capability for troubleshooting and issue resolution
- Periodic Audit and Health Check: Quarterly system audits and annual comprehensive health checks
- Knowledge Transfer: Continuous knowledge transfer to WZPDCL IT staff
- Documentation Updates: Updates to all documentation reflecting system changes
- Spare Parts and Components: Supply of necessary spare parts and replacement components
- Performance Monitoring: Continuous monitoring of system performance against SLAs

8.1 Support Response Times

The following support response times shall be maintained:

SEVERITY LEVEL	DESCRIPTION	RESPONSE TIME
Critical (P1)	System down or major functionality unavailable	1 hour
High (P2)	Significant functionality impaired	4 hours
Medium (P3)	Minor functionality affected	8 hours
Low (P4)	Cosmetic issues or enhancement requests	24 hours

9. TRAINING REQUIREMENTS

Comprehensive training must be provided to WZPDCL staff to ensure effective operation, administration, and maintenance of the upgraded system. Training shall be conducted in multiple phases and cover all user categories.

9.1 Training Categories

IT Administrators and System Administrators

Training topics include:

- System architecture and components
- System administration and configuration
- User management and security
- Database management and backup/recovery
- Performance monitoring and optimization
- Troubleshooting and diagnostics
- Integration management

Call Center Staff and Customer Service Representatives

Training topics include:

- Consumer portal and mobile app features
- Customer query handling
- Transaction processing and verification
- Complaint management
- Report generation for customer service

Vending Operators and Agent Network

Training topics include:

- Token generation and vending procedures
- Payment processing
- Agent Management System (AMS) operations
- Transaction reconciliation
- Customer verification procedures

Field Engineers and Technical Staff

Training topics include:

- Meter installation and commissioning
- On-site troubleshooting
- Remote meter management
- Firmware upgrade procedures
- Hand Held Unit (HHU) operations

Management and Reporting Team

Training topics include:

- Dashboard and analytics usage
- Report generation and customization
- Business intelligence tools
- Key Performance Indicators (KPI) monitoring
- Decision support system usage

9.2 Training Methodology

Training shall be delivered through a combination of:

- Classroom training sessions with presentations and demonstrations
- Hands-on practical training in a sandbox/training environment
- On-the-job training during parallel run and hypercare period
- Training documentation including user guides and quick reference cards
- Video tutorials and e-learning modules for self-paced learning
- Train-the-trainer sessions to create internal WZPDCL training capacity

9.3 Training Schedule and Duration

Minimum training hours required per category:

USER CATEGORY	NUMBER OF PARTICIPANTS	TRAINING DURATION	Remarks
IT Administrators	10 persons	32 hours	The duration of the training shall not exceed the number of man-months specified in the Price Schedule.
Call Center Staff	13 persons	24 hours	
Field Engineers	50 persons	32 hours	
Management Team	10 persons	16 hours	

9.4 For Foreign Training

9.4.1 During Training Course Tenderer have to follow as per EC-Council for CEH (Certified Ethical Hacker), Standard Course from Microsoft for MCSE (Microsoft Certified Solution Expert) and Standard Certified Course from CISCO. Tenderer provide Certification Voucher and training facility of Vendor Certification.

Also, training shall be provided as required on the subjects mentioned below.

9.4.2 Understand SDN architecture, components, controllers, APIs, protocols

- Understand SDN architecture, components, controllers, APIs, protocols
- Deploy and manage SDN controllers
- Implement fabric networking (spine-leaf)
- Apply network automation and programmability
- Integrate SDN with traditional enterprise networks
- Understand real-world datacenter use cases

- Build strong foundation in enterprise cyber security
- Configure and manage firewalls, IPS, WAF, EDR
- Understand vulnerability management, SOC processes, log analysis
- Learn incident detection & response
- Hands-on practical security operations

9.4.3

1. Service Level Management

- Service Level Management
- Needs analysis
- Capability assessment
- Service portfolio
- Service catalogue
- Service Level Agreements (SLAs)
- Availability measurement
- Data points in SLA
- Service reporting
- Complaint procedure
- Customer satisfaction measurement
- Service Improvement Process (SIP)
- SLA content

2. The Data Centre Organization

- Operational issues
- Organization chart
- Roles and responsibilities
- Skills matrix
- Contingency / backup roles
- Shift management
- Performance management
- Career development
- Training and assessment
- Job rotation
- Succession planning
- Disciplinary program

3. Managing Safety & Statutory Requirements

- Safety policies and regulations
- Occupational Health and Safety (OH&S)
- Safety awareness training
- Permit to Work (PTW)
- Lock-out / Tag-out
- Personal Protective Equipment (PPE)
- Testing and tagging of equipment
- Emergency preparedness and response
- Reporting of safety issues
- Reviews / internal audit / external audit

4. Managing Physical Security

- Security policies and procedures
- Security standards and guidelines
- Security awareness
- Security incident management
- Disciplinary program
- Reviews, internal and external audits

5. Facilities Management

- Maintenance policies and procedures
 - Various maintenance programs
 - Outsourcing of maintenance activities
 - Maintenance contract options
 - Warranty
 - Maintenance schedule
 - Service situations
 - Spare part management
 - Contamination control
-

6. Data Centre Operations

- Policies and procedures for data centre operations
 - Service operations and daily data centre operations
-

7. Monitoring / Reporting / Control

- Monitoring requirements
 - Escalation procedures
 - Reporting
 - Trend analysis
 - Reviews
-

8. Project Management

- Project management
 - Project organization
 - Project manager
 - Project phases
-

9. Environmental Sustainability

- Importance of sustainability
 - Sustainability policies
 - Environmental management
 - Waste management
 - Water management
 - ICT utilisation management
 - Environmental performance measurements
 - Renewable energy factor (REF)
-

10. Organizational Resilience

- Business continuity
 - Data centre facility options
 - Business Impact Analysis
 - Type of facility
 - Human resources
 - Facility, equipment and consumables
-

11. Governance, Risk and Compliance

- Management commitment
 - Coordination, collaboration and integration
 - Compliance
 - Risk management
-

- Document management
- Financial management
- Vendor management
- Asset management

9.4.4 Virtualization and Storage management with RAID; Overview of Various command to access CISCO/Fortinet network equipment so that one Data center manager can operate data center easily.

The tenderer will provide required training in the manufacturers/suppliers' country(s).

9.5 Training Cost

The full training program is to be approved by the employer/engineer prior to commencement. The cost of Air Tickets (both way) from Bangladesh to Manufacturer's Country, Hotel Accommodation, fooding and lodging etc. will be borne by the contractor. Other than this, the Contractor will pay a standard amount of pocket money (USD 150) per day (including journey Period). All the cost of this purpose shall be deemed is included in the offered price.

The contractor shall also to arrange a local training program. The Contractor is to report on the capability and progress of each trainee at the completion of their training periods. All cost of local training including accommodation, transport and fooding will be bear by the contractor. The contractor also pay pocket money (BDT 1000) per day for each trainee during local training.

10. ACCEPTANCE CRITERIA

The upgraded system will be accepted by WZPDCL only after successful completion and verification of all the following acceptance criteria:

1. All system components successfully installed, configured, and operational
2. All integrations with internal WZPDCL systems functioning correctly with verified data flow
3. All integrations with external systems (payment gateways, SMS, email) operational
4. Complete data migration validated with zero data loss and 100% accuracy verified
5. User Acceptance Testing (UAT) completed successfully with formal sign-off from WZPDCL
6. Security compliance proven through security audit and penetration testing reports
7. Performance benchmarks met as specified in Section 7 with documented proof
8. All documentation delivered and reviewed by WZPDCL
9. Training completed for all user categories with training completion certificates
10. Hardware Security Module (HSM) and Software Security Module (SSM) operational
11. Consumer portal and mobile applications functional and published to app stores
12. System demonstrated to support specified capacity (40 lakh meters)
13. Backup and disaster recovery procedures tested and validated
14. Parallel run successfully completed for agreed duration
15. No critical or high severity defects remaining in the system

10.1 Acceptance Process

The acceptance process shall follow these steps:

1. Bidder notification of system readiness for acceptance testing
2. WZPDCL team conducts comprehensive acceptance testing covering all criteria
3. Issues identified during testing documented and prioritized
4. Bidder resolves all critical and high priority issues
5. Re-testing of resolved issues by WZPDCL
6. Final acceptance testing and system verification
7. Formal acceptance sign-off by designated WZPDCL authority
8. Commencement of warranty and O&M support period

11. PAYMENT TERMS

Payments shall be made in installments linked to completion and acceptance of project phases as follows:

As per Tender Document

Note: All payments are subject to deduction of applicable taxes as per Government of Bangladesh regulations.

12. OTHER CONDITIONS AND REQUIREMENTS

12.1 Regulatory Compliance

The bidder must comply with:

- All relevant laws and regulations of the Government of the People's Republic of Bangladesh
- Bangladesh Energy Regulatory Commission (BERC) rules and guidelines
- WZPDCL standards, policies, and operational procedures
- Bangladesh Telecommunication Regulatory Commission (BTRC) requirements for communication systems
- Data protection and privacy regulations applicable in Bangladesh

12.2 Intellectual Property and Source Code

All customized software and configurations developed specifically for this project shall remain the intellectual property of WZPDCL. The bidder must provide either:

- Complete source code of all customized modules with full rights for WZPDCL to modify and maintain, OR
- Source code escrow arrangement with a reputable escrow agent with clearly defined release conditions

12.3 Data Ownership

All data collected, processed, and stored in the system belongs solely to WZPDCL. The bidder has no rights to use, access, or share this data except as necessary for providing contracted services. Upon project completion or contract termination, the bidder must securely delete all WZPDCL data from their systems and provide certification of data deletion.

12.4 Software Licenses

All software licenses must be:

- Perpetual licenses with 5 years Operational Support Service.
- Transferable to WZPDCL name without additional cost
- Licensed for the full capacity (initially 20 lakh meters, scalable to 40 lakh meters)
- Include all necessary user licenses, API licenses, and concurrent access licenses
- Provided with valid license certificates and activation keys

12.5 Warranty and Liability

The bidder warrants that:

- The system will function as specified in this TOR and bid documents
- The system is free from defects in design, materials, and workmanship
- The system does not infringe on any third-party intellectual property rights
- The bidder has authority to grant all necessary licenses and rights
- The system complies with all specified security and performance standards

12.6 Dispute Resolution

Any disputes arising from this contract shall be resolved through:

1. Initial attempt at amicable settlement through mutual discussion
2. Mediation by a mutually agreed mediator if direct discussion fails
3. Arbitration under the Bangladesh Arbitration Act, 2001 if mediation fails
4. Legal jurisdiction of courts in Dhaka, Bangladesh as final resort

12.7 Force Majeure

Neither party shall be liable for failure to perform obligations due to force majeure events including natural disasters, wars, epidemics, government actions, or other events beyond reasonable control. The affected party must notify the other party within 7 days of the force majeure event and make reasonable efforts to resume performance.

12.8 Confidentiality

The bidder must maintain strict confidentiality of all WZPDCL information, data, and business processes. Confidential information shall not be disclosed to third parties without prior written consent from WZPDCL. This confidentiality obligation shall survive contract termination for a period of 5 years.

13.0 TECHNICAL ORIENTATION AND QUALITY TEST WITNESS:

13.01 Factory Inspection and Test Witness:

The PE shall have the right to inspect/test the goods/materials to confirm their conformity to the specification. The PE shall be entitled at all reasonable time during manufacture to inspect, examine and test of goods/materials at the manufacturers' premises, workmanship and performance.

The test shall be carried out as per related standard and GTP unless otherwise mentioned at the manufacturer premises or other places where the test facilities are available.

The Contractor shall, after consulting the PE, give the PE reasonable notice in writing of the date and the place at which any material or equipment will be ready for testing as provided in the contract and unless the PE shall attend at the place so named on date, which the contractor has stated in his notice, the contractor may proceed with the tests, which shall be deemed to have been made in the PE 's presence, and shall forth with forward to the PE duly certified copies of test readings.

When the PE intends to attend the test, he shall promptly inform the contractor accordingly in writing, so that he can take action. The PE shall give the contractor timely notice in writing of his intention to attend the test.

Where the contractor provides for tests on the premises of the contractor or of any manufacturer of the contractor, except where otherwise specified, shall provide free of charge such assistance, labor, materials, electricity, fuel, stores, apparatus and instruments as may be requisite and as may be reasonably demanded to carry out such test efficiently. These tests shall be performed as per related standard & GTP and only routine tests as agreed upon, will be performed.

As and when the PE is satisfied that any materials/equipment shall have passes the tests referred to in this clause, PE shall notify the contractor in writing to that effect.

Should any inspected/tested goods fail to conform to the specification, the PE shall have the right to reject any of the items or complete batch if necessary. In that case Contractor has to replace the Equipment and to make good of them without any financial involvement to the PE. In case any of the Equipment found not conforming with the specification at the time of post landing Inspection, the contractor will in no way be relieved from the responsibility of replacing them or making them good at their own cost, despite the Equipment were found good at the time of Factory Acceptance Test. Nothing in this clause shall in any way release the contractor from any warranty or other obligations under the contract.

If the offered goods are manufactured outside the PE's country, then Utility's Inspection Team shall have to conduct Technical Orientation and Quality Test Witness at the manufacturer's factory premises. The PE 's nominated "Engineering Team" consisting of at least 03 (Three) Engineers in each team shall take part in the witness of the QAT of the goods/ Technical Orientation on the manufacturer's premises for a period of 7 days (excluding journey time). All the cost regarding QAT witness by the PE's 'Engineering Team' i.e. the cost of Air Ticket from Dhaka to the place of inspection/training & return, internal transportation, Phone, Fax, E-mail, Health insurance, Hotel accommodation, Food etc. and pocket money of 150 USD per day per person for the period of 7 days (excluding journey time) shall be borne by the Contractor and the cost shall be included with the equipment's quoted price.

No goods shall be packed, prepared for shipment / delivery unless it has been approved including Test reports and written instruction has been issued by the PE .

The tenderer has to mention the place of Technical Orientation and Quality Test Witness in the following table:

Sl. No.	Item	Period of Technical Orientation and Quality Test Witness	Place & Country of Technical Orientation and Quality Test Witness

During Technical Orientation & Quality Test Witness, the inspection team will select at random basis for testing the selected items in an independent testing lab for the tests.

13.02 Post-Delivery Inspection & Testing:

The Contractor shall inform the PE immediately after arrival of the goods at the designated store of Utility (as per delivery schedule). An Inspection team of Utility shall perform the post-landing inspection in presence of contractor's representative. The Contractor shall arrange the program of post-landing inspection. Any defect or damage have been found at post-landing inspection, the defective or damaged materials/ goods to be replaced by the contractor at his own cost within the stipulated time.

The PE 's right to inspect, test (where necessary) and reject the goods after delivery at the designated store of Utility shall in no way be limited or waived by reason of the goods having previously been inspected, tested and passed by the PE prior to the good's delivery. The cost incurred for this purpose shall be borne by the contractor.

APPENDIX - ACRONYMS AND DEFINITIONS

ACRONYM	FULL FORM
AES	Advanced Encryption Standard
AMS	Agent Management System
API	Application Programming Interface
BERC	Bangladesh Energy Regulatory Commission
CIM	Common Information Model
CIS	Customer Information System
CRM	Customer Relationship Management
DCU	Data Concentrator Unit
DT	Distribution Transformer
GIS	Geographic Information System
HES	Head End System
HHU	Hand Held Unit
HSM	Hardware Security Module
IVR	Interactive Voice Response
KEK	Key Encryption Key
KPI	Key Performance Indicator
MDM	Meter Data Management
NERC CIP	North American Electric Reliability Corporation Critical Infrastructure Protection
NIST	National Institute of Standards and Technology
NTP	Network Time Protocol
O&M	Operation and Maintenance
OTP	One-Time Password
RBAC	Role-Based Access Control
RTO	Recovery Time Objective
SA	Security Association
SAAS	Software as a Service
SAIDI	System Average Interruption Duration Index
SAIFI	System Average Interruption Frequency Index
SCADA	Supervisory Control and Data Acquisition
SIEM	Security Information and Event Management
SLA	Service Level Agreement
SMS	Short Message Service
SSM	Software Security Module
TLS	Transport Layer Security
TOR	Terms of Reference
TOU	Time of Use
UAT	User Acceptance Testing
VPN	Virtual Private Network
WZPDCL	West Zone Power Distribution Company Limited

6.1.3 Technical Term of Reference for Development of Web based Post-paid Billing Software

Development of Web based Post-paid Billing Software (Part-2)

1. Background

West Zone Power Distribution Company Limited (WZPDCL) is responsible to supply of electricity to customer premises through 52 offices under 6 circle offices in the western part of the country (Khulna & Barishal division and greater Faridpur area comprising 21 districts and 21 Upazila excluding REB area). WZPDCL has two types metering system of electricity consumer as Postpaid meter and Prepaid meter.

The existing postpaid billing system of operates using a distributed server-client topology. As a result, there are 52 separate billing servers installed in 52 different field offices. Each of these 52 servers maintains its own individual database. One or more client PCs are connected to the billing server computer. The postpaid billing software used by WZPDCL is developed in Visual Basic 6 and is desktop-based. SQL Server 2008R2 is used as the database management system.

Due to the distributed nature of the system with 52 billing servers, 52 separate applications, and 52 separate databases—centralized data storage, report generation, data transparency, and data security cannot be ensured effectively. The operation and maintenance of the postpaid billing software require additional time and incur higher financial costs. Data security is also a very big risk as the data is distributed in all billing stations with no scope for data consolidation at any point.

Moreover, these systems are developed using old/obsolete technologies with minimum stability, scalability, maintainability and functional maturity. On top of that, due to imbalanced engagement model and agreement related complexities, the manual billing system vendors are exploiting WZPDCL in a very unusual manner, which is considered to be very non-standard of the global software industry practices.

WZPDCL wants to implement new Web based Postpaid billing software system as well as conversion of existing 52 nos. distributed database to single centralized database system integrated with new web-based application.

Hosting the postpaid billing application on server, database on ODA (Oracle Database Appliance) and another Server for third-party access (MFS, Bank etc.) and another Server for MIS application. Field-level Circle Offices and Electricity Supply Offices would then be able to access and use the application and database through intranet.

2. Objectives

The primary objectives of the software are:

- To develop web based Postpaid billing software.
- To develop web-based Management Information System (MIS) application for generating report.
- Any type of customized report can be generated and managed centrally as per requirements.
- Banks involved in electricity e-bill collection will be able to verify bills online using the interface of the billing software.
- To ensure faster, systematic, better consumer service delivery.
- To eliminate or drastically reduce reading manipulation etc. types of fraudulent activities;
- To ensure accurate, faster, tamper-proof billing (processing, generation, delivery, payment processing etc.) and revenue collection using centralized, state-of-the-art technologies;
- Assurance in real time backup facilities.
- Assurance in data security.
- To ensure online based Commercial Operation Procedure (COP).
- Postpaid billing system can be integrated with Online new connection application, Miscellaneous application, Complain Management System (CMS), Accounting Software and prepaid metering

system. So that, we can generate automatic centralized report all types of consumers (prepaid/postpaid).

3. Review of Existing Service

Currently WZPDCL is practicing very manual, distributed, highly error and fraud prone billing process, because of which every year WZPDCL is losing of huge volume of revenue along with never achieved customer satisfaction level.

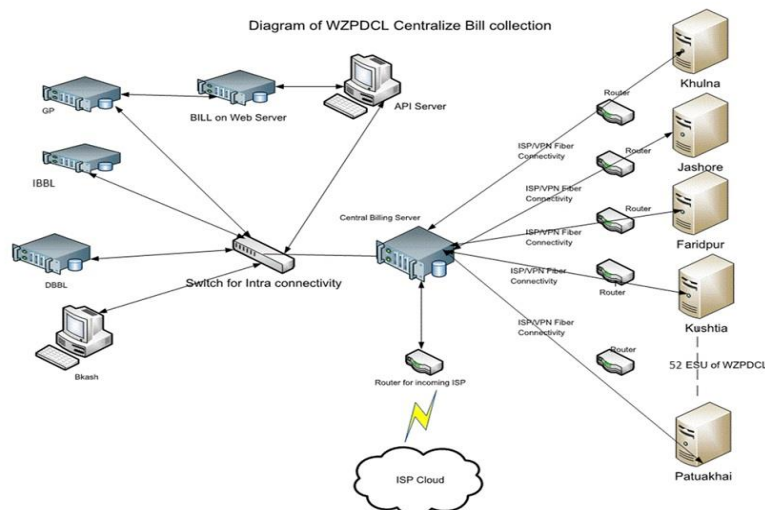
3.1 Existing Service

The existing postpaid billing system of operates using a distributed server-client topology. As a result, there are 52 separate billing servers installed in 52 different field offices. Each of these 52 servers maintains its own individual database. One or more client PCs are connected to the billing server computer. The postpaid billing software used by WZPDCL is developed in Visual Basic 6 and is desktop-based. SQL Server 2008R2 is used as the database management system.

Due to the distributed nature of the system with 52 billing servers, 52 separate applications, and 52 separate databases—centralized data storage, report generation, data transparency, and data security cannot be ensured effectively. The operation and maintenance of the postpaid billing software require additional time and incur higher financial costs. Data security is also a very big risk as the data is distributed in all billing stations with no scope for data consolidation at any point.

Currently, the connectivity of 52 office servers with the central billing server at WZPDCL headquarters is through broadband VPN, so only the customer's monthly bill and online bill information is stored on the central server. In addition, any other information related to the customer's bill such as outstanding information, previous history, offline bill information, etc. is not possible to store centrally because it is distributed across 52 locations and the data size is large.

Moreover, these systems are developed using old/obsolete technologies with minimum stability, scalability, maintainability and functional maturity. On top of that, due to imbalanced engagement model and agreement related complexities, the manual billing system vendors are exploiting WZPDCL in a very unusual manner, which is considered to be very non-standard of the global software industry practices.



3.2 Challenges of Existing system:

- As the existing billing software and database are distributed separately across 52 offices, it is not possible to generate and manage central reports. Each office has to purchase individual hardware (server, computers) and software for billing work. As a result, a large amount of money is being spent on hardware, software and management to store billing data.
- Since the existing database is distributed, there is no real-time communication between the central server and the database of 52 field offices, which is causing difficulties in collecting electricity bills through the online system. For example, if a customer pays the same bill multiple times through multiple mobile operators/banks, the system accepts it. As a result, there is difficulty in reconciling the bills collected every month. This increases customer dissatisfaction.
- Since the existing billing software is desktop-based, a separate interface has to be used to exchange data between the central billing server at the headquarters and the billing servers of the 52 field offices through broadband VPN connectivity. If connectivity is lost for any reason, data cannot be exchanged. Additional manpower has to be deployed. Moreover, there is a possibility of data loss.
- Data accessibility, manageability and analyzability is close to zero for WZPDCL because of this deployment architecture and access unavailability.
- These systems are developed using old/obsolete technologies with poor stability, scalability, maintainability and functional maturity.

4. Scope of Work

The scope of work for the works to develop new Web Based Postpaid billing application, develop web-based Management Information System (MIS) application for generating all types of report, conversion of existing 52 nos. distributed database to single centralized database system integrated with new web-based application and develop API to integrate Mobile Financial Services (MFS) and Banks for collecting electricity bill on online platform as well as collecting consumer data from Online new connection and transfer migrated consumer data to prepaid metering system, collecting Monthly Operation Data (MOD) from Prepaid metering system.

Detailed scope of work includes the following:

To design, develop, implement and manage a Web Based Postpaid billing application which will cover the following features:

- All tasks regarding postpaid electricity bill generation, bill processing, bill delivery, bill collection as per tariff of electricity consumers and reporting as per requirements.
- Electronic bill payment processing engine along with different payment channels management.
- Bill collection monitoring and Fraud Management.
- Software should be dynamic and robust.
- All operators (MFS and Online Banking) should be connected to the software through API.
- For any operation execution, a log should be maintained.
- The application must be developed using ASP.NET Core MVC framework.
- All features those are mandatory for postpaid billing system as per requirements of govt bodies (BERC, Power Division, SREDA, WZPDCL etc.) must be fully implemented in the centralized web-based application.
- Applications development must be completed within 06 (six) months (including software requirement analysis) from date of contract signing.

To design, develop and implement a Web based Management Information System (MIS) application for generating all types of report which will cover the following features:

- All tasks of reporting regarding postpaid electricity bill as per requirements.
- Software should be dynamic and robust.
- The application must be developed using ASP.NET Core MVC framework.
- All types of reporting those are mandatory for postpaid billing system as per requirements of govt bodies (BERC, Power Division, SREDA, WZPDCL etc.).
- Reports can be generated and printed centrally from the server located at the head office. Additionally, the 6 circle offices and 52 field offices will also be able to generate and print their respective reports.
- The software should have provision for report generation as per requirements.
- There should have provision to generate dynamic customized report.
- Reports should be in Excel, CSV, PDF format.
- Applications development completing within 06 (six) months from date of contract signing.

To design, develop, implement and manage a Centralized database system which will cover the following features:

- Conversion of existing 52 nos. distributed database (SQL server 2008R2) to single Oracle 19C Enterprise centralized database system without any data loss.
- Postpaid billing system can be integrated with Online new connection and prepaid metering system. So that, we can generate automatic centralized report for all types of consumers (prepaid/postpaid).
- Database must be developed in Oracle 19C Enterprise.

To design, develop, implement and manage API which will cover the following features:

- Develop a common API to integrate mobile financial operators/Banks with web-based software for collecting electricity bill on online platform.
- Mobile Financial operators/Banks engaged in the collection of electricity bills should be provided an interface of the web-based software so that monthly electricity bills can be checked online based on the customer's account number.
- Develop an API to integrate Prepaid Metering system.
- All customers who will be transferred to the prepaid system will have their information transferred to the prepaid software system. Along with this, prepaid consumer's all required data will be brought to the postpaid system.

4.1 Development and Implementation Methodology

Development methodology i.e. SDLC plays a very important role to clear the ultimate project objectives precisely, to stable the project requirements, to monitor the progress with measurable deliverables and managing the entire project efficiently. Here the vendor is requested to propose and submit a best possible suited SDLC approach for this project considering the project scopes, requirements of application, objectives, organizational environmental factors and behavior, project timeline, ultimate deliverables and various resources to be used.

4.2 System Requirement Analysis

Requirements finalization will be a very important milestone of vendor's proposed development methodology. It is expected that, the selected vendor will carry out detailed requirement study and analysis on the each and every scope of work that mentioned in the TOR. Under this scope of work, the selected vendor has to analyze the detail functions, processes, documents, actors, sites and infrastructure of the relevant prevailing system precisely of the concerned organization. At this phase, vendor's ultimate objective will be finalization of the work requirements in details under the scope of TOR and approval of the concern organizational authority. Here vendor is requested to propose and submit a system requirement analysis plan which should cover the scope of work at this phase, relevant activities to be performed, timeline, deliverables to be produced, dependencies and resources to be used.

4.3 System Design

Basically, at this phase the detail functional scope defining and designing as per the standard of software engineering approach for the proposed system tasks are being performed. This is very vital and important phase of any SDLC. Considering the ultimate development and implementation scope, the proposed system design should be robust, scalable, user friendly and interoperable enough.

At this system designing phase vendor may perform different following designing related task and will produce various standard System designing Documents (SDD)

- Identifying module, components, tasks, I/O and functional features.
- Specifying technical and functional requirements.
- User Interface design.
- Description of UI and requirements.
- Preparing the use cases.
- Defining Integration and interoperability scope.
- Designing system architecture.
- Determine process and data flow.
- Database design.
- API Design.
- Finalizing tools, technologies and frameworks to be used etc.

Here vendor is requested to cover details system designing plan in their technical proposal which may include relevant activities, approaches, methods, documentations and deliverables.

4.4 Development

At this stage vendor must take prior acceptance or approval from the concerned authority on tools, technologies and framework that will be used for the development of the Application. Based on approved SRS and SDD vendor will prepare a comprehensive development plan for the Application which should include a schedule consisting development item wise start date, test date, review date, completion date etc. At the development stage, vendor must follow the standard code convention, code level documentations, header of each file, algorithms, interfaces, code compression and API's should be supplied with proper description and

documentations. All kinds of standard testing tasks that are required to be performed at the development phase should be mentioned in the plan. Considering the scope mentioned in the TOR for this application, vendor is requested to include a preliminary development plan (standard approach) in their technical proposal.

4.5 Integration

Considering the above-mentioned Integration requirements and scopes for this application, vendor must include a phase in their proposed Development and implementation methodology approach. At this stage, the vendor will perform all necessary tasks regarding integration to make the application interoperable.

4.6 Testing

The vendor must propose a testing plan for this work starting from development to deployment. This testing plan should cover all the standard suitable testing approaches for this application which may include phase wise testing activities like test scripting, test cases, testing tools, testing process, test log, result and report formats i.e. expected test deliverables based on the application development requirements. The vendor should submit testing plan, which may include standard test approaches. Vendor will bear the all-testing cost.

Some are mentioned below as examples for reference

- Unit Test
- Functional Test
- Installation testing
- Compatibility testing
- Smoke and sanity testing
- Regression testing
- Stress Testing
- Acceptance testing.
- Alpha testing
- Beta testing.
- Functional vs non-functional testing.
- Concurrency testing.
- Destructive testing.
- Software performance testing is mandatory.
- Usability testing.
- Accessibility testing.
- Security testing is mandatory (VAPT etc.) from any reputed third-party organization having ISO 27001/CREST certified.
- All test result should be certified by BUET/KUET.
- All testing cost shall be borne by the Vendor.

4.7 Hosting

Vendor should submit primary hosting requirements for this application at Live Environment as well as Test Environment related to hardware, servers, network, security, storage, traffic, firewall, bandwidth etc. i.e. complete hosting infrastructure that will be requires for their developed application hosting considering the implementation scope. Based on their submitted requirements, regarding hosting West Zone Power Distribution Company Limited (WZPDCL) will provide detail hosting infrastructure, facility and environment.

4.8 User Acceptance Test (UAT)

User Acceptance Test (UAT) is a very vital and essential phase in the web base application development lifecycle. At this phase, all types of users must test the developed application by themselves and have to provide a details feedback/ test report. Based on the UAT report, vendor has to update the application accordingly to ensure user satisfaction by making it more user friendly. Here, it is expected that, considering the type of users and their role in the application, the vendor must propose a comprehensive UAT plan in their technical proposal which may cover the followings:

- UAT activities to be perform (planning, designing test cases selection of testing team, Executing test cases and documenting, Bug fixing, sign-off etc.).
- types of user wise roles and test items distribution
- resource requirement
- activity wise time requirement
- activity wise test case, test results/ deliverables
- detail user feedback / test reports
- System update plan
- UAT time limit 03 (three) months from handover the job or date of issue a Provisional Acceptance Certificate (PAC).

4.9 Management and Migration of Legacy Data

Under the process of existing 52 nos. distributed database (SQL server 2008R2) to single Oracle 19C Enterprise centralized database system transformation, during application activation or deployment, it may be necessary to move the legacy data of prevailing services. In this case, vendor may require performing different relevant activities that may include data collection, softcopy conversion, data filter, data cleansing, data verification, data process, data entry, data migration and overall data management. Here, it is expected that, the vendor will propose their detail data management and data migration plan for this work considering the estimation of legacy data mentioned below which will be required to migrate into the developed application.

Description	Location	Existing format	Target format	Amount of Consumer
existing 52 nos. distributed database	52 Locations	SQL server 2008R2	Oracle 19C Enterprise	18 Lac (approx.)

Table: Estimation of Legacy Data to be migrated

4.10 Deployment and Implementation

This is the phase of SDLC, when the consent is being given to "GO LIVE" of the developed system after completed all kinds of development, integration, testing and hosting. This is very crucial and sensitive stage for a government application because at this stage the system becomes public and expose to access towards all levels of users. The Pilot or full-scale implementation period starts formally in this stage only. Vendor is requested to propose their Deployment and Implementation plan covering the major activities to be performed, the deliverables to be provided etc.

4.11 Training and Knowledge Transfer

The vendor has to provide detail training for the following users:

- ✚ Training of Trainers (TOT) for about 100 trainers in 06 (Six) batches nominated by WZPDCL, having duration minimum 05 (Five) days.
 - ✚ Training for all (about 250) users in minimum 06 (Six) batches nominated by WZPDCL, having duration minimum 03 (Three) days.
 - ✚ Training for administration (Source Code & Database) for 12 Users (for technology transfer) 02 (two) batches nominated by WZPDCL, having duration minimum 15 (Fifteen) days.
 - ✚ Cost of providing all necessary facilities/items (Snacks, Lunch, allowance etc.) of the trainees.
 - ✚ **The duration of the training shall not exceed the number of man-months specified in the Price Schedule.**
-
- The vendor must propose a detail training plan for the users of the application.
 - The vendor has to develop training modules and curriculums and conduct TOT course for the prospective Trainers. After that they will be able to provide training to Users of WZPDCLs if necessary.
 - The vendor should include necessary training methodology, documentation and training aids support in their training plan.
 - The training materials may include user manual, administration manual, quick start tutorial, online help, frequently asked questions.
 - The training plan must describe the sequencing, time, duration and resources involved in implementation of each of the consultant's proposed training activities.
 - The training plan should contain full course descriptions for all courses that to be carried out for respective users.
 - The vendor should develop multimedia training materials for all users. These materials shall be available for viewing and reviewing for all users through a web portal.
 - The training instructions should support both English and Bengali language.
 - The training activities should cover the training feedback, evaluation and report also.
 - The vendor also needs to propose their smooth, efficient and effective knowledge transfer idea and plan here in this technical proposal with the training plan.

4.12 Maintenance and Support Service

The selected Vendor has to provide a period of 05 (Five) years maintenance and support service. Maintenance and Support Service will start from after handover the job or date of issue a Provisional Acceptance Certificate (PAC). Here it is expected that, the vendor must provide detail maintenance and support service plan in the technical proposal, which may include the followings-

- Support service types and mode of services
- Service desk functionalities
- Configuration management
- Change management
- Service layers for support
- Tools will be used for Support service management
- Communication management and modality
- Release management
- Incident management
- Problem management
- SLA (Service Level Agreement)
- Maintenance and support service-related reporting
- Support service types
- Service Log Management
- Database & Storage Management

Apart from the above-mentioned issues, if vendor thinks any other issue to be included in their plan, it would be considered as added value addition.

4.13 Duration of the assignment

The selected vendor must complete the above-mentioned work (application development and deployment, Conversion of existing 52 nos. distributed database (SQL server 2008R2) to single Oracle 19C Enterprise centralized database system) within the stipulated time mentioned in GCC-29.1 excluding the maintenance and support service period.

The vendor shall submit detail action plan using a Gantt chart indicating the following tasks (not limited to):

- Total duration of the application development.
- Implementation plan to conversion of existing 52 nos. distributed database (SQL server 2008R2) to single Oracle 19C Enterprise centralized database system without any data loss.
- Total duration of the Maintenance and support service after implementation
- Proposed SDLC Phase-wise and deliverable-wise time distribution and duration.
- The schedule may cover Activity, Deliverables, and Time in Days, Dependencies etc.

5. Educational Qualification and Experience of Key Professional Staff

The vendor is expected to provide work distribution and team composition plan as deemed suited based on this project requirements and milestones and as per their proposed development and implementation methodology approach. The interested applicant should provide a team composition plan in their proposal describing the position, roles, tasks to be assigned, expected man-days of involvement, expected deliverables and required skill and expertise

However, for proper execution of the project firm/applicant may constitute the team focusing on following position and criteria.

SL No	Position	person	Qualification	Experience in similar work (years)
1	Project Manager	1	B.Sc.Engg.(CSE/EEE/ECE)	Working experience with minimum 5(Five) years on project management plus minimum 3 years experience on Software base & network oriented project development.
2	Software Engineer	1	B.Sc.Engg.(CSE/EEE)	Working experience with minimum 3 (three) years on project management & Organizational Software Architect management with minimum 2 (two) years experience
3	System Analyst	1	B.Sc. Engg. (CSE/EEE) with related training.	Working experience with minimum 3 (three) years on system analysis & design, Oracle under AIX/UNIX/Linux/windows based, Oracle Developer, PL/SQL and more.
4	Oracle Database Administrator	1	B.Sc. Engg.(CSE/EEE) with OCP(DBATrack)	Working experience with minimum 03 (three) years on DBA, Oracle under AIX/UNIX/Linux of field oriented project.
5	System Administrator	1	B.Sc. Engg. (CSE/EEE)/ Masters in any Discipline (Science background) with related training.	Working experience with minimum 03 (three) years on AIX/UNIX/RHCE & CCNA
6	Programmer	1	B.Sc. Engg. (CSE/EEE)/ Masters in any Discipline (Science background)	Working experience with minimum 02 (two) years on C#, Oracle Database, Oracle Developer, PL/SQL

7	Mobile Application & Network Engineer	1	B.Sc. Engg (CSE/EEE)	Working experience with minimum 3(three)years with CCNA on with convensional wireless network like mobile network.
8	Network Engineer/Hardware Engineer	1	Bachelor in any Discipline (Engineering) with A+/CCNA/RHCE/MCSE certification	Working experience with minimum 3(three)years on interfacing with convensional wireless network like mobile network.
9	Documentation	2	Bachelor in any Discipline	-
10	Technician	10	HSC (Vocational)/Trade course	Working experience with minimum 5(Five)years

For the Duration of Support Service:

No	Position	Person	Total Works Experience (Years)	Experience in similar works (Years)
1	Coordinator	1	5	3
2	System Administrator	1	5	3
3	Network Engineer	1	5	3
4	Hardware Engineer	1	5	3
5	Programmer	1	5	3
6	Database Administrator	1	5	3
7	Electrical Supervisor	10	5	3
8	UCC/ UVS operator	10	3	2

Since, “Design, Manufacture, Supply, Installation, Testing & Commissioning” and “Support Service” have different timeframe, same person can be offered for both of these services as long as his/her qualifications match the respective requirements.

6. Expected Deliverables

Considering the scope of service and scope of work of this project and based on the proposed project development & implementation methodology, the vendor has to submit here a complete list of all types of deliverables will be produced throughout the entire project timeline whether those are

materials, services, applications, source codes, documents, plans, reports etc. in a table format mentioning the stages, activities and timelines.

Some examples of the deliverables are mentioned here under for your reference.

- Project inception and management report
- System requirement specification (SRS) with ERD, DFD and Use Case Diagrams.
- System design document (SDD)
- Complete source code
- Detail source code documentation
- Test plan with test scripts and testing reports
- Technical documentation (system architecture, module integration points, workflow engine, data dictionary, user manual etc.)
- Training plan and reports
- Training materials and user manuals
- Integration plan and report
- Audit log
- API
- Web based Postpaid billing application
- Web-based Management Information System (MIS) application for generating report.
- UAT Report
- VAPT Report
- Maintenance, agreement & SLA
- Maintenance and support log
- Hosting requirement specification, plan and report
- Implementation plan and report
- HR activity plan and report
- Progress and review reports
- The Tenderer shall hand over the Source Code, Database Structure, Database, and all related Technical Documentation to the Employer. All such materials shall become the property of the Employer.

7. Responsibilities of the Client

WZPDCL will provide information as per requirement of study. During the process of consolidating the billing data from 52 offices into a centralized database, WZPDCL will provide full cooperation. However, it shall remain the consultant's responsibility to ensure the successful completion of the assignment by providing all necessary information, analytics, insights, instructions, and close supervision, as required by WZPDCL.

8. Functions and Features

The web based Postpaid billing software shall have to adopt and implement the latest versions of the RE Program related Policies and Rules, Statutory Regulatory Orders (SROs), Guidelines, Explanations and all other instructions made there under.

The following is a general summary of the functionality required in each Business Process.

8.1 Consumer Information Management (CIM)

SL	Features Name	Features Description
1	Add/Edit New Consumer	Add/Edit New Consumer by Application
2	Change Account Information	Change Account information
3	Change Consumer Book	Change Consumer from one book to another
4	Customer Tariff Management	Conversion of consumer tariff from Lower to Higher.
5	Customer Tariff Management	Conversion of consumer tariff from Higher to Lower.
6	MT/HT Meter Management	Assign MT/HT Meter
7	Sub-Meter Management	Assign Sub-Meter under a Bulk Meter
8	Transformer Wise Meter Management	Assign Transformer -Meter with Consumers
9	Customer Management	Update Consumer Information
10		Print Consumer Certificate
11		Print Certificate of Payment
12		Clearance Certificate
13	Meter Reporting	Meter Details Reports (meter seal, earthing, meter box, meter display etc.)
14	Bill Management	Due Bills

8.2 Tariff Management

SL	Features Name	Features Description
1	Tariff Management	Consumer Classification by Tariff
2		Tariff Rate & Parameter Configuration for different type of bill.
3		Rate Schedule Update on demand
4		The system might utilize a configurable method to store and maintain all rates applicable to for the computation of interest, penalty and surcharge etc. calculation. The method of calculation of interest (simple or compound) should be configurable.

8.3 Meter Management

SL	Features Name	Features Description
1	Meter Management	- Add/Edit New Meter for New Connection of a Meter Re-connection of a Meter Disconnection of a Meter (permanent) Disconnection of a Meter (Temporary)

8.4 Bill Processing

SI	Features Name	Features Description
1	Bill Processing	Current Month Reading Entry
2		Current Month Reading Adjustment (if applicable)
3		Mother Meter & Child-Meter Reading Adjustment
4		Net Meter Reading Adjustment
5		Combined Meter Reading two/three meter of single Account Number.
6		Advance Bill Generation (Full/Partial)
7		Prepare & Process Normal Bill for different tariff consumers
8		Prepare & Process Average Bill
9		Prepare & Process Estimated Bill
10		Prepare & Process Penalty bill
11		Print Combined Bill & Collection
12		Credit Posting
13		Bank reconciliation
14		Handle Installment provision for due bills
15		Month Close - Approval / Cross check
16		Month Close Management

8.5 Adjustments and Corrections (ADC)

This module facilitates special adjustments and corrections of generated bills.

SI	Features Name	Features Description
1	Adjustment & Correction	Bill Correction and Bill Adjustment by higher authority for Current month
2		Bill Correction and Bill Adjustment by higher authority for closed month
3		Debit Memo/Credit Memo
4		Bill Adjustment from Security Deposit
5		Bill Adjustment from Advance
6		Bill Adjustment from Double Payment

8.6 Approval and Bill Generation (BG)

SI	Features Name	Features Description
1	Approval & Bill Generation	Review & Approve processed Normal Bill for different tariff consumers
2		Review & Approve processed Average Bill
3		Review & Approve processed Estimated Bill
4		Review & Approve processed Penalty bill
5		Generate Final Bills with a unique auto-generated barcode printed in the generated bill
6		Management of Bills Printing

8.7 Bill Delivery Management (BD)

SI	Features Name	Features Description
1	Bill Delivery Management	The system shall facilitate management of delivery of WZPDCL bills through variety of communication channels with its consumers including hardcopy, email, what's app messages and mobile based on participation of the consumer at different communication channels.
2		The system shall facilitate of End of Fiscal Year every consumer will get a certificate for Bill clearance certificate.
3		Configure and create Area/book etc. wise virtual lots of printed bills.
4		Configure automatic assignment of lot(s) of printed bills to bill distributor.
5		Assign lot(s) of printed bills to individual bill distributor.
6		The system shall facilitate optional feature of bill delivery notification module as part of the android app, using which all bill distributors will view the list of printed bills to be delivered by him, and at completion of delivery of each individual bill, the bill distributor will have to press a button to complete the delivery and the system will remove the item from the list of bills to be delivered after validating.
7		The system shall automatically and instantly validate the completion of delivery of every individual printed bill delivered by every individual bill distributor using the pre-registered GPS location of the meter assigned to a customer. This will ensure elimination of fake delivery.
8		The system shall facilitate real-time billing station/elaka/ bill distributor etc. wise bill delivery progress view, notifications, alerts etc. to different user groups as specified
9		The system shall facilitate through a web interface and/or android app and/or SMS interface a feature for the consumers

SI	Features Name	Features Description
		to check the status of the delivery of their bills online; i.e. a consumer can find if his bills are delivered through the channels of his preference or not using all or any of the above-mentioned channels.

8.8 Payment Processing Channel Management (PPC)

SI	Features Name	Features Description
1	Payment Processing Channel Management	The system shall facilitate configuration of payment channels, e.g. • Cash at own counter • Cash at bank counter • Cash at 3rd party counter • Mobile banking channel • Internet banking / EFT • At ATM and/or cash deposit machines (CDM) etc.
2		Create and configure Individual Payment Processing Channels.
3		Monitor connectivity, interfaces and transactions with each payment processing channels.
4		Generate channel performance report, different types of statistics and report related to payment processing channels
5		System shall facilitate a payment collection module/interface to be used by all collection agencies at all collection points using which the collectors will be able to enter specified payment information during the collection, on completion of the collection process, the data will be available online in the server-side core engine. The collectors will also be able to view their statements online as and when required.
6		On completion of the payment collection through any channel, the system will send a payment confirmation notification through SMS/ email to the consumer and this activity will be logged in the system for future reference.

8.9 Collection and Consumer Accounting (CCA)

SI	Features Name	Features Description
1	Collection & Consumer Accounting	Collection Point Registration i.e. Office, Bank-Branch, Spot Collection, SMS, etc.
2		System shall facilitate a payment collection module / interface to be used by all collection agencies at all collection points using which the collectors will be able to read the barcode printed on the bill to fetch all bill related data and enter specified payment information during the collection, on completion of the collection process, the data will be available online in the server side core engine along with automatic Chart of Accounts entry as collection head. The collectors will also be able to view their statements online as and when required.
3		Real-time view of Daily Bill Collection by office, bank-branch, collection point, with special permission etc.
4		Collection of rebated Office Bill Auto adjustment
5		Other ESU Area office bill collection
6		DC/RC (Disconnection/Reconnection fee) Bill collection
7		Others bill collection
8		Bank Deposit - Collection & VAT
9		Cash Closing Management
10		Generate Collection Register
11		Print Collection Register by book, by tariff, by collection point, by user & by date etc.
12		The system shall facilitate the creation of ledger accounts for consumer, consumer type, and bill period.
13		The system shall provide for a variety of accounting transactions ("money events"), which include but are not limited to: • Payment • Refunds & Refunds Interest paid • Charges (Penalty, Surcharge, Interest) • Other Charges - Ability to identify and define • The format of accounting transactions must identify: - Transaction code - Description - Transaction dates (received, posted, effective, etc.) - Whether it is a debit or credit (could be represented as positive or negative number)

SI	Features Name	Features Description
14		The system shall record all transactions and provide the ability to view the basis of these transactions
15		The system might allow for consumers within the same type to have different due dates.
16		The system will enable all consumer types to be viewed in the same style of consumer account.
17		The system will structure the account details so that all transaction types are clearly identified while being able to present all the consumer's account balances across all types.
18		The system shall allow proper identification and posting of all information passed to it from the payment, enforcement, rebate management etc. modules/systems.
19		The system will allow for multiple configurable views and reports involving different consumer types consolidated by the account no. and billing station.
20		The system will allow, with appropriate security, consumers to view their account via an online browser facility (including an android app).
21		The system will provide the capability for user groups to view a summary of the transactions posted for a given consumer and consumer type and billing period.
22		The system shall facilitate the maintenance of a record of aging of debts; aging would be by user definable dates (i.e.; >90 days) or by size of debt.
23		The system will allow off-sets of credit with debits within consumer types and across consumer types. The system will allow for automatic or manual intervention of this function depending on consumer type.
24		The system shall have the ability to display information at a point in time in the past
25		The system shall have the ability to generate consumer statements for a specific period or a summary statement for a consumer.
26		The system shall have the ability to conduct an Account Integrity Check on a periodic basis at the billing system level and consumer level. The integrity of the billing system and consumer ledger will be checked to ensure that logical relationships between transactions are intact and that no transactions appear to be missing or have incorrect values.

SI	Features Name	Features Description
27		The system shall generate management reports: • Age of the outstanding debt • For each consumer type, branch office, region and be able to consolidate this information on a national level. • An audit trail of any adjustments made • An overall account status by: - Consumer - Consumer type

8.10 Revenue Accounting (RA)

This covers the accounting for revenue paid by consumers through the cash, banking system and electronic channels

SI	Features Name	Features Description
1	Revenue Accounting	The system shall recognize and interface with Payment Channels such as: • Cash at own counter • Cash at bank counter • Cash at 3rd party counter • Mobile banking channel • Internet banking/ EFT • At ATM and/or cash deposit machines (COM) etc.
2		The system shall recognize Electronic Payment Types such as: • Credit/Debit Card • Electronic Transfers (Online, EFT) • Mobile Banking etc.
3		The system shall have the capability to record the following attributes (not limited to) of all payments: • Payment period • Payment date and time • Payment type(s) • Payment location / Collection point • Payment amount. • Bill Reference • Identification of payer and/or agent etc.
4		System shall have the capability to define parameters for payments which can check for validity of: • Payment amount • Effective and Expiry Dates • Location • Etc.

SI	Features Name	Features Description
5		The system must fully account for all payments received with detailed tracking of individual transactions from receipt through deposit and posting to consumer and revenue account. All the applicable payment information must be captured from the various payment channels.
6		The system shall have the capability to report on all payment types.
7		The system must accept and record the issuance of refunds through the system.
8		The system shall allow for real time update of transactions conducted through all electronic channels of all transactions with end-of-day update.
9		The system must allow a journal entry to be done where any subsequent adjustment of the payment transaction to any consumer account is different from the initial/receipted "consumer type", bill period and billing station. This must be done with the appropriate security and control measures inclusive of an audit trail.
10		The system shall provide a mechanism for the processing of payments that cannot be properly posted to the Consumer's account. That is, it shall have the ability to recognize payments in Revenue Accounting although not in Consumer Accounts (i.e.: through the use of Suspense Accounting).
11		The system must provide the capability for different specified user groups to view revenue for a given reporting period by segments and sub-segments, namely: • WZPDCL • Circle Office • ESU • Consumer • Consumer type, etc. The system shall facilitate the reporting of the revenue using any mix of the above segments.
12		The system shall, on a predetermined schedule or on data entry, calculate interest, penalty etc. on amounts subject to interest/penalty and post this amount to the consumer' current account for the affected bill period.
13		The system shall facilitate aging management through following features/ reports: • Aging By Book

SI	Features Name	Features Description
		- WZPDCL MOD Form: 310/4 - By Tariff - By Feeder - By Grand Total - Aging Reconcile-By Book 0 Consumer Due Balance List 0 Consumer Extra Balance List 0 Consumer Diff. Balance List 0 Consumer Equal Balance List 0 Aging By Consumer [Reconcile] 0 Aging Reconcile [View] - Defaulter List 0 Disconnection for Non- Payment 0 Previously Disconnected consumer 0 Top Defaulters

8.11 Revenue Management (RM)

SI	Features Name	Features Description
1	Revenue Management	The system shall facilitate the reconciliation of daily deposits /transactions information
2		The system shall produce Revenue Management Reports on overall account status, general ledger for the administration, reports for other stakeholders such as the Ministry, and audit trail of adjustments made.
3		The system shall produce reports of payments received and posted/un-posted to bank account by: - Payment type (cash, credit/debit card, EFT etc.) - Location/ payment processing/collection agents - Consumer type etc.
4		The system will enable the generation and assignment of a list of transactions to a specified user or user group for work in order to balance the bank reported deposits and the accounting system with bank accounts.
5		The system shall have the capability to compare current revenue with target over a configurable period.

SI	Features Name	Features Description
6		The system shall have the capability of 'dash- boarding' revenue collection against predetermined budgets for specific consumer types and for the revenue as a whole.
7		The system shall generate Revenue Statements and Financial Reports for various purposes.
8		The system will provide an integrated General Ledger to manage reporting of revenues by revenue type.

8.12 Rebate/Subsidy Management (RBT)

SI	Features Name	Features Description
1	Rebate/ Subsidy Management	Rebate consideration by GOB/Authority, setup of rebate period
2		VAT Exemptions for industrial consumer
3		Receive GOB allocation & Rebate Adjustment by auto-distribution
4		Rebate Collection
5		Rebate Collection Posting
6		Subsidy Collection
7		Subsidy Collection Posting
8		Rebate-Subsidy Auto Collection
9		Reports On Agricultural Report
10		Reports On Religious (Account Wise)
11		Reports On Subsidy (By Book)
12		Reports On Subsidy (Quarterly)
13		Reports On Freedom Fighter By Book
14		Reports On VAT Exemptions for industrial consumer

8.13 Report Engine (RPT) & Dashboard Management

SI	Features Name	Features Description
1	Report Engine	The system shall facilitate the default reports to be: - Exported in csv, pdf, excel formats - Generated as scheduled and dumped at specified locations - Circulated via configured email
2		The system shall facilitate the following default reports. User can view on dashboard with filtering, export, and printing: 1. Consumer List - by different 29. RC-DC Report 30. Tariff-wise report 31. Ministry-wise Outstanding report

SI	Features Name	Features Description	
		parameters 2. Meter Reading Sheet - by different parameters 3. Electricity Billing Sheet 4. Consumer Billing Data 5. Transformer-wise consumer report 6. Tariff-wise, Slab-wise (i.e. 7 steps for LT-A) & Time of Usage wise (i.e. LT-D3: Flat, Peak, Off Peak, Super Off Peak) sales Report (No. of Consumer, Sales Unit, Demand Charge, Total Bill, Total Billed Consumer in a FY) from FY:2010-11 to onwards. 7. Sales, Energy, Demand, Vat, Collection, Bill, Billing rate report 8. Electricity Sales Journal - KWH [Detail & Summary] 9. Electricity Sales Journal - Taka [Detail & Summary] 10. Debit /Credit Journal 11. Disconnection Reconnection Report for Non-Payment List - by different parameters 12. List of Disconnected consumers, outstanding, fixed for illegal consumer 13. Consumer Subsidiary Ledger 14. Consumer Subsidiary Ledger with Rebate 15. Consumer Subsidiary Ledger Control 16. Account-wise Summary Balance 17. Quarterly Rebate Statement 18. Collection Register 19. Collection Report 20. Calculate Import Units from Energy Auditing Office, BPDB, Khulna, Jashore, Barishal (including Circle Offices) 21. Feeder-wise MOD 22. Prepare MOD (Central, circle, and ESU-wise) 23. Defaulter List (Ascending, Descending, Utility, Category) 24. Certificate for Payment/Non-payment 25. Aging report by book/billing	32. Bill Rebate Information 33. Monthly system loss 34. MOD (Monthly Operational Data) Prepare. 35. Report of missing customers during BPDB Tenure (number, collection, arrears) from 6 circles 36. Prepare consolidated collection statement of postpaid consumers through various banks and MFS 37. Prepare report of mobile court/departmental disconnection of illegal connections and fine realization 38. Prepare central and circle-wise commercial targets of WZPDCL 39. Prepare MIS Report (Executive Summary) 40. Bill of Import Units (BPDB and PGCB bills) 41. Prepare arrears report of government, semi-government, private institutions, autonomous bodies 42. Rebate adjustment information against religious establishments 43. City Corporation/Municipality/Ministry, Arrear information (Monthly, Yearly) 44. Freedom Fighters/Model Mosque/Temple Rebate information (Monthly/Half Yearly/Yearly) 45. Preparation of ESU wise Per Month Target Achievement report 46. New Connection Report

SI	Features Name	Features Description	
		assistant/summary 26. Receivable of consumer, SnD-wise, ministry-wise, category-wise 27. Sector-wise receivable (Autonomous, Govt, Private) 28. Drill down from summary to individual transaction, receivable, ledger, rate	
3		The system shall facilitate dynamic report creation feature where the system administrator can create new reports on user demand with management approval using a dynamic user interface.	

8.14 Master Data Management (MDM)

SI	Features Name	Features Description
1	Master Data Management	Facility for configuration and management of Location Information - Division, District, Union, Thana, Elaka etc.
2		Functionality for configuration and management of Post Code registration
3		Functionality for configuration and management of consumer information such as: • Consumer (Basic Info, e.g. name, address, account no, meter no, digit count, seal no., load etc.) • Consumer Status • Change Account • Opening Balance, etc.
4		Functionality for configuration and management of WZPDCL basic data registration.
5		Functionality for configuration and management of WZPDCL, Billing station department, designation.
6		Functionality for configuration and management of WZPDCL Employee registration - department & designation wise.
7		Functionality for configuration and management of Yearly Holiday Schedule, calendar.
8		Functionality for configuration and management of collection agency information.
9		Functionality for configuration and management of payment processors or gateways information.
10		Functionality for configuration and management suppliers' information.
11		Functionality for configuration and management of other master data such as currency, asset type, asset status, etc.

8.15 System Security

SI	Features Name	Features Description	User
1	Security Monitoring	Monitoring of activities that can raise system security threat and trend to make violation of defined security measures. Classification and notification of enlisted security threats with an index of priority like EMERGENCY, HIGHEST, MEDIUM, LOWEST and so on.	Security Analyst
2	Security Prevention	Blocking of activities that are classified as higher priority index of certain threshold.	

8.16 Audit Management

SI	Features Name	Features Description	User
1	Monitoring of Fraudulent Activities.	Monitoring of activities that can raise abnormalities and trend to make fraud. Classification and notification of enlisted fraud with an index of priority like EMERGENCY, HIGHEST, MEDIUM, LOWEST and so on.	System Auditor
2	Reporting Engine	Specialized set of confidential reports for auditors only to make its processes easiest and more accurate.	System Auditor

8.17 Users and User roles

Vendor should have submitted a comprehensive plan and approach covering different types of users and their roles providing accessibility, privacy, confidentiality and transparency based on the given statics. Also have to mention the user friendliness login system.

Types of users	Titles of users	No of users	Geographical office location	Activity
Web applications operator	Meter Reader	1200	District-21, Upazilla-21	Meter Reading related all activities
	Bill Distributor	1200	District-21, Upazilla-21	Meter distributing related all activities
	Billing Operator	300	District-21, Upazilla-21	Bill Processing, Bill Generation related job.
	Billing Supervisor	100	District-21, Upazilla-21	Bill Processing, Bill Generation, Bill Supervising and Update Consumer Data related job.
	SAE	500	District-21, Upazilla-21	Bill Supervising, Update Consumer Data and report generating related job
	SDE/AE	200	District-21, Upazilla-21	Bill Supervising, Update Consumer Data and report generating related job.
	XEN/RE	60	District-21, Upazilla-21	Bill Correction and others approving related job.
	SE	10	District-6	Bill Correction and others approving related job.

	Accountant	100	District-21, Upazilla-21	Accounting Related job.
	Total	3670		
Web applications observer	MD	1	Khulna	Observe all features
	ED (F)	1		Observe all features
	GM (F & A)	1		Observe all features
	DGM (F/A/Audit)	3		Observe all features
	SE (Commercial)	1		Observe all features
	XEN/Manager (Commercial)	2		Observe all features
	SDE/AE (ICT/Commercial)	8		Observe all features Particular ESU
	Total	16		
Web applications admin	SE (ICT)/XEN (ICT)	3	Khulna	Assign Role
	SDE/AE/SAE (ICT)	5		Monitor system particular ESU
	Vendor	1	NA	Update the system in any need
Web applications Users	Consumer	18 lacs	West Zone of Bangladesh	Error free bill, Online bill payment

8.18 Security and Privacy Requirements

The vendor should submit an extensive and complete security and privacy plan for this web application considering the following issues

- Project technical scope
- Functional and nonfunctional requirements and Ultimate objectives
- Concerned service provider organization's operational environments and capacity
- User roles - Accessibility, Authorization and Accountability
- Importance of data management
- Technologies to be used for development & run
- Hosting
- Client and service side
- Overall standard application security requirements.

Apart from this the vendor should keep in account the following considerations also as well as vendor should provide a checklist based on system and hosting security plan (i.e. fraud, hacking, money laundering etc.) & have to provide the test report of that checklist.

8.19 Integration Requirements

As a government system or Postpaid billing application, integration with the required and other prescribed existing system is very important and essential. Only by proper integration making interoperable, a Postpaid billing application can drive the ultimate citizen benefits with the optimum use of technology from service to Postpaid billing application transformation. Here vendor is expected to come up with an integration plan in their technical proposal considering and understanding the scope of the Postpaid billing application as per this TOR. The possible integration scopes of this Postpaid billing application are mentioned below as reference for the vendor.

System Name	Purpose	Dependent Organization
Online New Connection Software	To retrieve the consumer information data	OWN
Online Miscellaneous Software	To retrieve the consumer information data	OWN
Complaint Management System/Call center	Consumer get their billing information, bill payment, receive complain and solve etc.	OWN
Prepaid Metering System	To transfer the consumer information data.	OWN

8.20 Hosting Requirements

Vendor may be hosted developed application in WZPDCL datacenter for testing purpose before the delivery to the client. However, Vendor must be hosted developed application in WZPDCL datacenter after the delivery. Therefore, vendor is requested to submit a preliminary hosting plan for this application considering the issues mentioned below:

- Hosting requirement /environment (hardware, servers, network, security, storage, traffic, firewall, bandwidth.
- Hosting architecture
- Data Growth and Scalability plan
- User handling/load balancing mechanism
- Licensing issues
- Scheduled backup & Restore Requirements
- Disaster recovery requirements
- Monitoring tools requirements

8.21 Application Compliance Requirements

- The application which is a web-based solution, has to be hosted in centralized Web-server.
- The application should be designed and built using Service Oriented Architecture (SOA).

- Application should use Asp.net core MVC framework.
- Considering the operating/client environment at different level of this application, it should be developed in such a way so that it requires low bandwidth to run.
- The web-based application should support cross browser platforms (popular web-browsers such as Mozilla Firefox, Opera, Chrome, Internet Explorer, Safari etc.).
- Should have ability to seamless integration with future module/components/applications.
- Application should be lightweight and rich client-side scripting.
- UI should be developed based on the analysis of UX.
- Any web interface of this application should be fully responsive.
- Page load time, login response-time, on-click" load time for the web application should be less than 3 seconds while this is accessed over the intranet.
- Average transaction response time, on-submit response-time, or any other database access/ search time should be less than 5 seconds when the system solution is accessed over the intranet.
- The proposed solution should be highly scalable to accommodate current and future requirements within the scope of the scope mentioned in the TOR.
- The application should be provided with appropriate caching mechanism to handle very high-traffic scalability.
- The vendor may propose here other relevant measures for this application scalability.

8.22 Risk Assessment and Business Continuity Plan (BCP)

Vendor is requested to prepare full assessment of all possible risk during the period of project inception to its life time. As per assessed risk, a mitigation policy and business continuity plan (BCP) is also requested to be documented properly. Business Continuity plan will play a very important role by creating the systems of prevention and recovery to deal with potential threats and risk of this application operation. Vendor is requested propose a Business Continuity Plan for this application. Regarding business continuity you may take in account the followings issues if applicable or suitable for this Application:

- All standard backup facilities should be supported by the system which can be started with disk-based backup facility, gradually moving to Storage Area Network (SAN) based backup system.
- Vendor ensures to make a backup strategy plan as well as implement it by hosting on a server in our Disaster Recovery (DR) in Jessore.
- Data and the Operating system core component will be separated. A ghost image of the Operating system will always be available in case of rebuilding the server. All data can be restored in the data drive once the Operating System is restored.

- System can also have an automated Backup mechanism by which users can schedule the backups and the system will take the backups without manual intervention.
- System must check for the media and generate a report on backup with date time and details of backup.
- If a restoration fails for any reason, the system should prompt with proper error messages and suggest what has to be done to rectify the situation via on-screen, logs, email and text messages.
- System should maintain an automated recovery system and all versions of backup will be maintained. At any given point in time, the versions and incremental backup details can be retrieved from the system.
- The system may be hosted in virtual servers or containers. A restore of a virtual server/container is much easier and faster compared to a single host server.

8.23 Interoperability and Data Exchange

The selected vendor must develop this system following all the standards and protocols of interoperability, integration and data exchange with other systems. It is expected that the system will be based on open architecture and will be fully interoperable with the current and future systems.

The following are the key expectations on interoperability requirements:

- a. The system should be designed for interoperability using industry standard protocols.
- b. System must expose data by Advanced Message Queuing Protocol and REST via TLS
- c. All imported data must undergo data validation to ensure full integrity.
- d. Data exchange within the system at different levels via the internet shall be encrypted.
- e. The system should have functionality to exchange data with other own systems or external institute systems.
- f. The system shall have functionality to export/import files based on the standard template defined through web services and/or API.

Full API documentation must be provided so that third party integrators can integrate their system with this system.

8.24 System Audit

This system will maintain an audit trail of any changes or updates made in any information that are considered as vital and should maintain the audit log with information such as

- Log the users who are accessing the system
- Log the parts of the application that are being accessed

- Log the fields that are being modified
- Log the results of these modifications
- Log attempted breaches of access
- Log attempted breaches of modification rights
- Timestamp.

Ensure an audit trail is kept for all transactions and all audit transactions logged are kept on the trail file or trail database from where system can generate different audit reports as and when required.

8.25 IT Audit

Vendor should support client and/or authorizes person or organization while IT audit will be required.

8.26 UI/UX.

The vendor must propose a UI/ UX plan containing UI designing method and tools, prototype or Mockup design (if applicable), UI review method, process for study and analyze UX, collaboration of basic web and mobile UX issues and expected result and outcome of UX, finalizing the UI/UX design. Apart from this, the vendor should consider the following issues as requirement at the time of UI/UX plan.

- The system interfaces should be highly user friendly, easy to navigate and ensure fast loading.
- The UI shall design by using well-established, supported and lightweight UI framework so that it follows widely used industry flow patterns
- UI shall be easily configurable if any changes are needed
- Menu, content and navigation shall be based on the user entitlements, roles and permissions.

8.27 Accessibility

Vendor must develop this application ensuring access for the citizen (Service Recipients) with disabilities in different standard accessible formats. Application should be developed in "universal design" and "assistive technologies". Accepting and facilitating the use of sign languages, augmentative and alternative inputs and all other accessible means, modes and formats for inputs and outputs as per their choice by "Service Recipients" with disabilities; All features (Web application) should be usable with the help of screen reading software by the service recipients with disability.

9. Coding Conventions

The vendor must follow the standard coding styles to produce high-quality code for further uses of the code in terms of reusability, refactoring, task automation, language factors etc. The vendor should submit a standard coding convention approach which may include different conventions like commenting, indent style, naming etc. following the best coding practices.

10. Documentation

Detail and proper documentation of such ICT based project like Postpaid Billing Application development and implementation for WZPDCL is very vital and essential. Documentation is required for any such project as reference, knowledge transfer, analysis of development and implementation history, baseline information for any modification or change, guidance etc. In this issue, Vender is expected the highest-level professionalism for delivering the standard documentation approach at each phase of application development and implementation project. Vendor is requested here to include an extensive documentation plan of this project in their technical proposal, which may cover the followings:

- Documents titles phase or activity wise
- Purpose of document
- About the format of documents (if possible, only index or fields)
- Type of expert and skilled resource will be used for documentation
- Document priority and dependency
- Time requirement for preparation (If applicable)

11. Tools and Technologies to be used

Vendor is recommended to choose the appropriate tools and technologies to be used for the development and implementation of the application. The selected vendor has to consult with WZPDCL to finalize the tools, technologies, framework and platform with the approval of same authority's consent.

The main components of the software will be web-based application and the database will be platform independent. It should be run in Windows/Linux/OSx operating system at user end and should be compatible to all major browsers such as - Internet Explorer, Firefox, Google Chrome, and Opera etc.

The System UI should be compatible with Tab & Smart Phone browsers.

Understanding the details scope of this project, vendor is requested to submit a comprehensive plan in their technical proposal regarding tools and technologies to be used.

13. Quality Attributes and Assurance

The Quality attributes and Assurance plan will describe the standards, processes and procedures in this Application development life cycle which will be used to support the consistent delivery of high-quality, professional standard application and services provided in the support of an automated environment. The quality assurance process

will be concerned with establishing the authority of the QA function, quality assurance standards, procedures, policies, and monitoring, and evaluation processes to determine quality in relation to established standards. Quality assurance activities will concentrate on the prevention of problems through the continuous improvement of processes.

In order to provide high quality products and services, each support team will adhere to processes, procedures and standards. Quality Assurance (QA) is a process used to monitor and evaluate the adherence to processes, procedures, and standards to determine potential product and service quality. It will involve reviewing and auditing the products and activities to verify that they comply with the applicable procedures and standards, and will assure the appropriate visibility for the results of the reviews and audits.

The vendor is requested to provide an extensive Quality Assurance plan with measurable attributes for each phase of this application development life cycle in their technical proposal.

14. Copyright

WZPDCL shall be entitled to all proprietary rights including but not limited to patents, copyrights and trademarks, regard to many Vendors. All kinds of source code including code documentation and other approved documents (all versions trail, products, developed applications, documents and all kinds of deliverables) which bear a direct relation to or is made in consequence of the application provided by the vendor under this scope of this TOR.

The vendor shall assist in securing such property rights and transferring them in compliance with the requirement of the applicable law. After the completion of the project such rights will be handed over to the WZPDCL that will be produced at the time of entire system development and implementation life cycle under the scope of this TOR will be owned by WZPDCL.

The vendor should properly deliver all the entire approved source codes and other deliverables to the WZPDCL. The vendor cannot claim any royalty or authority of any sort in case of replicating the source code or database or any other deliverables under this TOR for any future use that WZPDCL and the Government of Bangladesh may see fit.

Any studies, documents, reports, graphics or other material prepared by the vendor for this project under this TOR shall belong to and remain the property of WZPDCL.

The firm cannot use part or whole of the document / source code of this assignment elsewhere without the permission of WZPDCL.

15. Change Management and Update Policy

Vendors are requested to prepare a policy of change management and future upgradation of system to foster the system maintenance more easily and accurately. The policy shall include the instructions and explanation of all possible upgradation path; adaption requirements and guidelines of any operational and technical change.

16. Conclusion

WZPDCL is trying to ensure faster, systematic and much higher consumer service delivery by introducing a faster, robust, secure, tamper-proof, efficient meter reading, bill processing cycle management technology framework. WZPDCL expect that the vendor will complete this project in time and help to serve the nation.

6.1.4 The major scopes: Major Scopes are described below:

Sl. No.	Description of Items	Unit of Measurement	Quantity
Part-A: Upgradation of Existing Smart Metering System & Development of Web based Post-paid Billing Software			
1	MDMS development	Lot	01
2	Data Migration	Lot	01
3	Support Service as per specification	Lot	01
4	Development of Web based Post-paid Billing Software	Lot	01
Part-B: Passive Infrastructure Solution			

Sl. No.	Description of Items	Unit of Measurement	Quantity
1.0	NOC & SOC Room Buildup (Including the following materials)	Lot	01
1.1	Video Wall Panel	Nos	18
1.2	Video wall Processor	Nos	02
1.3	HDMI Matrix Switcher	Nos	02
1.4	Control System	Nos	02
1.5	20 m True 4K HDMI Active Optical Cable	Nos	28
1.6	Operator PC	Nos	12
1.8	23.8 Inch Monitor with Dual Arm Desk Mount Stand	Nos	24
1.9	HDMI Splitter	Nos	12
1.10	Network PoE Switch	Nos	02
1.11	15U AV Rack	Nos	02
1.12	Accessories	Nos	02
1.13	Operator Table	Nos	12
1.14	Operator Chair	Nos	12
2.0	Raised Floor System (Including the following materials)	Lot	1
2.1	Raised Floor	SFT	850
2.2	Steel Ventilation Perforated Panel	SFT	40
2.3	Air Grommet	SFT	10
2.4	Panel Lifter	Nos	02
2.5	Thermal Insulation under Raised floor	SFT	850
3.0	Electrical Cable (Including the following materials)	Lot	1
3.1	Main Incoming Cable LT Panel to PCD to AVR to MDB	Meter	800
3.2	Cable For UPS In/Out (80kVA)	Meter	320
3.3	Cable For Precision AC	Meter	230
3.4	Cable For Industrial Socket	Meter	550
3.5	Cable from MDB to Mechanical DB	Meter	80
3.6	Cable from MDB to Utility DB	Meter	80
3.7	Cable for UPS Grounding	Meter	50
3.8	Cable for PAC Grounding	Meter	50
3.9	Bonding Cable	Coil	3

Sl. No.	Description of Items	Unit of Measurement	Quantity
3.10	Earth Continuity Conductor	Coil	5
3.11	Cable For Combo Socket	Coil	8
3.12	Cable For Light and Others	Coil	10
3.13	Cable Ladder/Tray for Electrical Cable	RFT	350
3.14	Accessories for Electrical works	Lot	1
4.0	Distribution Board (DB) (Including the following materials)	Lot	1
4.1	Data Center Main Distribution Board (MDB)/ AVR Output DB	PCS	2
4.2	Data Center UPS Output DB	PCS	2
4.3	Data Center Mechanical DB	PCS	2
4.5	Data Center Utility DB	PCS	2
5.0	Earthing System (Including the following materials)	Set	1
5.1	Earthing Materials	Set	1
5.2	Earthing Cable from Earth Pit to Data Center	Meter	240
6.0	LPS (Lightning Protection System)	Set	1
7.0	Signal Reference Grid (SRG)	Set	1
8.0	SPD (Surge Protection Device)	Nos	06
9.0	80KVA Online UPS 30Min Backup for Critical IT Load	Set	2
10.0	20KVA Online UPS 30Min Backup for Non Critical Load	Set	1
11.0	300kVA Phase Correction Device	Nos	02
12.0	250kVA Automatic Voltage Regulator (AVR)	Nos	02
13.0	275 KVA Generator including ATS and other Accessories	Set	1
14.0	Rack Mount ATS/STS - 16A	Nos	04
15.0	Conduit Work	Lot	1
16.0	Lighting System	Lot	1
17.0	Switch Socket and Socket Outlet	Lot	1
18.0	Industrial Socket (Two different source)	Lot	1
19.0	Structured Cabling (Including the following materials)	Lot	1
19.1	CAT6A UTP Cable	Box	30
19.2	CAT6A Copper Patch Panel	Nos	18

Sl. No.	Description of Items	Unit of Measurement	Quantity
19.3	3 Meter CAT6A Patch Cord	Nos	192
19.4	5 Meter CAT6A Patch Cord	Nos	192
19.5	Wire Manager	Nos	32
19.6	High Density Fiber Patch Panel	Nos	16
19.7	MPO Module	Nos	32
19.8	Fiber Patch Panel	Nos	02
19.9	5 Meter SM Fiber Patch Cord	Nos	24
19.10	3 Meter OM4 Fiber Patch Cord	Nos	192
19.11	5 Meter OM4 Fiber Patch Cord	Nos	192
19.12	35 Meter Fiber Optic Trunk	Nos	04
19.13	10 Meter Fiber Optic Trunk	Nos	04
19.14	8 Meter Fiber Optic Trunk	Nos	04
19.15	6 Meter Fiber Optic Trunk	Nos	08
20.0	Containment & Rack with PDU (Including the following materials)	Lot	1
20.1	Intelligent-PDU	Nos	20 s
20.2	IP-KVM Switch	Nos	04
21.0	DCIM, BMS and EMS (Environment Monitoring System) (Including the following materials)	Nos	01
21.1	Temperature and Humidity Sensor	Nos	05
21.2	Door Contact Sensor	Nos	02
21.3	Water Detector	Nos	03
21.4	GSM Modem	Nos	01
21.5	Accessories	Lot	1
22.0	Fire Detection and Suppression System (Including the following materials)	Lot	1
22.1	Gas Cylinder for Server Room	Lot	1
22.2	Gas Cylinder for Power Room	Lot	1
22.3	Fire Extinguishing Panel	Nos	01
22.4	Smoke Detector	Nos	08
22.5	Heat Detector	Nos	08
22.6	Alarm Bell	Nos	02

Sl. No.	Description of Items	Unit of Measurement	Quantity
22.7	Rotating Light	Nos	02
22.8	Manual release switch/Call Point	Nos	02
22.9	Exit sign	Nos	02
22.10	Caution Sign,	Nos	02
22.11	Gas Discharge Sign	Nos	02
22.12	Discharge Nozzles	Nos	08
22.13	Manual Handheld extinguisher	Nos	02
22.14	MS Seamless pipes	Lot	1
22.15	Electrical Fittings	Lot	1
23.0	Vesda System (Including the following materials)	Set	2
23.1	Sampling Pipe and All Accessories	Lot	1
24.0	Rodent Repellent System (Including the following materials)	Set	1
24.1	Master Controller	Set	1
24.2	Transducer	Nos	10
24.3	Accessories	Lot	1
25.0	IPCAM & Surveillance Solution (Including the following materials)	Lot	1
25.1	4MP Bullet Camera	Nos	15
25.2	4MP Dome Camera	Nos	05
25.3	32-ch NVR	Nos	01
25.4	Network PoE Switch	Nos	01
25.5	CAT6 UTP Cable	Box	02
25.6	RJ45 Connector	Nos	50
25.7	Accessories	Lot	1
26.0	Access Control Solution (Including the following materials)	Lot	1
26.1	Access Terminal for Entry	Nos	07
26.2	Access Terminal for Exit	Nos	07
26.3	Network PoE Switch	Nos	01
26.4	CAT6 UTP Cable	Box	01
26.5	RJ45 Connector	Nos	30

Sl. No.	Description of Items	Unit of Measurement	Quantity
26.6	Management PC	Nos	01
27.0	Precision AC	Nos	03
28.0	Confort Air Condition (Including the following materials)	Lot	1
28.1	Power Room (1W+1S)	Nos	02
28.2	NOC Room (1W+1S)	Nos	02
28.3	SOC Room (1W+1S)	Nos	02
28.4	AC Control Panel	Nos	03
28.4	Accessories	Lot	6
29.0	Dehumidifier	Nos	04
30	Foreign Training for 7 Days for 07 Person	MM	1.63
31	Local Training	MM	1.66

6.1.5 Part-C: Active Solution

SI No.	ITEMS DESCRIPTION	Unit	Quantity
Part-C: Active Solution			
1	WAN Switch	Nos	4
2	Core Router	Nos	2
3	Core Firewall	Nos	2
4	Internet Router	Nos	2
5	Internet Firewall	Nos	2
6	Partner Router	Nos	2
7	Partner Firewall	Nos	2
8	Spine and Core Switch	Nos	2
9	SDN Controller	Nos	1
10	Leaf Switch	Nos	2
11	IPN Switch	Nos	2
12	Storage	Nos	1
13	Database Server	Nos	2
14	Application Server	Nos	7
15	SAN Switch	Nos	2
16	Management Firewall	Nos	2
17	Management Switch	Nos	2
18	Anti DDoS Solution	Nos	2
19	Web Application Firewall with LB	Nos	2
20	Backup Solution	Set	1
21	Virtualization Solution	Nos	1
22	Operating System_(Windows Server)	Nos	7
23	Disaster Recovery and Business Continuity Manager	Lot	1
24	EDR	Nos	150
25	Privileged Access Management (PAM)	Nos	1

26	NMS 150 node with 5 Laptop/MacBook	Set	1
27	Oracle License Renewal	Set	1
28	File Sandboxing	Nos	1
29	Secure Web Gateway	Nos	1
30	NDR	Nos	1
31	Network Threat Detection	Nos	1
32	Foreign Training for 7 Days for 07 Person	MM	1.63
33	Local Training	MM	1.66

6.1.6 Civil Work (DC Inside & Genertor room Buildup)

1	Civil Work (DC Inside & Genertor room Buildup)		
SI	Description of Items	Unit	QTY
1	Site Preparation	Lot	1
2	Brick Works	Sft	4000
3	Plaster Works	Sft	8000
4	Floor Tiles	Sft	2600
5	Paint Works	Sft	11080
6	Epoxy Paint	Sft	2000
7	Glass Partition	SFT	200
8	Swing Glass Door	Nos	8
10a	Stair and Ramp for Data Center	Lot	2
10b	Mantrap and Ramp with landing platform for server room	Lot	1
11	Dry wall	Sft	800
12	Fire Rated Door	Nos	7
13	Air Sealing	Lot	1
14	Fire Rated Pathway	Lot	1
15	Generator Room Buildup	Lot	1