

**Subject: Technical SOW+SOR FOR SUPPLY, INSTALLATION,  
COMMISSIONING, OPERATION AND MAINTENANCE OF AMI System**

**Ref. Documents:**

No Attachment

**SCOPE OF WORK for Design, Supply,  
Installation, Testing, Commissioning,  
Operation and Maintenance of an  
Advanced Metering Infrastructure (AMI)  
System**

**Under DBFOOT Model — Design, Build,  
Finance, Own, Operate and Transfer**



# Volume II

Invited by:

Gujarat Energy Limited,

Tower 2, Infocity, Gandhinagar, Gujarat

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# 1 Definition and Acronyms:

For this Request for Proposal (RFP) document, the following definitions shall apply:

**Primary Definitions:** Refer to Volume I of this RFP

## 1.1 Acronyms

Acronym	Full Form
AGA	American Gas Association
AMI	Advanced Metering Infrastructure
AMR	Automated Meter Reading
API	Application Programming Interface
ATEX	Atmosphères Explosibles (hazardous area classification standard)
BIS	Bureau of Indian Standards
BoQ	Bill of Quantities
CA	Chartered Accountant
CGD	City Gas Distribution
CGS	City Gate Station
CMP	Centralised Monitoring Platform
CNG	Compressed Natural Gas
COTS	Commercial Off-The-Shelf
CRM / CIS	Customer Relationship Management / Customer Information System
CSV	Comma-Separated Values
DBFOOT	
DLMS/COSEM	Device Language Message Specification / Companion Specification for Energy Metering
EMD	Earnest Money Deposit

ERP	Enterprise Resource Planning
EVC	Electronic Volume Corrector
FAT	Factory Acceptance Test
GA	Geographical Area
GIS	Geographic Information System

Acronym	Full Form
GEL	Gujarat Energy Limited
HES	Head End System (functional capability of AMI Platform)
IEC	International Electrotechnical Commission
IMS	Inlet Metering Skid
IST	Indian Standard Time (UTC+5:30)
MAF	Manufacturer Authorisation Form
MDMS	Meter Data Management System (functional capability of AMI Platform)
MeITY	Ministry of Electronics and Information Technology
MFA	Multi-Factor Authentication
MIU	Meter Interface Unit
MQTT	Message Queuing Telemetry Transport
NCIIPC	National Critical Information Infrastructure Protection Centre
NIT	Notice Inviting Tender
NTL	Non-Technical Loss
O&M	Operations and Maintenance
OISD	Oil Industry Safety Directorate
OEM	Original Equipment Manufacturer

OPEX	Operational Expenditure
OTA	Over-the-Air
PD	Positive Displacement (Diaphragm) Meter
PESO	Petroleum and Explosives Safety Organisation
PNGRB	Petroleum and Natural Gas Regulatory Board
PNG	Piped Natural Gas
POC	Proof of Concept
PQ	Pre-Qualification
PTZ	Pressure-Temperature-Compressibility correction
QAP	Quality Assurance Plan
RBAC	Role-Based Access Control
RFP	Request for Proposal

Acronym	Full Form
RPD	Rotary Positive Displacement meter
RSSI	Received Signal Strength Indicator
SAP	Systems, Applications and Products (GEL's ERP and Billing platform)
SAT	Site Acceptance Test
SaaS	Software as a Service
SCM	Standard Cubic Metre
SIM	Subscriber Identity Module
SLA	Service Level Agreement
SoW	Scope of Work

SOR	Schedule of Rates
SSO	Single Sign-On
TLS	Transport Layer Security
TQ	Technical Qualification
UAT	User Acceptance Testing
USM	Ultrasonic Meter
VEE	Validation, Estimation and Editing
WAN	Wide Area Network
NMS	Network Management System
EMS	Enterprise Management System
VAPT	Vulnerability Assessment and Penetration Testing
CERT-In	Computer Emergency Response Team — India
SLP	Secondary Level Point
ESB	Enterprise Service Bus
CAMC	Comprehensive Annual Maintenance Contract
SINR	Signal to Interference and Noise Ratio
NTP	Network Time Protocol
APN	Access Point Name
NB-IoT	Narrowband Internet of Things
SNMP	Simple Network Management Protocol
BGV	Background Verification
PTW	Permit to Work
ITSM	IT Service Management
WCAG	Web Content Accessibility Guidelines
QHSE	Quality, Health, Safety and Environment
DOQ	Daily Order Quantity
<b>Acronym</b>	<b>Full Form</b>
CIM	Common Information Model (IEC 61968-9)
PBG	Performance Bank Guarantee
DLMS/COSEM	Device Language Message Specification / Companion Specification for Energy Metering
TLS	Transport Layer Security



## 1.2 Project-Specific Definitions

Term	Definition
<b>AMI System</b>	An Advanced Metering Infrastructure (AMI) System is an integrated end-to-end infrastructure comprising field communication devices (Modems and MIUs), a wireless communication network and a centralised software platform that enables automated, two-way exchange of gas metering data between field devices and GEL's enterprise systems. The AMI System, as defined under this RFP, shall collect, transmit, process, validate and deliver gas consumption data from Electronic Volume Correctors (EVCs) and from Positive Displacement (Diaphragm) meters, to GEL's SAP Billing system and other designated enterprise applications, without manual intervention.
<b>AMI Platform</b>	The centralised cloud-hosted software platform forming the core of the AMI System, delivering the full functional scope of data acquisition, data management, alarm management, asset management, reporting, billing integration and staff mobile application as specified in Section 4 of this document. The Bidder may deliver these functions through a unified product or a combination of integrated software components, provided all specified functional requirements are fully met.
<b>Bidder / Vendor</b>	The entity submitting a bid in response to this RFP and, upon award, executing the Project under contract with GEL. The Bidder assumes full end-to-end responsibility for the design, supply, installation, testing, commissioning, operation and maintenance of the AMI System.
<b>COTS</b>	Commercial Off-The-Shelf — a pre-developed, commercially available software product with an established user base and proven deployments in utility environments. The AMI Platform proposed under this RFP shall be a COTS product. Custom-developed or bespoke platforms are not acceptable.
<b>DBFOOT Model</b>	Design, Build, Finance, Own, Operate and Transfer — the contractual and commercial model under which the Bidder designs, builds, finances, owns and operates all hardware infrastructure (Modems, MIUs, communication equipment and associated accessories) during the contractual period and transfers full ownership of all assets to GEL at contract completion in fully functional condition with a minimum remaining useful life of five years.
<b>Driver</b>	A software component within the AMI Platform that enables two-way communication between the platform and a specific EVC OEM's proprietary communication protocol or interface. Each new EVC OEM make or model

Term	Definition
	that is not natively supported by the AMI Platform requires a dedicated driver developed by the Bidder.
<b>EVC</b>	Electronic Volume Corrector — a device fitted to a gas meter that automatically corrects measured gas volume at line conditions (Qn) to standard reference conditions (Qb) by applying real-time pressure, temperature and compressibility corrections (PTZ correction). EVCs are the primary field metering devices covered under this RFP.
<b>GA</b>	Geographical Area — GEL's operational planning unit. GEL currently operates across 29 GAs spanning multiple states. All references to operational teams, reporting and monitoring in this document are structured at the GA level.
<b>GA Teams</b>	GEL's operational field teams and GA-level management personnel who operate, monitor and manage the gas distribution network within each Geographical Area. GA Teams are the primary users of the AMI System within GEL's operations.
<b>Go-Live</b>	The date on which the AMI System — comprising the fully deployed and configured AMI Platform, all installed field Modems and MIUs and all mandatory integrations — has been formally accepted by GEL following successful completion of all testing and User Acceptance Testing (UAT) and from which date the O&M period commences and the SLA measurement begins.
<b>HES Functionality</b>	The set of functional capabilities relating to automated two-way communication with all field devices (EVCs via Modems, PD Meters via MIUs), scheduled and on-demand data acquisition, alarm and event processing, OTA firmware management and device health monitoring. This is a functional requirement of the AMI Platform — the Bidder may deliver it through a dedicated Head End System, a unified combined platform, or any other compliant COTS architecture.
<b>IMS</b>	Industrial Metering Skid — a field installation comprising gas metering equipment at the inlet to an Industrial or Commercial consumer's premises, typically equipped with an EVC for automated volume correction and data logging.

<b>MDMS Functionality</b>	The set of functional capabilities relating to meter data Validation, Estimation and Editing (VEE), billing determinant preparation, data archival, asset management, exception management and integration with GEL's enterprise systems. This is a functional requirement of the AMI Platform — the Bidder may deliver it through a dedicated Meter Data Management System, a unified combined platform, or any other compliant COTS architecture.
<b>MIU</b>	Meter Interface Unit — a field device supplied and installed by the Bidder on a Positive Displacement (Diaphragm) gas meter that captures the meter's pulse output and transmits metering data to the AMI Platform via a wireless

Term	Definition
	communication network. Each MIU shall incorporate a built-in communication modem or be paired with a dedicated external modem, enabling direct connectivity to the AMI Platform without any intermediary infrastructure.
<b>Modem</b>	A wireless communication device supplied and installed by the Bidder and connected to an EVC, enabling the EVC to transmit metering data to the AMI Platform over a wireless wide area network (WAN). All Modems supplied under this RFP shall be newly procured — no reuse of existing field devices is in scope. Each Modem shall support dual-SIM operation and shall be ATEX/PESO certified for installation in hazardous area classifications applicable at GEL field locations.
<b>O&amp;M Period</b>	Operations and Maintenance Period — the five-year period commencing from the Project Go-Live date, during which the Bidder is responsible for the full operation, maintenance and performance of the AMI System against the SLAs specified in Section 12 of this document.
<b>OPEX</b>	Operational Expenditure — the recurring quarterly payments made by GEL to the Bidder during the O&M Period for AMI System operation, maintenance and SaaS services, payable on a per-device basis subject to SLA compliance as defined in Section 12.
<b>OTA</b>	Over-the-Air — the remote delivery of firmware updates, security patches, or configuration changes to field devices (Modems, MIUs) without requiring physical site access. OTA capability is a mandatory functional requirement of the AMI Platform.

<b>PD Meter</b>	Positive Displacement (Diaphragm) Gas Meter — a volumetric gas meter characterised by a mechanical pulse output interface. Under this RFP, PD Meters at Industrial metering locations are within the current scope for MIU installation. PD Meters at Commercial customer locations are designated for integration in a subsequent phase.
<b>SaaS</b>	Software as a Service — the cloud-based delivery model under which the AMI Platform (including all functional modules, hosting infrastructure and software licences) is provided to GEL on a subscription basis by the Bidder throughout the contractual period.
<b>SIM</b>	Subscriber Identity Module — the cellular connectivity module within a Modem or MIU that enables wireless WAN communication. All Modems and MIUs supplied under this RFP shall support dual-SIM operation. GEL shall determine SIM operator selection. All SIMs shall be registered in Bidder's name.
<b>UAT</b>	User Acceptance Testing — structured testing conducted by GEL's designated GA Teams and functional teams to validate that the AMI System meets all specified functional, integration and performance requirements prior to Go-Live acceptance.
<b>Term</b>	<b>Definition</b>
<b>VEE</b>	Validation, Estimation and Editing — the data quality assurance process implemented in the AMI Platform whereby: (a) collected meter data is validated against configurable rules; (b) missing or anomalous values are estimated using industry-standard methods; and (c) all data corrections are recorded with mandatory reason codes and maintained in an immutable audit trail.

### Order of Precedence

In case of inconsistencies, conflicts, or discrepancies between various standards, the following order of precedence shall be followed:

- Statutory Requirements
- International Codes & Standards
- Project Documents
- Good Engineering Practice commonly used by the worldwide Oil & Gas Industry

If a conflict arises, the most stringent requirement shall be applied. Any critical inconsistencies shall be escalated to the GEL Project Team for resolution and GEL's decision shall be final.

## 2 Introduction and Overview

### 2.1 About Gujarat Energy Limited (GEL)

Gujarat Energy Limited (GEL) is one of India's leading natural gas distribution companies and is a part of the GSPC Group. GEL has emerged as India's largest City Gas Distribution (CGD) company in terms of sales volume with presence across 29 Geographical Areas (GA) across 6 states (Gujarat, Rajasthan, Maharashtra, Madhya Pradesh, Haryana and Punjab) and one union territory.

GEL is engaged in the business of natural gas distribution including Piped Natural Gas (PNG) and Compressed Natural Gas (CNG). The company provides PNG to domestic, commercial and industrial customers and CNG to the transport sector. GEL has an extensive pipeline network and infrastructure to deliver these services efficiently and safely.

**GEL operates across multiple geographical areas. The company's operational footprint includes:**

1. 29 Geographic areas across 6 states
2. Covering 44 districts of these 6 states, out of which Gujarat being the largest contributor.
3. Union Territory of Dadra & Nagar Haveli.

The company's operations span urban, semi-urban and rural areas, with a focus on expanding its reach to provide clean and economical fuel to a larger customer base.

GEL continues to expand its infrastructure to meet the growing demand for natural gas across its operational areas.

GEL is advancing its digital transformation journey by addressing current operational challenges. GEL is now focused on centralizing and simplifying data collection across its 29 GAs onto a single platform. This strategic move is designed to enhance data visibility and reliability, allowing seamless integration with other systems to boost operational efficiency and support strategic decision-making.

Gujarat Energy Limited (GEL) is India's largest City Gas Distribution (CGD) company by geographical spread, operating across 29 Geographical Areas (GAs) spanning multiple states. GEL distributes Piped Natural Gas (PNG) to industrial, commercial and domestic consumers and Compressed Natural Gas (CNG) to the automotive sector.

GEL's infrastructure network encompasses various assets such as City Gate Stations (CGS), District Regulating Stations (DRS), Industrial and commercial Metering and Pressure Regulating Skids (IMS), CNG stations and domestic and commercial PNG metering points. GEL's metering sites includes Electronic Volume Correctors (EVCs) across multiple OEM makes and models and Positive Displacement (Diaphragm) gas meters of varying sizes.

As part of its ongoing digital transformation programme, GEL is implementing a comprehensive Advanced Metering Infrastructure (AMI) system to automate meter data collection, enable remote monitoring and control and integrate metering data seamlessly with its enterprise systems.

## 2.2 Background and Purpose

Gujarat Energy Limited (GEL) hereby invites bids from qualified and experienced BIDDERS for the "Design, Supply, Installation, Testing, Commissioning, Operation and Maintenance of an Advanced Metering Infrastructure (AMI) System " for monitoring GEL's gas distribution infrastructure across its operational areas in India.

GEL currently operates an existing AMI system for automated data collection from its Industrial and Commercial customers with EVC-equipped metering locations and manually from Positive Displacement gas meters at select Industrial sites. The proposed AMI System under this RFP shall **replace** the existing AMI system in its entirety subject to successful fulfilment of "Parallel Operations Requirement" elaborated separately. The Bidder shall be responsible to make sure the transition from the existing system to the new AMI System, with no disruption to GEL's billing operations or data continuity.

**Parallel Operations Requirement:** The Bidder shall conduct a mandatory **parallel operations period** of a minimum duration to be agreed with GEL (indicatively 30–60 days per zone), during which both the existing AMI system and the new AMI System shall simultaneously collect data from the same field devices. The Bidder shall provide GEL with a comparative data reconciliation report demonstrating that the new AMI System is collecting, processing and delivering data accurately and in accordance with all SLAs defined in Section 12. The parallel operations plan, reconciliation methodology and acceptance criteria shall be submitted by the Bidder as part of the Phase 2 deliverables.

The purpose of this procurement is to deploy a new end-to-end AMI System that replaces the existing system, delivers validated and processed gas consumption data directly to GEL's SAP Billing system and provides GEL's GA Teams with real-time operational visibility through a centralised AMI Platform and a GEL staff mobile application.

This document defines the complete Scope of Work, functional requirements, technical specifications, implementation milestones, O&M obligations and SLA framework for the AMI System.

The BQC (Bidder Qualification Criteria) is covered in a separate companion document forming part of the complete tender package.

BIDDERS are required to submit their proposal in accordance with the requirements specified in this RFP (including both the volumes I and II). The PURCHASER reserves the right to reject any or all bids without assigning any reason whatsoever.

### 2.2.1 Overview and Scope of Work

Bidder is required to execute below mentioned scope of work under this RFP. This is a very highlevel Scope of Work, which is mentioned to provide an overview of the requirement to the Bidder.

The successful bidder will implement all the above solutions on a single private Cloud Infrastructure on MeITY-approved cloud with comprehensive cybersecurity implementation, data management

systems and scalable architecture, with appropriate redundancy and security measures to ensure high availability and reliability. The Cloud Service Provider should be an empanelled member of MeitY Empanelled CSPs for the entire duration of this project including extension if any.

Bidder is required to provide these services on the following business model i.e. DBFOOT:

**Software:** All the software proposed as part of the RFP is to be supplied on a **Software as a Service** (SaaS) basis.

**Hardware:** All the hardware material commissioned as part of the project, shall be under the ownership of the Bidder for the entire contractual duration of the project i.e 5 Years (for complete Go-Live) and upon completion of the proposed tenure of the project, asset is to be **transferred onto the name of GEL**. (This includes all the hardware installed and / or commissioned as part of the project).

## 2.3 AMI System — Definition and Overview

### 2.3.1 Definition

An **Advanced Metering Infrastructure (AMI) System** is an integrated end-to-end infrastructure comprising:

- **Field Communication Devices** — Modems connected to EVCs at Industrial and Commercial metering locations and Meter Interface Units (MIUs) with built-in or dedicated external modems installed on Positive Displacement meters at Industrial, Commercial and few domestic metering locations.
- **Wireless Communication Network** — a wide area network (WAN) linking all field devices to the AMI Platform, using wireless cellular 4G/LTE with fall back on 2G or Nb-IoT communication technology as proposed by the Bidder.
- **AMI Platform** — a centralised, cloud-hosted COTS software platform delivering automated data acquisition, data management, VEE processing, billing integration, alarm management, asset management, reporting and staff mobile application functionality.
- **Common Cloud Platform** — Setup of common private cloud platform with High availability (includes geographically separated Disaster Recovery centre as well) for this project with provision of cyber security features to ensure data security. The Cloud Service Provider should be an empanelled member of MeitY Empanelled CSPs and for VPC as well for the entire duration of this project including extension if any.

The AMI System enables **automated, two-way exchange of gas metering data** between field devices and GEL's enterprise systems, eliminating manual meter reading and enabling data-driven operations management primarily for data collection at fixed interval, on demand based on volume of data as required by GEL personnel

### 2.3.2 Scope Boundary

The AMI System under this RFP covers:

Metering Category	Device Type	Current Scope	Future Phase
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Industrial customers	Modems at IMS with EVC (EVCs are already installed / shall be supplied by GEL, if required)	✓ In scope	—
Commercial customers	Modems at IMS with EVC (EVCs are already installed / shall be supplied by GEL, if required)	✓ In scope	—
Industrial customers	MIU with either built in or external modem at IMS with PD (Diaphragm) Meter  (PD Meters are already installed / shall be supplied by GEL, if required)	✓ In scope	—
Domestic customers	Diaphragm G1.6 Meter (PD Meters are already installed / shall be supplied by GEL, if required)	Provision for 100 nos. MIUs to be considered	

The following are explicitly **outside the scope** of this RFP:

- Supply of any type of meter and EVCs

### 2.3.3 Scope Summary

- The successful Bidder shall design, supply, install, test, commission, operate and maintain a complete AMI System for Energy Limited covering all **field metering locations** (with EVC's and with PD meters) as per SOR across GEL's network, with the AMI Platform mandatorily scalable to a minimum of **as per SOR metering points**.
- The AMI System shall comprise:

Component	Description
<b>AMI Platform</b>	Cloud-hosted COTS platform delivering HES functionality, MDMS functionality, GEL staff mobile application and all integrations. Architecture (unified or modular) at Bidder's discretion, provided all functional requirements are met.
<b>EVC Communication Modems</b>	New dual-SIM wireless Modems supplied and installed by the Bidder at all EVC-equipped metering locations. Multi-OEM EVC integration is mandatory — the Bidder shall integrate all EVC makes and models present in GEL's network.
Component	Description
	Bidder to conduct detailed feasibility survey for healthy network availability for ISP's (Internet service providers) in various operating zones of GEL.
<b>Meter Interface Units (MIUs)</b>	Devices with built-in or dedicated external modems supplied and installed by the Bidder for Positive Displacement meters, including pulse interface cabling.

<b>Wireless Communication Network</b>	End-to-end WAN connectivity for all field devices. The Bidder shall select the appropriate wireless communication technology (cellular(4G LTE) or NB-IoT) that meets the functional and SLA requirements defined in this document.
<b>GEL Billing Integration</b>	Mandatory automated integration with GEL's SAP Billing system for delivery of validated parameters.
<b>Enterprise System Integrations</b>	Integration with GEL's SCADA, CMP, CRM and other enterprise systems as required during the contractual period, through open APIs.

### 2.3.3.1 Key Parameters

Parameter	Value
Current metering scope	~4500 field locations (refer Annexure A for detailed breakup)
Platform scalability requirement	As per SOR
EVC integration	All make and models — no exclusions
PD meter integration (current scope)	Industrial customer PD meters
Modem supply	All newly supplied by Bidder where GSM Modems are to be replaced with cellular 4G/LTE with fall back on 2G Modems / NB-IoT technology — no reuse of existing devices
MIU	With built-in or dedicated external modem
Communication technology	Bidder's choice — must meet SLA requirements (Section 12)
SIM configuration	Dual SIM;
AMI Platform deployment	SaaS on MeITY empaneled private cloud only
Disaster Recovery	Geographic DR mandatory; separate from primary site
Parameter	Value
Billing integration	Compulsory — SAP (GEL ERP/Billing)
Other integrations	SCADA, CMP, CRM and other GEL systems as required
Contract model	DBFOOT — Bidder owns and operates all hardware for the entire contract duration
Implementation period	6 months from contract award to Go-Live

O&M period	5 years from Go-Live
Payment basis	Quarterly OPEX post Go-Live, SLA-linkedZero payment during implementation; quarterly OPEX post Go-Live, SLA-linked5% of mobilization advance against the BG after the award of the contract; remaining 95% shall be paid on a quarterly basis

## 2.3.4 DBFOOT Model

The AMI System shall be delivered under a **DBFOOT (Design, Build, Finance, Own, Operate and Transfer)** model, applicable to all hardware components of the AMI System.

### 2.3.4.1 Bidder's Obligations Under DBFOOT

The Bidder shall:

- **Design** the complete AMI System architecture including field hardware, communication network and AMI Platform, to meet all requirements specified in this document.
- **Build** and deploy the entire AMI System — procure, supply, install, test and commission all hardware and software components.
- **Finance** the full cost of hardware procurement, installation and deployment. GEL makes no payment during the implementation period (except for mobilization advance against the BG). All capital expenditure is borne by the Bidder.
- **Own** all hardware assets (Modems, MIUs, communication equipment and associated accessories) throughout the contractual period. GEL does not purchase or own hardware during the contractual period.
- **Operate** the complete AMI System throughout the O&M Period, maintaining all hardware and software in full working condition and meeting all SLAs defined in Section 12.
- **Transfer** complete ownership of all hardware assets to GEL at contract completion in a fully functional condition, with a minimum remaining useful life of **five years** for each component category.

### 2.3.4.2 About DBFOOT model

The DBFOOT model places full technical, operational and financial responsibility for hardware on the Bidder. Specifically:

- GEL does not prescribe specific power source solutions, or detailed installation design — the Bidder is responsible for designing a system that meets GEL's functional and SLA requirements.
- The Bidder bears all risks of hardware obsolescence, failure and replacement throughout the contractual period.
- GEL prescribes either 4G LTE with fall back on 2G or NB-IoT technology for cellular communication. Communication hardware for New EVC or PD meter during the O&M Period shall be Supplied, installed, Operated and maintained by the Bidder as per the rate applicable for that specific year, as priced in the SOR.

- All SIM cards shall be registered in Bidder's name; however, SIM management and coordination with operators is entirely the Bidder's responsibility.

### 2.3.4.3 Asset Transfer at Contract Completion

At contract completion, the Bidder shall transfer to GEL:

- All deployed Modems, MIUs, antennas, enclosures and associated field hardware in fully functional condition.
- Complete asset inventory with GPS coordinates, serial numbers, make, model, firmware versions and condition reports for every device.
- All SIM cards registered in Bidder's name with updated service agreements.
- Documentation for all EVC OEM communication drivers developed under this contract.
- All AMI Platform documentation, API specifications, configuration files, integration specifications and operational manuals.
- Active software licences in GEL's name, with transition support to GEL or its nominated successor.

## 2.3.5 Cybersecurity and Data Protection Requirements

The AMI System shall be designed, implemented and operated as a **cyber-secure system** throughout the contractual period. Cybersecurity is not an optional feature — it is a baseline requirement that applies to every component and layer of the AMI System.

### 2.3.5.1 Communication Encryption

All data communication within the AMI System shall be encrypted in accordance with applicable industry standards:

- **Field device to AMI Platform (Modem/MIU → Cloud):** All data transmitted from Modems and MIUs to the AMI Platform over the WAN shall be encrypted using **TLS 1.2 or higher** (TLS 1.3 preferred). Unencrypted communication paths between field devices and the platform are not permissible under any circumstances.
- **Intra-platform communication:** All communication between AMI Platform components (application layer, data layer, integration layer) shall be encrypted.
- **Platform to enterprise systems:** All data exchanges between the AMI Platform and GEL's enterprise systems (SAP Billing, CMP, CRM and others) shall be encrypted using TLS 1.2 or higher.
- **Data at rest:** All metering data, configuration data and user data stored in the AMI Platform shall be encrypted at rest using AES-256 or equivalent.
- The Bidder shall provide GEL with a communication security architecture document as part of the Phase 2 deliverables, confirming the encryption standards applied at each communication boundary.

## 2.3.6 Overall System Cybersecurity

The complete AMI System — including field devices, communication network, AMI Platform and all integrations — shall comply with the following cybersecurity requirements:

- **Standards compliance:** The AMI System shall comply with **IEC 62443** (Industrial Automation and Control Systems Security) at applicable security levels and with **NCIIPC guidelines** for Critical Information Infrastructure throughout the contractual period.
- **Secure device identity:** All field devices (Modems and MIUs) shall implement device authentication mechanisms to prevent unauthorised device spoofing, replay attacks and man-in-the-middle attacks.
- **Access control:** The AMI Platform shall implement Role-Based Access Control (RBAC), Multi-Factor Authentication (MFA) and Active Directory integration with Single Sign-On (SSO) as specified in Section 4.
- **Penetration testing:** The Bidder shall conduct an independent penetration test of the complete AMI System by a **CERT-In empanelled security auditor** prior to Go-Live. All critical and high severity findings shall be remediated before GEL grants Go-Live acceptance. Penetration test results and remediation evidence shall be submitted to GEL as a Go-Live prerequisite. Bidder shall also undertake the VAPT every year during the contractual period.
- **Security patch management:** The Bidder shall apply security patches to the AMI Platform, cloud infrastructure and field device firmware within **30 days** of availability for critical patches and **90 days** for non-critical patches, with prior notification to GEL for each patch deployment. Formal intimation for security patches to be given to GEL without affecting GEL's Billing and data collection time frame.
- **Cybersecurity audit:** The Bidder shall conduct and submit to GEL an annual cybersecurity review of the AMI System throughout the O&M Period.

### 2.3.7 Product and Software Lifecycle Requirements

No hardware product, software product, operating system, database, middleware, or any other component proposed as part of the AMI System shall be at or beyond its **End-of-Life (EOL)** or **End-of-Support (EOS)** date at the time of deployment. Specifically:

- All proposed hardware products shall have a minimum remaining manufacturer support life of **5 years** from the planned Go-Live date.
- All proposed software products, operating systems, databases and middleware shall have active vendor support and security patch availability for the entire contractual period (implementation + O&M).
- The Bidder shall submit, as part of the technical proposal, a **Product Lifecycle Declaration** listing every hardware and software component in the proposed AMI System along with the current manufacturer support status and confirmed EOL/EOS date for each component.
- In the event any component reaches EOL/EOS during the O&M Period, the Bidder shall proactively plan and execute an upgrade or migration to a supported version at no additional cost to GEL, with prior intimation and GEL's written approval.
- GEL reserves the right to reject any proposal that includes EOL or EOS products at the time of bid evaluation.

### 2.3.8 Project Objectives

The AMI System shall achieve the following objectives for Gujarat Energy Limited:

1. **Zero Manual Meter Reading:** Automate gas consumption data collection from all in-scope EVC and PD meter locations, achieving the billing data availability SLAs defined in Section 12.
2. **Multi-OEM EVC Integration:** Integrate with all EVC makes and models across GEL's network through newly supplied Modems and purpose-developed OEM drivers, with no exclusion of any EVC type on grounds of compatibility.
3. **Industrial PD Meter Automation:** Enable automated data collection from all in-scope Positive Displacement meters through newly supplied MIUs (with built-in or dedicated external modems) and pulse interface cabling.
4. **Billing System Integration:** Deliver validated, VEE-processed gas consumption data to GEL's SAP Billing system, supporting GEL agreed billing cycles of **7-day, 10-day and 15day** intervals across different customer categories, without disruption to any billing cycle.
5. **Real-Time Operational Visibility:** Provide GEL's GA Teams with real-time visibility of field device status, data collection performance, alarms and exceptions through the AMI Platform web interface and GEL staff mobile application.
6. **Enterprise Integration:** Interface the AMI Platform with GEL's SCADA, CMP, CRM and other enterprise systems as required during the contractual period through open, standard APIs.
7. **Parallel Operations:** Demonstrate complete and accurate functioning of the new AMI System through a mandatory parallel operations period before decommissioning of the existing AMI system, with zone-wise acceptance by GEL based on comparative data reconciliation.
8. **Cyber-Secure System:** Implement and maintain a fully cyber-secure AMI System with encrypted field-to-platform communication (TLS 1.2 or higher), IEC 62443 and NCIIPC compliance, annual cybersecurity audits and timely security patch deployment throughout the contractual period.
9. **Data Integrity and Regulatory Compliance:** Ensure all collected meter data undergoes VEE processing with a complete, immutable audit trail and that all data storage and reporting complies with PNGRB regulations and applicable standards throughout the contractual period.
10. **Vendor Independence:** Protect GEL's long-term operational independence through COTS platform selection, open API standards, supported (non-EOL) products and structured asset transfer at contract completion.

### 2.3.9 Project Beneficiaries

Stakeholder	Benefit
<b>GEL GA Teams</b>	Real-time field device visibility, automated alarms, exception management and AMI system dashboards via web platform and mobile app across all 29 GAs
<b>GEL Revenue and Billing</b>	Automated delivery of validated billing data to SAP across all billing cycles; elimination of estimated bills; complete data audit trail
<b>GEL Safety and Operations</b>	Real-time tamper alerts, communication failure notifications and consumption anomaly detection surfaced through AMI dashboards and mobile app

<b>GEL Management</b>	Network-wide consumption analytics, gas loss/NTL analysis, data completeness KPIs and regulatory reporting
<b>PNGRB / Regulators</b>	Automated regulatory data exports; immutable event and audit logs; historical data accessible for any period within the 10-year retention window
<b>GEL Finance</b>	Transparent SLA-linked quarterly billing; asset inventory visibility; structured handover at contract completion





## 3 Scope of Work

## 3.1 AMI General Requirements

This section defines the comprehensive scope of work to be performed by the BIDDER for the design, supply, installation, testing, commissioning and post-implementation support of the AMI system for Gujarat Energy Limited. The scope is divided into two main parts:

- **Brief Scope of the Bidder:** A brief scope of the proposed AMI system.
- **Metering Sites wise Scope:** Specific monitoring and control requirements for each type of facility in the gas distribution network.
- **General AMI Scope:** Requirements for central AMI system functionality, including software, infrastructure, analytics, reporting and integration.

## 3.2 Brief AMI Scope of the Bidder

- The Bidder shall design, supply, install, test, commission, operate and maintain a complete Advanced Metering Infrastructure (AMI) System for Gujarat Energy Limited to replace GEL's existing AMI system and automate meter data collection from field metering locations (Qty. as specified in the SOR) across GEL's 29 Geographical Areas.
- In the event of any discrepancy between the quantities of metering nodes listed in SOW, quantities identified during the survey and quantities stated in the SOR (Schedule of Rates), the quantities in the SOR shall prevail for commercial purposes. The Bidder shall flag any such discrepancy in writing to GEL during the survey; GEL shall issue a written clarification before installation commences. In the absence of a written clarification, the SOR quantities shall be treated as final.
- The battery limit for the bidder starts from, in the case of EVC at the serial port and in the case of PD meters at the index cover. The bidder is not required to supply either the EVCs or PD meters under the scope of this RFP.
- The Bidder shall supply and install new dual-SIM wireless Modems at all EVC-equipped metering locations (IMS). The Bidder shall integrate all EVC makes and models present in GEL's network. No EVC location shall be excluded on grounds of EVC type, make, model, or communication protocol. All Make and Models of EVCs and PD Meters (List as provided separately as Annexure) shall be integrated by the Bidder without fail. This shall form the basis for Go-Live criteria. All Modems shall be newly supplied — reuse of existing field hardware is not permitted.
- The Bidder shall supply and install Meter Interface Units (MIUs) with built-in or dedicated external modems with dual-SIM functionality, along with all required pulse interface cabling, at all in-scope Positive Displacement (Diaphragm) meter locations at Industrial customer sites.
- The Bidder shall deploy, configure and maintain a cloud-hosted COTS AMI Platform on a MeITY empanelled cloud infrastructure with a geographically separate Disaster Recovery site. The AMI Platform shall deliver HES functionality, MDMS functionality, a GEL staff mobile application and all specifications as specified in this document.

- The Bidder shall configure mandatory integration between the AMI Platform and GEL's SAP Billing system, supporting different types of billing cycles such as 7-day, 10-day and 15-day intervals (or any other billing cycle as per GEL requirement). The Bidder shall configure integrations with GEL's SCADA, CMP, CRM and other enterprise systems as and when required during the contractual period.
- The Bidder shall develop communication drivers for all EVC OEM makes and models in GEL's network if that are not natively supported by the proposed AMI Platform.
- The Bidder shall plan and execute a mandatory parallel operations period zone-by-zone, providing comparative data reconciliation reports for GEL's acceptance at each zone.
- The Bidder shall select the wireless communication technology — cellular (4G LTE) or NBIoT — appropriate for site conditions at each location. GEL specifies SLA outcomes; the Bidder selects the technology to meet them.
- The Bidder shall manage all SIM cards throughout the contractual period. All SIMs shall be registered in Bidder's name.
- All data
- The Bidder shall procure, own, operate and maintain all hardware throughout the contractual period and transfer all assets to GEL in fully functional condition at contract completion, with a minimum remaining useful life of five years per component.
- The Bidder shall operate and maintain the complete AMI System during the five-year O&M Period, meeting all SLAs specified in Section 12 of this document.
- The Bidder shall make sure all hardware and software products proposed under this RFP are not at or beyond their End-of-Life (EOL) or End-of-Support (EOS) date at the time of deployment and carry a minimum remaining manufacturer support life of five years from the planned Go-Live date.
- The Bidder shall ensure all field-to-platform communication is encrypted using TLS 1.2 or higher. The complete AMI System and its data shall comply with IEC 62443, NCIIPC and DPDP guidelines for cybersecurity throughout the contractual period.
- The Bidder shall conduct an independent penetration test by a CERT-In empanelled security auditor prior to Go-Live and remediate all critical and high severity findings before seeking GEL's acceptance. Additionally, Bidder shall also undertake the VAPT testing through CERT-IN empanelled agency every year and shall submit report in this regard.
- The Bidder shall carry out any modifications, additions, or configuration changes to the AMI Platform as required by GEL at any stage of the project, including during the O&M period, without additional cost to GEL.
- The Bidder shall handle any increase in the quantity of field devices, including all associated works — survey, supply, installation, commissioning and AMI Platform registration — as per the annual unit rate applicable for that O&M year as priced in the SOR.
- The AMI platform architecture shall support canonical data model-based normalization to enable standardized interoperability across multi-OEM devices and enterprise applications.

- The bidder shall supply and install junction boxes with surge protection devices for all field connections at hazardous area locations in accordance with IEC 60079 for Zone 1, Gr IIA/B with mandatory ATEX/PESO certification for all supplied equipment .



- The Bidder shall estimate and recommend minimum bandwidth requirement for the internet / intranet each of the GA locations and Head office / other office locations of GEL to access cloud-based AMI solution.
- The bidder shall ensure the mobile application supports both iOS and Android platforms with role-based access control and secure authentication.
- The bidder shall configure the Mobile Gateway Server to manage mobile authentication, optimize data for efficient mobile transmission, handle push notifications for alarms and events and manage offline synchronization for mobile devices.
- The bidder shall deploy comprehensive cyber security across enterprise IT and OT networks for a unified end-to-end security architecture with separate firewalls for OT Networks and redundant firewalls for internet and intranet with automatic failover capability.
- The bidder shall be responsible for all activities related to software including firmware upgradation, patch management and software updates throughout the warranty and postwarranty maintenance period.
- The bidder shall deploy multiple teams in each GA location to complete all installation works within the defined time schedule, with at least one safety engineer in each GA location while work is being carried out to ensure compliance with safety protocols.
- The bidder shall provide surge protection devices extensively for AC/DC at input and output, as well as at earth circuits and field communication links to ensure system robustness against electrical transients.
- The bidder shall ensure all equipment is capable of operating in the specified environmental conditions and designed for 24x7 operation, with all modems and MIUs being of rugged design (industrial grade), as air-conditioned rooms are not available at GA locations.
- The bidder shall coordinate with mechanical, civil, electrical, instrumentation and other contractors for all works related to AMI, conduct site visits to gather any required input or data and shall take work permits from GEL for each station for each day of working at any station.
- The bidder shall design the AMI system with flexibility for future technological upgrades and deliver a system architecture that supports addition of new EVCs, new parameters and modifications to existing configurations without requiring major system changes.
- The bidder shall carry out any number of changes, modifications, additions, or deletions to Graphics, Logics, Reports, etc. as required by GEL for any number of times at any stage of the project (including during warranty and post-warranty periods) without any additional cost to GEL.
- The bidder shall handle the scope for increase of quantity of any item involving all the works including design, engineering, transport, insurance, loading, unloading, supply, erection, cabling, glanding, termination, testing and commissioning of the respective item, complete in all respects.
- The bidder shall implement VPN tunnelling architecture with IPsec protocol and AES-256 encryption for all communications between field devices and the cloud-based AMI infrastructure.
- All APIs, protocol adapters, communication interfaces and integration interfaces shall be openly documented and made available to GEL without additional licensing dependency.







All equipment shall be capable of operating for the specified environmental conditions. All equipment unless otherwise specified, shall be electronic type.

Dual pole MCB shall be provided for all power isolation at any location. Power to any device at any location shall be through dual pole MCB.

Laying & routing of cables through conduits, glanding, termination of cables, dressing and ferruling for all the cables.

Providing earthing to new AMI equipment at all locations by extending the earth conductor of suitable dimension from earth pit or earthing grid. Vendor may check earth connectivity before connection to the equipment rack. Bidder shall use 1 C x 6 sq mm FRLS armoured cable for earthing at each location and cost of the same shall be included in installation cost of respective equipment.

Vendor must coordinate with Instrumentation / Telecommunication / Electrical / CP system contractor / vendor during installation & commissioning for proper integration as required.

The electrical works associated with the installation and commissioning of the equipments, earthing of equipments at all sites, powering of equipments at all sites, termination of cables as required shall be the responsibility of the bidder. Supply and laying of Power Cables from Electrical panel to respective equipment cables as required shall be the responsibility of the bidder.

Glanding, ferruling, cable tagging at both ends of each cable, termination of cabling at field devices end, work station end and respective end at EVC, Electrical Panel, IEDs or any other interfacing device shall be bidder's responsibility.

The design and installation shall be generally in accordance with international recommended practices and other applicable standards like ASI, IBR etc. All standards, code of practice shall be of the latest edition.

The Bidder shall provide power solution for all modems at GEL sites including all hardware, materials and installation activities as specified below:

All materials and equipment shall be of the highest quality, conforming to international standards and safety requirements. The Bidder shall provide all necessary installation accessories, supports and ancillary items required for complete and safe grid power connection to the EVC, whether specifically mentioned or not.

The bidder shall give necessary user, access and configuration to GEL for all the applications in this RFP.

The bidder shall provide and configure the firewall for all applications and it should be Nextgen or WAF

All hardware and components supplied under this contract shall be brand new, unused and latest generation available from the manufacturer.

No refurbished, reconditioned, or second-hand equipment shall be supplied under any circumstances.

All hardware and components shall come with manufacturer's comprehensive warranty as specified in the contract terms.

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The Bidder shall provide manufacturer's warranty certificates for all supplied hardware and components.

- Any hardware or component found to be non-compliant with the "new" requirement shall be immediately replaced at the Bidder's cost without any time extension.
- The Bidder shall assume complete responsibility for any incident, failure, or disruption occurring in the deployed systems during the contract period.
- Incident management shall include:
  - ○ Immediate response to any system failure or disruption
  - ○ Root cause analysis and corrective action implementation
  - ○ Preventive measures to avoid recurrence
  - ○ Complete documentation of incident and resolution steps
- The Bidder shall be liable for:
  - ○ Any business disruption caused by system failures
  - ○ Data loss or corruption incidents
  - ○ Security breaches or cyber incidents
  - ○ Performance degradation below SLA requirements
- The Bidder shall maintain comprehensive incident management system with real-time tracking and reporting capabilities.
- GEL shall be immediately notified of any incident along with preliminary assessment and resolution timeline.
- The Bidder shall be responsible for performing and completing all work, activities, services and deliverables necessary for the successful completion of the project, whether specifically mentioned in the scope of work or not. This includes but is not limited to any ancillary work, supporting activities, complementary services, regulatory compliance requirements, testing, commissioning, documentation, training and any other tasks that are reasonably necessary or incidental to achieve the project objectives and deliverables as envisioned. The Bidder cannot claim additional compensation or refuse to perform any work on the grounds that such work was not explicitly mentioned in the scope of work, provided such work is reasonably necessary for project completion. The Bidder is expected to use their professional expertise and industry knowledge to identify and execute all necessary work components to deliver a complete, functional and ready-to-operate solution.

The bidder shall ensure all work is performed in line with GEL health and safety guidelines

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- This is a NO DEVIATION TENDER. All bidders must complete the attached Deviation Form. Any deviations noted outside of this prescribed form will render the offer non-responsive and liable for rejection, as per the form's instructions
- In case of any dispute between Bidder and OEM, it shall be the responsibilities of Bidder to resolve this concern. In any case, there should not be any impact on GEL arising out of this dispute. Bidder should ensure this to be addressed.
- If in case the SI does not perform up to the GEL's expectation in alignment with RFP requirements, GEL shall serve them with one notice, followed by 2 show cause notices and if the same is not addressed even after these 3 notices, GEL reserves the right to terminate the contract with the Bidder, including blacklist the Bidder. GEL may award such work to other agency and also reserves the right to recover the cost associated with this, including the execution and / or O&M from the Bidder.

## 3.3 EVC OEM Driver Development

### 3.3.1 Driver Development

- The Bidder shall develop communication drivers for all EVC OEM makes and models in GEL's network if that are not natively supported by the proposed AMI Platform. This work is within the Bidder's scope and shall be completed before hardware installation begins at locations with those EVC OEMs.
- Driver development for all EVC OEMs present in GEL's network (as per Annexure A) at the time of contract award should be completed and is included in the Bidder's contracted price. No additional charge to GEL applies for these drivers.
- For new EVC OEMs introduced into GEL's network after contract award, where the AMI Platform does not natively support that OEM's protocol, the Bidder shall develop the required driver. The one-time cost of driver development per new EVC OEM shall be separately quoted by the Bidder and agreed with GEL before development commences. This is a separate line item in the SOR.
- The Bidder shall maintain a driver version register, updated whenever a driver is developed, modified, or upgraded.

### 3.3.2 New EVC and PD Meter Onboarding During the O&M Period

- During the five-year O&M Period, GEL will install new EVC and PD meters at new or existing metering locations. The Bidder shall onboard all such new meters into the AMI System.
- New meter onboarding during the O&M Period shall be priced on the **annual unit rate applicable for the year in which onboarding occurs**, as quoted in the SOR. The SOR shall contain a separate unit rate for each year of the O&M Period (Year 1 through Year 5).

- GEL shall pay per device onboarded at that year's rate. There is no blanket or free onboarding of new meters during the O&M Period.





The Bidder's scope for each new device is identical to the initial deployment scope: physical survey, supply and installation of hardware, WAN connectivity, device commissioning in the AMI Platform and confirmation of data collection.

Where a new EVC OEM not previously present in GEL's network is introduced during the O&M Period, driver development costs shall apply as per SOR.

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### 3.4 Indicative AMI Scope

The following table provides an indicative station-wise breakdown of the AMI scope. A detailed GA-wise and location-wise list of all EVC and PD meter locations is provided in Annexure A.

Sr. No.	Location Type	No. of Locations (Indicative)	New Hardware to be Supplied and Installed by Bidder	Services to be Performed by Bidder
1	Metering Skid (IMS) — with EVC	3,158	<ul style="list-style-type: none"> <li>- New dual-SIM industrial wireless Modem per EVC</li> <li>- Antenna with mounting hardware</li> <li>- Weatherproof enclosure (outside skid, safe zone, min. 1.5m from skid)</li> <li>- Shielded cable between EVC and Modem</li> <li>- Surge protection devices</li> <li>- Cable glands and mounting accessories</li> </ul>	<ul style="list-style-type: none"> <li>- Physical survey and site assessment - Interface with EVC via RS-232/RS-485</li> <li>- Configuration of communication protocol (Modbus RTU/TCP or EVC OEM protocol as applicable)</li> <li>- TLS-encrypted communication to AMI Platform</li> <li>- Push and pull data collection configuration</li> <li>- OTA firmware update capability</li> <li>- Device registration and commissioning in AMI Platform</li> <li>- Parallel operations data collection and reconciliation</li> </ul>

2	Positive Displacement (Diaphragm) Meter	1,439	<ul style="list-style-type: none"> <li>- New MIU with built-in or dedicated external modem per PD meter</li> <li>- Pulse interface cabling from PD meter pulse output to MIU</li> <li>- Antenna with mounting hardware</li> <li>- Weatherproof enclosure</li> <li>- Surge protection devices</li> </ul>	<ul style="list-style-type: none"> <li>- Physical survey and site assessment, including pulse output interface evaluation</li> <li>- Supply and installation of pulse interface cabling</li> <li>- MIU configuration with correct pulse constant per meter</li> <li>- TLS-encrypted communication to AMI Platform</li> <li>- Device registration and commissioning in AMI Platform</li> <li>- Parallel operations data collection and reconciliation</li> </ul>
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RFP for Selection of Implementation Agency for establishing AMI for Gujarat Energy Limited

File No: GGL-IT & ERP-2026-6-181812

Sr. No.	Location Type	No. of Locations (Indicative)	New Hardware to be Supplied and Installed by Bidder	Services to be Performed by Bidder
			- Cable glands and mounting accessories	
3	Commercial Metering Sites — with EVC	Part of 3,158 above	Same as Row 1	Same as Row 1
4	Domestic Meters with G1.6 PD meters	100	<ul style="list-style-type: none"> <li>- New MIU with built-in or dedicated external modem per PD meter</li> <li>- Pulse interface cabling from PD meter pulse output to MIU</li> <li>- Antenna with mounting hardware</li> <li>- Weatherproof enclosure</li> <li>- Surge protection devices</li> <li>- Cable glands and mounting accessories</li> </ul>	<ul style="list-style-type: none"> <li>- Physical survey and site assessment, including pulse output interface evaluation</li> <li>- Supply and installation of pulse interface cabling</li> <li>- MIU configuration with correct pulse constant per meter</li> <li>- TLS-encrypted communication to AMI Platform</li> <li>- Device registration and commissioning in AMI Platform</li> <li>- Parallel operations data collection and reconciliation</li> </ul>

*Note: The quantities listed above are indicative for planning purposes. The Bidder shall verify all quantities during Site Survey and Onboarding. Payment shall be made based on actual quantities commissioned and operated. Refer to Annexure A for the detailed GA-wise location list.*



## 3.4.1 Detailed AMI Hardware Scope

### 3.4.1.1 Metering Sites with EVC (IMS)

#### 3.4.1.1.1 Existing Setup

- Industrial and Commercial metering Skids are equipped with EVCs of multiple make and models for gas volume correction and billing measurement.
- GEL's existing AMI system currently collects data from these EVCs through installed modems. The Bidder shall replace all existing modems with newly supplied Modems. Reuse of any existing modem hardware is not permitted.
- EVC make and models vary across GEL's 29 GAs. Some EVCs communicate via Modbus RS-485/232; others use proprietary OEM protocols. A detailed list of EVC OEMs and models is provided in Annexure A.

#### 3.4.1.1.2 New Hardware to be Supplied and Installed by Bidder

- The Bidder shall supply and install one new dual-SIM industrial wireless Modem per EVC at each IMS location.
- The Bidder shall supply and install an antenna at each location, with appropriate mounting hardware and cable routing to achieve optimum signal reception.
- The Bidder shall supply and install a weatherproof enclosure for the Modem and associated accessories. The enclosure shall be positioned outside the metering skid in the safe zone, at a minimum distance of 1.5 metres from the skid, in line with prevailing field practice at GEL sites.
- If the modem is not ATEX/PESO certified, an appropriate ATEX/PESO certified safety barrier is to be installed by the bidder between EVC and the modem
- The Bidder shall supply and install shielded communication cable between the EVC communication port and the Modem.
- The Bidder shall supply and install surge protection devices on all communication lines.
- The Bidder shall supply and install cable glands at all field connections.
- All hardware installed in or near hazardous area classified zones shall be ATEX/PESO certified and suitable for the applicable area classification. The enclosure shall carry a minimum IP65 rating for outdoor installation in industrial environments.
- The Bidder shall determine and implement the power supply arrangement — mains, battery, or other source — required to meet the device availability SLA specified in Section 12. GEL does not prescribe the power source; the Bidder is responsible for continuous device availability.
- The Bidder shall supply and install a **weatherproof industrial outdoor enclosure** for each Modem installation. The enclosure shall meet minimum IP65 ingress protection for outdoor industrial environments. The enclosure shall be installed in the safe zone, at a minimum distance of **5 feet (1.5 metres)** from the boundary of the hazardous area at the metering skid

- and shall not be positioned inside any hazardous classified zone. The enclosure shall be wall-mounted or pole-mounted as dictated by site conditions. Where pole mounting is required, the Bidder shall supply and install the pole, including all civil foundation work, hardware, clamping brackets and associated accessories — pole installation is within the Bidder's scope. All ancillary items required for the weatherproof enclosure installation — cable glands, mounting plates, DIN rails, terminal blocks, breathers, hinged lockable door, anti-condensation heater where required and anti-tamper seal — shall be supplied and installed by the Bidder.

### **3.4.1.1.3 Work Associated with Implementation**

- The Bidder shall conduct a physical site survey at each IMS location prior to installation, as detailed in Section 3.5.
- The Bidder shall engineer and implement the interface between the new Modem and the EVC via RS-232/RS-485, using shielded cable.
- The Bidder shall configure the communication protocol between the Modem and EVC — Modbus RTU/TCP or the applicable EVC OEM proprietary protocol — using the appropriate driver in the AMI Platform.
- Where the AMI Platform does not natively support an EVC OEM's communication protocol, the Bidder shall develop the required driver before installation at those locations commences. Refer to Section 3.8 for driver development obligations.
- The Bidder shall configure TLS 1.2 or higher encryption on all data communication between the Modem and the AMI Platform.
- The Bidder shall configure the modem to push data transmission at all required frequencies, with a minimum of daily standard read with 24 hourly granular read and real-time eventtriggered push. All parameters as present in the hourly logs of existing EVC / MIU shall be pushed to AMI System as per pre-define periodicity by the modem.
- The Bidder shall configure on-demand (pull) data read capability for each device.
- AMI Software shall be capable to push/pull data based on GEL EIC requirements
- Daily, Hourly, interval based as per the time frame mentioned in customized way in terms of Dates. All parameters data configured in EVC's to be retrived remotely from AMI software.
- The Bidder shall implement store-and-forward functionality based on available EVC or Modem memory to retain data during communication outages and transmit on reconnection.
- The Bidder shall configure OTA firmware update capability for each deployed Modem through the AMI Platform.
- The Bidder shall register and commission each device in the AMI Platform, verify successful data transmission and confirm that the AMI Platform is correctly receiving and processing data from the device before completing installation at that location.
- All installation activities shall be carried out in the presence of GEL's designated representative. Comprehensive installation records including photographs, signal strength readings and commissioning test results shall be maintained for each location.

The Bidder shall restore the site to its pre-installation condition on completion of works at each location.

**3.4.1.1.4 Connectivity**

- The Bidder shall design and deploy WAN connectivity for each IMS location using the communication technology — cellular or NB-IoT— selected by the Bidder based on site signal survey results and the SLA requirements in Section 12.
- Each Modem shall be fitted with dual SIM cards. The primary and secondary SIM slots shall be configured for automatic failover. The Bidder shall, where operationally feasible, use SIM cards from two different network operators across the two SIM slots to maximise network redundancy.
- The Bidder shall activate both SIM slots, verify data transmission on each slot independently and confirm automatic failover between slots during commissioning testing.
- All SIM cards shall be registered in Bidder's name under appropriate industrial/IoT service plans. GEL shall determine SIM operator preference before procurement.

The Bidder shall configure a dedicated APN or equivalent secure network configuration for all SIM cards to prevent unauthorised access to the communication channel

**3.4.1.2 Positive Displacement Meters****3.4.1.2.1 Existing Setup**

- PD (Diaphragm) meters have provision to interface with MIU.
- At present, meter reading of PD meter locations is carried out manually. Under this RFP, new MIUs shall be supplied, installed, operated and maintained by the Bidder for the entire contract duration.
- PD meters at these locations vary by make and model across GEL's network. A detailed list of PD meter locations is provided in Annexure A.

**3.4.1.2.2 New Hardware to be Supplied and Installed by Bidder**

- The Bidder shall supply and install new MIU per PD meter at each in-scope location. Each MIU shall incorporate a built-in communication modem or shall be paired with a dedicated external communication modem. MIU shall be ATEX/PESO certified for installation in Zone 1 Hazardous area.
- If the MIU is not ATEX/PESO certified, an ATEX/PESO certified safety barrier is to be installed by the bidder between PD meter and the MIU
- The Bidder shall supply and install pulse interface cabling from the PD meter's pulse output port to the MIU input. All pulse cabling shall be shielded and routed appropriately for the installation environment.
- The Bidder shall supply and install appropriate mounting hardware and a weatherproof enclosure for the MIU, rated at minimum IP54 for outdoor industrial use.
- The Bidder shall supply and install surge protection devices on communication lines.

- The Bidder shall supply and install cable glands at all field connections.
- All hardware shall be ATEX/PESO certified for the applicable hazardous area classification at the installation site.
- Where the MIU is of snap-fit type and mounts directly on the meter index, no additional enclosure is required provided the MIU's own housing meets minimum IP65. Where the MIU is not of snap-fit type, the Bidder shall supply and install a **weatherproof junction box** with a hinged, lockable door for the MIU. The junction box shall be mounted at the most appropriate position for the site — **wall-mounted, pole-mounted, or pipe-mounted** — based on site conditions identified during the Phase 1 survey. Where pole or pipe mounting is required, the Bidder shall supply and install all associated mounting hardware, brackets and civil works. All ancillary items — cable glands, mounting hardware, DIN rails, anticondensation provisions and anti-tamper seals — shall be supplied and installed by the Bidder. The wire-seal provision specified in Section 5.3.1 shall apply regardless of mounting type.
- The Bidder shall determine and implement the power supply arrangement required to meet the device availability SLA specified in Section 12.

#### 3.4.1.2.3 Work Associated with Implementation

- The Bidder shall conduct a physical site survey at each PD meter location prior to installation, including assessment of the pulse output interface, pulse cabling route and site conditions, as detailed in Section 3.5.
- The Bidder shall supply and install pulse interface cabling between the PD meter pulse output and the MIU. Cable routing shall protect cabling from mechanical damage and environmental exposure.
- The Bidder shall configure the pulse constant in the MIU to match the PD meter's rated pulse output per unit volume and verify pulse count accuracy against a concurrent manual meter reading before installation is complete.
- The Bidder shall configure TLS 1.2 or higher encryption on all communication between the MIU/modem and the AMI Platform.
- The Bidder shall configure the modem to push data transmission at all required frequencies, with a minimum of: daily standard read with 24 hourly granular read and real-time eventtriggered push.
- The Bidder shall configure on-demand (pull) data read capability for each device.
- The Bidder shall configure OTA firmware update capability for each deployed MIU through the AMI Platform.
- The Bidder shall register and commission each MIU in the AMI Platform, verify successful data transmission and confirm that the AMI Platform is correctly receiving and processing pulse-count data from the device before completing installation at that location.
- All installation activities shall be carried out in the presence of GEL's designated representative, with comprehensive installation records including photographs, pulse count verification data, signal strength readings and commissioning test results maintained for each location.



The Bidder shall restore the site to its pre-installation condition on completion of works at each location.

- The MIU shall capture the meter index in a manner that is numerically identical to the mechanical index displayed on the PD meter at the time of reading. The Bidder shall configure the pulse constant per device to make sure the MIU-derived cumulative volume matches the mechanical index reading at all times. Any discrepancy between the MIUcaptured index and the mechanical index at the time of commissioning constitutes a commissioning failure.

#### **3.4.1.2.4 Connectivity**

- The Bidder shall design and deploy WAN connectivity for each PD meter location using the communication technology selected by the Bidder based on site signal survey results and SLA requirements in Section 12.
- Each MIU modem (built-in or external) shall support dual-SIM operation with automatic failover. The Bidder shall activate both SIM slots, verify data transmission on each and confirm failover functionality during commissioning testing.
- All SIM cards shall be registered in Bidder's name.
- The Bidder shall configure a dedicated APN or equivalent secure network configuration for all SIM cards.

### **3.5 General AMI Platform Scope**

This section defines the requirements for the AMI Platform and all associated software components. Detailed functional specifications for each module are provided in Section 4.

The Bidder shall design, supply, install, test, commission, operate and maintain a complete Advanced Metering Infrastructure (AMI) System for Gujarat Energy Limited, covering all field metering locations made up of EVC-equipped metering and approximately Positive Displacement metering sites — across GEL's 29 Geographical Areas. In the event of any discrepancy between quantities stated in this Scope of Work and quantities in the Schedule of Rates, the Schedule of Rates shall prevail for commercial purposes; the Bidder shall flag such discrepancies in writing to GEL during Phase 1.

Prior to decommissioning the existing AMI system, the Bidder shall conduct a mandatory parallel operations period — indicatively 30 to 60 days per zone — during which both systems shall simultaneously collect data from the same field devices. The Bidder shall provide a zone-wise comparative data reconciliation report before GEL authorises decommissioning in each zone.

The AMI Platform is the central software system through which all field metering data flows. It is structured across four functional layers — HES (Head-End System), MDMS (Meter Data Management System), NMS (Network Management System) and EMS (Enterprise Management System) — each with a dedicated scope sub-section below. Cross-cutting capabilities that span all four layers are covered in the sub-sections from 3.4.14 onwards.

#### **3.5.1 AMI Platform Overview and General Requirements**

- The Bidder shall deploy a COTS AMI Platform on a MelTY-empanelled private cloud with all data centres within India. The Cloud Service Provider shall maintain active MelTY

- empanelment for the full contractual period including any extensions; loss of empanelment shall require immediate migration to a compliant provider at the Bidder's cost with no disruption to GEL operations.
- The AMI Platform shall be hosted in a primary cloud data centre with a geographically separate Disaster Recovery (DR) site. The DR site shall be in a different geographic region from the primary. Automatic failover to the DR site shall be configured and tested with a Recovery Time Objective (RTO) of four hours or less and a Recovery Point Objective (RPO) of one hour or less.
- The AMI Platform shall support the contracted metering scope and shall be scalable to a minimum of 7,000 metering points without architectural redesign, performance degradation, or additional per-node licence cost beyond the contracted rate.
- The Bidder shall demonstrate at least two live utility references for the proposed COTS AMI Platform at the time of bid submission.
- The AMI Platform architecture — whether a single unified COTS product or separate preintegrated components — is at the Bidder's discretion, provided all functional requirements in Section 4 are met. Where HES and MDMS functionality are delivered as separate products, they shall be pre-integrated at the time of bid submission; custom integration developed at implementation is not acceptable.

### 3.5.2 Interoperability and Open Standards

- The AMI Platform shall be built on open, documented protocols and data standards — including Modbus RTU/TCP, DLMS/COSEM, MQTT and REST APIs — so that GEL can independently connect third-party systems, onboard new field devices and replace any platform component at contract expiry without architectural constraints. No proprietary interface that creates vendor lock-in at any layer is acceptable.
- At contract expiry, GEL or its successor shall be able to onboard Modems and MIUs from any compliant manufacturer through the platform's open API and standard protocol interfaces, without requiring any architectural change to the AMI Platform. The Bidder shall demonstrate this capability during UAT by simulating onboarding of a device from a manufacturer different from the originally deployed hardware.
- All integration interfaces between the AMI Platform and GEL enterprise systems shall conform to the IEC 61968-9 CIM data model or an equivalent industry-standard data model agreed with GEL before Go-Live.
- All hardware supplied under this RFP shall be newly manufactured, carry a remaining manufacturer support life of at least five years from the planned Go-Live date and not be at or beyond End-of-Life or End-of-Support at the time of supply.

### 3.5.3 Multi-OEM EVC and PD Meter Integration

- The AMI Platform shall communicate with all EVC makes and models in GEL's network as listed in Annexure A. No EVC location shall be excluded due to protocol limitations or proprietary interface constraints. All future EVC makes and models introduced during the

contractual period shall likewise be integrated; a separate one-time SOR line item shall apply per new EVC make or model not present in Annexure A at contract award.

- The Bidder shall maintain a driver library covering all EVC OEMs in GEL's installed base and shall develop drivers for any OEM not natively supported by the proposed platform. Driver development for all OEMs in Annexure A at contract award is within scope at no additional cost to GEL.
- At this stage, the AMI System shall read data from EVCs and update alarm thresholds through the AMI Platform.
- Remote configuration of other EVC parameters is not part of this scope.
- The AMI Platform shall communicate with all PD meter MIU types installed under this RFP. Integration is via the MIU pulse interface. The AMI Platform shall communicate with all PD meter MIU types installed under this RFP; all PD meter locations are in scope without exception.
- All liaison with EVC and PD meter OEMs required to complete driver development, resolve protocol ambiguities, obtain technical documentation and fulfil any other obligation under this RFP shall be the sole responsibility of the Bidder; GEL shall not be required to intervene or facilitate communication with any OEM on the Bidder's behalf.
- Where an EVC or PD meter OEM does not cooperate or imposes conditions that delay driver development or integration, the Bidder shall resolve such impediments independently and at its own cost; delays or failures attributable to OEM non-cooperation shall not constitute grounds for milestone extension or additional charges to GEL.

### **3.5.4 Layer 1 — Head-End System (HES) Functionality**

#### **3.5.4.1 Device Communication and Data Acquisition**

- The HES layer shall manage all two-way communication between the AMI Platform and field devices — EVC Modems and PD meter MIUs — covering device registration, protocol translation, scheduled polling, on-demand reads, alarm event push and OTA firmware management.
- Communication shall operate in push (device-initiated) and pull (server-initiated, on-demand) modes, independently configurable per device or device group. Both modes are mandatory.
- Data collection shall operate across three tiers as a minimum: daily billing-cycle reads, hourly interval reads and real-time event-based push for alarms and tamper events. GEL reserves the right to modify the data collection frequency, tier structure and parameters at any time during the contractual period; the Bidder shall implement such changes at no additional cost.
- The HES shall support NTP-based time synchronisation across all devices with IST as the mandatory reference; firmware OTA updates with signed firmware and rollback capability; and store-and-forward with automatic data backfilling from device internal memory following communication outages.
- Where HES and MDMS functionality are delivered as separate products, their interface shall be a pre-integrated, native data flow using IEC 61968-9 CIM or an equivalent standard agreed with GEL, with a maximum 5-minute synchronisation lag for billing-grade data.

## 3.5.5 Layer 2 — Meter Data Management System (MDMS)

### 3.5.5.1 Meter Data Storage and Collection

- The MDMS shall maintain a centralised data repository for all meter data collected from EVCs and MIUs, retaining all collected and processed data for a minimum of 10 years with full retrieval and export capability for any historical period.
- Original raw data received from field devices shall be preserved in a non-manipulated state alongside processed data for the full retention period. No user — including system administrators — shall be able to modify or delete raw data records.
- The MDMS shall support customer grouping by customer type (Industrial/Commercial), geography, GA, billing cycle (7-day, 10-day, 15-day) and any other configurable filter required by GEL for operational and billing purposes.
- Automated data archival shall run at 180-day intervals or at such other interval specified in the approved FRS/SRS. The Bidder shall document and demonstrate the archival and restoration process before Go-Live.
- The MDMS shall automatically detect data gaps in historical records and trigger backfilling from device internal memory, with conflict resolution for overlapping periods and duplicate records handled without manual intervention.

### 3.5.5.2 Validation, Estimation and Editing (VEE)

- The AMI Platform shall process all collected meter data through a configurable VEE engine before any use in billing or reporting. All VEE rules shall be configurable by GEL without vendor involvement.
- Validation shall cover at minimum: consumption threshold checks, zero consumption detection, consecutive identical reading detection, negative flow (reverse flow) detection, digit overflow correction and pulse coherence verification between MIU and PD meter readings.
- Where validation identifies missing or anomalous values, the VEE engine shall automatically trigger estimation using industry-standard methods configurable per customer segment. The estimation workflow shall be configurable: auto-application, manual review before application, or estimated value as a suggestion pending GEL approval.
- All manual edits to validated or estimated values shall require a reason code from a configurable list and an authorisation workflow. Every edit shall be logged in an immutable audit trail with editor identity, timestamp, original value and new value.
- An automated daily data quality report covering completeness, accuracy and discrepancies shall be generated and made available to GEL's GA Teams without manual intervention.

### 3.5.5.3 Billing Determinant Calculation

- The MDMS shall calculate all billing determinants required by GEL's SAP Billing system, including total gas consumption (SCM), energy (MMBTU or GJ), peak flow rate, time-of-day block consumption, imbalance quantity against Contract Demand or Annual Quantity and

average calorific value. No PTZ correction shall be applied at the platform level; EVCs supply corrected volume ( $Q_b$ ) directly.

- Billing determinant calculation shall support 7-day, 10-day and 15-day billing cycles operating concurrently, with each customer assigned to one cycle. Determinant extraction shall operate independently per customer's assigned cycle without cross-cycle interference.
- ToD tariff configuration shall be available by customer category, day type (weekday, weekend, holiday) and season. The number and duration of ToD blocks shall be configurable by GEL without vendor involvement.
- Special metering situations — check metering, sub-metering, bi-directional metering and multiple meters at the same premises — shall be handled correctly in all billing and reporting calculations.
- Validated billing determinants shall be delivered automatically to GEL's SAP Billing system on or before each customer's scheduled billing date. A manual reading entry workflow shall be available as a fallback for locations where automated collection has failed before the billing date; manual entries shall be flagged in the SAP export.

#### 3.5.5.4 Asset Management

- The AMI Platform shall maintain a master asset repository covering all installed metering assets, including meter location, customer information (name, BP number), service line number, meter ID, meter type, configuration parameters, GIS coordinates and customer hierarchy association (DRS, SLP, CGS, Distribution Main).
- Device lifecycle status — Installed, In Service, Faulty, Decommissioned, Removed — shall be tracked per device from installation through decommissioning, with configuration change history retained per asset with timestamp and authorising user.
- GIS coordinates shall be maintained for every installed device, with map visualisation and hierarchical navigation from network level down to individual device level, filterable by status, customer category, GA and communication technology.
- Damage and deterioration events shall be loggable against any asset with cause attribution (customer, operations, environment) and a complete in-service location history per device.
- Bulk asset data import through file upload shall be supported, with validation against existing records and error reporting before the import is committed.

#### 3.5.5.5 Device Lifecycle and Reconciliation

- The AMI Platform shall manage the full device lifecycle — registration, installation, provisioning, operations, maintenance and decommissioning — through a defined workflow with enforced status transitions and appropriate authorisation requirements per transition.
- Automated reconciliation reports shall identify meters installed but not communicating for a configurable duration, segmented by GA, communication technology and customer category, without manual generation.
- Exceptions shall be automatically generated for devices not delivering accurate meter data post-installation. Exception criteria shall be configurable per device type and customer category.

- Gas consumption history shall be maintained without interruption across meter replacements; consumption continuity shall be preserved at the customer level even when the underlying meter is replaced, with no data loss.
- A real-time dashboard shall display pending, in-progress, installed and decommissioned device counts by GA, updating continuously.

### 3.5.5.6 Alarm, Event and Exception Management

- The AMI Platform shall support a configurable alarm framework covering: safety alarms (tamper, cover open, pulse cable cut, reverse flow, pressure exceedance, power supply failure); revenue alarms (zero consumption, consumption threshold breach, Daily Order Quantity exceedance); network alarms (communication failure, signal quality degradation, device offline, time synchronisation failure); and device health alarms (low battery, firmware fault, metrological sensor failure, pulse coherence failure, volume under alarm, spare volume conditions).
- Tamper alarms shall reach the platform within one minute of the device event. All alarm categories, priorities and threshold values shall be configurable by authorised GEL users without vendor involvement.
- Multi-channel notifications — Email, SMS, WhatsApp and mobile application push — shall be configurable per alarm category and per recipient role. Notification delivery confirmation shall be logged for audit.
- Alarm acknowledgement, configurable escalation rules for unacknowledged alarms, resolution tracking with notes and service order auto-generation from configured alarm types shall be available. Service orders shall route to GEL's Workforce Management system through standard APIs.
- Complete alarm history and trend data shall be retained for the full contractual period, with trend reports available by alarm type, device, customer and GA.

### 3.5.5.7 Revenue Protection and Loss Analytics

- The AMI Platform shall analyse meter tamper flags, zero consumption patterns and DRS/SLP-level material balance — comparing measured input against aggregate metered output — to identify Non-Technical Loss. Material balance reconciliation shall run daily, with anomalies flagged automatically.
- Pattern analysis shall compare each customer's consumption against their own historical profile and against comparable customers in the same category and geography. Configurable business rules shall drive alert generation and shall be adjustable by authorised GEL users through a user interface that does not require programming skills; rule changes shall be versioned with effective dates.
- Authorised field activity records shall suppress false-positive alerts during planned maintenance and meter replacements. A field activity calendar maintained by authorised GEL users shall drive alert suppression.



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- A case management workflow shall support suspect customer investigation with multi-user collaboration, activity logging and evidence capture. Service orders for field investigation shall be auto-generated and routed to the appropriate GA Team.

Investigation outcomes shall be logged back to the case, enabling trend analysis of revenue protection effectiveness over time.

### 3.5.6 Cross-Cutting Capabilities

#### 3.5.6.1 Reporting and Dashboards

- The AMI Platform shall provide a network-wide dashboard with heat map visualisation showing device and customer status by GA and zone, GA-wise drill-down dashboards configurable by role and a complete customer 360° view covering consumption history, billing history, alarms, communication history and service requests.
- Standard reports shall cover at minimum: customer-wise consumption (daily, monthly, historical, trend, minimum/maximum flow, flow analysis, parameter logs); alarm and event reporting (alarm summary, detail, history, tamper events, communication failures, sensor failures, critical alarms); billing and SAP integration reports (SAP upload report by 08:00 IST daily, billing critical data, billing validation exceptions, customer billing consumption); AMI system health reports (platform uptime, device connectivity, communication availability, network health, device health status); and data quality reports (validation failures, false readings, zero reading exceptions, missing data, wrong uploads, data integrity status).
- A custom report builder shall allow authorised GEL users to create, save, schedule and share reports without programming skills. All standard and custom reports shall be exportable in PDF, XLSX, CSV and XML formats. Report data shall be accessible through APIs.
- All reports required under PNGRB regulations — including metered sales volumes, DRS/SLP throughput and NTL analysis — shall be generated by the platform.
- Scheduled reports shall be delivered via email to configured recipients. The daily SAP upload report shall be generated and delivered automatically by 08:00 IST every day without manual trigger.

#### 3.5.6.2 Integration with GEL Enterprise Systems

- Integration with GEL's SAP Billing system is mandatory and is a hard prerequisite for GoLive acceptance. Validated, VEE-processed billing determinants shall be delivered to SAP on each customer's scheduled billing date across all three billing cycle types. Direct API and scheduled file transfer modes shall both be supported.
- The AMI Platform shall integrate with GEL's SCADA system, Centralised Monitoring Platform, CRM/CIS, GIS, Workforce Management system and any other GEL enterprise system identified during the contractual period, through open REST APIs. No proprietary interface that prevents GEL from independently connecting third-party systems is acceptable.



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- The Bidder shall implement an API gateway layer managing concurrent connections to enterprise systems with load management and automatic failover. The AMI Platform shall be capable of integrating with any additional GEL system through its open API layer without requiring platform architecture changes.

The Bidder shall implement data lineage tracking — maintaining a complete audit trail of data sources, transformations and processing steps from field device through to enterprise system delivery.

- Complete, up-to-date API documentation shall be provided to GEL and updated whenever the platform API changes. Webhook-based, event-driven integration shall be supported for real-time downstream consumption of meter data and alarm events.

### 3.5.6.3 Security and Compliance

- The AMI Platform and the complete AMI System shall comply with IEC 62443 and NCIIPC guidelines for Critical Information Infrastructure throughout the contractual period. All data in transit between field devices and the platform shall use TLS 1.2 or higher; all data at rest shall use AES-256 encryption. A dedicated APN or equivalent secure network configuration shall be implemented for all SIM cards.
- The Bidder shall implement Role-Based Access Control with granular permissions per module and per data scope, Multi-Factor Authentication mandatory for all user access (web, mobile and API), Active Directory integration with Single Sign-On using SAML 2.0 or OAuth 2.0/OpenID Connect and automatic disabling of accounts inactive beyond a configurable period.
- The Bidder shall conduct an independent penetration test of the complete AMI System — platform, APIs, field device communication and all integrations — by a CERT-In empanelled auditor before requesting Go-Live acceptance. All critical and high severity findings shall be remediated and remediation evidence provided to GEL before Go-Live acceptance is granted.
- Critical security patches shall be applied within 30 days and non-critical patches within 90 days of availability, with prior notification to GEL for each deployment. An annual cybersecurity review shall be conducted during each O&M year, with the report submitted to GEL within 30 days of the review date.
- Tamper-proof audit logs covering all user actions, device commands, data modifications, configuration changes and integration events shall be maintained for a minimum of two years. All cybersecurity obligations are within the contracted scope at no additional cost to GEL.

### 3.5.6.4 Data Responsibility — Lapses, Loss, and Theft

The Bidder is solely and unconditionally responsible for the integrity, availability, continuity, and security of all metering data collected, processed, stored, and transmitted by the AMI System from the date of commissioning of each device through the full contractual period. This responsibility covers three distinct categories:

#### **Data Lapses:**

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- Any gap in metering data collection caused by AMI Platform downtime, communication failure, software fault, incorrect configuration, or any cause attributable to the Bidder's scope shall be the Bidder's responsibility to investigate, report, and remediate.
- For every data gap, the Bidder shall attempt recovery of missing data from the field device's internal memory through the store-and-forward mechanism. Where full recovery is possible,

recovered data shall be ingested and processed through the normal VEE and billing workflow, clearly flagged as backfilled.

- Where data cannot be recovered from device memory — for example where the device buffer was overwritten before connection was restored — the Bidder shall document the cause, the affected device, the affected time period, and the estimated data loss, and shall submit this to GEL as part of the quarterly EMS report. The affected period shall be excluded from billable days per the SLA framework in Section 12 and shall not be invoiced.
- Data lapses attributable to GEL-directed actions, customer-side obstruction, or force majeure events shall be classified as non-Bidder-attributable per the NMS root-cause categorisation framework and shall not attract penalties, provided the Bidder has documented and submitted evidence of the cause to GEL within 5 working days of identifying the gap.

#### **Data Loss:**

- The Bidder is responsible for any metering data that is collected by the AMI System but subsequently lost due to storage failure, software error, accidental deletion, incorrect configuration change, failed migration, or any other cause within the Bidder's scope.
- Where data loss is identified, the Bidder shall notify GEL in writing within 24 hours of detection, identifying the scope of loss — affected devices, affected time period, estimated volume of records — and the probable cause.
- The Bidder shall restore lost data from the most recent backup within the Recovery Point Objective defined in the AMI Platform architecture. Where data predates the most recent backup and cannot be recovered, the Bidder shall document the irrecoverable loss in full and submit a root-cause analysis to GEL within 5 working days.
- The Bidder shall not fabricate, estimate, or substitute metering data to fill a loss gap. Raw data records that have been lost cannot be reconstructed; such gaps shall be reflected accurately in the EMS and in all billing and SLA reporting.
- Irrecoverable data loss shall be treated as a Critical SLA breach under Section 12 and shall attract the applicable penalties. GEL's right to withhold payment for periods where data was permanently lost is unaffected by any force majeure or other contractual exclusion.

#### **Data Theft and Unauthorised Access:**

- The Bidder is responsible for preventing unauthorised access to all metering data within the AMI System — whether at rest in the cloud database, in transit between field devices and the platform, through APIs, or through any user interface.
- Where the Bidder identifies or has reasonable grounds to suspect unauthorised access, data exfiltration, or a security breach affecting any component of the AMI System, the Bidder shall notify GEL in writing within **4 hours** of detection. This notification shall include the nature of the incident, the data or systems affected, the probable attack vector, and the immediate containment measures taken.
- Within **24 hours** of detection, the Bidder shall notify CERT-In and any other regulatory authority as required under applicable Indian law, and shall copy GEL on all such notifications.

- The Bidder shall conduct a root-cause analysis of any confirmed breach and shall submit a full incident report — including cause, extent of data accessed or exfiltrated, remediation actions completed, and measures implemented to prevent recurrence — to GEL within **7 calendar days** of the incident.
- The cost of all remediation, regulatory compliance, forensic investigation, notification obligations, and any GEL reputational or commercial damage arising from a data breach caused by a failure in the Bidder's systems, processes, or personnel shall be borne entirely by the Bidder. GEL shall have no financial obligation in connection with any such breach.
- GEL reserves the right to commission an independent forensic investigation of any suspected data breach at the Bidder's cost. The Bidder shall provide full access to all systems, logs, and personnel required for such an investigation within the timeline specified by GEL.

### 3.5.6.5 GEL Staff User Interfaces

- The Bidder shall deliver a responsive web portal accessible on desktop, tablet and mobile devices supporting current versions of mainstream browsers and a native mobile application for iOS and Android published and maintained on Apple App Store and Google Play Store throughout the O&M Period.
- Both interfaces shall implement RBAC, Active Directory integration, SSO and MFA consistent with the platform security framework. A GEL staff member's access rights on the mobile application shall be identical to their web platform access rights.
- The mobile application shall support at minimum: network-wide and GA-level AMI status dashboards with drill-down to device level; device status search and view; on-demand read initiation from any device; alarm view, acknowledgement, assignment, update and closure from the mobile interface; field technician task management and rescheduling with automatic supervisor notification; survey data capture with GPS tagging and photograph upload; installation confirmation workflow; exception logging from the field; and access to all standard reports in mobile-optimised view with export and sharing capability.
- The mobile application shall support offline mode — read-only access to the last synchronised data when connectivity is unavailable and offline capture of survey and commissioning data with automatic synchronisation on connectivity restoration. Real-time push notifications for all critical alarms shall be delivered to authorised mobile users.
- Both interfaces shall support English as minimum language options and shall be fully operational on all days including public holidays.

### 3.5.6.6 Maintenance, Updates and Version Management

- All platform updates, patches, bug fixes and major version upgrades shall be delivered at no additional cost to GEL throughout the contractual period. Critical security patches shall be applied within 30 days and non-critical patches within 90 days of availability, with prior notification to GEL.
- Major version upgrades affecting platform functionality or user interfaces shall require GEL's written approval before deployment and shall be deployed in agreed maintenance windows. Rollback capability shall be maintained for all updates; rollback procedures shall be documented and tested before each major deployment.

- The Bidder shall implement remote diagnostic and troubleshooting capabilities for all connected field devices, covering at minimum: remote reboot, remote diagnostic test, communication diagnostics, configuration read-back and device event log retrieval.
- The Bidder shall proactively identify components approaching End-of-Life or End-of-Support before service impact and plan migration accordingly. Migration of any component reaching EOL during the contractual period shall be at no additional cost to GEL.
- A complete change log shall be maintained throughout the contractual period and handed over to GEL at contract completion in accordance with Section 8.

### **3.5.7 Layer 3 — Network Management System (NMS)**

#### **3.5.7.1 Communication Network Monitoring and SIM Management**

- The NMS layer shall monitor the communication health of every Modem and MIU in real time, tracking online/offline status, last successful communication timestamp and consecutive failure count per device. A field network topology view showing real-time connectivity status segmented by GA, zone and communication technology shall be available.
- Signal quality metrics — RSSI, SINR or equivalent and packet loss percentage — shall be tracked and retained per device for the full contractual period. Configurable quality thresholds shall trigger network performance alerts.
- SIM-level performance shall be monitored per device: active SIM identity, data usage per billing cycle, per-SIM signal quality and automatic failover events between primary and secondary SIM. Per-operator performance statistics shall be available to support GEL's SIM operator selection decisions.
- Communication failures shall be classified by root cause — signal quality, SIM issue, device hardware, network outage, planned maintenance, GEL-attributable, or TSP-attributable — with this classification feeding directly into SLA exclusion determination as specified in Section 12. Remote network device control — modem reboot, SIM switchover, communication parameter push — shall be supported where the device permits.
- Network performance reports shall cover communication success rate per device, per zone and per GA; signal quality distribution across the network; SIM failover frequency; and TSP-attributable outage time.

### **3.5.8 Layer 4 — Enterprise Management System (EMS)**

#### **3.5.8.1 SLA Monitoring and Compliance Reporting**

- The Bidder shall supply, deploy and maintain an Enterprise Management System as an integral part of the contracted AMI System scope at no additional cost to GEL. In this RFP, EMS refers to the Enterprise Management System for SLA monitoring — it is not an Element Management System or an Energy Management System.

- The EMS is the authoritative and sole reference for all SLA performance measurement and quarterly payment determination as specified in Section 12. All SLA events — device Go-Live dates, uptime, communication outcomes, data collection completeness, billing data delivery and incident resolution — shall be captured automatically without manual entry.
- The EMS shall calculate pro-rata billable days per device per quarter, generate quarterly SLA compliance reports simultaneously available to GEL and the Bidder and compute applicable penalty deductions automatically using the penalty framework in Section 12.
- An immutable SLA event log shall prevent modification or deletion of any recorded event. GEL shall have direct, independent, read-only access to all EMS data at all times through a dedicated view that the Bidder cannot disable, restrict, or intercept.
- Real-time trending alerts shall notify the Bidder when any SLA metric is approaching a breach threshold. The EMS shall be fully deployed and GEL access confirmed as a mandatory condition of Go-Live acceptance.

### 3.5.9 Quality Assurance, Testing and Acceptance Criteria

This Section defines the quality assurance framework, testing responsibilities, test procedures, acceptance criteria and documentation requirements that govern all phases of the AMI Project from hardware procurement through to full project Go-Live acceptance. The requirements in this Section apply in addition to and do not replace, the functional requirements for QA, FAT, SAT and UAT specified in Section 4.21.

#### 3.5.9.1 Quality Assurance Framework

- The Bidder has full and sole responsibility for the quality of all hardware, software, installation workmanship, integration, data migration and platform configuration delivered under this contract. GEL's inspection, witnessing, or approval activities at any stage do not transfer or diminish this responsibility.
- The Bidder shall deploy a dedicated quality management function for the project. A named Quality Manager shall be identified in the bid, shall be present at key inspection and acceptance events and shall be the single point of accountability for all quality-related correspondence with GEL.
- All testing activities shall be conducted in the same environment and architecture that will be used for production. Testing conducted in a separate or simulated environment shall not be accepted as evidence of compliance.
- The Bidder shall maintain a live test management system throughout the project, capable of logging test cases, recording test results, tracking defect status and generating summary reports accessible to GEL on request. The system may be the Bidder's own tool; GEL does not intend to own or host the tool.
- The Bidder shall prepare and maintain as-built documentation — single-line drawings, network topology diagrams, device installation records and configuration records — and submit the complete as-built package to GEL as part of the Go-Live acceptance deliverables.

- Any delay in testing caused by factors within the Bidder's control shall render the Bidder liable to milestone delay penalties per Section 12. Where a delay is caused by factors outside the Bidder's control, the Bidder shall initiate formal written notice to GEL within 48 hours of the delay becoming apparent, with supporting evidence. Delay notices without supporting documentation shall not be accepted.

### 3.5.9.2 Hardware Delivery Inspection

- Before any hardware is dispatched from the Bidder's facility or the manufacturer's facility, the Bidder shall prepare a detailed shipment checklist for each lot, specifying item descriptions, part numbers, quantities, serial numbers, firmware versions and certification references for each unit. GEL may audit this checklist at any time.
- On delivery of each hardware lot to the Bidder's staging facility or directly to site, the Bidder shall conduct a physical receipt inspection in the presence of GEL's designated representative. The inspection shall cover:
  - Physical count against the shipment checklist — any shortfall renders the shipment incomplete
  - Physical condition check — each unit examined for transit damage, incomplete assemblies, or missing accessories
  - Serial number and part number verification against purchase documents
  - Certification label verification — PESO/ATEX labels, IP rating markings and manufacturer certification markings
- Any unit found to be physically damaged, non-compliant with RFP specifications, or missing required certifications shall be rejected and returned to the Bidder's supplier at the Bidder's cost. Rejected units shall be replaced and re-inspected before being accepted into the project inventory.
- GEL reserves the right to request replacement of any hardware that is found, at any stage of the project, to be non-compliant with the specifications in Section 5. Where the noncompliance affects the SLA performance, the Bidder shall replace the hardware at no cost to GEL and within the timeline specified in Section 12.
- The Bidder shall maintain an inventory management log for all hardware received, installed, held in spare inventory and decommissioned, updated in real time and accessible to GEL throughout the contractual period.

### 3.5.9.3 Quality Assurance Plan

- The Bidder shall submit a Quality Assurance Plan to GEL within **seven working days of contract award**. The QAP shall be submitted before any hardware procurement activity begins. GEL's written approval of the QAP is a prerequisite for hardware procurement.
- The QAP shall cover at minimum:

- Hardware procurement quality standards and supplier qualification criteria ○  
FAT procedures for all hardware types (Modems and MIUs)



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- SAT procedures for each location type (EVC Modem location and PD Meter MIU location)
  - AMI Platform testing procedures — system testing, integration testing, performance testing and security testing
  - Parallel operations methodology and reconciliation procedures
  - UAT procedures and acceptance criteria
  - Data quality check procedures at each phase
  - EOL/EOS compliance verification procedures at time of procurement
- Defect classification criteria — critical, high, medium and low — with associated resolution timelines
- Non-conformance management procedures
- Where GEL raises queries on the QAP during its review, the Bidder shall resolve all queries to GEL's satisfaction within **two working days of receiving the queries**. No extension to the installation schedule shall be granted for delays in QAP approval that are attributable to the Bidder.
- Where a system change, process change, or incident finding during the project requires the QAP to be revised, the Bidder shall submit the revised QAP to GEL for approval within **10 working days** of the triggering event.

#### 3.5.9.4 Factory Acceptance Testing (FAT)

- FAT shall be conducted on all Modems and MIUs before dispatch to site. No unit shall be dispatched without a GEL-accepted FAT pass record.
- FAT shall be conducted by a **third-party inspection agency (TPIA)** appointed and paid for by the Bidder. The TPIA shall be an accredited inspection body. The engagement, scheduling, conduct and payment of the TPIA are entirely the Bidder's responsibility.
- The Bidder shall notify GEL by email at least **five working days before** each FAT activity, specifying the date, location, batch composition and TPIA contact. GEL reserves the right to witness any or all FAT activities at any time, with or without advance notice. GEL witnessing does not substitute for TPIA certification.
- The TPIA shall issue a FAT completion certificate for each hardware batch. GEL shall issue technical clearance within **seven working days of receiving all TPIA documents**. Hardware shall not be dispatched before GEL's technical clearance.
- FAT shall verify the following as a minimum for every unit in each batch:

#### Physical and Mechanical:

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- Physical condition and build quality — no damage, incomplete assembly, or missing components
- Enclosure IP rating — verified against IP54 minimum by test or certification
- Compliance with MIL-STD-810G or the latest equivalent standard for environmental durability
- ATEX/PESO certification validity for the applicable hazardous area classification
- Dimensional and mounting compliance with specifications in Section 5

#### **Communication and Protocol:**

- Communication functionality on both SIM slots independently — data transmission, signal quality (RSSI/SINR) and failover
- Modbus RTU and Modbus TCP protocol driver operation
- All applicable EVC OEM proprietary protocol drivers loaded and functional
- Dual-SIM failover — primary SIM disabled; automatic failover to secondary within configured timeout; data transmission confirmed on secondary

#### **Firmware and Software:**

- Firmware version verified and confirmed not EOL/EOS
- OTA firmware update reception and confirmation — a test firmware package delivered to the device and applied successfully
- Secure boot confirmed — device rejects unsigned firmware

#### **MIU-Specific:**

- Pulse count accuracy against a calibrated reference — tolerance per QAP
- Pulse cable interface verified — shielding and connector integrity
- Units that fail FAT shall be reworked by the Bidder, retested and presented for re-inspection. The TPIA shall issue a fresh certificate covering reworked units before they are dispatched. Rework and re-inspection are entirely at the Bidder's cost and time.

### **3.5.9.5 Site Acceptance Testing (SAT)**

- SAT shall be conducted at every field location after installation and before that location is declared commissioned. SAT shall be conducted in the presence of GEL's designated GA Team representative.
- The SAT checklist shall be reviewed and approved by GEL as part of the QAP approval. No SAT may commence before GEL approves the checklist.

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- SAT shall verify the following as a minimum for each location:

**Physical Installation:**

- Modem or MIU physical positioning, enclosure fixing quality, cable routing and weatherproofing
- Shielded cable integrity between EVC and Modem, or pulse cable between PD meter and MIU

Safe-zone compliance — Modem/MIU enclosure confirmed outside the metering skid at minimum 1.5 metres from the hazardous zone boundary

Earthing and surge protection installation

**Communication:**

- Communication test on both SIM slots independently — data transmission confirmed and RSSI and SINR logged for each SIM
- SIM failover test — primary SIM manually disabled; automatic failover to secondary confirmed with data transmission continuing without operator intervention
- Communication protocol test — data read from EVC confirmed against a concurrent manual reading for the same interval

**Platform-Side:**

- AMI Platform data receipt — data transmitted from the device is received and correctly processed in the AMI Platform; confirmed by the Bidder's platform operator during SAT
- End-to-end data flow test — data for the device is confirmed as reaching the SAP billing data export in the correct format ○ TLS encryption confirmed active on the field-to-platform communication path
- OTA capability test — AMI Platform successfully pushes a test firmware package to the device and the device confirms receipt

**PD Meter Locations (additional):**

- Simultaneous manual read of the mechanical index and the MIU-captured index at the same instant, with agreement within the tolerance defined in the QAP ○  
Pulse count reconciliation over a test period
- The Bidder shall prepare a SAT completion record for each location, documenting all test results, RSSI/SINR readings and any deviations. The SAT record shall be signed by both the Bidder's representative and GEL's GA Team representative before the location is declared commissioned. GEL's representative shall not be pressured to sign before all deficiencies are resolved.

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- Locations where SAT identifies deficiencies shall be recorded in the Bidder's installation tracker, reworked and retested. No zone shall be declared ready for parallel operations until 100% of locations in that zone have a signed SAT record.

## **3.5.10 AMI Platform Testing Framework**

### **3.5.10.1.1 System Testing**

- The Bidder shall conduct comprehensive system testing of the complete AMI Platform before requesting UAT commencement. System testing covers all functional requirements in Section 4, verified in the production environment.

- The Bidder shall prepare a system test plan and test case library covering every functional requirement in Section 4. The plan shall be submitted to GEL for review before testing begins. GEL may request the Bidder to share test cases and results at any time.
- System testing shall include:
  - All HES functionality — device communication, on-demand reads, threshold configuration, firmware OTA, time synchronisation as per RFP
  - All MDMS functionality — data collection, VEE rule processing, billing determinant calculation, data storage and retrieval as per RFP
  - All NMS functionality — communication monitoring, SIM tracking, fault detection, remote device operations as per RFP
  - All EMS functionality — SLA event capture, billable days calculation, compliance report generation, GEL independent access as per RFP
  - All alarm types and notification delivery across all channels
  - All report types and dashboard functionality
  - All integration interfaces — SAP Billing, SCADA, CMP, CRM, GIS, Workforce Management
  - Web application functionality on desktops and tablets
  - Mobile application functionality across both iOS and Android on current device hardware
- Defects identified during system testing shall be classified, tracked and resolved before the Bidder requests UAT commencement. All critical and high severity defects shall be resolved and verified before UAT begins.

#### **3.5.10.1.2 Integration Testing**

- The Bidder shall conduct integration testing for all enterprise system interfaces before requesting UAT commencement, covering:
  - SAP Billing end-to-end integration test — a full billing cycle run with simulated device data, validated from AMI Platform through to SAP billing record creation
  - SCADA integration test — data exchange verified in both directions where applicable
  - CMP integration test — asset and mapping data exchange confirmed
  - All other integrations configured for the project
- Integration testing shall be conducted with GEL's IT team and SAP team in attendance for SAP Billing integration and CRM/CIS integration tests. The Bidder shall coordinate scheduling with GEL's teams at least five working days in advance.
- The Bidder shall prepare an integration test report for each interface, documenting test scenarios, data samples used, results and any issues identified. All integration defects shall be resolved before UAT begins.

### 3.5.10.1.3 Performance and Load Testing

- The Bidder shall conduct performance and load testing of the AMI Platform before requesting UAT commencement. Performance testing shall be conducted in the same architecture that is set up for production.
- Performance testing shall verify the following at minimum:
  - Platform response under simultaneous load from 100 concurrent users
  - Data collection throughput — platform handles scheduled collection from all contracted devices simultaneously within the defined collection windows
  - Dashboard and report response times meet the thresholds in Section 12.7
  - SAP billing data export completes within the delivery window for all customer billing dates simultaneously
  - Real-time alarm processing — platform processes and notifies 1,000 simultaneous alarm events without queueing delay beyond the SLA threshold
  - Platform DR failover — full failover to DR site completed within the RTO of 4 hours; data loss does not exceed the RPO of 1 hour
- The Bidder shall share performance test results with GEL. Where performance test results do not meet Section 12.7 thresholds, the Bidder shall remediate and retest before UAT begins.

### 3.5.10.1.4 Security Testing and VAPT

- The Bidder shall conduct security testing covering: application-layer security controls, network layer security, data centre and cloud infrastructure security, security configuration review of all components and mobile application security against OWASP Mobile Security Top 10.
- An independent **Vulnerability Assessment and Penetration Test (VAPT)** of the complete AMI System — AMI Platform, all APIs, field device communication, cloud infrastructure and all integration interfaces — shall be conducted by a **CERT-In empanelled security auditor** before Go-Live acceptance is requested. The cost of this VAPT is entirely the Bidder's responsibility.
- The VAPT report shall be submitted to GEL. All **critical and high severity findings** shall be remediated and remediation evidence provided to GEL before Go-Live acceptance is granted. This is a mandatory Go-Live acceptance condition. Medium and low severity findings shall have a documented remediation plan agreed with GEL within 30 days of the VAPT report.
- During the O&M Period, an annual cybersecurity review and VAPT shall be conducted by a CERT-In empanelled auditor at the Bidder's cost. The review report and identified remediation actions shall be submitted to GEL within 30 days of each review.
- Where a critical security finding is identified after Go-Live, the Bidder shall remediate it within **30 days of discovery** and shall notify GEL immediately on discovery.

### 3.5.10.2 User Acceptance Testing (UAT)

- UAT shall be conducted with GEL's designated UAT team — comprising GA Team operators, billing team representatives, IT team and SAP team — before Go-Live acceptance is requested.
- The Bidder shall submit a UAT test plan to GEL for written approval before testing begins. The plan shall include:
  - Test scripts for all operational scenarios relevant to each GEL role ○ Defect classification criteria (critical, high, medium, low)
  - Entry criteria for commencing UAT — all system, integration and performance testing complete; all critical and high defects resolved
  - Exit criteria for requesting Go-Live acceptance — all critical and high severity UAT defects resolved; UAT completion report signed ○ Escalation and resolution timelines per defect classification
- UAT shall cover the following at minimum:
  - All functional requirements in Section 4 verified from the end-user perspective ○ All configured integrations — SAP Billing end-to-end, SCADA, CMP, CRM ○ All standard report types and the custom report builder
  - All dashboard types — network-wide heat map, GA-level, customer 360° view, administrative dashboard
  - Full alarm and notification workflow — alarm generation, multi-channel notification, acknowledgement, escalation and closure
  - Mobile application on iOS and Android — dashboards, on-demand read, alarm management, manual meter reading capture with photo and GPS, work order management, offline capture and sync ○ Field hardware agnosticism demonstration per RFP
  - A live DR failover test — full failover to DR site, data verified intact, GEL access to EMS confirmed from DR
  - CERT-In VAPT remediation sign-off — Bidder confirms all critical and high findings are closed
  - EMS live audit — GEL confirms independent access to EMS data, SLA event capture is active and a sample quarterly report is reviewed
- Changes to the AMI Platform identified as necessary during UAT shall not be treated as Change Requests. The Bidder shall implement all changes required to achieve UAT exit criteria within the contracted scope.
- The Bidder shall provide a UAT completion report signed by GEL's designated UAT team lead. This report is a mandatory condition of Go-Live acceptance. Any UAT defect not resolved and verified closed before signature shall be recorded in the UAT completion report

as an open item — and such open items at critical or high severity shall block Go-Live acceptance.

- Where GEL's UAT team identifies a defect not covered by the test scripts, the Bidder shall classify, log and remediate it within the timelines for its severity level. GEL's defect classification decision is final.

### 3.5.10.3 Go-Live Readiness and Acceptance

The Bidder shall obtain Go-Live acceptance from GEL before the AMI System enters the O&M Period. The Bidder shall submit a formal Go-Live Readiness Report to GEL confirming completion of all the following conditions:

#	Condition	Verification Method
1	100% of in-scope field locations have a signed SAT record	SAT tracker extract
2	Parallel operations completed for all zones with GEL acceptance of reconciliation reports	Reconciliation report sign-off records
3	System, integration and performance testing complete; no open critical or high defects	Bidder test completion report
4	CERT-In VAPT complete; all critical and high findings remediated with evidence provided to GEL	VAPT report and remediation evidence
5	UAT complete and UAT completion report signed by GEL's UAT team lead	Signed UAT completion report
6	SAP Billing integration live — billing data successfully delivered for at least one full billing cycle	SAP team confirmation
7	EMS deployed, active and GEL independent access confirmed and tested	GEL IT team confirmation
8	DR failover test passed	DR test record with GEL signoff
9	All SOPs developed, approved, accessible on AMI Platform and training delivered per Section 7.6	Go-Live SOP Checklist
10	As-built documentation complete and submitted	Document submission record
11	NMS active and tracking all commissioned devices	GEL NMS access confirmation
12	No open billing date impacts — all devices live in time for first billing run	EMS commissioned device count confirmed

GEL shall review the Go-Live Readiness Report and either issue the Go-Live acceptance certificate or provide a written list of conditions not yet satisfied. The Bidder shall resolve all outstanding



conditions and resubmit. The Go-Live acceptance certificate shall be issued by GEL only when all conditions are satisfied to GEL's written confirmation. The decision of GEL is final and binding.

### 3.5.10.4 Post-Go-Live Operational Testing

- During the 3-month SLA stabilisation period, the Bidder shall conduct daily data quality checks and weekly performance reviews, with reports submitted to GEL. The SLA stabilisation period is a testing and verification phase for the purpose of confirming sustained SLA compliance — it is not a payment period.
- The Bidder shall conduct quarterly performance assessments during the O&M Period, comparing actual SLA performance against targets, identifying any degradation trends and presenting findings to GEL with remediation proposals where needed.
- Where any hardware type fails at a rate indicating a systematic quality issue — defined as more than 5% failure rate of any single hardware type in any rolling 90-day period — the Bidder shall conduct a root cause analysis, submit findings to GEL within 15 days and propose a systematic remediation. GEL may require the Bidder to replace all units of the affected type at no additional cost.
- The Bidder shall retain all SAT records, FAT certificates, test reports, VAPT findings and UAT documentation for the full contractual period plus two years post-handover and shall make these available to GEL on request.

## 3.5.11 Miscellaneous Activities for All Locations

### 3.5.11.1 General

The Bidder shall execute the miscellaneous activities described in this section across all EVC and PD meter locations as applicable, based on the specific scope identified during the Phase 1 site survey and detailed engineering. These activities support the core installation, commissioning and operation of the AMI System and are part of the Bidder's contracted scope under the DBFOOT model. The Bidder shall inform GEL at least **seven (7) calendar days** in advance before commencing any work at any location and shall obtain written permission and work permits from GEL. Work shall commence only after the Bidder receives the required approvals and shall be carried out in accordance with GEL's health, safety and environmental guidelines and applicable OISD standards. Pre-Installation Activities and Site Preparation

#### 3.5.11.1.1 Permissions and Regulatory Compliance

- The Bidder shall obtain a work permit from GEL for each location for each day of work, maintaining continuous authorisation throughout the installation period at that location.
- The Bidder shall submit detailed work plans and schedules for GEL's approval before commencing work at each location and shall coordinate with GEL's GA Teams to minimise disruption to ongoing operations.

- The Bidder shall secure all regulatory clearances and permits required by local authorities, including PESO clearances for work in or adjacent to hazardous classified areas.
- The Bidder shall obtain GEL's HSE Permit to Work (PTW) before commencing work, as per GEL's prevailing PTW procedure.
- The Bidder shall coordinate with the respective GEL GA Team and department heads for site access and scheduling.

#### **3.5.11.1.1.2 Site Assessment and Documentation**

- The Bidder shall study the existing EVC or PD meter configuration, communication port type and field conditions at each location before commencing physical work.
- The Bidder shall conduct a signal strength assessment at each location to determine antenna requirements and optimal placement for the selected communication technology.
- The Bidder shall record the data collection performance of GEL's existing AMI system at each location, as the baseline for parallel operations reconciliation.
- The Bidder shall document any deviation from the survey findings or proposed installation design and shall propose corrective measures for GEL's approval before proceeding.

#### **3.5.11.1.1.3 Safety Implementation**

- The Bidder shall deploy at least one qualified safety officer in each Geographical Area (GA) while installation work is being carried out in that GA.
- The Bidder shall conduct a mandatory safety briefing with all personnel before commencing work at each location.
- The Bidder shall perform a Job Safety Analysis (JSA) for all installation activities and obtain GEL's approval before work begins.
- The Bidder shall provide and enforce the use of appropriate personal protective equipment (PPE) suitable for the hazardous area classification at each work site.
- The Bidder shall carry out all work in line with GEL's health and safety guidelines and applicable OISD standards.

#### **3.5.11.1.2 Power Supply Design and Power Calculation**

GEL does not prescribe whether field devices shall be mains-powered or battery-operated. The Bidder is free to select the power arrangement for each device type based on site conditions, provided the arrangement meets the device availability SLA in Section 12 and the battery backup requirements in this RFP. However, the Bidder shall demonstrate the adequacy of its proposed power design through formal power calculations.

- The Bidder shall submit a **power calculation and power budget** for each device type (EVC Modem and MIU) to GEL as part of the Phase 2 deliverables, before hardware installation commences.
- **For battery-operated devices**, the power calculation shall demonstrate that the proposed battery capacity supports a minimum operating life of **five (5) years** under the stated data transmission frequency (minimum once-daily push), accounting for communication retries,

signal conditions and ambient temperature variation across GEL's operating geography. The calculation shall state the battery chemistry, rated capacity, expected current draw per operating mode (sleep, active, transmit), duty cycle and the derived battery life.

- **For mains-powered devices**, the power calculation shall demonstrate the device's continuous power consumption, the rating of the proposed power supply module and the sizing of the battery backup that maintains continuous device operation for a minimum of **72 hours (3 days)** during a mains supply failure. The calculation shall state the backup battery capacity, current draw during mains failure and the derived backup autonomy.
- The Bidder shall update the power calculation if the device configuration, transmission frequency, or communication technology changes during the project.
- GEL reserves the right to review the power calculation and require revision where the calculation does not adequately support the device availability SLA or the battery life and backup requirements.

#### **3.5.11.1.2.1.1 Installation Activities**

##### **3.5.11.1.2.1.1.1 Modem Installation at EVC Locations**

- The Bidder shall install one new dual-SIM Modem per EVC, interfaced to the EVC communication port via RS-232 or RS-485 using shielded cable, as detailed in Sections 3.3.1 and 5.4.1.
- The Bidder shall install the Modem within a weatherproof enclosure positioned in the safe zone, at a minimum distance of 5 feet (1.5 metres) from the boundary of the hazardous area at the metering skid, wall-mounted or pole-mounted as dictated by site conditions. Where pole mounting is required, pole supply, installation, civil foundation work and all ancillary mounting hardware are within the Bidder's scope. The Bidder shall install the antenna at the optimal position determined during the signal survey, with appropriate mounting hardware and cable routing. MIU Installation at PD Meter Locations
- The Bidder shall install one MIU per PD meter, snap-fit directly to the meter index where supported, or connected via supplied pulse cable and housed in a weatherproof junction box where snap-fit is not feasible, as detailed in Sections 3.3.2 and 5.4.2.
- Where the MIU is housed in a junction box, the box shall be wall-mounted, pole-mounted, or pipe-mounted based on site conditions, with all mounting hardware and ancillaries supplied and installed by the Bidder.
- The Bidder shall configure the MIU pulse constant to match the PD meter's rated pulse output and shall verify index parity against the mechanical index at commissioning.

##### **3.5.11.1.2.1.1.2 Enclosures and Ancillaries**

- The Bidder shall supply and install all weatherproof enclosures, junction boxes, cable glands, mounting plates, DIN rails, terminal blocks, breathers, hinged lockable doors, anticondensation provisions where required and anti-tamper seals needed for a complete and weatherproof installation at each location. All enclosures shall meet minimum IP54 ingress protection and shall comply with MIL-STD-810G or the latest equivalent standard. Cabling
- The Bidder shall supply and install shielded communication cable between the EVC and the Modem. Cable routing and fixing shall protect against mechanical damage and environmental exposure. Cable shielding shall be earthed at one end only.

- The Bidder shall supply and install pulse interface cabling between the PD meter pulse output and the MIU where snap-fit mounting is not used.
- Cable sizing and routing design are the Bidder's engineering responsibility and shall be appropriate for the site conditions and the device's communication and power requirements.

#### **3.5.11.1.2.1.2 EVC and PD Meter Data Management and Communication**

##### **3.5.11.1.2.1.2.1 Register Mapping and Documentation**

- The Bidder shall provide complete Modbus (or applicable protocol) register mapping for all parameters of every EVC make and model in GEL's network.
- The Bidder shall deliver comprehensive documentation detailing register addresses, data types, scaling factors and parameter descriptions for each EVC make and model, at no additional cost to GEL.
- The register mapping shall cover all leading EVC makes and models currently deployed across GEL's network, as listed in Annexure A.

##### **3.5.11.1.2.1.2.2 Communication Modes**

- The modem and MIU listening mode should be configurable as per GEL requirements but at minimum of every hour to check for any pull requests from the AMI platform
- The Bidder shall implement real-time scheduled communication for routine monitoring and daily, hourly and event-based data collection.
- The Bidder shall implement on-demand (pull) data retrieval, enabling authorised GEL users to retrieve specific data ranges, parameter sets, or historical records from any device through the AMI Platform interface, mobile application, or API.
- The Bidder shall implement push (unsolicited) data reporting for critical events and alarms, with the tamper alert latency as per SLA.

##### **3.5.11.1.2.1.2.3 Data Backfilling**

- The Bidder shall implement automatic data backfilling to recover historical measurement data following power outages, communication failures, or maintenance activities.
- The Bidder shall implement automatic gap detection in central historical records and shall initiate backfilling from the EVC or MIU internal memory.
- The Bidder shall implement priority-based recovery, prioritising critical measurement data — accumulated volumes, flow rates, pressure and temperature readings and alarm events.
- The Bidder shall implement store-and-forward functionality using device internal memory to buffer data during communication outages and transmit it on restoration, with no data loss.
- The Bidder shall implement conflict resolution for overlapping data periods, duplicate records and timestamp synchronisation during backfilling.

#### **3.11.5.4 Communication Reliability**

- The Bidder shall implement configurable retry mechanisms, timeout settings and error handling for reliable data transmission under varying network conditions.

- The Bidder shall maintain comprehensive logging and audit trails for all data operations — scheduled polls, on-demand requests, backfilling activities and communication errors.

- The Bidder shall implement data validation and quality checks at ingestion, with status indicators for data quality and communication reliability.

#### **3.5.11.1.2.1.3 Communication Network and Protocol Integration**

- The Bidder shall supply and configure all protocol drivers and conversion required to integrate every EVC make and model in GEL's network into the AMI Platform, regardless of manufacturer or communication protocol.
- The Bidder shall support multiple communication protocols including Modbus RTU, Modbus TCP, DLMS/COSEM, MQTT and proprietary EVC OEM protocols as required.
- The Bidder shall ensure driver compatibility across all communication interfaces present in GEL's network, including RS-232, RS-485 and where applicable Ethernet connections.
- The Bidder shall develop drivers for any EVC OEM not natively supported by the AMI Platform.
- The Bidder shall maintain backward compatibility with older EVC models and their communication protocols throughout the contractual period.

#### **3.5.11.1.2.1.4 Safety and Protection Systems**

##### **3.5.11.1.2.1.4.1 Intrinsic Safety**

- The Bidder shall ensure all hardware installed in or adjacent to hazardous classified areas carries valid PESO certification appropriate for the area classification.
- The Bidder shall implement appropriate separation and isolation between safe-area and hazardous-area circuits where applicable.
- The Bidder shall ensure all hazardous-area installations comply with applicable safety standards and obtain the required certifications.

##### **3.5.11.1.2.1.4.2 Surge and Lightning Protection**

- The Bidder shall provide surge and lightning protection for communication lines and power supply circuits as required to maintain the device availability SLA. Surge protection design is the Bidder's engineering responsibility, sized to suit the site conditions.

##### **3.5.11.1.2.1.4.3 Earthing and Grounding**

- The Bidder shall carry out all earthing and grounding in accordance with PNGRB guidelines and the prevailing best practices of the CGD industry. GEL does not prescribe specific resistance values. Earthing design is the Bidder's engineering responsibility, taking into account the applicable OISD standards and OEM recommendations.

#### **3.5.11.1.2.1.5 Material Delivery and Warehouse Accountability**

The Bidder shall ensure complete accountability for material procurement, storage and delivery to installation sites through the following:

**Warehouse Storage:** The Bidder shall procure and store all project hardware at its own warehouses or facilities, zoned by GA or region, with appropriate environmental controls, security and inventory management systems.

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- **Just-in-Time Delivery:** The Bidder shall deliver materials from its warehouses to installation sites as required for the implementation schedule, coordinated with the zone-wise rollout plan, without affecting project timelines.
- **Storage Management:** The Bidder's warehouse facilities shall maintain appropriate environmental conditions for all equipment types, adequate security and access controls, proper handling and storage procedures per manufacturer specifications and insurance coverage for stored materials against theft, damage and natural calamities.
- **Reconciliation:** The Bidder shall maintain complete reconciliation records — purchase order quantities versus received quantities at the warehouse, real-time warehouse inventory status, site delivery confirmations with timestamps, material condition reports on delivery and immediate notification to GEL of any discrepancy.
- **Timeline Accountability:** The Bidder shall be fully responsible for material availability and shall not allow any delay in implementation on account of material non-availability. Delays attributable to material non-availability shall attract penalties as per Section 12.
- **Contractual Accountability:** The Bidder shall be contractually liable for any missing, damaged, or undelivered material from procurement through to final installation and commissioning at each site.

#### 3.5.11.1.2.1.6 Commissioning Activities

- The Bidder shall configure each device for data collection at the three required frequencies — daily, hourly and event-based push — and shall verify on-demand pull capability at commissioning.
- The Bidder shall configure store-and-forward, retry and backfilling functionality at each device during commissioning.
- The Bidder shall register and commission each device in the AMI Platform, verify successful data transmission on both SIM slots and confirm that the AMI Platform correctly receives and processes data from the device.
- The Bidder shall configure data validation and quality checks for each commissioned device.
- The Bidder shall complete the SAT for each location, with a signed SAT record obtained before the location is declared commissioned.

#### 3.5.11.1.2.1.7 Testing Activities

- The Bidder shall submit comprehensive testing procedures covering all hardware and software components for GEL's review and approval before testing begins, as part of the QAP (Section 4.12.1).
- The Bidder shall perform cable integrity and connection verification testing for every installed device — signal continuity, connection integrity and communication interface functionality.  
  
The Bidder shall test communication on both SIM slots independently, including automatic failover and shall record signal strength readings at commissioning.
- The Bidder shall test the end-to-end data flow from each device through the AMI Platform to the SAP billing data export, as part of the zone-level SAT.



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- The Bidder shall document all testing results with comprehensive analysis and corrective actions and shall include them in the SAT documentation for each location.

#### **3.5.11.1.2.1.8 Protocol and Software Version Management**

- The Bidder shall supply and implement all communication protocols, software components and system applications using the latest commercially available versions at the time of deployment. No component shall be at or beyond its End-of-Life (EOL) or End-of-Support (EOS) date at the time of deployment.
- The Bidder shall provide all version updates and upgrades — major platform upgrades, minor updates, security patches, firmware updates and protocol stack updates — at no additional cost to GEL throughout the contractual period.
- The Bidder shall implement critical security patches within the timelines specified in Section 4.9.3 and Section 12.10.
- The Bidder shall maintain rollback capability for all updates, with immediate restoration procedures if an update causes a problem.
- The Bidder shall obtain GEL's approval before applying any major version change that may impact system functionality or user interfaces and shall provide complete documentation for all version changes including impact analysis.
- The Bidder shall conduct comprehensive testing of all updates in a controlled environment before production deployment and shall coordinate version updates during agreed maintenance windows to minimise operational impact.
- Where any component reaches EOL or EOS during the contractual period, the Bidder shall upgrade or migrate to an equivalent or higher-specification supported version at no additional cost to GEL, with GEL's advance notification and approval.

#### **3.5.11.1.2.1.9 SIM Card Procurement and Lifecycle Management**

- The Bidder shall procure, supply and manage all SIM cards required for the project across all device types.
- All SIM cards procured must be M2M sims
- For all dual-SIM installations, the Bidder shall procure SIM cards from two different service providers, where operationally feasible, to enable communication redundancy and network failover.
- All SIM cards shall be issued and registered in the name of Bidder, with appropriate corporate/industrial service plans. Bidder shall determine SIM operator selection to meet the SLA requirements.

The Bidder shall be solely responsible for managing all SIM-related matters — service requests, technical support, billing queries and operator coordination — throughout the contractual period.

- All SIM cards shall support the communication technology selected by the Bidder for the site, with appropriate APN configuration and shall be registered for industrial/IoT applications.



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- The Bidder shall ensure continuous connectivity, monitor data usage, manage SIM security and provide communication diagnostics for all SIMs at no additional charge to GEL.
- The Bidder shall replace any non-performing SIM card promptly at no cost to GEL, including all coordination with the service provider, within the timelines specified in Section 12.

#### **3.5.11.1.2.1.10 Quality Assurance and Site Management**

- The Bidder shall implement quality control throughout all installation, commissioning and testing activities in accordance with the QAP, FAT and SAT procedures in Section 4.12.
- All activities at field locations shall be carried out in the presence of GEL's designated GA Team representative, following approved procedures, with complete documentation of all results, observations and corrective actions.
- The Bidder shall maintain work area cleanliness and shall restore each site to its preinstallation condition on completion of works.
- The Bidder shall ensure proper disposal of any removed packaging, waste, or materials in accordance with environmental requirements.
- The Bidder shall provide complete documentation for each location — installation details, configuration parameters, commissioning test results and SAT records — for ongoing maintenance and system operation.

## 4 AMI Platform Functional Requirements

### 4.1 Guiding Principle

- The requirements in this Section define the functional outcomes GEL requires from the AMI Platform. The Bidder may deliver these requirements through a unified combined platform or through separate integrated software components — the architecture is at the Bidder's discretion. What is mandatory is that every requirement in this Section is fully met, demonstrated during the Field Trial/POC and sustained throughout the contractual period.
- References to "HES functionality" and "MDMS functionality" in this Section identify the functional domain of each requirement. They do not mandate a specific product or architecture.
- All requirements in this Section are mandatory. No deviations are permitted. Any bid that proposes alternatives to, or exclusions from, the requirements listed here shall be considered non-responsive.

#### 4.1.1 FRS/SRS Development

The functional requirements set out in this Section are **indicative and representative of GEL's minimum expectations — they are not exhaustive**. The requirements describe what GEL requires the AMI System to do, but they do not represent the complete or final set of functional and system requirements for the project. The Bidder shall treat these requirements as the baseline and shall deliver the full functional capability needed to operate a complete, billing-grade AMI System, whether or not every individual function is explicitly listed in this Section.

- Following contract award, the Bidder shall prepare a detailed Functional Requirements Specification (FRS) and System Requirements Specification (SRS) in consultation with GEL, covering the complete functional scope of the AMI System, all interface and integration requirements, data models, workflows, user roles, reports and system behaviour.
- The FRS and SRS shall expand on the indicative requirements in this Section and shall capture all additional functional and system requirements identified during the detailed design phase, including any requirements raised by GEL's GA Teams, billing team, IT team and SAP team.
- The FRS and SRS shall be submitted to GEL for review and written approval during the Phase 2 (AMI Platform Deployment) stage, before the AMI Platform configuration is finalised. GEL's approval of the FRS and SRS is a prerequisite for proceeding to platform configuration and integration.
- The GEL-approved FRS and SRS shall form the binding functional baseline against which the AMI System is configured, tested (UAT) and accepted at Go-Live. Any function described in this Section, or reasonably implied by it, or subsequently agreed in the approved FRS/SRS, shall be delivered by the Bidder at no additional cost.
- Where a requirement is identified during FRS/SRS development that is a reasonable and necessary part of a complete AMI System but was not explicitly listed in this RFP, the Bidder shall include it in the FRS/SRS and deliver it within the contracted scope. The Bidder shall

not treat the absence of an explicit listing in this Section as grounds for exclusion or additional charge.

## 4.2 AMI Platform System Architecture and General Requirements

Module	Feature	Requirement
4.2.1 Cloud Hosting	MeITY Empanelment	The AMI Platform shall be deployed on a MeITY-empanelled private cloud with all data centres within India. The Cloud Service Provider shall maintain active MeITY empanelment for the full contractual period including any extensions; loss of empanelment shall require immediate migration to a compliant provider at the Bidder's cost without service disruption to GEL.
4.2.1 Cloud Hosting	On-Premise Restriction	On-premise or hybrid on-premise deployment is not acceptable. The AMI Platform shall be fully cloud-hosted.
4.2.2 High Availability and DR	Primary and DR Sites	The AMI Platform shall operate from a primary cloud data centre and a geographically separate Disaster Recovery site physically and administratively distinct from the primary region.
4.2.2 High Availability and DR	RTO and RPO	Automatic failover to the DR site shall be configured and tested. Recovery Time Objective shall be four hours or less. Recovery Point Objective shall be one hour or less.
4.2.2 High Availability and DR	DR Drills	The Bidder shall conduct quarterly DR drills with documented results submitted to GEL within 10 working days of each drill.
4.2.2 High Availability and DR	DR Failover Demonstration	A live DR failover test shall be conducted as part of UAT before Go-Live acceptance is requested; successful completion is a mandatory UAT exit criterion.
4.2.3 Scalability	Metering Point Scale	The AMI Platform shall support the contracted metering scope and shall be scalable to a minimum of 7,000 metering points without architectural change, performance degradation, or additional per-node licence cost beyond the contracted rate.
4.2.3 Scalability	Concurrent Users	The platform shall support a minimum of 100 concurrent GEL users, scalable to 150 concurrent users without architectural change or additional per-user licence cost.

4.2.3 Scalability	Horizontal Scaling	The platform shall be built on an open, distributed architecture that scales horizontally through addition of hardware without performance degradation.
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Module	Feature	Requirement
4.2.4 COTS Platform	COTS Requirement	The Bidder shall deploy a COTS AMI Platform. Bespoke core platform development is not acceptable.
4.2.4 COTS Platform	Utility References	The Bidder shall demonstrate at least two live utility references for the proposed AMI Platform at the time of bid submission.
4.2.5 Hardware Standards	New Hardware Only	All hardware supplied under this contract shall be newly manufactured. Refurbished or previously deployed hardware is not acceptable.
4.2.5 Hardware Standards	EOL/EOS Restriction	No hardware component, software product, operating system, database, or middleware forming part of the AMI System shall be at or beyond its End-of-Life or End-of-Support date at the time of supply.
4.2.5 Hardware Standards	Manufacturer Support Life	All components shall carry a minimum remaining manufacturer support life of five years from the planned Go-Live date.
4.2.6 Layered AMI Architecture	Four Functional Layers	The AMI Platform shall implement four functional layers: HES (Head-End System), MDMS (Meter Data Management System), NMS (Network Management System) and EMS (Enterprise Management System). All four layers shall be operational before Go-Live acceptance.
4.2.7 Device Hierarchy	Logical Hierarchy	The AMI Platform shall organise all connected devices within a logical hierarchy covering at minimum: Geographical Area (GA) → Zone/District → Customer Type (Industrial/Commercial) → Location → Device. All reports, dashboards and drill-down navigation shall support each level of this hierarchy.
4.2.8 Platform Visualisation	Operational Status View	The AMI Platform interface shall visualise device communication status, scheduled and re-dial activities, customer locations, data collection status and data validation and sharing status across the deployed network.

4.2.9 Platform Health and Capacity	Automated Health Checks	The Bidder shall implement automated health checks across all platform components — application, database, communication and integration services — with automated alerting to GEL for any abnormal condition without manual intervention.
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Module	Feature	Requirement
4.2.9 Platform Health and Capacity	Capacity Dashboard	The Bidder shall provide GEL with a platform capacity dashboard covering storage utilisation, processing load and connectivity bandwidth trends, with configurable threshold alerts for capacity planning.
4.2.10 Bandwidth Recommendation	GA and Head Office	The Bidder shall estimate and recommend minimum bandwidth requirements for each of GEL's GA offices and head office to access the cloud-based AMI Platform; this recommendation shall be submitted as part of Phase 2 deliverables.
4.2.7 Location Hierarchy	Logical Device Grouping	The AMI Platform shall support a logical location hierarchy for all devices covering at minimum: Geographical Area (GA) → Zone/District → Customer Type (Industrial/Commercial) → Location → Device. All reports, dashboards and alerts shall support drill-down at each level of this hierarchy.
4.2.8 Platform Health Monitoring	Automated Health Checks	The Bidder shall implement automated health checks across all platform components — application, database, communication and integration services — with automated alerting for abnormal conditions without manual intervention.
4.2.8 Platform Health Monitoring	Capacity Dashboard	GEL shall be provided with a platform capacity dashboard covering storage utilisation, processing load and connectivity bandwidth trends, with configurable threshold alerts for capacity planning.
4.2.9 Maintenance Mode	Device and Group Maintenance	The AMI Platform shall support maintenance mode for individual devices or device groups, with appropriate alarm suppression during planned maintenance activities. Maintenance mode shall be time-limited and shall auto-cancel if not closed within the configured period.
4.2.9 Maintenance Mode	Maintenance Activity Logging	All maintenance activities performed on assets shall be logged with the action taken, the user responsible and the outcome.

4.2.6 Layered AMI Architecture	HES-MDMS Pre-Integration — Acceptable Options	Where HES and MDMS functionality are delivered as separate products, the following options are acceptable: (a) a single unified COTS platform — preferred; (b) separate COTS products from the same OEM, pre-integrated by that OEM, with documented proof; (c) separate COTS products from different OEMs pre-integrated as a documented partnership, with at least one prior reference deployment of the same product combination and documented operational performance metrics.
Module	Feature	Requirement
4.2.6 Layered AMI Architecture	HES-MDMS Pre-Integration — Unacceptable Approaches	The following are not acceptable: bespoke integration developed by the Bidder at implementation time; middleware-only stitching without native data flow; HES-to-MDMS data flow requiring manual export-import, batch file transfer at intervals greater than 15 minutes, or operator intervention as the primary mechanism.
4.2.6 Layered AMI Architecture	Pre-Integration Evidence	For Option (b), the bid shall include documentation of pre-integration architecture, data flow and at least one prior reference deployment. For Option (c), a joint OEM declaration confirming the partnership and commitment for the contractual period is mandatory in addition.
4.2.7 Platform Module Implementation	Minimum Module List	The Bidder shall implement separate functional modules within the AMI Platform covering at minimum: device communication, data collection scheduling, data validation and management, billing integration, alarm and event management, asset management, reporting and analytics, user access management and GEL staff mobile application.

### 4.3 Interoperability and Open Standards

Module	Feature	Requirement
4.3.1 Open Interface Standards	No Proprietary Lock-In	The AMI Platform shall be built on open, documented standards at every layer. No proprietary interfaces that prevent GEL from independently connecting third-party systems, onboarding new field devices, or migrating to an alternative platform are acceptable.

4.3.1 Open Interface Standards	API Documentation	Complete API documentation shall be provided to GEL on delivery and updated whenever the platform API changes; documentation shall cover all northbound, southbound and integration interfaces.
4.3.2 Field Hardware Agnosticism	Post-Contract Flexibility	At contract expiry, GEL or its successor shall be able to onboard field devices from any compliant manufacturer through the platform's open APIs and standard protocol interfaces — Modbus RTU/TCP, DLMS/COSEM, MQTT — without requiring architectural change to the AMI Platform.
Module	Feature	Requirement
4.3.2 Field Hardware Agnosticism	UAT Demonstration	The Bidder shall demonstrate field hardware agnosticism during UAT by simulating the onboarding of a device from a manufacturer different from the originally deployed hardware.
4.3.3 Standard Data Models	Integration Standards	All integration interfaces shall conform to industry-standard data models — including IEC 61968-9 CIM or equivalent — as agreed with GEL before Go-Live.
4.3.3 Standard Data Models	HES-MDMS Interface Standard	The native HES-to-MDMS interface shall use IEC 61968-9 CIM messaging or an equivalent industrystandard data model; the interface shall exist at the time of bid submission and shall not be a deliverable to be built at implementation; real-time data synchronisation shall not exceed five minutes for billinggrade data.

## 4.4 Multi-OEM EVC and PD Meter Integration

Module	Feature	Requirement
4.4.1 EVC Integration Coverage	All Makes and Models	The AMI Platform shall communicate with all EVC makes and models present in GEL's network at contract award and with all EVC OEMs introduced during the contractual period.
4.4.1 EVC Integration Coverage	No Exclusions	No EVC location shall be excluded from the AMI System due to protocol limitations, proprietary interface constraints, or any other technical reason.



4.4.2 Driver Library	Existing OEM Coverage	The Bidder shall maintain a driver library covering all EVC OEMs in GEL's installed base; driver development for all OEMs present at contract award is within the contracted scope at no additional cost to GEL.
4.4.2 Driver Library	New OEM Drivers	Driver development for new EVC OEM makes or models introduced during the contract period shall be priced as a separate one-time SOR line item per OEM; the driver shall be developed and loaded into the AMI Platform before hardware installation at those locations begins.
Module	Feature	Requirement
4.4.2 Driver Library	Loading Before Installation	EVC OEM drivers for all OEMs in Annexure A shall be developed, tested and loaded into the AMI Platform before hardware installation at those locations commences.
4.4.3 OEM Liaison	Bidder Responsibility	All liaison with EVC and PD meter OEMs required to complete driver development, obtain technical documentation, resolve protocol ambiguities and fulfil any other obligation under this RFP shall be the sole responsibility of the Bidder; GEL shall not be required to intervene or facilitate communication with any OEM on the Bidder's behalf.
4.4.3 OEM Liaison	OEM Non-Cooperation	Where an EVC or PD meter OEM does not cooperate or imposes conditions that delay driver development or integration, the Bidder shall resolve such impediments independently and at its own cost; delays or failures attributable to OEM non-cooperation shall not constitute grounds for milestone extension or additional charges to GEL.
4.4.4 EVC Read Scope	Current Scope	At this stage, the AMI System shall read data from EVCs and update alarm thresholds through the AMI Platform; remote configuration of other EVC parameters is not within this RFP scope.
4.4.4 EVC Read Scope	Optional Write Command Module	Write command capability beyond alarm threshold updates is an optional module, priced as a separate line item in the SOR; GEL retains the right to activate or not activate this module at any time during the contractual period; all write command executions shall be logged in an immutable audit trail with authorising user, timestamp, command type and device response.
4.4.5 PD Meter Integration	All MIU Types	The AMI Platform shall communicate with all PD meter MIU types installed under this RFP.

4.4.5 PD Meter Integration	All PD Locations	All PD meter locations in scope are to be integrated without exception; no PD meter location shall be excluded.
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## 4.5 Device Communication and Data Acquisition

### Layer 1 — Head-End System (HES) Functionality

Module	Feature	Requirement
4.5.1 Device Registration	Automatic Discovery	The HES shall automatically discover and register every field device on commissioning without manual intervention beyond initial provisioning.
4.5.1 Device Registration	Device Profile Storage	The HES shall store a complete profile per device including: device type, OEM, model, hardware version, firmware version, device IDs, communication module ID, GPS coordinates, metering location association and logged-in/out timestamps.
4.5.1 Device Registration	Multi-Device Type Support	EVC Modems and PD meter MIUs shall be handled through a unified registration workflow with device type driving the appropriate data handling path.
4.5.2 Communication Protocols	Modbus	The HES shall support Modbus RTU and Modbus TCP for EVC communication.
4.5.2 Communication Protocols	DLMS/COSEM	The HES shall support DLMS/COSEM per IEC 62056 for device types requiring this protocol.
4.5.2 Communication Protocols	MQTT and REST	The HES shall support MQTT and REST APIs for cloud-native device communication.
4.5.2 Communication Protocols	Proprietary Protocols	The HES shall support all proprietary EVC OEM protocols required by the OEMs in GEL's network.
4.5.2 Communication Protocols	Backward Compatibility	Backward compatibility with all existing protocol versions across EVC OEMs in GEL's network shall be maintained.

4.5.3 Multi-Network Support	NB-IoT	The HES shall support 4G LTE with 2G fall back and NB-IoT connectivity.
4.5.3 Multi-Network Support	Technology-Agnostic Operation	Devices on different communication technologies shall be managed through a single unified interface with no operational differentiation visible to the GEL user.
4.5.4 Bidirectional Communication	Push and Pull	Both device-initiated push and system-initiated pull communication shall be supported.

Module	Feature	Requirement
4.5.4 Bidirectional Communication	Unicast and Multicast	Unicast (single device) and multicast (device group) communication shall be supported for reads and configuration commands.
4.5.5 Data Collection	Three-Tier Minimum	The HES shall collect data at a minimum in three tiers: once per day (standard billing read aligned to each customer's billing date); once per hour with 15-minute granularity for industrial customers (interval data); and in real time on event or alarm trigger with one-minute end-to-end latency for safety-critical events (event-based push).
4.5.5 Data Collection	GEL Flexibility	GEL reserves the right to modify the data collection frequency, tier structure and parameters for any device or device group at any time during the contractual period; the Bidder shall implement such changes within a timeline agreed with GEL at no additional cost.
4.5.5 Data Collection	Comprehensive Parameter Collection	All parameters present in the hourly logs of connected EVCs and MIUs shall be collected and transmitted to the AMI Platform at the configured periodicity; no parameter available from the device shall be excluded from collection without GEL's written agreement.
4.5.5 Data Collection	Customer Grouping	The AMI Platform shall support customer grouping by customer type (Industrial/Commercial), geography, GA, billing cycle (7-day, 10-day, 15-day) and any other configurable filter as required by GEL.
4.5.6 Scheduled Dialing	Configurable Schedule	Scheduled data acquisition shall be configurable per device and per parameter with frequencies from real-time to daily.

4.5.6 Scheduled Dialing	Automatic Re-Dial	On communication failure, the HES shall automatically re-dial with configurable retry count and interval per device type. A configurable threshold shall be set above which retry failures trigger an alarm rather than further retry.
4.5.7 On-Demand Read	Individual Device	On-demand read for any individual device shall be available at any time with results available within 5 minutes for 95% of requests.
4.5.7 On-Demand Read	Group Read	On-demand read for device groups — by GA, zone, or customer category — shall be supported.

Module	Feature	Requirement
4.5.7 On-Demand Read	Multi-Interface Access	On-demand reads shall be initiatable through the web portal, mobile application and APIs.
4.5.8 Remote Configuration	Alarm Threshold Updates	The HES shall support remote updates of EVC and MIU alarm thresholds for consumption, pressure, temperature and signal strength.
4.5.8 Remote Configuration	Scope Restriction	Remote configuration beyond alarm threshold updates is outside this RFP scope except through the optional Write Command Module in Section 4.4.4.
4.5.9 Time Synchronisation	NTP-Based Sync	NTP-based time synchronisation shall be maintained across all devices with IST (UTC+5:30) as the mandatory reference.
4.5.9 Time Synchronisation	Drift Alerting	The HES shall verify synchronisation status per device and alert on devices that drift beyond a configurable tolerance.
4.5.9 Time Synchronisation	Timestamp Integrity	All collected data records shall carry device-side timestamps validated against the IST reference; timestamp integrity is critical for billing accuracy and any record with an invalid or unsynchronised timestamp shall be flagged before VEE processing.
4.5.10 Firmware OTA	Signed Firmware Only	The HES shall accept only digitally signed firmware; integrity validation shall be mandatory before deployment to any field device.
4.5.10 Firmware OTA	Staged Rollout	OTA firmware delivery shall support staged rollout to configurable device groups, with delivery confirmation tracking per device before proceeding to the next group.

4.5.10 Firmware OTA	Deployment Modes	Firmware updates shall support both single-device (unicast) and group (multicast) deployment.
4.5.10 Firmware OTA	Rollback	Firmware rollback shall be supported if an update causes operational issues; rollback procedures shall complete within 24 hours of identification.
4.5.10 Firmware OTA	Status Visibility	Firmware upgrade status — current version, last upgrade date and upgrade result — shall be visible per device in the platform asset register.
4.5.11 Store-and-Forward	Automatic Backfill	Store-and-forward data from devices shall be automatically ingested on communication restoration with no data loss.
Module	Feature	Requirement
4.5.11 Store-and-Forward	Gap Detection and Conflict Resolution	Data gaps shall be detected and backfilling triggered automatically; conflict resolution for overlapping data periods and duplicate records shall be handled without manual intervention.
4.5.12 HES-to-MDMS Data Reconciliation	Record Count Reconciliation	For each device per scheduled collection window, the HES shall log the count of data records dispatched to the MDMS. The MDMS shall log the count of records received for the same device and window. The platform shall automatically reconcile these counts after each collection cycle; any discrepancy between records dispatched by HES and records received by MDMS shall be detected, logged, and trigger an automatic retry or alert within 15 minutes.
4.5.12 HES-to-MDMS Data Reconciliation	Reconciliation Dashboard	A reconciliation dashboard shall be available to GEL's IT team showing, per device and per collection window, the dispatch count from HES, the receipt count at MDMS, and any outstanding discrepancy. Discrepancies unresolved after 1 hour shall escalate to an alarm.
4.5.12 HES-to-MDMS Data Reconciliation	Monthly Reconciliation Report	A monthly reconciliation report covering HES-dispatched vs MDMS-received record counts across the entire network shall be generated automatically and made available to GEL without the Bidder needing to produce it manually.

## 4.6 Meter Data Storage and Collection

### Layer 2 — Meter Data Management System (MDMS) Functionality

Module	Feature	Requirement
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4.6.1 Central Data Repository	10-Year Retention	The MDMS shall retain all collected and processed meter data for a minimum of 10 years with full retrieval and export capability for any historical period without impact on current operations.
4.6.1 Central Data Repository	Tamper-Proof Raw Data	Original raw data received from field devices shall be stored in a non-manipulated, tamper-proof state alongside VEE-processed data throughout the retention period; no user, including system administrators, shall be able to modify or delete raw data records.
4.6.1 Central Data Repository	Backup Requirements	Automated data backup shall meet the RPO of one hour; the Bidder shall conduct quarterly backup restoration drills with results submitted to GEL.
4.6.2 Customer Grouping	By Type, GA, Billing Cycle	The MDMS shall support customer grouping by customer type (Industrial/Commercial), geography, GA, billing cycle and any other configurable filter as required by GEL.
Module	Feature	Requirement
4.6.3 Data Archival	Automated Archival	Automated data archival shall be performed at intervals specified in the approved FRS.
4.6.3 Data Archival	Restoration	Archival and restoration procedures shall be documented and demonstrated to GEL before Go-Live; archived data shall be retrievable within a defined SLA.
4.6.4 Data Aggregation	Multi-Level	The MDMS shall aggregate data at DRS, SLP, GA and customer levels for operational reporting and gas balance analysis.
4.6.4 Data Aggregation	Configurable Time Periods	Aggregation shall support hourly, daily, weekly, monthly, quarterly and annual time periods.
4.6.5 Database Integrity Verification	Periodic Integrity Scan	The MDMS shall run automated integrity verification scans on the data store at a minimum weekly frequency, checking for silent data corruption, record count discrepancies, checksum mismatches, and referential integrity violations across all metering records.
4.6.5 Database Integrity Verification	Integrity Scan Reporting	Results of each integrity scan shall be logged in an immutable scan log. Any anomaly detected shall generate an alert to the platform operations team and to GEL's designated IT contact within 4 hours of detection. GEL shall receive a monthly summary of scan results as part of the platform health report.

4.6.5 Database Integrity Verification	Remediation	Where an integrity scan identifies corrupted or missing records, the Bidder shall investigate and report the root cause to GEL within 5 working days, restore affected records from backup where possible, and log all restoration actions in the immutable audit trail. Records that cannot be restored shall be treated as data loss per Section 8
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## 4.7 Validation, Estimation and Editing (VEE)

Module	Feature	Requirement
4.7.1 Validation Rules	Threshold Checks	The VEE engine shall apply configurable upper and lower threshold checks for consumption, pressure, temperature, flow rate and battery voltage.
4.7.1 Validation Rules	Cumulative Register Reconciliation	The VEE engine shall reconcile cumulative register reads against interval-accumulated volumes and flag discrepancies.

Module	Feature	Requirement
4.7.1 Validation Rules	Zero Consumption Detection	Zero consumption over user-configurable durations per customer category shall be detected and flagged.
4.7.1 Validation Rules	Consecutive Identical Readings	Consecutive identical readings — indicative of a stuck meter or communication fault — shall be detected.
4.7.1 Validation Rules	Negative Flow Detection	Negative flow (reverse flow) shall be detected and flagged as a potential tamper event.
4.7.1 Validation Rules	Digit Overflow	Digit overflow in cumulative register reads shall be detected with appropriate correction applied.
4.7.1 Validation Rules	Pulse Coherence	Pulse coherence between MIU and PD meter readings shall be verified per device.

4.7.2 Estimation Methods	Standard Methods	The VEE engine shall implement: maximum and average of past N days; maximum and average of past N similar weekdays; maximum and average of similar blocks across past N similar weekdays.
4.7.2 Estimation Methods	Configurable Per Segment	Estimation method selection shall be configurable per customer segment by authorised GEL users without vendor involvement.
4.7.3 Editing Workflows	Authorized Editing	Authorized GEL users shall manually override validated or estimated values.
4.7.3 Editing Workflows	Reason Code and Authorization	Every manual edit shall require a reason code from a configurable list and an authorisation workflow appropriate to the edit's significance.
4.7.3 Editing Workflows	Audit Trail	Every edit shall be logged with editor identity, timestamp, original value, replacement value and reason code in an immutable trail.
4.7.4 Anomaly-Driven Estimation	Automatic Trigger	The VEE engine shall automatically flag, alarm and trigger estimation when anomalies appear in cumulative register reads, interval reads, or demand register reads.
Module	Feature	Requirement
4.7.4 Anomaly-Driven Estimation	Configurable Workflow	The estimation workflow shall be configurable: auto-application, manual review before application, or estimated value as a suggestion pending GEL approval.
4.7.5 Data Quality Checks	Duplicate Detection	Duplicate records shall be detected and resolved automatically; all instances shall be logged.
4.7.5 Data Quality Checks	Gap Identification	Missing reads per device per scheduled collection window shall be identified and logged automatically.
4.7.5 Data Quality Checks	Corrupt Packet Handling	Corrupt or malformed packets shall be detected, logged and excluded; automatic retry and GA Team notification shall follow.
4.7.5 Data Quality Checks	Manual Reading Entry	The MDMS shall accept manual readings for locations where automated collection has failed and a field read has been obtained; manual entries shall be logged with user identity, date, time, entry method and reason code.



4.7.6 VEE Rule Configuration	User-Configurable	VEE rules shall be configurable by authorised GEL users through the platform interface without vendor involvement.
4.7.6 VEE Rule Configuration	Rule Versioning	Rule changes shall be versioned with effective dates and rationale notes retained in the platform.
4.7.7 Data Quality Report	Daily Automated Report	An automated daily data quality report covering completeness, accuracy and flagged discrepancies shall be generated and made available to GEL's GA Teams.

## 4.8 Billing Determinant Calculation

Module	Feature	Requirement
4.8.1 Billing Determinants	Total Gas Consumption	The MDMS shall calculate total gas consumption (SCM) per customer per billing cycle.

Module	Feature	Requirement
4.8.1 Billing Determinants	Energy Consumption	Energy consumption (MMBTU or GJ) shall be calculated using the applicable Calorific Value per customer per billing cycle.
4.8.1 Billing Determinants	Peak Flow	Peak/Maximum Flow Rate (m <sup>3</sup> /h) shall be calculated per customer per billing cycle.
4.8.1 Billing Determinants	Imbalance Quantity	Imbalance Quantity (excess consumption over Annual Quantity or Contract Demand) shall be calculated per customer.
4.8.1 Billing Determinants	Average CV	Average Calorific Value (kcal/m <sup>3</sup> ) shall be calculated per customer per billing cycle.
4.8.1 Billing Determinants	ToD Block Consumption	Consumption per Time-of-Day block shall be calculated per customer per billing cycle.

4.8.2 Multi-Cycle Billing	Concurrent Cycles	The MDMS shall run 7-day, 10-day and 15-day billing cycles concurrently with each customer assigned to one cycle.
4.8.2 Multi-Cycle Billing	Independent Operation	Billing determinant extraction shall operate correctly and independently for each customer's assigned cycle.
4.8.3 ToD/Tariff Configuration	Multi-Category Support	Configurable ToD tariff options shall be available by customer category (Industrial PNG, Commercial PNG, CNG), day type (weekday, weekend, public holiday) and season.
4.8.3 ToD/Tariff Configuration	Configurable Time Blocks	ToD blocks shall be configurable by number and duration per customer category.
4.8.4 Special Metering	Check Metering	Check metering at industrial locations shall be handled with separate billing determinant calculation for the check meter alongside the primary meter.
4.8.4 Special Metering	Sub-Metering	Sub-metering at industrial complexes shall support both consolidated and individual billing determinant calculation.
4.8.4 Special Metering	Bi-Directional	Bi-directional metering shall be handled where applicable.

Module	Feature	Requirement
4.8.4 Special Metering	Multiple Meters at Premises	Multiple meters at the same customer premises shall be correctly accounted for in all billing and reporting calculations.
4.8.5 SAP Billing Integration	Automated Delivery	Validated billing determinants shall be delivered automatically to SAP Billing on each customer's scheduled billing date.
4.8.5 SAP Billing Integration	Format Configuration	The SAP upload format shall be agreed with GEL's SAP team before Go-Live and shall be modifiable at GEL's request at no additional cost.
4.8.5 SAP Billing Integration	Multi-Mode Support	Direct API integration and scheduled file transfer modes shall both be supported and configurable by GEL.
4.8.6 Imbalance and Contract Demand	Daily Tracking	Contract Demand utilisation and imbalance quantity shall be tracked per customer on a daily basis.

4.8.6 Imbalance and Contract Demand	Threshold Alerts	Alerts shall be generated when a customer approaches or exceeds Contract Demand or Annual Quantity thresholds.
4.8.7 Manual Reading Entry	Workflow	A workflow for manual reading entry shall be available where automated collection has failed before the billing date.
4.8.7 Manual Reading Entry	SAP Flagging	Manual entries shall be flagged as such in the billing determinant export to SAP, enabling GEL to track manual versus automated reads.
4.8.8 Billing Date Delivery	100% Target	All commissioned meters shall have validated billing determinants available for SAP Billing on or before each customer's scheduled billing date. SLA and penalty provisions are specified in Section 12.
4.8.9 Billing-Date Criticality Monitoring	Incomplete Determinant Flag	Where a complete billing determinant cannot be generated for a metering point due to an unresolved data gap, the platform shall flag the record with a reason code and notify the GA Team, enabling alternate data collection before the billing date.
4.8.9 Billing-Date Criticality Monitoring	Priority Alert	Where a metering point's billing date is approaching and data collection is incomplete, the platform shall generate a priority alert to the GA Team with sufficient lead time for resolution; the lead time threshold shall be configurable per billing cycle length.

## 4.9 Asset Management

Module	Feature	Requirement
4.9.1 Asset Repository	Master Data	The MDMS shall maintain a master repository of all installed meter assets including: device ID, make, model, serial number, firmware version, installation date, meter location (premises address), customer information (name, BP number), service line number, meter type, meter configuration parameters, GIS coordinates, SIM ICCID numbers for both SIM slots, current operational status and last successful communication timestamp.
4.9.1 Asset Repository	Configuration Management	Device configuration parameters per asset shall be stored with comparison capability between current and historical configurations.

4.9.1 Asset Repository	Customer Hierarchy	The repository shall maintain associations between each asset and upstream infrastructure (DRS, SLP, CGS, Distribution Main).
4.9.2 Lifecycle Tracking	Status Tracking	Meter and communication equipment status shall be tracked through: Installed, In Service, Faulty, Decommissioned and Removed.
4.9.2 Lifecycle Tracking	Configuration History	Configuration changes shall be tracked with timestamp and authorising user identity.
4.9.3 GIS Information	Coordinate Storage	Longitude and latitude coordinates shall be maintained for every installed device.
4.9.3 GIS Information	Network Association	Associations between devices and upstream infrastructure shall be maintained and visualised on map.
4.9.3 GIS Information	Map Visualisation	A map-based (GIS) view of all connected devices shall be available with real-time status overlays — communicating, non-communicating and alarmed — with GA boundary display and click-through to device level detail.
4.9.3 GIS Information	Device Health on Map	Real-time device health data — communication status, last successful read timestamp, RSSI for active SIM slot, battery level where reported and firmware version — shall be visible per device through the platform dashboard.
Module	Feature	Requirement
4.9.4 In-Service History	Complete History	Complete in-service location history per device shall be maintained with start and end dates for each location association.
4.9.4 In-Service History	Movement Tracking	Device movements between locations, spare parts use and refurbishment events shall be tracked in the history.
4.9.5 Damage Logging	Damage Events	Damage and deterioration events shall be loggable including corrosion, diaphragm failure and physical damage.
4.9.5 Damage Logging	Attribution	Damage events shall be tagged with cause attribution: customer, operations, or environment.

4.9.6 Bulk Import and Navigation	Bulk Import	Asset data bulk import through file upload shall be supported with validation against existing records and error reporting.
4.9.6 Bulk Import and Navigation	Hierarchical Navigation	Hierarchical navigation from network level to GA level to zone level to individual device level shall be available.

## 4.10 Device Lifecycle and Reconciliation

Module	Feature	Requirement
4.10.1 Lifecycle Workflow	End-to-End Lifecycle	A complete device lifecycle workflow shall be implemented covering registration, installation, provisioning, operations, maintenance and decommissioning.
4.10.1 Lifecycle Workflow	Status Transitions	The workflow shall enforce defined status transitions with appropriate authorisation requirements per transition.
4.10.2 Auto-Reconciliation	Installed vs Communicating	Automated reconciliation reports shall identify meters installed but not communicating for a configurable period and shall be generated daily, made available to GA Teams before GEL operations begin the next working day.
Module	Feature	Requirement
4.10.2 Auto-Reconciliation	Segmentation	Reports shall be segmented by GA, communication technology and customer category.
4.10.3 Exception Generation	Non-Performing Devices	Exceptions shall be generated automatically for devices not delivering accurate meter data postinstallation.
4.10.3 Exception Generation	Configurable Criteria	Exception criteria shall be configurable per device type and per customer category.
4.10.4 CrossReplacement Continuity	No Data Loss	Gas consumption history shall be tracked correctly across meter replacements with no loss of individual meter data.

4.10.4 CrossReplacement Continuity	Customer-Level Continuity	Consumption continuity shall be maintained at the customer level regardless of changes to the underlying meter or MIU.
4.10.5 Installation Dashboard	Real-Time Status	A real-time dashboard shall show pending, in-progress, installed and decommissioned device counts by GA at all times.
4.10.6 Real-Time Device Health	Per-Device Visibility	Real-time device health monitoring shall be visible per device through the platform dashboard, covering: communication status, last successful read timestamp, RSSI for active SIM slot, battery level where reported by the device and firmware version.
4.10.6 Real-Time Device Health	Daily Reconciliation Report	Automated meter-vs-communication reconciliation reports shall be generated daily showing: total devices registered, devices actively communicating, devices with complete data collection and devices below the SLA threshold with drill-down to the non-compliant device list; these reports shall be available to GA Teams by the start of GEL's next working day.

#### 4.10.1 A Field Device Maintenance Management

Module	Feature	Requirement
4.10A.1 Maintenance Schedule	Schedule per Device Type	The AMI Platform shall maintain a configurable preventive maintenance schedule per device type (Modem, MIU), specifying the inspection interval and battery replacement interval applicable to each.
4.10A.1 Maintenance Schedule	Next-Due Visibility	Per-device maintenance due dates shall be visible through the platform, showing last maintenance date, maintenance type performed and next scheduled maintenance date.
4.10A.2 Condition-Based Triggers	Battery Replacement	The platform shall generate a maintenance work order automatically when a device's battery level falls below a configurable threshold, flagging it for battery replacement before failure.
4.10A.2 Condition-Based Triggers	Communication Degradation	Persistent signal quality degradation below a configurable threshold shall trigger a field inspection work order for the affected device.
4.10A.3 Maintenance Work Orders	Auto-Generation	Planned maintenance work orders shall be generated automatically based on schedule or condition trigger and routed to the relevant GA Team through the platform's task management workflow.

4.10A.3 Maintenance Work Orders	Manual Generation	Authorised GEL users shall be able to raise maintenance work orders manually for any device at any time.
4.10A.4 Service History	Per-Device Record	A structured service history shall be maintained per device, recording for each maintenance event: date, maintenance type, technician, findings, action taken, parts replaced and outcome.
4.10A.4 Service History	Accessible from Device View	Service history shall be accessible directly from the device's asset record without requiring a separate search.
4.10A.5 Maintenance Dashboard	Overdue and Due-Soon	A maintenance dashboard shall show devices overdue for scheduled maintenance and devices whose maintenance is due within a configurable look-ahead window, segmented by GA and device type.
4.10A.5 Maintenance Dashboard	Compliance by GA	Maintenance compliance — percentage of devices with current maintenance status — shall be reported per GA.

## 4.11 Alarm, Event and Exception Management

Module	Feature	Requirement
4.11.1 Alarm Framework	Categorisation	Alarms shall be categorised by type — Safety, Device Health, Data Quality, Operational — and by priority: Critical, High, Medium, Low.
4.11.1 Alarm Framework	Configurable Categories	Alarm categories, priorities and escalation rules shall be configurable by authorised GEL users without vendor involvement.
4.11.2 Safety Alarms	Tamper Detection	Magnetic tamper, meter cover open and pulse cable cut alarms shall reach the AMI Platform within one minute end-to-end from the device event.
4.11.2 Safety Alarms	Reverse Flow	Reverse flow events shall be flagged in real time.
4.11.2 Safety Alarms	Pressure Anomaly	Pressure alarms beyond MAOP or below MOP shall be generated in real time.
4.11.2 Safety Alarms	Power Supply Failure	Power supply failure at any device shall generate a real-time alert.

4.11.2 Safety Alarms	Unauthorised Configuration	Unauthorised configuration attempts at any field device shall generate a real-time security alert.
4.11.3 Device Health Alarms	Low Battery	Low battery alerts shall be generated at configurable charge level thresholds for batteryoperated devices.
4.11.3 Device Health Alarms	Communication Module Failure	Communication module failure at any device shall generate an alarm.
4.11.3 Device Health Alarms	Device Malfunction	Device malfunction conditions shall be detected and alarmed.
4.11.3 Device Health Alarms	Metrological Sensor Failure	Metrological sensor failure conditions shall be detected and alarmed.
4.11.3 Device Health Alarms	Pulse Coherence Failure	Pulse coherence failures between MIU and PD meter shall generate an alarm.

Module	Feature	Requirement
4.11.3 Device Health Alarms	Volume Under Alarm	Volume under alarm (Vbs), spare volume and locked spare volume conditions shall generate alarms.
4.11.4 Data Quality Alarms	Zero and False Readings	Zero readings and false readings inconsistent with historical patterns shall be flagged.
4.11.4 Data Quality Alarms	Validation and Upload Exceptions	Cumulative validation exceptions, wrong uploads and data acceptance failures shall generate alarms.
4.11.5 Operational Alarms	Time Sync Issues	Date and time synchronisation issues on any device shall generate an operational alarm.
4.11.5 Operational Alarms	Devices Not on AMI Network	Industries or customers in scope but not connected to the AMI network shall be flagged as operational exceptions.
4.11.6 Configurable Threshold Alarms	Consumption Thresholds	Configurable upper and lower consumption thresholds shall trigger alarms per customer.



4.11.6 Configurable Threshold Alarms	Qmin, Qt and Qmax	Qmin (minimum flow), Qt (transition flow) and Qmax (maximum flow) thresholds shall be configurable per EVC/device in the AMI Platform and shall trigger alarms when breached.
4.11.6 Configurable Threshold Alarms	Pressure and Temperature	Configurable thresholds for pressure and temperature shall trigger alarms.
4.11.6 Configurable Threshold Alarms	Signal Strength	Configurable signal strength thresholds shall trigger communication quality alarms.
4.11.6 Configurable Threshold Alarms	DOQ Threshold Alerts	Configurable Daily Order Quantity thresholds per industrial customer shall be supported; alerts shall be triggered when actual daily consumption exceeds the configured DOQ.
4.11.7 Communication Failure Alerts	Configurable Duration	Alerts shall be generated when a device fails to communicate for a configurable duration.
4.11.7 Communication Failure Alerts	Root Cause Tagging	Alerts shall be tagged with root cause where determinable: signal quality, SIM issue, device hardware, or network outage.

Module	Feature	Requirement
4.11.8 Zero Consumption Alerts	Configurable Per Customer	Zero consumption alerts shall be configurable per customer to accommodate seasonal customers with legitimately extended zero-consumption periods.
4.11.8 Zero Consumption Alerts	Pattern Distinction	The platform shall distinguish expected from unexpected zero consumption based on historical patterns.
4.11.9 Multi-Channel Notification	Channels	Notifications shall be delivered via Email, SMS, WhatsApp and mobile application push notification.
4.11.9 Multi-Channel Notification	Category-Based Routing	Routing shall be configurable per alarm category and per recipient role.
4.11.9 Multi-Channel Notification	Delivery Confirmation	Notification delivery confirmation shall be logged for audit.

4.11.10 Alarm Workflow	Acknowledgement	Alarm acknowledgement by authorised users shall be logged with timestamp and user identity.
4.11.10 Alarm Workflow	Escalation	Unacknowledged alarms shall escalate per configurable rules.
4.11.10 Alarm Workflow	Resolution Tracking	Alarms shall be tracked to resolution with resolution notes mandatory before closure and final timestamp recorded.
4.11.10 Alarm Workflow	Recurring Issue Analysis	The platform shall identify devices with repeated alarm instances of the same type within a configurable rolling period and surface these as priority exceptions for GA Team review.
4.11.12 Communication Logs	All Attempts	Detailed communication logs for all communication attempts — successful, failed and retried — with diagnostic information per device shall be maintained.
4.11.13 Event and Communication Logs	Event Log Search	The event log shall be searchable and filterable by device, alarm type, user, date range and GA.
4.11.13 Event and Communication Logs	Communication Attempt Logging	Detailed communication logs shall be maintained for all communication attempts — successful, failed and retried — with diagnostic information per device and per attempt.
Module	Feature	Requirement
4.11.13 Event and Communication Logs	Maintenance Activity Logging	All maintenance activities performed on field assets — actions taken, user responsible and outcome — shall be logged against the relevant device record with timestamp.
4.11.11 Service Order Generation	Auto-Generation	Service orders shall be auto-generated from configured alarm types including meter stoppage, tampering, communication failures and pressure exceedances.
4.11.11 Service Order Generation	WFM Integration	Service orders shall route to GEL's Workforce Management system through standard APIs.
4.11.11 Service Order Generation	Safety SLA	Gas leak and safety emergency service orders shall carry a mandatory one-hour field response SLA.
4.11.12 Alarm History	Complete History	The full alarm and event history shall be maintained for the retention period.
4.11.12 Alarm History	Trend Reports	Alarm trend reports shall be available by alarm type, device, customer and GA.

## 4.12 Revenue Protection and Loss Analytics

Module	Feature	Requirement
4.12.1 Tampering Analysis	Tamper Flag Analysis	The platform shall analyse meter tamper flags — magnetic, cover open and reverse flow — to identify potential revenue loss patterns.
4.12.1 Tampering Analysis	Repeat Event Prioritisation	Repeat tamper events at the same location shall be escalated at higher priority.
4.12.2 Zero Consumption Detection	Pattern-Based	Zero consumption patterns inconsistent with a customer's historical usage shall be detected.
4.12.2 Zero Consumption Detection	Configurable Periods	Detection periods and thresholds shall be configurable per customer category.
4.12.3 DRS/SLP Material Balance	Input vs Output	DRS/SLP-level material balance comparing measured input with aggregate metered output shall be performed to identify Non-Technical Loss.
Module	Feature	Requirement
4.12.3 DRS/SLP Material Balance	Daily Reconciliation	Material balance shall be performed daily; anomalies shall be flagged automatically for investigation.
4.12.4 Configurable Business Rules	User-Configurable	Revenue protection alert business rules shall be configurable through a user interface accessible to authorised GEL users without programming skills.
4.12.4 Configurable Business Rules	Rule Versioning	Rule changes shall be versioned with effective dates and rationale notes.
4.12.5 Field Activity Filtering	Suppression	Revenue protection alerts triggered by authorised field activities — planned maintenance, meter replacement — shall be suppressed when the activity is recorded in the field activity calendar.
4.12.5 Field Activity Filtering	Activity Calendar	A field activity calendar driving alert suppression shall be maintained by authorised GEL users.

4.12.6 Historical Pattern Analytics	Usage Profiling	Historical consumption analytics and profiling shall be available to validate suspected revenue protection cases.
4.12.6 Historical Pattern Analytics	Comparable Customer Analysis	Customer usage patterns shall be comparable against similar customers in the same category and geography.
4.12.7 Investigation Workflow	Case Management	A case management workflow for suspect customers shall allow investigators to log activities, evidence and outcomes.
4.12.7 Investigation Workflow	Multi-User Collaboration	The workflow shall support multi-user collaboration with role-based access.
4.12.8 Service Order for Investigation	Auto-Generation	Service orders for field investigation of suspect cases shall be auto-generated and routed to the appropriate GA Team.
4.12.8 Service Order for Investigation	Outcome Tracking	Investigation outcomes shall be logged back to the case, enabling pattern analysis of revenue protection effectiveness.

## 4.13 Network Management System (NMS) Functionality

### Layer 3 — Network Management System

Module	Feature	Requirement
4.13.1 Network Topology	Topology View	The NMS shall provide a topology view of all field communication devices segmented by GA, zone and communication technology.
4.13.1 Network Topology	Real-Time Connectivity Status	The view shall show real-time connectivity status per device: online, offline, or degraded.
4.13.2 Device Communication Health	Online/Offline Tracking	Online and offline status per device shall be tracked with last successful communication timestamp and consecutive failure count.
4.13.2 Device Communication Health	SNMP or Native Telemetry	Communication health shall be tracked through SNMP or native device telemetry based on device capability.

4.13.3 Signal Quality Tracking	RSSI and SINR	RSSI and SINR (or equivalent quality indicator) per device shall be tracked and retained for the full contractual period.
4.13.3 Signal Quality Tracking	Packet Loss	Packet loss percentage per device shall be tracked.
4.13.3 Signal Quality Tracking	Configurable Thresholds	Configurable quality thresholds shall trigger network performance alerts.
4.13.4 SIM-Level Monitoring	Per-SIM Tracking	Active SIM identity, data usage per billing cycle, per-SIM signal quality and failover events between primary and secondary SIM shall be tracked per device.
4.13.4 SIM-Level Monitoring	Per-Operator Statistics	Per-operator performance statistics shall be available in reports to inform GEL's SIM operator selection decisions.
4.13.5 Network Fault Detection	Automated Detection	Automated fault detection shall trigger alerts when devices fail to communicate within configured thresholds.
4.13.5 Network Fault Detection	Notification	Faults shall trigger notifications through Email, SMS and mobile application push.
Module	Feature	Requirement
4.13.6 Remote Device Control	Modem Reboot	Remote modem reboot shall be supported where the device permits.
4.13.6 Remote Device Control	SIM Switchover	Remote SIM switchover commands shall be supported where the device permits.
4.13.6 Remote Device Control	Configuration Push	Remote network configuration push — APN, retry parameters — shall be supported where the device permits.
4.13.7 Performance Reports	Communication Success Rate	Communication success rate shall be reported per device, per zone and per GA.

4.13.7 Performance Reports	Signal Quality Distribution	Signal quality distribution across the network shall be reported.
4.13.7 Performance Reports	SIM Failover and TSP Outage	SIM failover frequency and TSP-attributable outage time per operator shall be reported.
4.13.8 Root-Cause Categorisation	Fault Classification	Communication failures shall be categorised as: signal quality, SIM issue, device hardware, network outage, planned maintenance, GEL-attributable, or TSP-attributable.
4.13.8 Root-Cause Categorisation	SLA Linkage	Root-cause categorisation shall drive SLA exclusion application per Section 12; TSP-attributable and GEL-attributable failures shall not count against the Bidder's SLA obligations.
4.13.9 TSP Coordination	Operator Interface	Where supported, the NMS shall interface with TSP networks to view operator-side planned outages and coverage advisories.
4.13.9 TSP Coordination	Bidder Responsibility	The Bidder shall coordinate directly with each TSP for network-level issues; GEL shall not be required to manage TSP relationships on the Bidder's behalf.

## 4.14 SLA Monitoring and Compliance Reporting (EMS)

*Layer 4 — Enterprise Management System*

Module	Feature	Requirement
4.14.1 SLA Authority	Authoritative Source	The EMS shall be the authoritative and sole reference for SLA performance calculation and penalty computation per Section 12.
4.14.1 SLA Authority	Automated Capture	All SLA events shall be captured automatically without manual entry by the Bidder.
4.14.2 Device-Level Tracking	Uptime	Per-device uptime shall be tracked as the percentage of scheduled data collection windows in which the device successfully transmitted data.
4.14.2 Device-Level Tracking	Communication Success Rate	Per-device communication success rate shall be tracked over each quarter.

4.14.2 Device-Level Tracking	Data Quality Metrics	Per-device data quality metrics — completeness, accuracy and validation pass rate — shall be tracked.
4.14.3 Billable Days	Per Device Per Quarter	Pro-rata billable days per device per quarter shall be calculated using the methodology in Section 11.
4.14.3 Billable Days	Daily Rate	Daily Rate = Annual Per-Device Rate ÷ 365. The EMS shall apply this formula per device.
4.14.4 Quarterly Compliance Report	Automatic Generation	Quarterly compliance reports shall be generated automatically at the end of each quarter.
4.14.4 Quarterly Compliance Report	Standard Format	Reports shall follow a format agreed with GEL before Go-Live, suitable for attaching to the quarterly invoice.
4.14.5 Immutable Event Log	No Modification	The Bidder shall not modify, delete, or override any recorded SLA event.
4.14.5 Immutable Event Log	Correction Exception	Where a correction to an incorrectly recorded event is required, it shall follow a documented exception process requiring GEL's prior written consent.
4.14.6 GEL Independent Access	Always-On Read-Only	GEL shall have direct, independent, read-only access to all EMS data at all times without requiring any Bidder action or approval.
4.14.6 GEL Independent Access	Non-Disableable	Access shall be through a dedicated GEL administrative view the Bidder cannot disable, restrict, or intercept.
Module	Feature	Requirement
4.14.7 Trending Alerts	Pre-Breach Alerts	Alerts shall be generated when any SLA metric is trending towards a breach before the threshold is reached.
4.14.7 Trending Alerts	Configurable Thresholds	Trending alert thresholds shall be configurable per SLA metric.
4.14.8 Penalty Calculation Engine	Automated Computation	The penalty framework in Section 12 shall be applied automatically to actual SLA performance.

4.14.8 Penalty Calculation Engine	Joint Visibility	Calculated penalty amounts shall be visible to GEL and the Bidder simultaneously in real time.
4.14.9 Invoice Validation Reports	Per Device	Each report shall show per device: Go-Live date, billable days, daily rate, calculated invoice amount, SLA compliance status and applicable penalty deduction.
4.14.9 Invoice Validation Reports	Independent Verification	The report shall allow GEL to verify every quarterly invoice independently without requesting data from the Bidder.
4.14.10 Historical Performance	Full Contract Period	Historical SLA performance data shall be retained for the full contractual period plus two years post-handover.
4.14.10 Historical Performance	Self-Service Query	GEL shall query any quarter's performance in detail without Bidder involvement.
4.14.11 API Data Export	Standard Formats	All EMS performance data shall be exportable via API in JSON, CSV and XML.

## 4.15 Reporting and Dashboards

Module	Feature	Requirement
4.15.1 Network-Wide Dashboard	Heat Map Visualisation	A network-wide dashboard with heat map visualisation shall show device and customer status by GA and zone.

Module	Feature	Requirement
4.15.1 Network-Wide Dashboard	Colour-Coded Status	Status colour coding shall represent data collection performance, communication health and alarm status simultaneously.
4.15.1 Network-Wide Dashboard	Real-Time Refresh	All dashboards shall refresh in real time without requiring manual page refresh; data displayed shall reflect the current platform state at all times.
4.15.1 Network-Wide Dashboard	Platform Status Visualisation	The platform interface shall visualise device communication status, scheduled and re-dial activities, customer locations, data collection status and data validation and sharing status across the network.



4.15.2 GA-Wise Dashboards	GA Drill-Down	Each GA shall have a dedicated dashboard with operations-relevant metrics.
4.15.2 GA-Wise Dashboards	Configurable Widgets	GA dashboards shall support configurable widgets per role: operations, billing, management.
4.15.2 GA-Wise Dashboards	Real-Time Refresh	All dashboards shall refresh in real time without manual page refresh.
4.15.3 Administrative Dashboard	User and System Management	An administrative dashboard shall be available for GEL's system administrators covering user management, permission assignments, API activity monitoring, system health indicators and audit log access.
4.15.3 Customer 360° View	Single-Screen View	A complete single-screen view per customer shall show consumption history, billing history, alarms, communication history and service requests.
4.15.3 Customer 360° View	Role-Based Scope	Access to customer data shall be restricted based on the user's role; payment and bank information shall not be visible to field-level roles.
4.15.4 Consumption Reports	Standard Types	Customer-wise consumption reports shall be available covering: daily, monthly, historical, trend analysis, minimum and maximum flow, flow analysis and customer-wise parameter logs. Reports for pressure, temperature, volume, volume under alarm and spare volume shall also be available.
4.15.5 Alarm and Event Reports	Alarm Report Types	Alarm and event reports shall include: alarm summary, alarm detail, event log, alarm history, communication failure, tamper event, sensor failure and critical alarm reports.

Module	Feature	Requirement
4.15.6 Billing Reports	Billing Report Types	Billing reports shall include: SAP upload reports, billing critical data reports, billing validation exception reports and customer billing consumption reports.
4.15.7 System Health Reports	Health Report Types	System health reports shall include: AMI system uptime, device connectivity, communication availability, network health and device health status reports.

4.15.8 Data Quality Reports	Quality Report Types	Data quality reports shall include: validation failure reports, false reading reports, zero reading exception reports, missing data reports, wrong upload reports and overall data integrity status reports.
4.15.9 Custom Report Builder	User-Configurable	A custom report builder shall be accessible to authorised users without programming requirements.
4.15.9 Custom Report Builder	Saveable and Schedulable	Custom reports shall be saveable, shareable across authorised users and schedulable for recurring delivery.
4.15.10 Scheduled Reports	Daily SAP Upload	A daily SAP upload report shall be generated and delivered automatically by 08:00 IST.
4.15.10 Scheduled Reports	Configurable Schedules	All other reports shall support configurable schedules: daily, weekly, monthly, quarterly.
4.15.10 Scheduled Reports	Email Delivery	Scheduled reports shall be delivered via email to configured recipient lists.
4.15.11 Regulatory Reports	PNGRB Compliance	All reports required for PNGRB compliance shall be generated on the required schedule.
4.15.12 Export Formats	Multi-Format	All reports shall be exportable in PDF, XLSX, CSV and XML.
4.15.12 Export Formats	API Access	Report data shall be accessible through APIs for downstream integration.
4.15.13 Data Quality Dashboard	Issue Tracking	A data quality dashboard shall highlight issues detected during collection and processing, with drill-down by device, GA and issue type.
Module	Feature	Requirement
4.15.14 Administrative Dashboard	System Administrator View	An administrative dashboard shall be available for GEL's system administrators covering: user management, permission assignments, API activity monitoring, system health indicators, platform capacity indicators and audit log access.

4.15.14 Administrative Dashboard	System Admin View	An administrative dashboard for GEL's system administrators shall cover: user management, permission assignments, API activity monitoring, system health indicators and audit log access.
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## 4.16 Integration with GEL Enterprise Systems

Module	Feature	Requirement
4.16.1 SAP Billing Integration	Mandatory	SAP Billing integration is mandatory. Validated billing determinants shall be delivered to SAP on each customer's scheduled billing date across all three billing cycle types.
4.16.1 SAP Billing Integration	Modes	Direct API and scheduled file transfer modes shall both be supported and configurable by GEL.
4.16.1 SAP Billing Integration	Format	The SAP upload format shall be agreed with GEL's SAP team before Go-Live and shall be modifiable at GEL's request at no additional cost.
4.16.2 SCADA Integration	Mandatory Interface	The AMI Platform shall integrate with GEL's SCADA system; the integration shall be configured and tested before Go-Live.
4.16.3 CMP Integration	Standard API	Integration with GEL's Centralised Monitoring Platform shall use standard APIs without bespoke development.
4.16.4 CRM/CIS Integration	Customer Data Sync	Customer data shall synchronise with GEL's CRM/CIS through standard APIs.
4.16.4 CRM/CIS Integration	Service Request Routing	Service requests originating in the AMI Platform shall route to CRM for case management.

Module	Feature	Requirement
4.16.5 GIS Integration	Coordinate Sync	Device GIS coordinates shall synchronise with GEL's GIS system.

4.16.5 GIS Integration	Map Layer	The AMI Platform map view shall consume GIS layers for pipeline network, DRS and SLP context where available.
4.16.6 Workforce Management Integration	Service Order Routing	Service orders shall route to GEL's Workforce Management system through standard APIs.
4.16.6 Workforce Management Integration	Outcome Sync	Service order outcomes shall sync back to the AMI Platform for closure and audit.
4.16.7 API Gateway	REST/SOAP/MQTT	REST, SOAP and MQTT APIs shall be available for third-party integration.
4.16.7 API Gateway	Concurrent Connection Management	The API gateway shall manage concurrent connections to enterprise systems with load management and automatic failover capability.
4.16.7 API Gateway	Secure Access	All API access shall require authentication and authorisation per the platform's RBAC framework.
4.16.7 API Gateway	Documentation	Complete, up-to-date API documentation in OpenAPI/Swagger standard shall be provided to GEL and maintained throughout the contractual period; documentation shall be updated with each platform release.
4.16.8 Data Lineage	Complete Audit Trail	A complete audit trail of data sources, transformations and processing steps from field device through to enterprise system delivery shall be maintained and available for any data point at any time.
4.16.9 Enterprise Service Bus	ESB Compatibility	The AMI Platform shall integrate with GEL's Enterprise Service Bus where deployed, using standard protocols.
4.16.9 Enterprise Service Bus	Standard Protocols	ESB integration shall use MQTT, AMQP and REST.
4.16.10 Webhook Integration	Real-Time Events	Webhook-based event publishing shall be supported for real-time downstream data consumption.
<b>Module</b>	<b>Feature</b>	<b>Requirement</b>

4.16.10 Webhook Integration	Configurable	Webhook event types, payloads and recipients shall be configurable by GEL.
4.16.11 Open API Layer	Any Additional GEL System	The AMI Platform shall be capable of integrating with any additional GEL system through its open API layer without requiring platform architecture changes.

## 4.17 Security and Compliance

Module	Feature	Requirement
4.17.1 Standards Compliance	IEC 62443	The AMI Platform shall comply with IEC 62443 for industrial automation cybersecurity throughout the contractual period.
4.17.1 Standards Compliance	NCIIPC	The platform shall comply with NCIIPC guidelines for Critical Information Infrastructure throughout the contractual period.
4.17.2 Communication Security	Field-to-Platform TLS	All communication between field devices and the AMI Platform shall use TLS 1.2 or higher; unencrypted field-to-platform communication paths are not acceptable.
4.17.2 Communication Security	VPN Tunnelling	The Bidder shall implement VPN tunnelling or equivalent secure channel for all communication between field devices and the AMI Platform cloud infrastructure, in addition to TLS encryption.
4.17.2 Communication Security	Device Authentication	All field devices shall be authenticated by the AMI Platform before data is accepted, preventing unauthorised device spoofing and replay attacks.
4.17.2 Communication Security	APN Configuration	A dedicated APN or equivalent secure network configuration shall be implemented for all SIM cards, preventing unauthorised access to the communication channel.
4.17.3 Data Encryption	Data in Transit	All data in transit between AMI Platform components and between the platform and enterprise systems shall use TLS 1.2 or higher.
4.17.3 Data Encryption	Data at Rest	All data at rest shall use AES-256 encryption.
4.17.3 Data Encryption	Key Management	Encryption key management shall implement periodic rotation per the platform security policy.

Module	Feature	Requirement
4.17.4 RBAC	Granular Permissions	RBAC shall implement granular permissions per module, per function, per device group, per GA and per data scope.
4.17.4 RBAC	Custom Roles	Authorised administrators shall create and modify custom roles without vendor involvement.
4.17.5 MFA and SSO	MFA Mandatory	Multi-factor authentication shall be mandatory for all user access — web interface, mobile application and API. Supported methods shall include at minimum TOTP and SMS OTP.
4.17.5 MFA and SSO	SSO Standard	Single Sign-On shall be implemented using SAML 2.0 or OAuth 2.0/OpenID Connect.
4.17.5 MFA and SSO	AD Integration	Integration with GEL's Active Directory for user authentication and authorisation shall be implemented.
4.17.6 Audit Logging	Scope	All user actions, device commands, data modifications, configuration changes and integration events shall be logged.
4.17.6 Audit Logging	Retention	Audit logs shall be retained for a minimum of two years.
4.17.6 Audit Logging	Tamper-Proof	Audit logs shall be tamper-proof; no user shall modify or delete entries.
4.17.7 Pre-Go-Live VAPT	CERT-In Auditor	An independent penetration test of the complete AMI System — platform, APIs, field device communication and all integrations — shall be conducted by a CERT-In empanelled security auditor before requesting Go-Live acceptance.
4.17.7 Pre-Go-Live VAPT	Go-Live Gate	All critical and high severity findings shall be remediated and remediation evidence provided to GEL before Go-Live acceptance is granted; this is a mandatory Go-Live acceptance condition.
4.17.8 Annual Cybersecurity Review	O&M Period	An annual cybersecurity review of the complete AMI System shall be conducted during each year of the O&M Period.
4.17.8 Annual Cybersecurity Review	Reporting	The review report and identified remediation actions shall be submitted to GEL within 30 days of the review date.
4.17.9 Security Patching	Critical Patches	Critical security patches shall be applied within 30 days of availability.

Module	Feature	Requirement
4.17.9 Security Patching	Non-Critical Patches	Non-critical patches shall be applied within 90 days of availability.
4.17.9 Security Patching	Advance Notice	GEL shall be notified with a minimum of 48 hours' advance notice before each patch deployment.
4.17.10 Inactive Account Management	Auto-Disable	Inactive accounts shall be automatically disabled after a configurable inactivity period; disablement shall be logged; reactivation shall require administrator action.
4.17.11 Data-Level Access Control	Restriction	The platform shall restrict user access to specific devices, customer segments, GAs, or data scopes based on assigned role.
4.17.12 Transmission-Layer Data Integrity	Message Authentication	All metering data transmitted between field devices and the AMI Platform shall be protected by a message authentication mechanism — HMAC-SHA256 or equivalent — at the application layer, in addition to TLS channel encryption. This ensures that data content cannot be altered in transit without detection, independent of the encryption layer.
4.17.12 Transmission-Layer Data Integrity	Tampered Packet Rejection	The AMI Platform shall reject and log any data packet whose message authentication code does not match the expected value. Rejected packets shall generate an alert, shall not be written to the data store, and shall be flagged for investigation.
4.17.12 Transmission-Layer Data Integrity	API Response Integrity	All API responses carrying metering data or billing determinants shall include a response checksum or digital signature enabling the receiving system to verify that the payload was not altered between platform and consumer.

## 4.18 GEL Staff User Interfaces

Module	Feature	Requirement
4.18.0 UI/UX Principles	Consistent Design Language	The web portal and mobile application shall follow a consistent design language — common navigation patterns, iconography, terminology and interaction behaviour — so that a user trained on one interface can operate the other without retraining.

Module	Feature	Requirement
4.18.0 UI/UX Principles	Role-Based Home Screen	Each user's home screen shall be personalised to their role, surfacing the dashboards, alerts and quick actions most relevant to that role on login without manual configuration.
4.18.0 UI/UX Principles	Page Load Performance	All dashboard and report pages shall load within three seconds on a standard broadband connection; dataheavy pages shall render progressively so the user sees meaningful content before the full page is complete.
4.18.0 UI/UX Principles	Accessible Design	The web portal shall meet WCAG 2.1 Level AA accessibility requirements, including sufficient colour contrast, keyboard navigability and screen reader compatibility.
4.18.0 UI/UX Principles	In-Application Guidance	Contextual help, field-level tooltips and guided workflows shall be available for complex tasks — such as VEE rule configuration, alarm threshold setup and report building — without requiring users to refer to external documentation.
4.18.0 UI/UX Principles	Session Management	User sessions shall time out after a configurable period of inactivity; the platform shall warn the user before session expiry and shall preserve unsaved work where technically feasible.
4.18.0 UI/UX Principles	Notification Centre	A consolidated notification centre shall be available on both web and mobile interfaces, showing all platform alerts, alarm notifications, task assignments and system messages in a single inbox with read/unread status and filtering.

Module	Feature	Requirement
4.18.1 Web Portal	Responsive Design	The web portal shall be responsive across desktop, tablet and mobile devices, automatically adapting to device form factor.
4.18.1 Web Portal	Browser Support	Current versions of Chrome, Edge, Firefox and Safari shall be supported.
4.18.2 Mobile Application	iOS and Android	A native mobile application shall be available for both iOS and Android.
4.18.2 Mobile Application	App Distribution	The application shall be published via the Apple App Store and Google Play Store or delivered through enterprise MDM distribution and maintained throughout the O&M Period.



Module	Feature	Requirement
4.18.2 Mobile Application	Access Parity	A GEL staff member's access rights on the mobile application shall be identical to their web platform access rights; the same RBAC, Active Directory integration, SSO and MFA shall apply to the mobile application.
4.18.3 Dashboard Capabilities	Network and GA Dashboard	The mobile application shall provide a network-wide and GA-level AMI System status dashboard with drill-down to device level.
4.18.3 Dashboard Capabilities	Alarm List	An active alarm list with filtering by type, priority, GA and assignment status shall be available.
4.18.3 Dashboard Capabilities	On-Demand Read	The ability to initiate an on-demand data read from any device shall be available through the mobile application.
4.18.4 Alarm Management on Mobile	View and Action	Alarms and exceptions shall be viewable, acknowledgeable, assignable, updatable and closeable from the mobile interface.
4.18.4 Alarm Management on Mobile	Resolution Notes	Resolution notes entry and resolution code selection shall be available from the mobile interface.
4.18.5 Reporting on Mobile	All Standard Reports	Access to all standard reports in a mobile-optimised view shall be available.
4.18.5 Reporting on Mobile	Export and Share	Export and sharing of reports from the mobile device shall be supported.
4.18.6 Field Operations	Survey Data Capture	Field survey data capture with GPS-tagged and time-stamped photograph upload shall be supported.
4.18.6 Field Operations	Installation Confirmation	A step-by-step field commissioning checklist completable from the mobile interface shall be provided.

4.18.6 Field Operations	Exception Logging	Exception logging from the field with photograph and GPS attachment shall be supported.
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Module	Feature	Requirement
4.18.6 Field Operations	Manual Meter Reading Capture	Where AMI data has not been received for a device by its scheduled read time, field staff shall be able to capture a manual meter reading through the mobile application. The following shall be mandatory before the reading can be submitted: a photograph of the meter display, GPS coordinates captured automatically by the device, a device-generated timestamp not editable by the field staff, the index value as read by the field staff and a reason code selected from a configurable list.
4.18.6 Field Operations	Reading Evidence Submission	On submission, the manual reading with its photograph, GPS coordinates, timestamp and reason code shall be transmitted to the MDMS and queued in the manual reading authorisation workflow. The field staff member shall receive a submission confirmation reference number before leaving the site. Readings submitted offline shall queue on the device and transmit automatically when connectivity is restored.
4.18.6 Field Operations	Reading Traceability	Every manually captured reading shall be flagged as such in the MDMS and in the SAP billing export. The photograph and GPS evidence shall be stored against the reading record and retrievable for audit for the full retention period.
4.18.7 Task Management	Field Tasks	Field technicians shall be able to view all assigned tasks from the mobile interface — installation tasks, maintenance visits, manual reading visits and investigation work orders — with device ID, location, GPS coordinates, last communication date and visit instructions per task.
4.18.7 Task Management	Platform-Dispatched Work Orders	When the AMI Platform identifies a group of devices that have not communicated for a configurable period, it shall generate a batch of field visit work orders. A supervisor shall be able to review the batch on the web portal or mobile application, assign individual work orders to specific field staff or distribute them across the team and dispatch the full batch in a single operation.
4.18.7 Task Management	Geographic Distribution	Work order assignment shall display the geographic spread of pending visits on a map. The supervisor shall be able to assign by geographic proximity, by GA zone, or by individual field staff.

4.18.7 Task Management	Batch Status Tracking	Supervisors shall be able to track the status of all dispatched work orders in a batch — pending, inprogress, completed, deferred — from a single dashboard view on both web and mobile, without contacting individual field staff.
4.18.7 Task Management	Rescheduling	Task rescheduling shall be available from the mobile interface with automatic notification to the supervisor on rescheduling.

Module	Feature	Requirement
4.18.7 Task Management	Task Closure	Field staff shall close tasks from the mobile interface on completion, with mandatory outcome entry — issue resolved, device replaced, reading captured, fault escalated — before closure. Closed tasks with manual readings shall link directly to the reading evidence record in the MDMS.
4.18.8 Offline Mode	Read-Only Access	Read-only access to the last synchronised data shall be available when network connectivity is unavailable, covering device status, task list and alarm history.
4.18.8 Offline Mode	Offline Capture and Sync	The following data capture operations shall be fully functional offline: manual meter reading capture with photograph and GPS, survey data entry, field commissioning checklist completion, exception logging and task closure with outcome entry. All offline data shall sync automatically and in full when connectivity is restored, without requiring any manual action from the field staff member.
4.18.8 Offline Mode	Sync Confirmation	After connectivity is restored and sync is complete, the field staff member shall receive a notification confirming which records were successfully submitted and flagging any that require attention.
4.18.9 Push Notifications	Critical Alarms	Real-time push notifications for all critical alarms shall be delivered to authorised mobile application users, identifying alarm type, device, location and GA.
4.18.10 Language Support	English	Both the web portal and mobile application shall support English as minimum language options.
4.18.11 Holiday Access	Continuous Availability	Both interfaces shall be available continuously including on public holidays and weekends; no calendar-based access restrictions are acceptable.

4.18.12 Issue Raising and Helpdesk Ticketing	Issue Raising by GEL Staff	GEL staff shall be able to raise issues directly from both the web portal and mobile application against any device, data record, report discrepancy, platform function, or field incident. The issue form shall capture: issue type (hardware, platform, data, integration, field), priority, free-text description and supporting photograph or screenshot. Issue raising shall require no more than three steps from the point the user identifies the problem.
4.18.12 Issue Raising and Helpdesk Ticketing	Ticket Generation to Bidder	Every issue raised by GEL staff shall generate a timestamped ticket assigned to the Bidder's support team. A ticket reference number shall be displayed to the GEL staff member immediately on submission. The Bidder shall not be able to modify the original ticket content after it is raised by GEL.

Module	Feature	Requirement
4.18.12 Issue Raising and Helpdesk Ticketing	Response and Resolution SLA	Response and resolution SLAs per ticket priority — Critical, High, Medium, Low — shall be as defined in Section 12. The EMS shall track SLA compliance for all GEL-raised tickets. Tickets not acknowledged within the defined response SLA shall escalate automatically to the Bidder's escalation contact and to GEL's nominated contact simultaneously.
4.18.12 Issue Raising and Helpdesk Ticketing	Status Visibility	GEL staff shall be able to view the status of all their raised tickets — open, acknowledged, in-progress, pending GEL action, resolved, closed — with the Bidder's latest update and estimated resolution date visible without contacting the Bidder. GEL staff shall be able to add comments and additional evidence to an open ticket at any time.
4.18.12 Issue Raising and Helpdesk Ticketing	Resolution and Closure	Tickets shall be closed by GEL staff after they confirm the issue is resolved; the Bidder shall not close tickets unilaterally. Where GEL does not respond to a resolved ticket within a configurable period, the platform shall prompt the GEL staff member.
4.18.12 Issue Raising and Helpdesk Ticketing	Ticket History	A full history of all tickets raised — initial report, Bidder responses, actions taken, resolution notes and closure details — shall be retained for the full contractual period and accessible to GEL at any time without Bidder involvement.
4.18.12 Issue Raising and Helpdesk Ticketing	Monthly Ticket Summary	The EMS shall generate a monthly ticket summary report covering: total tickets raised by category and priority, first response SLA compliance rate, resolution SLA compliance rate, recurring issues by device or location and open tickets carried forward. This report shall be available in the EMS without the Bidder needing to produce it manually.

4.18.13 Platform Performance Monitoring	Continuous Monitoring	The Bidder shall implement continuous performance monitoring of the AMI Platform with automated alerting when application response times, database query latency, data throughput, API response times, or cloud resource utilisation exceed configurable thresholds.
4.18.13 Platform Performance Monitoring	ITSM Integration	The Bidder shall integrate the AMI Platform with GEL's or the Bidder's IT service management system for automated service ticket creation from platform-generated alarms and exceptions where GEL requires this integration.
4.18.13 Platform Performance Monitoring	Planned Maintenance Notice	The Bidder shall notify GEL a minimum of 72 hours before any planned maintenance on the AMI Platform. Planned maintenance shall be scheduled during agreed low-impact windows and shall not coincide with any GEL billing date.

## 4.19 Data Migration from Existing AMI System

Module	Feature	Requirement
4.19.1 Parallel Operations	Mandatory Period	A mandatory parallel operations period shall be conducted per zone — a minimum of 30 days and up to 60 days or as agreed with GEL — during which both the existing AMI system and the new AMI System shall simultaneously collect data from the same field devices.
4.19.1 Parallel Operations	Reconciliation Report	At the end of each zone's parallel period, the Bidder shall submit a zone-level reconciliation report demonstrating that the new system matches or exceeds the data collection performance of the existing system.
4.19.2 Historical Data Migration	Migration Scope	3-year historical meter data and asset records from the existing AMI system shall be migrated into the new AMI Platform; no historical data shall be lost or rendered inaccessible after migration.
4.19.2 Historical Data Migration	Methodology	The Bidder shall document the migration methodology — including data mapping, validation procedures and rollback plan — and agree it with GEL before migration commences.
4.19.3 Gap Resolution	Investigation and Resolution	Any data gaps or discrepancies identified during the parallel period shall be investigated and resolved by the Bidder within a timeline agreed with GEL.

4.19.4 Billing Continuity	Zero Disruption	The Bidder shall ensure zero disruption to GEL's billing operations and data continuity throughout the transition from the existing system to the new AMI System.
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## 4.20 Maintenance, Updates and Version Management

Module	Feature	Requirement
4.20.1 Platform Updates	Zero Additional Cost	All platform updates, patches and version upgrades throughout the contractual period shall be at no additional cost to GEL.

Module	Feature	Requirement
4.20.1 Platform Updates	Latest Versions	All platform components shall be on the latest commercially available versions at the time of deployment.
4.20.2 Remote Diagnostics	Covered Capabilities	Remote diagnostic and troubleshooting capabilities shall be implemented for all connected field devices, covering at minimum: remote reboot, remote diagnostic test, communication diagnostics, configuration read-back and device event log retrieval.
4.20.3 Security Patching	Critical Patches	Critical security patches shall be applied within 30 days of availability.
4.20.3 Security Patching	Non-Critical Patches	Non-critical patches shall be applied within 90 days of availability.
4.20.3 Security Patching	Advance Notice	GEL shall be notified with a minimum of 48 hours' advance notice before each patch deployment.
4.20.4 Major Version Upgrades	GEL Approval	Major upgrades affecting platform functionality or user interfaces shall require GEL's written approval before deployment.
4.20.4 Major Version Upgrades	Maintenance Window	Major upgrades shall be deployed within agreed maintenance windows to minimise operational impact.

4.20.5 EOL/EOS Management	Proactive Identification	Components approaching End-of-Life or End-of-Support shall be identified and replacement planned before service impact.
4.20.5 EOL/EOS Management	Migration Cost	Migration when any component reaches EOL or EOS during the contractual period shall be at no additional cost to GEL.
4.20.6 Rollback Capability	All Updates	Rollback capability shall be maintained for all updates with immediate restoration procedures if issues arise.
4.20.6 Rollback Capability	Tested Procedures	Rollback procedures shall be documented and tested before each major deployment.
Module	Feature	Requirement
4.20.7 Change Management	Documentation	All version changes shall be documented with version number, change summary, impact analysis and verification results.
4.20.7 Change Management	Change Log	A complete change log shall be maintained throughout the contractual period and handed over to GEL at contract completion.
4.20.8 System Enhancements	GEL Modification Requests	Reasonable GEL requests for modifications to platform configuration, report formats, integration parameters and VEE rules shall be implemented within timelines agreed with GEL at no additional cost.

## 4.21 Quality Assurance, FAT, SAT and UAT

Module	Feature	Requirement
4.21.1 Quality Assurance Plan	Submission	The Bidder shall submit a QAP covering all hardware, software, integration and field installation activities before procurement and deployment commence.
4.21.1 Quality Assurance Plan	GEL Approval	The QAP shall be approved by GEL before any procurement or deployment activity begins.

4.21.1 Quality Assurance Plan	Scope	All field activities shall be carried out in the presence of GEL's designated GA Team representative following approved QAP procedures with complete documentation of all results and corrective actions.
4.21.2 Factory Acceptance Testing	Third-Party Inspection	FAT shall be conducted by a third-party inspection agency (TPIA) appointed and paid for by the Bidder; the TPIA shall be an accredited inspection body recognised by GEL.
4.21.2 Factory Acceptance Testing	GEL Witnessing	GEL may witness any FAT activity with or without advance notice; FAT certificates shall be issued before hardware dispatch; no unit that fails FAT shall be dispatched without rework, retest and a GEL-accepted FAT pass record.
4.21.2 Factory Acceptance Testing	FAT Checklist	FAT shall verify at minimum: physical condition and build quality; firmware version and EOL/EOS compliance; communication on both SIM slots — data transmission, failover and signal integrity; protocol driver operation for all EVC OEM protocols in scope; OTA firmware reception and confirmation;

Module	Feature	Requirement
		environmental protection — IP rating verified; MIL-STD-810G compliance; ATEX/PESO certification validity; and for MIUs — pulse count accuracy against a calibrated reference.
4.21.3 Site Acceptance Testing	Per Location	SAT shall be conducted at each field location before that location is declared commissioned.
4.21.3 Site Acceptance Testing	PD Meter Index Check	At each PD meter location, SAT shall include a simultaneous manual read of the mechanical index and the MIU-captured index with agreement within the tolerance defined in the QAP.
4.21.3 Site Acceptance Testing	Platform-Side SAT Checklist	SAT shall verify at minimum: communication test on both SIM slots independently with RSSI logged; SIM failover test — primary SIM disabled, automatic failover confirmed; protocol communication test — data read confirmed against a concurrent manual reading; AMI Platform data receipt — data transmitted is received and correctly processed in the AMI Platform; end-to-end data flow test — data for the device reaches the SAP billing data export; TLS encryption confirmation on the communication path; OTA firmware capability confirmation — platform successfully pushes a test firmware package to the device.
4.21.3 Site Acceptance Testing	Dual Sign-Off	SAT records shall be signed by both the Bidder's representative and GEL's GA Team representative before the location enters operational status.



4.21.3 Site Acceptance Testing	Deficiency Resolution	Locations where SAT identifies deficiencies shall be flagged, reworked and retested before the zone is declared ready for parallel operations.
4.21.4 User Acceptance Testing	Multi-Team	UAT shall be conducted with GEL's GA Teams, billing team, IT team and SAP team.
4.21.4 User Acceptance Testing	Coverage	UAT shall cover all AMI Platform functional requirements, all configured integrations, all standard report types and mobile application functionality.
4.21.4 User Acceptance Testing	DR Failover Test	A live DR failover test shall be conducted as part of UAT; successful completion is a mandatory exit criterion before Go-Live acceptance is granted.
4.21.4 User Acceptance Testing	CERT-In Sign-Off	Evidence of remediation of all critical and high severity findings from the pre-Go-Live CERT-In VAPT shall be provided to GEL as a mandatory UAT exit criterion.
Module	Feature	Requirement
4.21.4 User Acceptance Testing	Defect Resolution	All critical and high severity UAT defects shall be resolved before Go-Live acceptance is granted.
4.21.5 UAT Documentation	Test Plan	The Bidder shall prepare a UAT test plan with test scripts covering all operational scenarios relevant to GEL's GA Teams and submit it to GEL for written approval before testing begins.
4.21.5 UAT Documentation	Completion Report	A UAT completion report signed by GEL's designated UAT team lead is a mandatory condition of Go-Live acceptance.

# Modem and MIU —Technical Specifications

## 5.1 General Hardware Principles

The specifications in this Section are indicative minimum requirements. Since the AMI System is delivered under the DBFOOT model, the Bidder owns all field hardware throughout the contractual period. The Bidder is therefore responsible for hardware design decisions — including power supply arrangement, enclosure design, barrier surge protection, communication technology and cable sizing — needed to meet GEL's functional and SLA requirements. GEL does not specify exact implementation values for these design parameters.

What GEL specifies are the minimum functional, environmental, communication and cybersecurity requirements that each device must meet. The Bidder shall design the field hardware to meet these requirements and to satisfy the device availability and data collection SLAs in Section 12. GEL reserves the right to review and reject proposed hardware that does not meet the specifications in this Section.

All hardware supplied under this RFP shall:

- Be newly manufactured — no refurbished or previously deployed hardware is acceptable
- Carry a remaining manufacturer support life of at least five years from the planned Go-Live date
- Not be at or beyond End-of-Life (EOL) or End-of-Support (EOS) at the time of supply
- Be compliant with MIL-STD-810G or the latest equivalent standard for environmental protection
- Carry a minimum IP65 ingress protection rating for outdoor industrial installation
- Be ATEX/PESO certified for the hazardous area classification applicable at the installation site
- Be RoHS compliant

### 5.1.1 EVC Communication Modem — Technical Specifications

#### 5.1.1.1 General Requirements

Sr. No.	Parameter	Specification
1	Type	Rugged industrial-grade cellular communication modem for direct interface with Electronic Volume Correctors
2	Application	Remote automated data acquisition from EVCs at metering skids (IMS); two-way communication between EVC and AMI Platform
3	EVC Compatibility	Modem shall support integration with all EVC makes and models in GEL's installed base (List provided separately as Annexure). A comprehensive compatibility list shall be submitted with the bid.
4	Serial Interface	Minimum two serial ports — RS-232 and RS-485/422 — for direct connection to EVC communication port and minimum two ethernet ports

Sr. No.	Parameter	Specification
5	Protocol Support	Modbus RTU, Modbus TCP, DLMS/COSEM and proprietary EVC OEM protocols as required for all EVC makes and models in GEL's network. Protocol documentation shall be shared with GEL at no cost as part of device supply.
6	Mounting	DIN rail or panel mounting; suitable for installation within a weatherproof outdoor enclosure
7	Certifications	ATEX/PESO certified for Zone 1, Group IIA/B as per IEC 60079; RoHS compliant; CE/MIL-STD-810G or latest equivalent

### 5.1.1.2 Communication and Network

Sr. No.	Parameter	Specification
1	Network Technology	The Bidder shall select the communication technology — 4G LTE or NB-IoT,— based on site-level signal survey results and the SLA requirements in Section 12. The Bidder is not restricted to any single technology and may deploy different technologies at different locations.
2	SIM Slots	Dual physical SIM slots with automatic failover. Where operationally feasible, SIM cards from two different operators shall be used across the two slots.
3	SIM Failover	Automatic failover from primary to secondary SIM on detection of network failure, with automatic restoration to primary when the primary network recovers. Failover event shall be logged and notified to the AMI Platform.
4	SIM Registration	All SIM cards shall be registered in Bidder's name under industrial/IoT service plans.
5	Transmission Modes	Push (scheduled and event-driven) and Pull (on-demand, serverinitiated). Both modes mandatory.
6	Encryption	TLS 1.2 or higher (TLS 1.3 preferred) for all data communication between Modem and AMI Platform. Unencrypted data transmission to the platform is not acceptable.
7	Communication Architecture	Push communication, pull communication, event-driven communication, retry handling, session persistence, heartbeat monitoring and configurable polling intervals — all supported.
8	Connectivity Status	LED or LCD indication for SIM 1 and SIM 2 signal strength and active connection status.
9	Antenna Connection	SMA or compatible RF connector for external high-gain antenna.

### 5.1.1.3 Data Storage and Transmission

Sr. No.	Parameter	Specification
1	Store-and-Forward	Modem shall store data locally during communication outages and transmit automatically on communication restoration, with no data loss.
Sr. No.	Parameter	Specification

		Minimum local storage capacity: 30 days of hourly interval data, plus alarm logs, event logs, communication logs and command execution logs.
2	Timestamp Preservation	All stored data records shall carry the EVC-side timestamp at the time of reading. Where the Modem stores EVC parameters in internal memory, the original EVC date and time stamp shall be preserved and transmitted to the AMI Platform, with no substitution of server-side timestamps for EVC-side timestamps.
3	Backfill	On restoration of communication after an outage, the Modem shall backfill all stored data to the AMI Platform in chronological order.
4	Data Integrity	Checksum validation on all transmitted data. The Modem shall not transmit partial, corrupt, or zero-value packets as valid data reads.
5	Retry Logic	Configurable automatic retry on failed transmission, with configurable retry count and interval. Retries shall stop automatically after successful transmission to avoid unnecessary communication overhead.

#### 5.1.1.4 Power Supply

Sr. No.	Parameter	Specification
1	If Bidder proposes battery-only power	Battery life shall be a minimum of <b>5 years</b> under standard operating conditions GEL agreed data push schedule to AMI Platform. Battery shall be industrial grade and field-replaceable.
2	If Bidder proposes mains power with battery backup	Mains supply as primary; battery backup minimum duration of <b>72 hours (3 days)</b> to maintain continuous Modem operation during mains supply failure. Battery shall be industrial grade and fieldreplaceable.
3	Power failure detection	Modem shall detect and report mains supply failure to AMI Platform in real time. Battery charge level shall be reported to AMI Platform at configurable intervals.
4	Battery replacement	When battery level falls below 20% remaining capacity, the AMI Platform shall generate an alert. Battery replacement is within the Bidder's O&M scope at no additional cost to GEL.
5	Requirement	GEL does not prescribe the power source. Whatever arrangement the Bidder proposes, it shall meet the device availability SLA in Section 12 and the battery life requirements above.
6	Power Source	The Bidder shall determine the power supply arrangement — mains, battery, solar, or hybrid — required to meet the device availability SLA in Section 12.
7	Requirement	The Modem shall operate continuously without interruption under the power arrangement selected by the Bidder. Power supply failure that results in data loss or communication outage counts against the device availability SLA.
8	Optimisation	The Modem shall implement intelligent power management including sleep/wake cycles and configurable retry limits to optimise power consumption under the selected power arrangement.

#### 5.1.1.5 Device Management

Sr. No.	Parameter	Specification
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1	OTA Firmware	Remote firmware upgrade Over-the-Air with no data loss from device memory. Full rollback to previous firmware version in case of upgrade failure.
2	Remote Diagnostics	Remote diagnostics accessible from AMI Platform including: remote reboot, communication diagnostics, signal quality monitoring, network registration status, data session status, reboot history and power interruption events.
3	Local Configuration	Local configuration and diagnostics via Bluetooth or optical interface. All local configuration access shall be password/OTP-based. Necessary accessories (Bluetooth dongle or optical cable) shall be supplied with each Modem.
4	Auto Recovery	Automatic watchdog with self-reboot on communication failure or abnormal device condition, without data loss.
5	Geo-tagging	GPS coordinates of Modem installation captured at I&C, accurate to within $\pm 1$ metre, stored in the AMI Platform asset register.
6	Device Identification	OEM name, model, firmware version, IMEI, ICCID (both SIM slots), SIM status and signal strength captured at I&C and available in the AMI Platform.
7	Telemetry	The Modem shall continuously report the following telemetry to the AMI Platform: signal strength per SIM slot, SIM status, network registration status, data session status, packet loss indicators, reboot history, power events and communication latency indicators.

#### 5.1.1.6 Environmental and Mechanical Requirements

Sr. No.	Parameter	Specification
1	Operating Temperature	-10°C to +55°C minimum
2	Storage Temperature	-10°C to +65°C minimum
3	Relative Humidity	5% to 95% RH, non-condensing
4	Ingress Protection	Minimum IP65 for the complete installed assembly (Modem within weatherproof enclosure)
5	Hazardous Area	ATEX/PESO certified Zone 1, Group IIA/B as per IEC 60079 for installation in or adjacent to hazardous classified areas
6	Environmental Standard	MIL-STD-810G or latest equivalent for vibration, shock and environmental protection
7	EMC Compliance	IEC/EN applicable EMC standards
8	Enclosure	Modem shall be installed within a weatherproof outdoor enclosure supplied by the Bidder. The enclosure shall be positioned outside the metering skid in the safe zone, at a minimum distance of 5 feet from the skid. Enclosure material shall be powder-coated SS304, polycarbonate,
Sr. No.	Parameter	Specification

		or equivalent non-corrosive material suitable for outdoor coastal and industrial environments.
9	Cable	Shielded communication cable between EVC and Modem. Cable routing and fixing shall protect against mechanical damage and environmental exposure.

#### 5.1.1.7 Cybersecurity Requirements

Sr. No.	Parameter	Specification
1	Encryption	AES-256 minimum for data at rest on device; TLS 1.2 or higher for data in transit
2	Secure Boot	Secure boot implementation — device shall only execute digitally signed firmware
3	Signed Firmware	All firmware updates shall be digitally signed. The Modem shall reject unsigned firmware packages.
4	Device Authentication	Unique device identity authentication with the AMI Platform before data exchange is permitted
5	Secure Credential Storage	Encryption keys and credentials stored in secure, tamperresistant storage
6	Role-Based Access	Role-based access control for local and remote configuration
7	Session Management	Automatic session timeout and logout functionality
8	Audit Trail	Complete audit trail of all configuration activities, firmware changes and access events
9	VAPT	Modem shall be included in the CERT-In VAPT conducted before Go-Live as specified in Section 4.9.3

#### 5.1.1.8 Antenna Requirements

Sr. No.	Parameter	Specification
1	Type	Omnidirectional external high-gain antenna compatible with the communication technology deployed at each site
2	Frequency	Compatible with all cellular/LPWAN bands used by selected operators in India
3	Gain	Minimum 5 dBi for cellular; appropriate gain for NB-IoT as applicable
4	Connector	SMA or compatible with Modem connection
5	Cable	Low-loss RF cable of appropriate length for the site layout
6	Mounting	Pole mount or wall mount with bracket, positioned for optimum signal reception
7	Environmental	IP65 minimum; UV-resistant, weather-proof housing; operating temperature -10°C to +55°C
8	Lightning Protection	Built-in lightning arrestor

## 5.1.2 Meter Interface Unit (MIU) — Indicative Technical Specifications

### 5.1.2.1 General Requirements

Sr. No.	Parameter	Specification
1	Application	Remote data acquisition from Positive Displacement (Diaphragm) gas meters via pulse output interface
2	Meter Compatibility	MIU shall be compatible with all PD meter makes and models in GEL's installed base (List provided separately as Annexure). A comprehensive compatibility list shall be submitted with the bid.
3	Supported Meter Interfaces	MIU shall support magnetic/reed switch-based index and Cyble-based pulse interfaces.
4	Mounting	MIU shall snap-fit directly to the meter wherever the meter make/model supports it. Where snap-fit is not feasible, the MIU shall be connected to the PD meter via a pulse cable supplied by the Bidder. A wire seal provision shall be present on the MIU (or pulse cable connection) so that the MIU or cable cannot be removed from the meter without breaking the seal. Wire sealing shall be carried out by GEL.
5	Built-in or External Modem	Each MIU shall incorporate either a built-in communication modem or be paired with a dedicated external communication modem. Communication from the MIU to the AMI Platform shall not depend on any shared or intermediate infrastructure.
6	Enclosure Material	Powder-coated SS304, polycarbonate, or equivalent non-corrosive material suitable for outdoor industrial and coastal environments across all GEL operating locations.
7	Certifications	ATEX/PESO Zone 1 certified; RoHS compliant; MIL-STD-810G or latest equivalent

### 5.1.2.2 Meter Interface and Pulse Cable

Sr. No.	Parameter	Specification
1	Pulse Cable	A pulse cable compatible with the specific meter make and model shall be supplied with each MIU where snap-fit mounting is not feasible.
2	Mounting — Non Snap-fit	Where the MIU is not of snap-fit type, the MIU shall be installed within a weatherproof enclosure with a hinged, lockable door and appropriate mounting accessories (pole mount or wall mount as required for the site). The enclosure shall be supplied and installed by the Bidder with each MIU unless MIU is directly mounted to Index head of the meter.
3	Pulse Constant Configuration	The MIU shall support configuration of the pulse constant to match the rated pulse output of the PD meter at the installation site.

### 5.1.2.3 Communication and Network

Sr. No.	Parameter	Specification
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1	Network Technology	The Bidder shall select the communication technology — 4G LTE or NB-IoT— based on site-level signal survey results and the SLA requirements in Section 12.
2	SIM Slots	Dual physical SIM slots with automatic failover. Where operationally feasible, SIM cards from two different operators shall be used across the two slots.
3	Communication Protocol	MQTT, DLMS/COSEM and equivalent industry-standard open protocols. Full protocol documentation shall be shared with GEL at no cost as part of supply.
4	Transmission Modes	Three modes, all mandatory: scheduled push at configurable periods; event-based real-time push for alarms and tamper events; on-demand pull from AMI Platform.
5	Scheduled Push	As a minimum, once per day push to AMI Platform, transmitting all stored hourly logs for the preceding 24 hours, covering consumption, minimum/maximum flow rates, battery percentage, signal percentage and alarm status.
6	Real-Time Alert Latency	Maximum latency for real-time alerts (tamper, MIU cover open, pulse disconnect, etc.) reaching the AMI Platform: <b>1 minute</b> from event occurrence.
7	Encryption	TLS 1.2 or higher for all communication between MIU and AMI Platform.
8	Antenna	External high-gain antenna, with signal strength visible on MIU display or through configuration software.
9	Antenna Connection	SMA or compatible RF connector.

#### 5.1.2.4 Power Supply

Sr. No.	Parameter	Specification
1	If Bidder proposes battery-only power	Battery life shall be a minimum of <b>5 years</b> under standard operating conditions GEL agreed data push schedule to AMI Platform. Battery shall be industrial grade and field-replaceable.
2	If Bidder proposes mains power with battery backup	Mains supply as primary; battery backup minimum duration of <b>72 hours (3 days)</b> to maintain continuous Modem operation during mains supply failure. Battery shall be industrial grade and fieldreplaceable.
3	Power failure detection	MIU shall detect and report mains supply failure to AMI Platform in real time. Battery charge level shall be reported to AMI Platform at configurable intervals.
4	Battery replacement	When battery level falls below 20% remaining capacity, the AMI Platform shall generate an alert. Battery replacement is within the Bidder's O&M scope at no additional cost to GEL.
Sr. No.	Parameter	Specification
5	Requirement	GEL does not prescribe the power source. Whatever arrangement the Bidder proposes, it shall meet the device availability SLA in Section 12 and the battery life requirements above.



6	Power Source	The Bidder shall determine the power supply arrangement — mains, battery, solar, or hybrid — required to meet the device availability SLA in Section 12.
7	Requirement	The MIU shall operate continuously without interruption under the power arrangement selected by the Bidder. Power supply failure that results in data loss or communication outage counts against the device availability SLA.
8	Optimisation	The Modem shall implement intelligent power management including sleep/wake cycles and configurable retry limits to optimise power consumption under the selected power arrangement.

### 5.1.2.5 Real-Time Clock and Time Synchronisation

Sr. No.	Parameter	Specification
1	RTC Architecture	Temperature-Compensated Crystal Oscillator (TCXO) based Real-Time Clock
2	RTC Accuracy	Timestamp accuracy within $\pm 2$ minutes per year under TCXO architecture
3	RTC Backup	Minimum 10-year RTC battery backup
4	Time Synchronisation	MIU RTC shall be automatically synchronised with the NTP server clock provided by the Bidder at the AMI Platform end. RTC synchronisation logs shall be available in the AMI Platform.

### 5.1.2.6 Data Logging and Storage

Sr. No.	Parameter	Specification
1	Memory	Non-volatile memory — data shall be retained during power failure or device reset
2	Interval Logs	Configurable interval — 10, 20, or 30 minutes
3	Hourly Logs	Minimum 6 months of hourly logs
4	Daily Logs	Minimum 12 months of daily logs
5	Monthly Logs	Minimum 10 years of monthly logs
6	Event Logs	Communication failures, cable disconnect, low battery, device reboot/reset and configuration changes
7	Parameter Logs	Interval, hourly, daily and monthly logs shall include minimum and maximum values for consumption and flow rate within each logging period
8	Communication Failure Buffer	Minimum 30 days of hourly data storage available under communication failure conditions
9	Backfill	MIU shall backfill all stored data to the AMI Platform on communication restoration, in chronological order

### 5.1.2.7 Display, Keypad and User Interface

Sr. No.	Parameter	Specification
1	Display	Single-line, dual-line, OLED, or LCD — type at Bidder's design discretion

2	Display Parameters	Visual indication for meter reading, battery status, signal strength and alarm status
3	Display Power Saving	Display shall switch off after a configurable period of inactivity and shall be activated by a button on the MIU
4	Keypad	Navigation and manual trigger buttons
5	Local Configuration	Local configuration and diagnostics via Bluetooth or optical interface, protected by password/OTP-based secure access. Necessary accessories (optical cable or Bluetooth dongle) shall be supplied with each MIU.
6	Manual Transmission	Provision to trigger a manual data transmission from the MIU
7	Diagnostics	Real-time network diagnostics and communication logs viewable locally

### 5.1.2.8 Alarm and Tamper Features

Sr. No.	Alarm / Feature	Requirement
1	Magnetic tamper detection	Mandatory
2	MIU cover open alert	Mandatory
3	Pulse cable cut or disconnect alert	Mandatory
4	Low battery alert (user-configurable threshold)	Mandatory
5	Communication failure alert	Mandatory
6	Threshold-based alerts for minimum and maximum flow and consumption (user-configurable thresholds)	Mandatory
7	Signal strength alert	Mandatory
8	Unauthorised configuration alert	Mandatory

### 5.1.2.9 Environmental and Mechanical Requirements

Sr. No.	Parameter	Specification
1	Operating Temperature	-10°C to +55°C minimum
2	Storage Temperature	-10°C to +65°C minimum
3	Relative Humidity	5% to 95% RH, non-condensing
4	Ingress Protection	Minimum IP65 for the complete installed assembly (Modem within weatherproof enclosure)
5	Hazardous Area	ATEX/PESO certified Zone 1, Group IIA/B as per IEC 60079 for installation in or adjacent to hazardous classified areas
Sr. No.	Parameter	Specification
6	Environmental Standard	MIL-STD-810G or latest equivalent for vibration, shock and environmental protection
7	EMC Compliance	IEC/EN applicable EMC standards

8	Enclosure	Modem shall be installed within a weatherproof outdoor enclosure supplied by the Bidder. The enclosure shall be positioned outside the metering skid in the safe zone, at a minimum distance of 5 feet from the skid. Enclosure material shall be powder-coated SS304, polycarbonate, or equivalent non-corrosive material suitable for outdoor coastal and industrial environments.
9	Cable	Shielded communication cable between EVC and Modem. Cable routing and fixing shall protect against mechanical damage and environmental exposure.

#### 5.1.2.10 Cybersecurity Requirements

Sr. No.	Parameter	Specification
1	Encryption	AES-256 minimum for data at rest; TLS 1.2 or higher for data in transit
2	Secure Communication	TLS 1.2 or higher mandatory
3	Device Authentication	Unique device authentication with AMI Platform mandatory before data exchange
4	Secure Firmware	Digitally signed firmware only; MIU shall reject unsigned firmware packages
5	Audit Trails	Complete audit trail of all user and configuration activities
6	Access Control	Role-based access control for local and remote configuration
7	VAPT	MIU shall be included in the CERT-In VAPT conducted before Go-Live
8	Key Management	Secure encryption key management
9	Session Management	Automatic logout/session timeout

#### 5.1.2.11 AMI Platform Integration Requirements

Sr. No.	Parameter	Specification
1	Data Integration	Compatible with AMI Platform (HES/MDMS functionality), SAP/Billing system
2	API Support	Open APIs for third-party integration
3	Push/Pull	All MIU parameters, diagnostics and event logs shall be pushed to AMI Platform. All parameters shall be available for on-demand pull.
4	Export Formats	Data exportable in CSV/XLSX format and compatible with SAP/Billing integration
5	Timestamps	Mandatory on all logged records
Sr. No.	Parameter	Specification
6	Time Synchronisation	Mandatory — per Section 5.3.4
7	Remote Configuration	Remote configuration and diagnostics through AMI Platform

8	Data Synchronisation	Automatic synchronisation after communication restoration (backfill)
9	Transmission Frequency	All parameters (logged hourly) shall be transmitted to the AMI Platform by the MIU at minimum once every 24 hours

### 5.1.2.12 Continuous Diagnostics

- The MIU shall support continuous heartbeat diagnostics for network, device health and communication status monitoring.
- A timestamped log of MIU network registration events and AMI Platform communication history shall be maintained in the device and available to the AMI Platform.
- The MIU shall support automatic soft reset/auto-reboot on detection of communication failure conditions, without data loss.
- Device diagnostics shall include: battery status, signal quality, firmware version and communication health.
- Network diagnostics shall include: signal strength, registration logs and communication history — all available through the AMI Platform.
- Signal strength history logs shall be stored on the device and transmitted to the AMI Platform.
- Battery percentage and battery history logs shall be stored on the device and transmitted to the AMI Platform.

## 6 Project Implementation: Phases, Activities and Milestone Deliverables

### 6.1 General Execution Principles

- The Bidder shall treat the project as a single, integrated scope and shall be solely responsible for all coordination — technical, commercial and administrative — required to deliver the AMI System from contract award through Go-Live and across the full O&M Period.
- All milestone deliverables shall be submitted to GEL in writing. GEL's written acceptance of each milestone is a condition of progress to the next phase. No milestone shall be considered complete on the basis of verbal confirmation.
- The Bidder shall bear full financial risk during the implementation phase. The only payment GEL makes before the full project Go-Live acceptance certificate is the mobilisation advance described in Section 11.2. All CAPEX for hardware procurement, installation and platform deployment is the Bidder's investment, recovered through quarterly OPEX payments post Go-Live.
- The Bidder shall maintain a project QHSE plan throughout the implementation phase. All field activities shall comply with GEL's site safety requirements and applicable OISD standards.
- The Bidder shall maintain a risk register from contract award. Risks shall be reviewed with GEL at every project review meeting. The Bidder shall be responsible for implementing mitigation actions within agreed timelines.

- The date of contract award by GEL is referred to as **T1** throughout this Section. All milestone timelines are stated as offsets from T1.

## 6.2 Milestone Summary

The project is structured across three phases and six milestones. Phase 2 (platform deployment) and Phase 3 (hardware procurement) commence in parallel from T1 + 1 month to meet the sixmonth implementation window. The Bidder shall propose a detailed project schedule with the bid including zone-wise installation timelines, parallel team deployment and critical path analysis.

Milestone Phase		Description	Timeline	Payment Trigger
<b>A1</b>	Phase 1	Project Kickoff, Mobilisation and Planning	T1	None
<b>A2</b>	Phase 1	Site Survey Completion, BoQ Finalisation and Platform Device Onboarding	T1 + 1 month	None
<b>A3</b>	Phase 2	AMI Platform Deployment, Configuration, Integration and System Testing	T1 + 2 months (parallel with A2 and A4)	None
Milestone	Phase	Description	Timeline	Payment Trigger
<b>A4</b>	Phase 3	Hardware Procurement, FAT and Dispatch Clearance	T1 + 1.5 months (parallel with A2 and A3)	None
<b>A5</b>	Phase 3	Zone-wise Field Installation, SAT and Parallel Operations	T1 + 2 to T1 + 5 months	None
<b>A6</b>	Phase 3	Full Project Go-Live, SLA Stabilization and O&M Commencement	T1 + 6 months *(Go-Live); T1 + 9 months (O&M start)	Quarterly OPEX from Go-Live acceptance certificate date

**Note on payments:** No OPEX payment is triggered by any milestone. Quarterly OPEX billing commences from the date GEL issues the full project Go-Live acceptance certificate, following the 3-month SLA stabilisation period. See Section 11 for the complete payment framework.

## 6.3 Project Management Requirements

### 6.3.1 Project Management Office

The Bidder shall establish a dedicated Project Management Office (PMO) with effect from T1. The PMO shall manage all project activities from mobilisation through final Go-Live and across the O&M Period.

The PMO shall include at minimum:

- **Project Manager (1):** Minimum 8 years of experience in AMI or metering infrastructure implementation projects. Single Point of Contact (SPOC) for all contractual, technical and administrative matters with GEL. Shall attend all milestone review meetings in person or virtually and shall be available at short notice.
- **AMI Technical Lead (1):** Minimum 5 years of experience in AMI Platform deployment, HES/MDMS configuration and enterprise system integration. Responsible for platform architecture, driver development oversight and integration delivery.
- **Field Implementation Lead (1):** Responsible for coordinating zone-wise hardware installation teams, survey activities and site commissioning across all GAs.
- **HES/MDMS Integration Expert (1):** Responsible for SAP Billing integration, API configuration and all enterprise system integrations.
- **Project Coordinators / Documentation Specialists (minimum 2):** Responsible for progress reporting, document control, status tracking and milestone documentation.

The Bidder shall not replace the Project Manager or AMI Technical Lead without GEL's prior written approval. Any proposed replacement must have equal or superior qualifications.

### 6.3.2 Project Reporting

- The Bidder shall submit a weekly progress report to GEL covering activities completed, activities in progress, issues and risks, planned activities for the next week and any requests for GEL decisions or actions.
- The Bidder shall submit a monthly milestone status report at the beginning of each calendar month covering cumulative progress against the project schedule, updated risk register and resource deployment status.
- The Bidder shall attend a monthly project review meeting with GEL. Meeting minutes shall be prepared by the Bidder and circulated to GEL within 48 hours.
- The Bidder shall provide GEL with access to the project tracking tool (Gantt chart, task register, or equivalent) throughout the implementation phase, updated weekly.

### 6.3.3 Change Management

- Any changes to the agreed project scope, timeline, or deliverables shall be formally documented in a Change Request, signed by both parties before implementation.
- Changes requested by GEL that materially increase the Bidder's scope shall be priced based on the rates in the SOR where applicable.
- The Bidder shall not implement any scope change without GEL's written approval.

## 6.4 Phase 1 — Project Mobilisation and Survey

Phase 1 covers project mobilisation, site survey, BoQ finalisation and AMI Platform device onboarding. It spans Milestones A1 and A2 and runs from T1 to T1 + 1 month. Phase 1 acceptance is a prerequisite for hardware procurement.

## 6.4.1 Milestone A1 — Project Kickoff, Mobilisation and Planning

**Timeline:** T1 (contract award)

**Activities:**

- The Bidder shall attend a formal project kickoff meeting with GEL within **5 working days of T1**. The meeting shall confirm project scope, zone-wise rollout sequence, survey schedule, escalation matrix, communication protocols and site access arrangements.
- The Bidder shall mobilise the Project Management Office with all required roles confirmed and active from T1.
- The Bidder shall prepare and submit all planning documents listed below within **15 calendar days of T1**.
- The Bidder shall establish site access arrangements with GEL's GA Teams for all survey and installation activities before field work begins.
- The Bidder shall identify and initiate engagement with all EVC OEMs in GEL's installed base to begin driver development planning for any OEM not natively supported by the proposed AMI Platform.

**Deliverables:**

#	Deliverable	Description
1	Project Execution Plan	All phases, timelines, zone-wise rollout sequence, resource deployment plan and parallel team strategy
2	Quality Assurance Plan (QAP)	Per the QA, Testing and Acceptance Criteria section of this RFP; submitted for GEL approval
3	QHSE Plan	Site safety, health, environment and emergency response procedures for all field activities
4	Communication and Escalation Matrix	Named contacts, communication frequency and escalation paths for all project activities
5	Risk Register — Initial Version	Top risks with likelihood, impact, mitigation measures and owners
6	EVC OEM Driver Development Plan	List of all EVC OEMs in GEL's installed base, identification of those not natively supported and development timelines for each driver

**Acceptance Criteria:**

- GEL's written acceptance of the Project Execution Plan, QAP, QHSE Plan and EVC OEM Driver Development Plan
- PMO mobilised with all required roles confirmed in writing to GEL • Site access arrangements confirmed with GEL's GA Teams



## 6.4.2 Milestone A2 — Site Survey Completion, BoQ Finalisation and Platform Device Onboarding

**Timeline:** T1 + 1 month

**Activities:**

- The Bidder shall conduct a physical site survey at every EVC IMS/IPRS location and every PD meter location in scope. No hardware procurement shall commence without GEL's acceptance of this milestone.
- GEL does not prescribe a specific survey methodology. The Bidder shall propose a methodology — dipstick, full site-by-site, or a combination — appropriate for the scale and geography of the project. The proposed methodology, survey schedule and resource plan shall be submitted to GEL for review and acceptance before survey work begins.

Survey Data to be Collected at a minimum

**At each EVC/IMS location:**

- EVC make, model, serial number, firmware version and available communication port type and condition
- Power availability at the site — source type and capacity
- Signal survey for proposed communication technology (signal strength, operator coverage and any blind spots)
- GPS coordinates of the installation point
- Shortest route for shielded cable between EVC and Modem installation point
- Weatherproof enclosure siting — confirmation that a suitable safe-zone location at least 1.5 metres from the metering skid is available
- Access constraints, safe-zone compliance assessment, permit requirements, or sitespecific installation notes

**At each PD meter/IMS location:**

- Meter make, model, serial number and pulse output interface type
- Physical condition of the meter.
- Pulse output port availability and condition — confirm MIU is able to produce the pulse output from the available port.
- Pulse cabling route assessment from meter pulse output to proposed MIU location
- Power availability at the site
- Signal survey for proposed communication technology
- GPS coordinates
- Access constraints, safe-zone compliance assessment, permit requirements, or sitespecific notes
- The Bidder shall assess the data collection performance of the existing AMI system at each location over the 30 days preceding the survey — recording last successful read date, communication success rate and any known issues.



- The Bidder shall finalise the Bill of Quantities based on actual site conditions, confirming the count of EVC Modems, PD Meter MIUs, antennas, enclosures and ancillary hardware required per location.
- The Bidder shall register all surveyed locations and devices in the AMI Platform, creating a complete device registry ready for hardware commissioning.
- The Bidder shall prepare the Phase 3 installation plan — zone-wise rollout sequence, parallel field team deployment and location-wise installation timelines — based on survey findings.

**Deliverables:**

#	Deliverable	Description
1	Location-Wise Survey Reports	Site photographs, GPS coordinates, signal strength data, EVC/PD meter details, power assessment, safe-zone assessment and access constraints for every in-scope location
2	Existing AMI System Baseline Report	Data collection performance of the existing AMI system per location — 30-day average communication success rate, last successful read date and any known deficiencies
3	Confirmed Bill of Quantities	BoQ confirmed against actual site conditions, broken down by station type and GA, agreed with GEL before hardware procurement begins
4	AMI Platform Device Registry	Confirmation that all in-scope devices are registered in the AMI Platform with location details, GPS coordinates and device type
5	Phase 3 Implementation Plan	Zone-wise rollout sequence, parallel field team deployment plan, location-wise installation timelines and critical path
6	Risk Register — Survey Update	Updated with site-specific risks and access constraint findings

**Acceptance Criteria:**

- GEL's written acceptance of all six deliverables above
- BoQ agreed between Bidder and GEL in writing — this acceptance is the trigger for hardware procurement
- GEL's written approval of the Phase 3 implementation plan before field installation begins
- Device registry confirmed by GEL as complete for all in-scope locations

## 6.5 Phase 2 — AMI Platform Deployment, Configuration, Integration and Testing

Phase 2 covers the complete deployment of the AMI Platform from cloud infrastructure provisioning through to system testing and integration testing readiness. Phase 2 commences at T1 + 1 month and runs in parallel with Phase 3 hardware procurement.

## 6.5.1 Milestone A3 — AMI Platform Deployment, Configuration, Integration and System Testing

**Timeline:** T1 + 2 months (*commences at T1 + 1 month, in parallel with A2 and A4*)

### Activities:

- The Bidder shall procure and configure the MeITY-empanelled cloud infrastructure, including primary cloud data centre and geographically separate DR site, before any platform deployment commences.
- The Bidder shall deploy the AMI Platform — HES functionality, MDMS functionality, NMS functionality and EMS — on the provisioned cloud infrastructure.
- The Bidder shall complete all platform configuration including: EVC OEM protocol drivers for all OEMs in GEL's installed base, MIU data collection integration, three-tier data collection scheduling, VEE rules, customer grouping, billing cycle configuration as per GEL requirements (minimum of 7-day, 10-day and 15-day), SAP upload format and alarm threshold configuration.
- The Bidder shall complete and test the SAP Billing integration, covering all three billing cycle types and confirming that billing determinants are delivered in the format agreed with GEL's SAP team.
- The Bidder shall complete all other enterprise system integrations required by GEL at this stage — SCADA, CRM, GIS, Workforce Management and ESB where applicable.
- The Bidder shall complete AMI Platform system testing and integration testing per the QA, Testing and Acceptance Criteria section of this RFP. No defects classified as Critical or High shall remain open at milestone acceptance.
- The Bidder shall complete performance and load testing per the benchmarks in the QA, Testing and Acceptance Criteria section. All benchmarks shall be met before this milestone can be accepted.
- The Bidder shall deploy the EMS, configure GEL's independent read-only access and demonstrate automated quarterly SLA report generation to GEL's IT team.
- The Bidder shall configure the AMI Platform mobile application for all required GEL user roles and verify all offline and online capabilities.
- The Bidder shall configure and demonstrate the helpdesk ticketing system — GEL staff raises an issue, ticket is generated to the Bidder, status is visible to GEL.
- The Bidder shall prepare all platform documentation and deliver it to GEL as part of this milestone's deliverables.
- The NMS shall be deployed and operational, with all communication monitoring, SIM-level tracking and root-cause categorisation configured before this milestone is accepted.

### Deliverables:

#	Deliverable	Description
1	AMI Platform Deployment Confirmation	Written confirmation of cloud infrastructure provisioned (MeITY empanelled, primary + DR), with MeITY certificate

2	System Configuration Document	Complete record of all platform configuration — EVC drivers, VEE rules, billing cycles, collection schedules, alarm thresholds, user roles and integration parameters
3	EVC Driver Test Results	Per-OEM test results confirming data collection from all EVC OEMs in GEL's installed base
#	Deliverable	Description
4	SAP Integration Test Report	Test results confirming billing determinant delivery for all three billing cycle types in the agreed SAP format
5	Enterprise Integration Test Report	Test results for all other configured integrations (SCADA, CRM, GIS, WFM, ESB)
6	System Testing Report	Complete system testing results per the QA, Testing and Acceptance Criteria section — zero open Critical or High defects
7	Performance and Load Test Report	Test results against all benchmarks in the QA, Testing and Acceptance Criteria section
8	EMS Deployment and Access Confirmation	Confirmation that EMS is operational, GEL independent read-only access is active and automated quarterly SLA report generation has been demonstrated to GEL's IT team
9	NMS Deployment Confirmation	Confirmation that NMS is operational with all communication monitoring, SIM tracking and root-cause categorisation active
10	Mobile Application Deployment Confirmation	Confirmation that iOS and Android applications are deployed, all user roles are configured and offline mode is verified
11	AMI Platform FRS and SRS	GEL-approved Functional Requirements Specification and System Requirements Specification, agreed during this phase
12	API Documentation	Complete API documentation for all northbound, southbound and integration interfaces
13	DR Failover Test Record	Evidence of a live DR failover test with recovery within the RTO, from this phase's testing

**Acceptance Criteria:**

- GEL's written acceptance of all deliverables above
- All EVC OEM drivers operational and tested against GEL-witnessed data reads
- SAP Billing integration confirmed as operational by GEL's SAP team
- System testing complete with zero open Critical or High defects
- All performance benchmarks met
- EMS operational with GEL independent access confirmed
- NMS operational with communication monitoring active

- FRS and SRS approved by GEL in writing

## 6.6 Phase 3 — Hardware Procurement, Field Installation and Go-Live

Phase 3 covers hardware procurement, FAT, field installation across all GAs, SAT, parallel operations and the full project Go-Live. It spans Milestones A4, A5 and A6. A4 (hardware procurement and FAT) commences in parallel with Phase 2 from T1 + 1.5 months. A5 (field installation and SAT) commences from T1 + 2 months and runs across all zones simultaneously using parallel installation teams.

### 6.6.1 Milestone A4 — Hardware Procurement, FAT and Dispatch Clearance

**Timeline:** T1 + 1.5 months (*commences at T1 + 1 month, in parallel with A2 and A3*)

#### Activities:

- Following GEL's acceptance of Milestone A2 (BoQ confirmation), the Bidder shall initiate hardware procurement for all EVC Modems, PD Meter MIUs, antennas, enclosures, junction boxes, surge protection devices and all ancillary field hardware per the confirmed BoQ.
- The Bidder shall submit the unpriced Bill of Materials for 60% of total equipment quantities to GEL within **3 weeks of contract award**, independent of Milestone A2 completion, to enable early procurement planning.
- The Bidder shall conduct FAT on all hardware batches using a TPIA appointed and paid for by the Bidder, per the FAT procedures in the QA, Testing and Acceptance Criteria section of this RFP.
- No hardware batch shall be dispatched to site without GEL's dispatch clearance issued on the basis of the TPIA's FAT completion certificate.
- The Bidder shall maintain a hardware delivery and dispatch tracker, updated weekly, shared with GEL.

#### Deliverables:

#	Deliverable	Description
1	Unpriced BoM (60%)	Unpriced Bill of Materials for 60% of equipment quantities within 3 weeks of contract award
2	Hardware Procurement Schedule	Vendor-wise and item-wise procurement and delivery timeline updated weekly
3	TPIA FAT Completion Certificates	Batch-wise certificates issued by the TPIA for all hardware batches tested, with batch size, test date and pass/fail summary
4	GEL Dispatch Clearance Records	GEL-issued clearance for each dispatched batch based on TPIA certificates

5	Delivery and Receipt Confirmation	Location-wise delivery records confirming hardware received at site in good condition
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**Acceptance Criteria:**

- GEL's written acceptance of TPIA FAT completion certificates for all hardware batches
- All batches dispatched with GEL dispatch clearance
- Hardware delivered to site in quantities matching the confirmed BoQ

## 6.6.2 Milestone A5 — Field Installation, SAT and Parallel Operations

**Timeline:** T1 + 2 to T1 + 5 months

**Activities:**

- The Bidder shall mobilise parallel field installation teams across all active GAs simultaneously from T1 + 2 months. The number of teams shall be sufficient to complete all installations within the T1 + 5-month window.
- At each EVC location, the Bidder shall install and commission the EVC Modem per the approved installation procedures, including enclosure, antenna, cables, surge protection and SIM configuration.
- At each PD meter location, the Bidder shall install and commission the MIU per the approved installation procedures.
- The Bidder shall conduct SAT at every location immediately after installation, in the presence of GEL's GA Team representative, per the SAT checklists in the QA, Testing and Acceptance Criteria section.
- All SAT records shall be dual-signed by the Bidder's field representative and GEL's GA Team representative before the location is declared commissioned.
- The Bidder shall resolve all SAT deficiencies within **10 calendar days** of identification.
- Following SAT completion in each zone, the Bidder shall conduct parallel operations (minimum 30 days per zone) with both the existing AMI system and the new AMI System collecting data simultaneously, per the Parallel Operations Testing procedures in the QA, Testing and Acceptance Criteria section.
- At the end of each zone's parallel period, the Bidder shall submit the zone-level reconciliation report to GEL.
- The Bidder shall develop all EVC OEM drivers required for GEL's installed base and load them into the AMI Platform before installation at the relevant locations commences.
- The Bidder shall maintain an installation progress tracker showing, per location and per GA: survey status, installation status, SAT status, parallel operations status and any open deficiencies.

Integration Setup and Testing

**SAP Billing Integration — Mandatory:**

- The Bidder shall design, configure and test the integration between the AMI Platform and GEL's SAP Billing system. The integration design shall be agreed with GEL's SAP team before configuration begins.
- The integration shall deliver validated, VEE-processed billing determinants for all three billing cycle types in the format required by GEL's SAP system.
- Integration testing shall cover all billing cycle types, all customer categories, data gap handling and exception scenarios.
- Successful end-to-end billing data flow — from field device read through AMI Platform processing to SAP billing record — is a mandatory condition for Go-Live acceptance. **Other**

#### **Enterprise System Integrations:**

- The Bidder shall configure integrations with GEL's SCADA, CMP, CRM and any other enterprise systems identified by GEL, within timelines agreed with GEL.

#### **System Testing**

The Bidder shall complete all testing specified in Section 4 before requesting Go-Live acceptance from GEL. Testing shall cover:

- Functional testing of all AMI Platform modules against requirements in Section 4
- Performance testing under peak load conditions at the full 7,000-point scale
- Security testing including independent penetration test by a CERT-In empanelled auditor
- DR failover test demonstrating automatic failover and RTO/RPO compliance
- End-to-end integration testing with SAP Billing and all other configured enterprise systems
- User Acceptance Testing (UAT) with GEL's GA Teams covering all operational scenarios

#### **Parallel Operations**

On completion of Milestone A4 hardware installation, the Bidder shall execute a mandatory parallel operations period before the existing AMI system is decommissioned.

- The parallel operations period for each zone shall be a minimum duration agreed with GEL, indicatively 30 to 60 days.
- During the parallel period, both the existing AMI system and the new AMI System shall simultaneously collect data from the same field devices.
- The Bidder shall produce weekly comparative reconciliation reports for each zone during the parallel period, showing data collected by both systems per device — daily read comparison, any gaps in the new system and resolution status.
- Any data gaps or discrepancies in the new AMI System identified during the parallel period shall be investigated and resolved by the Bidder within the agreed timeline.
- At the end of the parallel period, the Bidder shall submit a zone-level reconciliation summary demonstrating that the new AMI System has matched or exceeded the data collection performance of the existing system.
- GEL will review the reconciliation summary and issue written Go-Live acceptance for that zone if satisfied.

#### **Deliverables:**

#	Deliverable	Description
1	Installation Completion Reports	Per zone: total locations installed, SAT completion status, open deficiencies and resolution status and EVC driver deployment status
2	SAT Records — All Locations	Dual-signed SAT completion record for every commissioned location, filed by GA and zone
3	SAT Deficiency Register	All deficiencies identified during SAT, with resolution status and close-out date
4	EVC Driver Register	List of all EVC OEM drivers developed, version, test results and load date per OEM
5	Parallel Operations Reconciliation Reports	Reconciliation report per the acceptance thresholds in the QA, Testing and Acceptance Criteria section
6	Installation Progress Tracker	Weekly updated tracker showing per-location status across all GAs
7	Non-Attributed Device Register (if applicable)	List of any devices that could not be commissioned due to reasons not attributable to the Bidder, with device ID, installation date, reason and proposed resolution action — submitted for GEL acceptance

**Acceptance Criteria:**

- 100% of in-scope devices commissioned, OR non-attributed device register accepted by GEL in writing for any exceptions
- All SAT records dual-signed and filed
- All open SAT deficiencies resolved and close-out confirmed by GEL
- Parallel operations reconciliation reports accepted by GEL for all zones
- Existing AMI system decommissioned in all zones per GEL's written acceptance
- EVC drivers for all OEMs in GEL's installed base loaded and operational in the AMI Platform

### 6.6.3 Milestone A6 — Full Project Go-Live, SLA Stabilisation and O&M Commencement

**Timeline:** T1 + 6 months (Go-Live readiness); T1 + 9 months (*full project Go-Live acceptance certificate*)

**Activities:**

- Following GEL's acceptance of Milestone A5, the Bidder shall submit a signed Go-Live Readiness Declaration to GEL per the Go-Live Preparedness checklist in the QA, Testing and Acceptance Criteria section, at least **5 working days** before requesting Go-Live acceptance.
- The Bidder shall conduct UAT with GEL's GA Teams, billing team, IT team and SAP team, per the UAT procedures in the QA, Testing and Acceptance Criteria section.



- The Bidder shall complete the pre-Go-Live CERT-In VAPT and remediate all Critical and High severity findings before requesting Go-Live acceptance. The CERT-In auditor's closure evidence shall be submitted to GEL.
- The Bidder shall conduct a live DR failover test as part of UAT, confirming full system functionality on the DR site within RTO.
- The Bidder shall ensure all approved SOPs per Section 7.6 are accessible through the AMI Platform (web and mobile) and that SOP training has been completed for all GA Teams.
- From the date of implementation Go-Live (T1 + 6 months), the Bidder shall operate the complete AMI System through a **3-month SLA stabilisation period** (T1 + 6 to T1 + 9 months). SLAs are measured and recorded throughout, but financial penalties do not apply during this period.
- At the end of the SLA stabilisation period, the Bidder shall submit the project closure documentation package.
- GEL shall issue the formal project Go-Live acceptance certificate on confirmation that all acceptance criteria below are met. From the date of this certificate, the five-year O&M Period commences and quarterly OPEX billing begins.

**Deliverables:**

#	Deliverable	Description
1	Go-Live Readiness Declaration	Signed declaration confirming completion of all 15 checklist items in the QA, Testing and Acceptance Criteria section
2	UAT Completion Report	Signed by GEL's designated UAT team lead; confirms all scenarios passed and zero Critical/High defects remain
3	CERT-In VAPT Final Clearance	CERT-In auditor's written confirmation that all Critical and High findings are remediated
4	DR Failover Test Record	Evidence of live DR failover test passed during UAT, with recovery time documented
5	EMS Go-Live Confirmation	Written confirmation that EMS is operational, GEL independent read-only access is active and automated SLA tracking is running for all commissioned devices
6	SOP Package Delivery Confirmation	GEL's written acceptance of all approved SOPs; confirmation that all SOPs are accessible via the AMI Platform
7	Training Completion Certificate	Confirmation of completion of all training per Section 7 for all GA Teams across all active zones
8	Complete System Documentation Package	As-built documentation, API specifications, all integration configurations, platform administration guides, O&M manuals, field maintenance procedures and asset inventory with GPS coordinates
9	SLA Stabilisation Period Reports	Monthly SLA performance report for each of the three stabilisation months
#	Deliverable	Description



10	Final Asset Inventory	Complete list of all deployed hardware by location and GA — Device ID, make, model, serial number, firmware version, SIM ICCIDs, GPS coordinates and commissioning date
11	Handover Documentation	Complete project handover pack including all documentation listed above, version-controlled and indexed

**Acceptance Criteria:**

- UAT completion report signed by GEL's designated UAT team lead
- Zero open Critical or High UAT defects
- CERT-In VAPT clearance with all findings closed
- Live DR failover test passed
- EMS fully deployed with GEL independent access confirmed and SLA tracking operational
- All approved SOPs accessible through AMI Platform (web and mobile)
- Training completion confirmed for all GA Teams
- Complete system documentation package accepted by GEL
- 3-month SLA stabilisation period complete with all three monthly SLA reports submitted
- GEL issues the formal full project Go-Live acceptance certificate
- From the date of this certificate, the five-year O&M Period commences; the 3-month stabilisation window does not count against the O&M Period; the SLA framework in Section 12 becomes fully operative

## 6.7 O&M Period Milestones

Once the full project Go-Live acceptance certificate is issued, the five-year O&M Period commences. The Bidder's obligations during the O&M Period are governed by Section 8 and Section 12. The following recurring milestones apply:

O&M Milestone	Frequency	Description
Quarterly OPEX Invoice and SLA Report	Every quarter	Invoice with EMS-generated SLA compliance report; 70% released on invoice acceptance; 30% after GEL SLA verification
Preventive Maintenance Report	Every quarter	PM completion records for all hardware — Modems, MIUs, antennas, enclosures — with next scheduled date
Annual Cybersecurity Review	Every 12 months	IEC 62443 / NCIIPC compliance review with findings report submitted to GEL within 30 days
O&M Milestone	Frequency	Description
Annual Platform Health Assessment	Every 12 months	Comprehensive review of platform performance, capacity, security patch status and EOL/EOS status of all components

Annual Asset Condition Report	Every 12 months	Physical condition assessment of all deployed hardware with recommended maintenance or replacement actions
Contract Year Transition Confirmation	Start of each O&M year	Confirmation of applicable unit rates for new EVC/PD meter onboarding per SOR

## 6.8 Cross-Cutting Activities Throughout Implementation

The following activities run in parallel with all milestones from T1 to Go-Live(including stabilisation period):

- **Project coordination and reporting** — Daily progress reports, weekly progress reports, Bimonthly reviews and risk register updates
- **QHSE compliance** — safety, health and environment management at all field sites per GEL's HSE requirements and applicable OISD standards
- **Change management** — logging, assessment and approval of scope changes
- **EVC driver development** — ongoing for any OEM requiring new driver development
- **Project communication** — regular updates to GEL's GA Team leaders on survey schedules, installation timelines and Go-Live planning for their zones, Data
- **Issue and defect tracking** — live punch point register maintained daily during active field phases; shared with GEL weekly; all issues reviewed at monthly project review meetings

## 7 Training and Capacity Building

### 7.1 Training Strategy

- The Bidder shall design and deliver a role-based training programme that covers all GEL personnel who will operate, manage, maintain, or use the AMI System in any capacity — from GA Team operators and field technicians to billing staff, system administrators and GEL management.
- The Bidder shall develop a Training Needs Assessment within 15 days of T1, identifying all GEL roles requiring training, the specific AMI system competencies required for each role and the number of personnel to be trained per role across all 29 GAs.
- The Bidder shall submit a Training Plan to GEL for review and written acceptance before training commences. The plan shall cover course content outlines, participant profiles, training schedule, venue or platform, delivery methodology and evaluation approach.
- The bidder shall offer a training schedule with all training modules for approval to GEL and complete the one batch of training before Go-Live of the AMI system.
- The Bidder shall implement a structured knowledge transfer programme alongside the training courses, with the objective of making GEL's teams operationally self-sufficient for day-to-day AMI system operations before Go-Live.
- The Bidder shall provide **shadowing opportunities** for GEL system administrators and GA Team supervisors during the AMI Platform deployment and commissioning phases. Designated GEL personnel shall work alongside the Bidder's technical team during platform configuration, integration setup and commissioning.

- The Bidder shall establish a self-paced Learning Management System (LMS) accessible to all GEL staff, containing recorded training modules for all courses agreed with GEL, with content updated whenever the AMI Platform changes. GEL staff shall be able to access and complete training modules at any time through the LMS without requiring Bidder scheduling.
- The Bidder shall provide training to all the concerned officials at GA level as well as at the corporate office level before the award of the Go live of the entire project. Further, Bidder shall provide necessary handholding during the stabilization phase of the project, which shall be of 3 months post the issuance of the Go live period.
- The Bidder shall make available at least **two refresher training batches per GA per O&M year** — one at the 6-month mark and one at the 12-month mark of each O&M year — covering operational refreshers, new functionality introduced during the year and knowledge gap areas identified from field operations.
- The Bidder shall deliver Go-Live training at each GA before that zone's Go-Live acceptance is granted. GEL shall not accept a zone's Go-Live without confirmed completion of training for that zone's GA Team.
- The Bidder shall deliver refresher training at each GA every six months throughout the O&M Period and at GEL's Head Office on a needs basis.
- The Bidder shall use a blend of delivery methods — classroom sessions, hands-on practice using the training environment and online modules — appropriate to each audience and course type.
- The Bidder shall set up and maintain a dedicated training environment throughout the GoLive and O&M phases. The training environment shall contain representative AMI system data and scenarios reflecting GEL's actual operational conditions. The environment shall be separate from the production AMI Platform.
- The Bidder shall manage all logistics for training delivery — materials, training environment access, attendance tracking and registration management.
- The Bidder shall record each training session. Recordings shall be made available to GEL's training team through the training environment throughout the O&M Phase, accessible to new or replacement GEL personnel at any time.
- The Bidder shall provide training in **English and Hindi** as a minimum. Training materials shall be available in English. If GEL requests materials in additional regional languages applicable to specific GAs, the Bidder shall provide them at no additional cost.
- All training content and materials shall be submitted to GEL for review and written approval before being delivered to participants.
- The Bidder shall seek and act on training participant feedback after each course. Where feedback identifies gaps or areas for improvement, the Bidder shall update the course content accordingly.
- The below are indicative training courses which will be subject to GEL's approval once the contract is awarded to the successful bidder.

## 7.2 Training Courses

- GA Team Operator Training - GEL GA Team operations staff responsible for day-to-day AMI system monitoring and exception management.
- Billing Team Training -

- System Administrator Training - GEL IT and system administration staff responsible for AMI Platform user management, security and configuration.
- Field Technician Training - GEL GA Team field technicians and supervisors responsible for installation oversight, site visits and field issue resolution.
- Management and Executive Overview -

## 7.3 Training Materials

- The Bidder shall develop comprehensive training materials for all courses before the training schedule begins.
- The Bidder shall produce the following materials for each course as a minimum:
  - **Training Manual:** Complete course content, step-by-step procedural guides, screenshots and reference material. Provided in hard copy and soft copy.
  - **User Manual:** Reference guide covering all AMI Platform functions relevant to the participant's role, available for ongoing use after training. Provided in hard copy and soft copy and accessible through the training environment throughout the O&M Phase.
  - **Hands-on Exercises:** Structured exercises covering all key operational scenarios, using the training environment. Each exercise shall include objectives, prerequisites, step-by-step instructions and expected outcomes.
  - **Quick Reference Cards:** Single-page laminated cards for each role covering the most common tasks and alarm response steps. Provided to each participant at training completion.
- All materials shall be in English as a minimum.
- The Bidder shall update all training materials and user manuals whenever the AMI Platform is updated or system procedures change, at no additional cost to GEL.
- Updated materials shall be distributed to GEL's training team and made available in the training environment within 30 days of any platform update.
- All training materials, once approved by GEL, become the property of GEL.

## 7.4 Knowledge Transfer

- The Bidder shall implement a structured knowledge transfer programme alongside the training courses, with the objective of making GEL's teams operationally self-sufficient for day-to-day AMI system operations by the end of the SLA stabilisation period.
- The Bidder shall provide **shadowing opportunities** for GEL system administrators and GA Team supervisors during the AMI Platform deployment and commissioning phases. Designated GEL personnel shall work alongside the Bidder's technical team during platform configuration, integration setup and commissioning.
- The Bidder shall define clear knowledge transfer objectives, the GEL roles responsible for each operational area and the criteria by which GEL considers each area independently managed.
- For AMI Platform administration, the Bidder shall guide GEL's IT team through at least two complete cycles of: VEE rule modification, RBAC update, alarm threshold change and user

- The Bidder shall produce a Knowledge Transfer Completion Report at the end of the SLA stabilisation period, confirming which competency areas have been transferred and identifying any areas requiring ongoing Bidder guidance.

## 7.5 Training Evaluation

- The Bidder shall evaluate training effectiveness for every course delivered, covering both participant competency and programme quality.
- **Participant Assessment:** Each participant shall complete a written or practical assessment at the end of their training course. Participants who do not achieve the minimum passing score shall receive a follow-up training session before the assessment is retaken. The Bidder shall report pass/fail results to GEL.
- **Programme Evaluation:** Participants shall complete a course feedback form at the end of each session, covering content relevance, delivery quality, training environment quality and overall usefulness. The Bidder shall review feedback after each course, summarise findings and share the summary with GEL along with planned improvements.
- **Competency Verification:** The Bidder shall conduct a competency verification exercise approximately 30 days after initial training at each GA, confirming that the trained personnel can perform their AMI system tasks independently and correctly. Results shall be documented and any gaps addressed through targeted follow-up sessions.
- The Bidder shall maintain a training register covering all participants trained, courses attended, assessment results and feedback scores throughout the contractual period. The register shall be available to GEL on request at any time.

## 7.6 Standard Operating Procedures

### 7.6.1 SOP Development Framework

The Bidder shall develop a comprehensive set of Standard Operating Procedures covering all critical AMI operations before Go-Live. SOPs shall be written in plain language, step-by-step format, suitable for GEL's GA Team operators and field staff without prior AMI experience.

The Bidder shall develop SOPs with approval from GEL covering the following categories as a minimum:

#### Platform Operations:

- Daily AMI Platform health check and data collection performance review
- Billing data delivery to SAP — normal procedure and failure resolution
- VEE rule review and update — including authorisation workflow and version control
- User account creation, modification, deactivation and access review
- Platform update and patch deployment — pre-deployment checklist, deployment steps, verification and rollback
- DR failover test execution and results documentation
- Report generation, scheduling and distribution management

**Alarm and Exception Management:**

- Safety-critical alarm response: tamper, reverse flow, pressure exceedance, power failure — with field escalation steps and one-hour response SLA
- Communication failure alarm response — triage, root-cause classification and field dispatch decision
- Data quality exception handling — VEE flag review, manual edit authorisation and audit trail completion
- Revenue protection alert investigation — from first alert to case closure
- Zero consumption and DOQ threshold alert response

**Mobile Application:**

- Login, navigation and role-based feature access
- Manual meter reading capture — photograph, GPS, index entry, reason code, submission confirmation
- Work order receipt, task execution and closure from the mobile interface
- Alarm acknowledgement, update and resolution from the mobile interface
- Offline data capture, sync verification and discrepancy reporting
- Issue raising and ticket submission to the Bidder

**Field Operations:**

- Modem installation, configuration and commissioning at EVC IMS locations
- MIU installation, configuration and commissioning at PD meter locations
- SAT procedure for EVC locations — data collection verification and sign-off
- SAT procedure for PD meter locations — simultaneous index parity check and sign-off
- Battery replacement — scheduling, on-site procedure and MDMS record update
- Modem replacement — device swap, driver reload, historical data continuity verification
- MIU replacement — device swap and consumption continuity verification
- SIM replacement and operator switchover — on-site procedure and NMS update
- Enclosure inspection, cleaning and preventive maintenance

**Emergency and Incident Response:**

- AMI Platform outage — immediate triage, DR failover decision tree and GEL notification
- Data loss or corruption incident — containment, assessment, recovery and reporting
- Cybersecurity incident — detection, isolation, CERT-In notification and remediation
- SAP integration failure — manual billing data preparation and SAP team coordination
- Parallel operations discrepancy — investigation procedure and reconciliation sign-off

## 7.6.2 SOP Review and Approval

- The Bidder shall submit all draft SOPs to GEL for review no later than four weeks before the UAT start date. SOPs shall not be used in field or platform operations until GEL has issued written approval.
- GEL's review shall include Operations, Safety and IT departments as appropriate per SOP category. The Bidder shall incorporate all review comments and resubmit within five working days of receiving GEL's consolidated feedback.
- The Bidder shall maintain a formal version control register for all SOPs, recording version number, revision summary, approval date, approved-by designation and implementation date. Superseded versions shall be archived and accessible to GEL.
- Where a system change, operational modification, or incident finding requires an SOP to be revised during the O&M period, the Bidder shall submit the revised SOP to GEL for approval within 10 working days of the triggering event.
- GEL reserves the right to request SOP revisions at any time during the contractual period. The Bidder shall address such requests within the timeline agreed with GEL.

## 7.6.3 SOP Training and Implementation

- The Bidder shall conduct dedicated SOP training sessions as part of the broader training programme. Each SOP category shall be covered in the training course for the relevant GEL role. No SOP shall be considered implemented until the relevant GEL staff have been trained against the approved version.
- For critical SOPs — safety alarm response, platform outage response, manual meter reading capture and cybersecurity incident response — the Bidder shall conduct live or simulation-based training exercises in addition to classroom or e-learning delivery. Pass criteria for these exercises shall be defined in the QAP.
- The Bidder shall monitor SOP adherence during the SLA stabilisation period. Where field observations or incident reviews indicate that a procedure is not being followed as written, the Bidder shall investigate whether the gap is a training issue or a procedure design issue and shall address both if required.
- All approved SOPs in their current version shall be available through the AMI Platform — accessible to GEL staff from the web portal and mobile application at any time without requiring the Bidder to distribute updated copies manually.

## 7.6.4 SOP Checklist for Go live

The following SOP deliverables are mandatory conditions of Go-Live acceptance. No Go-Live acceptance certificate shall be issued until GEL has confirmed in writing that each item below is complete:

#	Deliverable	Responsible	Acceptance Condition
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1	All SOPs drafted and submitted	Bidder	Submitted to GEL ≥4 weeks before UAT start
2	GEL written approval of all SOPs	GEL	Signed approval issued; no open review comments
3	SOP version control register live on AMI Platform	Bidder	Accessible to GEL from web portal
4	All SOPs accessible through AMI Platform (web and mobile)	Bidder	GEL confirms accessibility for all user roles
#	Deliverable	Responsible	Acceptance Condition
5	SOP training delivered for all roles	Bidder	Training register shows 100% completion for GA Teams across all active GAs
6	Critical SOP simulation exercises completed and passed	Bidder	Pass records signed by GEL's Training Coordinator
7	Emergency response SOPs tested during UAT (platform outage, cybersecurity incident)	Bidder	UAT test scripts include SOP walkthrough; outcomes documented
8	SOP adherence monitoring plan agreed for SLA stabilization period	Bidder + GEL	Written plan signed by both parties

## 7.7 Go-Live Support, Shadowing and Knowledge Transfer Transition

### 7.7.1 Three-Stage Support Model

The Bidder's operational support to GEL transitions through three defined stages from implementation Go-Live through the full contract period. The transition between stages is not automatic — each stage transition requires a formal sign-off between the Bidder and GEL.

Stage	Period	Bidder's Role	GEL's Role
<b>Stage 1 — Handover Support</b>	Implementation GoLive to start of SLA stabilization period	Bidder's technical team present and available in real time — onsite at agreed GA locations — to resolve any issues immediately. GEL staff perform all operations; Bidder does not operate the system on GEL's behalf.	GEL staff operate the system with Bidder immediately available for guidance; all operational decisions are GEL's.



<b>Stage 2 — Shadowing</b>	3-month SLA stabilization period	Bidder's technical team available same-day for any issue raised by GEL staff. The Bidder shadows GEL's operations — observing, guiding and mentoring — but does not intervene unless GEL requests it. The Bidder captures any operational gaps and addresses them through targeted training or SOP refinement.	GEL staff run day-to-day AMI operations independently. GEL's team leads confirm at the end of each month which operational areas are independently managed and which require further support.
Stage	Period	Bidder's Role	GEL's Role
<b>Stage 3 — Support Team Only</b>	From Knowledge Transfer Completion Certificate date through the full remaining contract period	Bidder provides support exclusively through the Central Support Team described in Section 8 — helpdesk ticketing, remote diagnostics, incident response and platform maintenance. No on-site shadowing or hand-holding. SLA response times in Section 12 apply.	GEL operates the AMI System fully independently. Issues are raised through the helpdesk ticketing system in Section 4.

## 7.7.2 Knowledge Transfer Completion Assessment

The transition from Stage 2 (Shadowing) to Stage 3 (Support Team Only) is conditional on GEL confirming that knowledge transfer is complete. At the end of the SLA stabilisation period, the Bidder shall conduct a formal Knowledge Transfer Completion Assessment covering all operational areas listed below.

### Indicative Assessment areas:

#	Operational Area	GEL Role Assessed	Independent Capability Criteria
1	AMI Platform daily health check and monitoring	GEL IT Administrator	Performs daily health check per SOP; identifies and escalates anomalies without Bidder guidance
2	SAP billing data monitoring and failure resolution	GEL Billing Team	Confirms SAP delivery for each billing date; follows failure resolution SOP independently
3	VEE rule review and update	GEL IT Administrator	Modifies a VEE rule, versions it and validates the outcome without Bidder involvement

4	Alarm acknowledgement, assignment and escalation	GEL GA Team Supervisor	Acknowledges, assigns and closes alarms following SOP; initiates field dispatch correctly
5	Manual meter reading capture via mobile application	GEL GA Team Field Staff	Captures a manual reading with photograph, GPS and reason code; submits correctly
6	Work order receipt, dispatch and task closure	GEL GA Team Supervisor	Receives a platform-dispatched batch, distributes to field staff, tracks completion
7	Issue raising and helpdesk ticket management	All GEL roles	Raises a ticket correctly; tracks status; responds to Bidder updates; closes on resolution
#	Operational Area	GEL Role Assessed	Independent Capability Criteria
8	RBAC and user account management	GEL IT Administrator	Creates a new user, assigns a role, verifies access and deactivates an account independently
9	EMS access and SLA report verification	GEL Finance/IT	Downloads quarterly SLA compliance report from EMS; verifies billable days and penalty calculation without Bidder involvement
10	Mobile application — full field operation cycle	GEL GA Team Field Staff	Completes a full field operation cycle (installation confirmation, SAT checklist, exception logging, offline capture, sync) independently
11	Revenue protection investigation workflow	GEL GA Team	Opens a revenue protection case, logs evidence, generates a service order and closes the case following SOP
12	Report generation and scheduling	GEL GA Team / Billing Team	Generates a standard report, creates a custom report and sets a scheduled delivery independently

### 7.7.3 Knowledge Transfer Completion Certificate

- The Bidder shall administer the assessment for each GEL role group in the presence of GEL's Training Coordinator.
- For each area, the GEL staff member shall perform the task without Bidder prompting. The Bidder may answer clarifying questions about the system but shall not guide the task execution.
- Where a GEL staff member does not meet the independent capability criteria in any area, the Bidder shall deliver targeted follow-up training or SOP clarification for that area within **5 working days** and the assessment for that area shall be re-run.

- When all areas are assessed as independently capable for all relevant GEL role groups, the Bidder and GEL's Training Coordinator shall jointly sign a **Knowledge Transfer Completion Certificate**.
- The Knowledge Transfer Completion Certificate is the formal trigger for the transition to Stage 3. From the certificate date, the Bidder's obligation for on-site support and shadowing ends. The Bidder's support obligation from that date is exclusively through the Central Support Team per Section 8.3 and Section 12.

### 7.7.4 Stage 3 — Support Team Model for the Full Contract Duration

From the Knowledge Transfer Completion Certificate date, the following support model applies for the full remaining contract period, including all five O&M years:

- GEL raises all issues through the AMI Platform helpdesk ticketing system. No issue shall be treated as unraised unless it is in the ticketing system.
- The Bidder's Support Team shall respond within the SLA timelines defined in Section 12 for each priority level.
- The Bidder shall provide remote diagnostics and remote resolution for platform issues. Where an issue requires a field visit, the Bidder shall deploy a field technician within the response timeline specified in Section 12.
- The Bidder shall not require GEL to contact the Bidder through channels other than the helpdesk system for routine support. Escalation contacts are available for issues where the Bidder breaches a Critical response SLA — these are defined in the escalation matrix agreed at Milestone A1.
- The Bidder shall not revert to on-site shadowing or hand-holding after the Knowledge Transfer Completion Certificate has been signed, except where GEL explicitly requests onsite attendance for a specific incident or activity. Such requests shall be accommodated within the SLA timelines in Section 12.
- Any training need that GEL identifies after the Knowledge Transfer Completion Certificate — for new staff, system updates, or process changes — shall be addressed through the training mechanisms in Section 7 and shall not constitute a reversion to Stage 2 support.

## 8 Comprehensive Operations and Maintenance Period

### 8.1 Overview

The success of this project depends as much on the O&M phase as on the implementation. Quarterly payments to the Bidder are directly linked to SLA performance — making this phase commercially significant for both parties.

The Bidder shall provide comprehensive operations and maintenance services covering all components of the AMI System — software platform, cloud infrastructure, field hardware (Modems and MIUs), communication network, SIM management and all integrations — for a period of **five years** from the date of full project Go-Live.

The O&M Period commences from the date GEL issues the formal project Go-Live acceptance certificate. Zones where Go-Live is achieved before the final zone shall be operated by the Bidder from their respective Go-Live dates, with pro-rata payment calculated at the Year 1 contracted rate until the full O&M Period commences.

Support model during the O&M Period. By the time the O&M Period begins, the Bidder shall have completed the knowledge transfer programme in Section 7 and a Knowledge Transfer Completion Certificate shall have been signed by both parties. From the certificate date, GEL operates the AMI System independently. The Bidder's support obligation for the full five-year O&M Period is exclusively through the Support Team described in Section 8 — helpdesk ticketing, remote diagnostics, incident response and scheduled maintenance. On-site shadowing or hand-holding is not part of the O&M support model. The full support transition model is defined in Section 7.

The Bidder shall have back-to-back Comprehensive Annual Maintenance Contracts (CAMCs) with all relevant OEMs and service providers for every component of the AMI System for the entire contract duration. GEL shall have the right to request copies of these CAMCs and OEM warranty certificates at any time during the contractual period.

No separate payment shall be made for manpower deployed during the O&M Phase. The Bidder shall price all O&M manpower costs within the financial bid.

## 8.2 General O&M Requirements

- The Bidder shall maintain the entire AMI System — all software, hardware, infrastructure, cloud services and integrations — in fully operational condition throughout the O&M Period, meeting all SLAs specified in Section 12 at all times.
- The Bidder shall modify, repair, or otherwise rectify any component of the AMI System that is not performing to the standards specified in this RFP, at no additional cost to GEL.
- The Bidder shall perform routine and periodic preventive maintenance (PM) on all hardware components — Modems, MIUs, antennas, enclosures and associated field accessories — on a quarterly basis. PM records shall be maintained and made available to GEL on request.
- The Bidder shall carry out all scheduled and unscheduled software updates, security patches, firmware upgrades and configuration changes required to maintain AMI Platform performance and security throughout the O&M Period.

- The Bidder shall apply critical security patches to the AMI Platform and field device firmware within 30 days of availability and non-critical patches within 90 days, with prior notification to GEL.
- The Bidder shall update device passwords and credentials periodically throughout the O&M Phase. No device shall retain default credentials at any point during the contract. Password updates shall be logged in the AMI Platform audit trail.
- The Bidder shall provide all MIS reports specified in this RFP and any additional reports required by GEL in the format and frequency requested by GEL.
- The Bidder shall resolve all reported faults and incidents within the SLA response times. Any component reported as down shall be repaired or replaced within the SLA timeframe stated in Section 12. Failure to meet these timelines will attract penalties as specified in Section 12.
- The Bidder shall provide support for the planning, optimisation and tuning of the AMI Platform whenever required during the O&M Period, at no additional cost to GEL.
- The Bidder shall carry out any number of modifications, additions, or configuration changes to AMI Platform configuration — reports, dashboards, VEE rules, alarm thresholds, integration parameters, user roles — as required by GEL during the O&M Period, at no additional cost to GEL.
- The Bidder shall take all necessary precautions to keep the complete AMI System secure and protected from cyberattacks, malware, physical damage and data breaches throughout the O&M Period.
- The Bidder shall conduct annual cybersecurity reviews as specified and submit review reports to GEL within 30 days of each review date.

### 8.3 Support Team

- The Bidder shall establish and maintain a dedicated Support Team (ST) from Go-Live through to contract completion.
- The ST shall be the single operational interface between the Bidder and GEL for all AMI System issues, service requests and escalations during the O&M Phase.
- The CST shall consist at minimum of:
  - **05 nos. of Zonal Coordinator** — responsible for coordinating field maintenance activities across GAs, scheduling preventive maintenance visits and managing field incident resolution, assisting GEL personnel in day to day platform operations, integration health and technical escalations. They will be deployed full time at GEL locations, 04 nos. at GEL approved GA offices and 1 nos. at GEL corporate headquarters in Gandhinagar.
  - **01 nos. of Project Manager** — A non-dedicated project manager which will be the SPOC responsible for continuous monitoring of the AMI Platform, field device communication status and proactive identification of issues before they breach SLAs

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- The ST shall be equipped with dedicated communication channels to GEL — email, phone and WhatsApp (or equivalent) — with response acknowledgement times as specified in Section 12.

The ST shall have remote access to the AMI Platform at all times, with full administrative capability to investigate and resolve platform issues without requiring site visits.

- The Bidder shall provide GEL with the complete contact details of the CST — individual names, mobile numbers, email addresses and escalation contacts — at Go-Live and shall update these details within 48 hours of any personnel change.
- All ST members shall be trained and certified on all components of the deployed AMI System before assignment to the ST role.
- The Bidder shall maintain a database of all team members — including any subcontractor staff — working on the project and shall share attendance and deployment records with GEL on request.

## 8.4 Preventive Maintenance

- The Bidder shall carry out Preventive Maintenance (PM) of all field hardware — Modems, MIUs, antennas, enclosures, cables and associated accessories — on a **quarterly basis** across all installation locations.
- The report from this report will form part of the mandatory documents which needs to be submitted during quarterly invoice submission.
- PM activities shall include at minimum: visual inspection of the enclosure and mounting; inspection of cable integrity and connections; cleaning of equipment and enclosure; verification of antenna mounting and condition; communication test on both SIM slots; signal strength reading and recording; device health diagnostic via local interface or remote diagnostic tool; and firmware version check with update if required.
- The Bidder shall maintain a PM logbook for each installation location, updated after each PM visit, recording the visit date, activities performed, observations and any corrective actions taken. PM logbooks shall be available to GEL for inspection at any time.
- Where a PM visit identifies a hardware fault or degraded performance, the Bidder shall rectify the issue within the corrective maintenance timelines, without waiting for the next scheduled PM cycle.
- PM scheduling shall be coordinated with GEL's GA Teams. The Bidder shall notify the relevant GA Team at least 48 hours in advance of any field visit.

## 8.5 Corrective Maintenance and Field Incident Resolution

- The Bidder shall investigate and resolve all hardware faults, communication failures and AMI Platform incidents within the response and resolution timelines specified in Section 12.

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- For field hardware faults (Modem or MIU failures, antenna damage, enclosure damage), the Bidder shall deploy a field technician to the affected location with replacement hardware within the timelines specified in Section 12. Replacement hardware shall be of the same make and model as the original, or equivalent or higher specification, subject to GEL's acceptance.

All replacement hardware shall be commissioned in the AMI Platform and verified for data transmission before the incident is closed.

- The Bidder shall use only OEM-certified spare parts and components for all corrective maintenance activities. Non-OEM or third-party components shall not be used without GEL's prior written approval.
- The Bidder shall maintain a structured incident management process with ticket logging, assignment, escalation, resolution and closure workflows. GEL shall have visibility of the incident register at all times through the AMI Platform or a shared incident management tool.

## 8.6 Platform and Software Operations

- The Bidder shall maintain the AMI Platform in a fully operational and high-availability configuration throughout the O&M Period, with the availability SLA specified in Section 12.
- The Bidder shall proactively check the AMI Platform for application performance, database health, cloud infrastructure metrics, integration status and security events — 24/7 and shall act on any anomaly before it impacts GEL operations.
- The Bidder shall manage all cloud infrastructure scaling, capacity adjustments and resource optimisation required to maintain AMI Platform performance as the number of connected devices grows.
- The Bidder shall plan and execute all software updates and platform upgrades with minimal service disruption. Major updates requiring downtime shall be pre-approved by GEL and scheduled during agreed low-impact windows. GEL shall be notified at least 72 hours in advance for any planned maintenance.
- The Bidder shall maintain, update and track all software licences — AMI Platform, AMI Platform modules, cloud infrastructure components, operating systems, databases and middleware — throughout the O&M Period. The Bidder shall ensure no component operates with an expired, invalid, or undersized licence.
- If any AMI Platform component reaches End-of-Life (EOL) or End-of-Support (EOS) during the O&M Period, the Bidder shall proactively plan and execute an upgrade or migration to a supported version, at no additional cost to GEL, with GEL's advance notification and written approval before the migration.
- The Bidder shall size and augment cloud infrastructure resources — compute, storage and bandwidth — at no additional cost to GEL if the originally provisioned resources prove insufficient to meet SLA requirements.
- The Bidder shall run automated weekly integrity verification scans on the MDMS data store — checking for silent data corruption, record count discrepancies, and referential integrity



- violations — and shall notify GEL of any anomaly within 4 hours of detection. A monthly scan results summary shall be included in the platform health report to GEL.
- Bidder shall provide requisite support in executing required modifications in the supplied AMI application. In case of the complex requirements, Bidder shall share timeline for the execution based on the mutual agreement. Bidder shall undertake all the basic modifications (specifically in report, dashboard, etc.) within 2 working days.

### 8.6A Technology Currency and Platform Compatibility

Technology currency and compatibility maintenance are standing obligations of the Bidder for the full contractual period. They are not one-time activities or Change Requests. All upgrades, compatibility updates, and technology migrations required under this section are within the contracted scope at no additional cost to GEL.

- **Technology stack upgrades.** The Bidder shall maintain all components of the AMI Platform — operating systems, databases, application frameworks, middleware, cloud services, and third-party libraries — at versions within their active manufacturer support lifecycle. This is a proactive, continuous obligation; the Bidder shall initiate migration to newer versions before any component reaches End-of-Support, without waiting for GEL to identify the risk. The Bidder shall notify GEL at least 30 days before executing any major version upgrade that affects user-facing functionality, API behaviour, or data structures, and shall obtain GEL's written approval before deployment.
- **Web portal browser and OS compatibility.** The web portal shall remain fully functional and visually consistent on the current and immediately preceding major release of the following browsers at all times: Google Chrome, Microsoft Edge, Mozilla Firefox, and Apple Safari. Compatibility shall extend across current major versions of Windows as used in GEL's offices. The Bidder shall proactively test the web portal against new browser releases before they reach stable general availability and shall deploy any required compatibility updates before the new browser version reaches general use. GEL shall not be required to retain older browser versions to maintain AMI Platform functionality.
- **Mobile application OS compatibility.** The mobile application shall remain fully functional on the current major version of iOS and the current major version of Android at all times. When Apple or Google releases a new major OS version, the Bidder shall complete compatibility testing, resolve all critical and high issues, and publish an updated application to the App Store and Play Store within 21 calendar days of the new OS version reaching general availability. GEL's field staff shall not experience any functional degradation as a result of updating their device OS.
- **Proactive testing schedule.** The Bidder shall maintain a technology compatibility testing calendar, updated quarterly, covering all planned and announced releases for operating systems, browsers, cloud services, and third-party components used in the AMI Platform. This calendar shall be shared with GEL at each quarterly review meeting. Compatibility testing shall occur before each release reaches GEL's user base, not after issues are reported by GEL staff.
- **No additional cost.** All activities under this section — technology stack upgrades, browser compatibility updates, mobile OS compatibility updates, and associated testing and deployment — are within the contracted scope. No additional payment, Change Request, or variation order shall be raised for any activity required under this section, regardless of the scale of the upgrade or the number of upgrades required during the O&M Period.



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## 8.7 SIM Management and Connectivity Operations

- The Bidder shall manage all SIM cards throughout the O&M Period — service requests, technical support, billing query resolution, APN configuration and operator coordination — for all SIMs registered in Bidder's name.
- The Bidder shall monitor SIM and connectivity status for every field device through the AMI Platform and shall proactively replace or troubleshoot any SIM exhibiting degraded performance before it causes an SLA breach.

The Bidder shall replace any non-performing SIM card within the timelines specified in Section 12, at no cost to GEL, including all coordination with the network operator.

- Where a SIM operator's network undergoes extended degradation affecting data collection at multiple sites in a GA, the Bidder shall proactively assess alternative network options and propose a SIM swap plan to GEL within 5 business days.
- The Bidder shall review SIM connectivity performance across the network on a monthly basis and include a connectivity summary — signal strength distribution, failover events, SIM replacement count and operator-wise performance — in the monthly operations report to GEL.

## 8.8 Maintenance Spares

- The Bidder shall maintain a minimum spare inventory of **10% of total deployed hardware quantities** (Modems, MIUs, antennas and associated accessories) at all times throughout the O&M Period, staged at locations i.e zonal warehouses that enable response within the SLA timelines.
- All spare Modems and MIUs shall be of the same make and model as the originally deployed hardware, pre-configured and ready for immediate deployment without on-site setup time.
- The Bidder shall provide GEL with a list of the spare part make, model, quantity and staging location at Go-Live and shall update this list on a quarterly basis.
- All spares shall be sourced from the same OEM manufacturing facilities as the original equipment. Non-OEM spare parts shall not be used without GEL's prior written approval.
- If any hardware component becomes unavailable or discontinued by the OEM during the O&M Period, the Bidder shall procure equivalent or higher-specification replacement hardware — at no additional cost to GEL — before the current spare stock is depleted.
- The validity of spare part rates quoted in the SOR shall extend for the full contractual period.

## 8.9 Vendor and Stakeholder Management

- The Bidder shall coordinate with all relevant stakeholders — GEL's GA Teams, GEL IT, SAP team, integration platform owners, OEMs, cloud service provider and SIM operators — to resolve all issues within agreed SLA timelines.

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- The Bidder shall ensure unresolved issues are escalated promptly through the Bidder's internal escalation structure and notified to GEL when they risk breaching SLA timelines.
- The Bidder shall maintain records of all stakeholder interactions, escalations and resolutions related to AMI System operations and shall make these available to GEL on request.

## 8.10 Field Support and Transport

- The Bidder shall maintain field support resources — technicians, vehicles, tools, ladders and testing equipment — across GEL's network to carry out preventive maintenance, corrective maintenance and new device installations within the timelines specified in this RFP.

Field vehicles and all associated expenses — driver, fuel, maintenance and insurance — are entirely the Bidder's responsibility throughout the contractual period. Vehicles and drivers shall comply with applicable RTO norms.

- The Bidder shall ensure no O&M activity or maintenance visit is delayed due to nonavailability of field resources, transport, or tools. The Bidder shall size its field resource pool based on the network scale and SLA response requirements.
- All field activities shall be carried out in compliance with GEL's site safety requirements and applicable OISD standards.

## 8.11 System Enhancement and Modification

- GEL may require enhancements to the AMI Platform — new reports, dashboard modifications, VEE rule additions, API extensions, new integration endpoints, or UI changes — during the O&M Period. The Bidder shall deliver such enhancements within timelines agreed with GEL, at no additional cost to GEL.
- The Bidder shall carry out any changes to AMI Platform graphics, logic, reports, or configurations as required by GEL during the O&M Period without charging an additional fee, provided the changes are within the scope of the contracted AMI System functionality.
- Changes that materially extend the scope beyond what is contracted — such as entirely new integration systems not within the agreed scope — shall follow the Change Request process.

### 8.11.1 New EVC OEM Driver Development and Deployment

Where GEL introduces a new EVC make or model during the O&M Period that is not covered by an existing driver in the Bidder's driver library, the Bidder shall develop, test, and deploy the required driver as follows:

- **Development timeline.** The Bidder shall deliver a fully tested EVC OEM driver within **30 calendar days** of receiving complete and accurate technical documentation from the EVC OEM. The 30-day clock starts on the date the Bidder confirms in writing to GEL that all required OEM documentation has been received. The driver shall be developed, configured, and tested against a physical sample of the new EVC before the 30-day period expires.

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- **OEM documentation responsibility.** Obtaining technical documentation from the EVC OEM is the Bidder's sole responsibility per Section 4.4.3. Where the OEM has not provided complete documentation within 5 calendar days of the Bidder's first request, the Bidder shall notify GEL in writing with the status, the documentation gaps, and the expected revised timeline. The Bidder shall not use OEM non-cooperation as grounds for delay without this documented notification.
- **GEL acceptance and deployment.** On completing the driver, the Bidder shall provide a test report confirming successful data collection from the new EVC make/model and submit it to GEL for written acceptance. On GEL's written acceptance, the Bidder shall deploy the driver to the production AMI Platform within **1 calendar day**. No further approval or scheduled maintenance window is required for a driver deployment that does not affect existing device connections.  
  
**Source code transfer.** On deployment, the Bidder shall transfer the complete driver source code to GEL per the obligations in Section 4.3.3, with build instructions, dependency specifications, and test procedures.
- **SOR pricing.** New EVC OEM driver development during the O&M Period is priced as a separate one-time SOR line item per OEM. The 30-day development and 1-day deployment obligations apply regardless of the SOR price.

### 8.11.2 EVC Replacement — Data Sync and Platform Continuity

Where GEL replaces a physical EVC unit at any location during the O&M Period — whether with the same make and model or a different one — the Bidder shall restore full AMI Platform operation for that location within the following timelines:

- **12-hour sync window.** From the time GEL or GEL's field representative notifies the Bidder through the AMI Platform helpdesk or mobile application that an EVC replacement is physically complete, the Bidder shall within **12 hours**: commission the new EVC in the AMI Platform; confirm the first successful data read from the new device; and verify that historical data from the replaced EVC is preserved and correctly associated with the same metering location in the MDMS.
- **Notification trigger.** The 12-hour clock starts from GEL's notification — via helpdesk ticket, mobile application task closure, or email to the Bidder's Central Support Team — that the physical replacement is complete. The Bidder shall acknowledge this notification within 30 minutes of receipt.
- **Same OEM replacement.** Where the replacement EVC is the same make and model as the original, no driver development is required and the 12-hour window applies in full from notification.
- **Data continuity.** Historical meter data from the replaced EVC shall be preserved in the MDMS without interruption. Consumption history, billing history, alarm history, and asset records shall remain accessible for the same metering location regardless of how many EVC replacements have occurred at that location.
- **SAP Billing continuity.** If the EVC replacement occurs within the current billing cycle, the Bidder shall make sure the billing determinants for that customer's current cycle are complete using data from both the old and new EVC records without gap or duplication.

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## 8.12 Handover at End of Contractual Period

Before the expiry of the contract, the Bidder shall complete the following handover activities to GEL or GEL's nominated successor:

### Asset Transfer:

- Transfer ownership of all deployed hardware — Modems, MIUs, antennas, enclosures, cables and associated accessories — in fully functional condition, with a minimum remaining useful life of five years for all components.
- Provide a complete and updated asset inventory listing every device with make, model, serial number, firmware version, GPS installation coordinates, SIM ICCID numbers and current operational status.

Transfer all SIM cards registered in Bidder's name with updated service agreements and contact details of the respective network operators.

- Replace any faulty or non-functional hardware with repaired or new devices before handover. No device shall be handed over in a non-functional state.

### Software and Licences:

- The bidder has to keep the AMI platform running until GEL onboards a new vendor, the payment for this period shall be made as per the amount quoted in the SOR for the respective year.
- Provide full access credentials, administrative accounts and API keys for all AMI Platform components to GEL.
- Facilitate the transition of the AMI Platform to GEL or its nominated successor without any interruption to data collection or SAP Billing integration.

### Technical Documentation:

- Complete and updated technical documentation covering AMI Platform architecture, all API specifications, integration configurations, VEE rule definitions and operational procedures.
- EVC OEM drivers developed under this contract, with build instructions, dependency specifications and test procedures, as specified.
- All O&M manuals, preventive maintenance procedures, troubleshooting guides and training materials in their latest versions.
- Complete communication and network configuration documentation — APN settings, SIM operator contacts, network topology and device configuration templates.

### Operational Handover:

- Conduct a structured handover period of at least 90 days before contract expiry, during which the Bidder's ST shall work alongside GEL's or the successor SI's technical team to transfer operational knowledge and confirm independent operational capability.

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- Submit a final project completion report covering five-year O&M performance — SLA compliance history, maintenance records, incident log summary and asset condition at handover.

**Transition Period Operations:**

- During the last **3 months** of the O&M Period, the Bidder shall operate the AMI System with increased GEL staff involvement, progressively transferring operational responsibility. The Bidder shall not reduce staffing levels during this period without GEL's prior written approval. GEL or its nominated successor SI shall be co-authorised on all AMI Platform administrative functions during this period, enabling a shadow operation before full handover.

**Platform Continuity Obligation:**

- The Bidder shall use all reasonable endeavours to ensure the AMI Platform remains commercially available and supported beyond the contractual period. At least 12 months before contract expiry, the Bidder shall notify GEL of the AMI Platform vendor's support roadmap for the next 5 years. Where the platform is approaching EOL within 3 years of

contract expiry, the Bidder shall propose a migration path to GEL, with indicative costs and timelines, enabling GEL to plan for the successor system.

**Data Migration Support:**

- The Bidder shall provide GEL with all historical AMI data in a portable, open format (CSV, JSON, or agreed database export) at contract completion. Data shall be exported for the full 10-year retention period or the actual contract duration, whichever is shorter. The Bidder shall assist GEL in migrating historical data to any successor AMI system or data warehouse, at no additional cost, for a period of 3 months post-contract expiry.

**Staff Knowledge Transfer Assessment:**

- Within 60 days of the final handover date, GEL shall conduct a knowledge assessment of its own staff to confirm operational self-sufficiency for AMI System operations. Where gaps are identified, the Bidder shall provide targeted additional training at no additional cost, within 30 days of the assessment report.

## 8.13 General Instructions

- The Bidder shall ensure continuous data collection and SAP Billing integration throughout the O&M Period. Any interruption to billing data delivery shall be treated as a critical incident subject to the SLA penalties in Section 12.
- The Bidder shall make sure the AMI Platform and all connected systems remain available and fully functional on all days — including public holidays, weekends and GEL billing dates.
- The Bidder shall not undertake any planned maintenance activity on GEL's billing dates without GEL's explicit advance approval.
- The Bidder shall maintain a helpdesk and escalation matrix that is accessible to GEL's GA Teams at all times, with defined response acknowledgement times for each priority level.
- GEL reserves the right to conduct periodic audits of the Bidder's O&M activities, maintenance records, spare inventory, ST staffing and cybersecurity compliance at any time during the contractual period. The Bidder shall cooperate fully with such audits and provide all requested information within 5 business days.
- GEL may terminate or extend the contract in accordance with the contractual terms. In the event of early termination, the Bidder shall cooperate fully with the transition and complete the handover obligations within the period specified in the termination notice.

## 9 Manpower Requirements

### 9.1 General Conditions

- The table lists the minimum indicative manpower requirement for this project. The Bidder is responsible for deploying sufficient resources — over and above this minimum list — to meet all SLAs, project timelines and deliverables specified in this RFP. No additional payment shall be made for manpower deployment beyond the contracted OPEX, regardless of the number of resources deployed.
- During bid submission, the Bidder shall submit CVs for all roles listed. CVs shall include complete educational qualifications with year and stream of degree, full employment history with month and year of each deployment, all relevant certifications and project references. CVs shall be submitted in the format specified in the bid submission documents.
- CVs submitted at bid stage shall be for individuals who are confirmed available to join the project upon contract award. If a proposed resource is unavailable at the time of onboarding, the Bidder shall be subject to penalty as specified in Section 12. Penalty shall not apply if GEL approves a resource change in advance.
- The Project Manager shall be on the Bidder's direct payroll. All other roles may be on the Bidder's, a subcontractor's, or an OEM's payroll, provided the Bidder retains full responsibility for performance and SLA compliance regardless of the employment arrangement.
- The Bidder shall submit Background Verification (BGV) documentation for all proposed resources to GEL within one month of contract award. GEL may request BGV for any resource at any point during the contractual period.
- GEL reserves the right to interview any proposed resource before deployment. If a resource does not meet GEL's expectations at interview, the Bidder shall propose an alternative with equal or higher qualifications within 10 business days.
- The successful Bidder shall deploy resources with a criminal-background-free declaration certificate submitted for each member before deployment.
- Where GEL identifies a resource as non-performing or receives negative feedback from any GEL department, GEL may request the Bidder to replace that resource. The replacement shall be deployed within **15 calendar days** of GEL's written request, with qualifications equal to or higher than the departing resource and subject to GEL's acceptance. GEL reserves the right to withhold payment for the period during which the non-performance issue was observed until the new resource is onboarded.
- Each deployed resource may take up to 24 leaves per calendar year (pro-rated quarterly), subject to advance intimation and written approval from the GEL officer in charge. If any team member is unavailable for more than one calendar week, the Bidder shall arrange an alternate resource for that period.

- In case a deployed employee leaves the Bidder's employment during the contractual period, the Bidder shall arrange a replacement of equal or higher qualification within 15 calendar days, subject to GEL's approval.
- The Bidder shall maintain a roster of all deployed team members — including any subcontractor or OEM staff — and shall share attendance records and deployment details with GEL on request.
- GEL may ask the Bidder to share activity logs of deployed resources on a daily, weekly, or monthly basis. The Bidder shall comply within 2 business days of the request.
- Frequent resource changes negatively impact project quality. GEL will factor resource retention into its assessment of the Bidder's performance throughout the contractual period.

## 9.2 Field Installation Teams — Not Included in Manpower Schedule

**The manpower roles listed cover only the central, technical and management personnel required for the AMI project. They do not account for the field installation teams the Bidder must onboard and deploy to complete hardware installation across all zones within the 6-month implementation timeline.**

Given the scale of the project — field metering locations spread across 29 Geographical Areas — the Bidder shall independently assess, plan and deploy the number of parallel field teams required to physically install Modems and MIUs, complete SAT and meet the zone-wise installation targets within the approved Phase 3 implementation plan. This field workforce — whether directly employed, subcontracted, or engaged through OEM installation partners — is entirely the Bidder's responsibility to plan, mobilise, manage and fund.

GEL will not accept timeline slippage, milestone delays, or SLA non-compliance on account of under-deployment of field installation teams. The Bidder shall include the full cost of field team mobilisation, deployment, accommodation, transport, tools and supervision within the financial bid.

Field teams are subject to the same BGV, safety compliance and conduct requirements as any other personnel deployed on this project. The Bidder shall maintain a roster of all field personnel deployed at any point during the contract and shall make it available to GEL on request.

## 9.3 Central and Technical Manpower — Minimum Requirement



Sr. No.	Resource Designation	Roles and Responsibilities	Minimum Qualification	Min. Requirement — Implementation	Min. Requirement — O&M
1	<b>Project Manager</b>	Overall in-charge of the complete AMI project across implementation and O&M phases. Single Point of Contact (SPOC) for all contractual, technical and administrative matters with GEL. Responsible for milestone delivery, SLA compliance, resource management and issue resolution. Chairs all project review meetings with GEL.	BE/B.Tech (CE, CS, IT, EC) with M.Tech or MBA. Minimum 10 years of post-qualification experience in AMI, metering infrastructure, or utility digital transformation projects. Minimum 3 years as a Project Manager for AMI implementation. Minimum 2 years as a Project Manager for post-implementation O&M.	1	1 (Shared / non dedicated)
2	<b>AMI Technical Lead / System Architect</b>	Responsible for the overall AMI system architecture, platform design, EVC driver development oversight, cloud infrastructure design and integration architecture. Coordinates all technical activities during implementation and is the primary technical escalation point for GEL.	BE/B.Tech or M.Tech in Computer Science, Electronics, or Electrical Engineering. Minimum 7 years of experience designing and implementing AMI or advanced metering systems for utilities (Gas, Electricity, or Water). Strong understanding of HES/MDMS platforms, Modbus, DLMS/COSEM, cloud architecture and IEC 62443.	1 (Shared / non dedicated)	—
3	<b>AMI Expert — Platform Operations</b>	Responsible for AMI Platform configuration, commissioning and ongoing operations. Manages EVC OEM driver integration, data collection scheduling, VEE rule configuration, alarm framework setup and platform performance monitoring during O&M.	BE/B.Tech in Computer Science, Electronics, or Electrical Engineering. Minimum 5 years of hands-on experience operating and maintaining an AMI platform (HES and MDMS functionality) for a utility. Experience with multi-OEM EVC integration and DLMS/COSEM or Modbus protocols.	1 (Shared / non dedicated)	-

Sr. No.	Resource Designation	Roles and Responsibilities	Minimum Qualification	Min. Requirement — Implementation	Min. Requirement — O&M
4	<b>HES/MDMS Integration Expert</b>	Responsible for design, configuration, testing, Operations and maintenance of all AMI Platform integrations — SAP Billing, CMP, CRM and other enterprise systems. Manages API documentation, integration monitoring and resolution of data flow issues during O&M.	BE/B.Tech or M.Tech in Computer Science or IT. Minimum 5 years of experience in enterprise system integration, with at least 2 years of experience integrating AMI/metering platforms with SAP Billing or equivalent ERP systems. Familiarity with REST APIs, MQTT and XML/JSON data formats.	1 (Shared / non dedicated)	-
5	<b>Modem / MIU Firmware and Software Expert</b>	Responsible for Modem and MIU firmware management — OTA update planning, rollout, rollback and troubleshooting. Manages low-level communication issues between field devices and the AMI Platform. Provides technical support for field hardware faults during O&M.	BE/B.Tech in Electronics, Telecommunications, or Computer Engineering. Minimum 5 years of experience in embedded firmware, cellular communication devices, or IoT field hardware. Direct experience with Modem/MIU configuration, OTA firmware management and Modbus or cellular protocol debugging.	1 (Shared / non dedicated)	-
6	<b>Network and Connectivity Engineer</b>	Responsible for design, deployment and ongoing management of WAN connectivity for all field devices — SIM configuration, APN management, signal performance monitoring, SIM replacement coordination and operator relations. Monitors daily connectivity status	BE/B.Tech in Telecommunications, Computer Networking, or Electronics Engineering. Minimum 4 years of experience in cellular network management, IoT connectivity, or similar field. Familiarity with NB-IoT, 4G LTE, SIM management platforms and APN configuration.	1 (Shared / non dedicated)	-

Sr. No.	Resource Designation	Roles and Responsibilities	Minimum Qualification	Min. Requirement — Implementation	Min. Requirement — O&M
		and proactively manages SIM failover events.			
7	<b>Field Installation Lead</b>	Oversees zone-wise hardware installation, leads field technician teams, coordinates site access with GEL's GA Teams and ensures SAT completion to the required standard at every location. Responsible for installation quality, field safety compliance and commissioning documentation.	BE/B.Tech or Diploma in Electrical, Electronics, or Instrumentation Engineering. Minimum 5 years of field installation and commissioning experience in metering or utility infrastructure projects. Experience supervising multi-team field installations across dispersed geographies.	1	—
8	<b>Field Technicians</b>	Responsible for physical installation of Modems and MIUs, pulse cable installation, antenna mounting, site testing, SAT execution and first-line field maintenance during O&M.	Diploma or ITI in Electrical, Electronics, or Instrumentation. Minimum 2 years of field installation experience in metering, instrumentation, or utility infrastructure.	As required to meet the implementation timeline across all zones	As required to meet O&M SLA field response timelines
9	<b>Project Coordinator / Documentation Specialist</b>	Supports the Project Manager with progress reporting, document control, status tracking, milestone documentation, meeting minutes, risk register maintenance and stakeholder communication.	Degree in Engineering, Business Administration, or related field. Minimum 3 years in project coordination and documentation management for technology projects.	1	5 (4 coordinators at zone level and 1 at corporate office level)
10	<b>HSE Manager</b>	Implements HSE policies and procedures for all field activities during implementation, covering hazardous area compliance, PESO requirements, QHSE plans, incident	BE/B.Tech in Chemical, Petroleum, or Safety Engineering. Minimum 5 years as an HSE professional in Oil and Gas or Utility infrastructure projects. Relevant	1	—

Sr. No.	Resource Designation	Roles and Responsibilities	Minimum Qualification	Min. Requirement — Implementation	Min. Requirement — O&M
		reporting and safety audits at installation sites.	OISD and PESO compliance experience.		

*Note: The headcount above is the minimum indicative requirement for central/technical roles. The Bidder shall deploy sufficient Field Technicians to complete installation across all zones within the 6-month implementation timeline. Given the scale of the project and the timeline, the Bidder shall estimate field team size and deploy accordingly. GEL will not accept timeline slippage on account of insufficient field resources.*

## 9.4 CV Submission Format

The Bidder shall submit CVs for all roles (excluding Field Technicians) as part of the technical bid. Each CV shall include:

- Full name and current designation
- Educational qualifications — degree, stream, institution and year of passing for each qualification
- Total years of post-qualification experience
- Employment history — employer name, designation, start month/year, end month/year and brief role description for each position
- AMI/metering-specific project references — project name, client, scope, Bidder's role and duration for each relevant project
- Certifications — certification name, issuing body and validity date
- Declaration statement confirming availability to join the project upon contract award, signed by the individual

CVs shall be accompanied by a scanned or digital signature of the individual confirming the accuracy of the information provided.

# 10 RACI Matrix for Project Milestones

## 10.1 Legend

Code	Role	Description
<b>R</b>	Responsible	Does the work — executes the activity
<b>A</b>	Accountable	Signs off on the work — owns the outcome
<b>C</b>	Consulted	Provides input before or during the activity
<b>I</b>	Informed	Kept informed of progress and outcomes
<b>A/R</b>	Accountable and Responsible	Both executes the activity and owns the outcome
<b>A/C</b>	Accountable and Consulted	Both owns the outcome and provides input

### Key Notes:

- All milestone deliverables require GEL Project Manager's written acceptance before the Bidder may proceed to the next phase.
- GEL Technical Team includes GEL's IT, AMI and integration staff supporting the project.
- GEL GA Teams refers to the operations and field teams at each Geographical Area who are the primary end-users of the AMI System.
- GEL SAP/Finance Team is engaged for billing integration, invoice processing and SLA payment activities.
- Bidder QA Team is responsible for quality assurance, FAT, SAT and testing documentation across all phases.

### Column Headers:

Abbreviation	Party
<b>BPM</b>	Bidder Project Manager
<b>BTT</b>	Bidder Technical Team

<b>BQA</b>	Bidder QA Team
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Abbreviation	Party
<b>GPM</b>	GEL Project Manager
<b>GTT</b>	GEL Technical Team
<b>GGA</b>	GEL GA Teams
<b>GSF</b>	GEL SAP / Finance Team

## 10.2 Milestone A1 — Project Kickoff, Mobilisation and Planning

Activity	BPM	BTT	BQA	GPM	GTT	GGA
<b>Kickoff and Planning</b>						
Project kickoff meeting	A/R	R	I	C	C	I
Project Execution Plan preparation and submission	A/R	R	C	C	I	I
QAP preparation and submission	A	R	R	C	C	I
QHSE Plan preparation and submission	A/R	R	C	C	I	C
Resource Deployment Plan submission	A/R	C	I	C	I	I
Communication and Escalation Matrix preparation	A/R	C	I	C	I	I
Risk Register — initial preparation	A/R	R	C	C	C	I
EVC OEM Driver Development Plan preparation	A	R	C	C	C	I
Site access arrangements with GEL GA Teams	A/R	C	I	C	C	R

<b>Milestone Acceptance</b>						
GEL review and acceptance of A1 deliverables	A	C	C	A/C	R	C

### 10.3 Milestone A2 — Site Survey, BoQ Finalisation and Platform Device Onboarding

Activity	BPM	BTT	BQA	GPM	GTT	GGA
<b>Survey Planning</b>						
Survey methodology preparation and submission	A	R	C	C	C	I
Survey schedule coordination with GEL GA Teams	A/R	C	I	C	I	R
<b>EVC Location Survey</b>						
Physical site survey — EVC IMS/IPRS locations	A	R	C	I	C	R
Signal strength survey — NB-IoT, 4G LTE assessment per location	A	R	C	I	C	I
Safe-zone compliance assessment per location	A	R	R	I	C	R
Existing AMI system baseline data collection — EVC locations	A	R	C	I	C	R
<b>PD Meter Location Survey</b>						
Physical site survey — PD meter locations	A	R	C	I	C	R
Pulse output interface and cabling route assessment	A	R	C	I	C	I
Signal strength survey — PD locations	A	R	C	I	C	I
Existing AMI system baseline data collection — PD locations	A	R	C	I	C	R
<b>Survey Documentation and BoQ</b>						

Location-wise survey report preparation	A	R	R	I	C	I
Existing AMI system baseline report preparation	A	R	R	I	C	I
Revised and confirmed BoQ preparation	A	R	C	C	R	I
BoQ agreement with GEL	A	C	I	A/C	R	I
Activity	BPM	BTT	BQA	GPM	GTT	GGA
<b>Device Onboarding</b>						
AMI Platform device registry population	A	R	C	I	C	I
Phase 3 Implementation Plan preparation	A/R	R	C	C	C	I
Risk Register — survey update	A/R	R	C	C	C	I
<b>Milestone Acceptance</b>						
GEL review and acceptance of A2 deliverables	A	C	C	A/C	R	R

## 10.4 Milestone A3 — AMI Platform Deployment, Configuration, Integration, and System Testing

Activity	BPM	BTT	BQA	GPM	GTT	GGA	GSF
<b>Cloud Infrastructure and Platform Deployment</b>							
Cloud infrastructure setup (primary + DR, MeITY empanelled)	A	R	C	I	R	I	I
AMI Platform software deployment (HES, MDMS, NMS, EMS)	A	R	C	I	C	I	I
MeITY empanelment certificate submission	A	R	C	C	R	I	I
<b>FRS and SRS</b>							



FRS and SRS preparation	A	R	C	C	R	C	I
FRS and SRS review and written approval	I	I	I	A/C	R	C	I
<b>Platform Configuration</b>							
EVC OEM driver development and loading	A	R	R	I	C	I	I

Activity	BPM	BTT	BQA	GPM	GTT	GGA	GSF
EVC driver test against reference EVC per OEM	A	R	R	C	R	I	I
MIU data collection configuration	A	R	C	I	C	I	I
Three-tier data collection scheduling	A	R	C	C	R	C	I
VEE rules configuration	A	R	C	C	R	C	I
Billing cycle configuration (7/10/15-day)	A	R	C	C	R	I	R
Customer grouping configuration	A	R	C	C	R	C	I
Alarm threshold and notification configuration	A	R	C	C	R	C	I
<b>NMS Deployment and Configuration</b>							
NMS deployment and communication monitoring configuration	A	R	C	I	R	I	I
NMS SIM-level monitoring and root-cause categorisation setup	A	R	C	C	R	I	I
<b>EMS Deployment and Configuration</b>							
EMS deployment and SLA tracking configuration	A	R	C	C	R	I	I
EMS GEL independent access configuration and confirmation	A	R	C	C	R	I	I

Automated quarterly SLA report generation demonstration	A	R	C	C	R	I	I
<b>SAP Billing Integration</b>							
SAP integration design and format agreement	A	R	C	C	R	I	R
SAP integration development and configuration	A	R	C	I	C	I	R
SAP integration testing — all three billing cycle types	A	R	R	C	R	I	R
SAP integration sign-off by GEL SAP team	I	C	I	C	R	I	A/R
<b>Enterprise System Integrations</b>							

Activity	BPM	BTT	BQA	GPM	GTT	GGA	GSF
SCADA integration configuration and testing	A	R	C	C	R	I	I
CRM integration configuration (if required)	A	R	C	C	R	I	I
GIS integration configuration (if required)	A	R	C	C	R	I	I
WFM integration configuration (if required)	A	R	C	C	R	C	I
ESB integration configuration (if required)	A	R	C	C	R	I	I
Integration testing per integration test plan	A	R	R	C	R	I	R
<b>Helpdesk Ticketing System</b>							
Helpdesk ticketing system configuration and testing	A	R	C	C	R	C	I
GEL staff walkthrough — issue raising and ticket tracking	A	R	C	I	C	R	I
<b>Mobile Application</b>							
Mobile application deployment (iOS and Android)	A	R	C	I	C	I	I

Manual reading capture workflow configuration and testing	A	R	R	C	C	R	I
Bulk work order dispatch configuration and testing	A	R	R	C	C	R	I
Mobile application UAT	A	R	R	C	C	R	I
<b>System Testing</b>							
System test plan preparation and submission	A	R	R	C	R	I	I
System testing execution — all functional areas	A	R	R	C	R	C	I
Integration testing execution per test plan	A	R	R	C	R	I	R
Performance and load testing execution	A	R	R	C	R	I	I
Performance test results review	A	C	C	C	A/C	I	I
<b>Activity</b>	<b>BPM</b>	<b>BTT</b>	<b>BQA</b>	<b>GPM</b>	<b>GTT</b>	<b>GGA</b>	<b>GSF</b>
Critical and High defect resolution (system and integration testing)	A	R	R	C	R	I	I
<b>Milestone Acceptance</b>							
GEL review and acceptance of A3 deliverables	A	C	C	A/C	R	C	R

## 10.5 Milestone A4 — Hardware Procurement, FAT and Dispatch Clearance

<b>Activity</b>	<b>BPM</b>	<b>BTT</b>	<b>BQA</b>	<b>GPM</b>	<b>GTT</b>	<b>GGA</b>
<b>Hardware Procurement</b>						
Unpriced BoM 60% submission within 3 weeks of contract award	A/R	R	C	C	I	I
Hardware procurement plan preparation and submission	A/R	R	C	C	C	I

Hardware procurement — Modems, MIUs and all accessories	A/R	R	C	I	I	I
<b>Factory Acceptance Testing</b>						
TPIA appointment and credentials submission to GEL	A	R	C	C	C	I
FAT procedure preparation	A	R	R	C	C	I
FAT execution — EVC Modems	A	R	R	C	C	I
FAT execution — PD Meter MIUs	A	R	R	C	C	I
FAT report preparation and submission to GEL per batch	A	R	R	I	C	I
GEL witness of FAT (optional, at GEL's discretion)	I	C	C	A/C	R	I
GEL technical clearance and dispatch authorisation per batch	I	C	C	A/C	R	I
<b>Logistics</b>						
<b>Activity</b>	<b>BPM</b>	<b>BTT</b>	<b>BQA</b>	<b>GPM</b>	<b>GTT</b>	<b>GGA</b>
Hardware staging and dispatch to zones	A/R	R	C	I	I	I
Material receipt and verification at site staging areas	A/R	R	R	I	I	C
<b>Milestone Acceptance</b>						
GEL acceptance of FAT records per batch	A	C	C	A/C	R	I

## 10.6 Milestone A5 —Field Installation, SAT and Parallel Operations

<b>Activity</b>	<b>BPM</b>	<b>BTT</b>	<b>BQA</b>	<b>GPM</b>	<b>GTT</b>	<b>GGA</b>
<b>Zone Installation</b>						

Zone-wise Modem installation at EVC IMS/IPRS locations	A	R	C	I	C	R
Zone-wise MIU and pulse cable installation at PD meter locations	A	R	C	I	C	R
Antenna installation and signal verification per location	A	R	C	I	C	I
Device provisioning and AMI Platform commissioning	A	R	C	I	C	I
Installation progress tracker maintenance and weekly sharing	A/R	R	C	I	C	I
<b>Site Acceptance Testing</b>						
SAT execution at each EVC location per SAT checklist	A	R	R	I	C	R
SAT execution at each PD meter location per SAT checklist	A	R	R	I	C	R
SAT record dual sign-off per location	A/R	R	R	I	C	R
SAT deficiency resolution and retest	A	R	R	I	C	I
SAT deficiency register maintenance and submission	A	R	R	I	C	I
<b>Activity</b>	<b>BPM</b>	<b>BTT</b>	<b>BQA</b>	<b>GPM</b>	<b>GTT</b>	<b>GGA</b>
End-to-end billing data flow test — zone level	A	R	R	C	R	I
<b>EVC Driver Development and Deployment</b>						
EVC OEM driver development — ongoing as needed	A	R	R	C	C	I
Driver loading into AMI Platform before zone installation	A	R	R	I	C	I
EVC driver register update	A	R	R	I	C	I
<b>Parallel Operations</b>						
Parallel operations period management per zone	A/R	R	C	C	C	R

Zone-level parallel operations reconciliation report preparation	A	R	R	I	C	I
Reconciliation report submission and review	A	C	I	C	R	R
Parallel operations discrepancy investigation and resolution	A	R	C	C	R	I
GEL acceptance of zone reconciliation report	I	C	C	A/C	R	R
Existing AMI system decommissioning per zone	A/R	R	C	C	R	R
<b>Non-Attributed Devices</b>						
Non-Attributed Device Register preparation (if applicable)	A	R	C	C	C	I
Non-Attributed Device Register submission and review	A	C	C	C	A/C	I
<b>Milestone Acceptance</b>						
Zone-by-zone commissioning status confirmation	A/R	C	C	C	R	R
GEL acceptance of Milestone A5	A	C	C	A/C	R	R

## 10.7 Milestone A6 — Full Project Go-Live, SLA Stabilisation and O&M Commencement

Activity	BPM	BTT	BQA	GPM	GTT	GGA	GSF
<b>Pre-Go-Live — UAT and Security</b>							
UAT test plan preparation and submission	A	R	R	C	R	C	I
UAT execution — GA Teams, billing, IT, SAP	A	R	R	C	R	R	R
UAT defect resolution — Critical and High	A	R	R	C	R	C	I
DR failover test during UAT	A	R	R	C	R	I	I

CERT-In VAPT coordination and execution	A	R	R	C	R	I	I
CERT-In Critical and High finding remediation	A	R	R	C	R	I	I
CERT-In auditor closure confirmation submission	A	R	R	C	C	I	I
Mobile app OWASP MASVS testing and remediation	A	R	R	C	C	I	I
Go-Live Readiness Declaration preparation	A/R	R	R	C	I	I	I
Go-Live Readiness Declaration review	I	I	I	A/C	R	R	C
<b>SOP and Training</b>							
SOP package completeness confirmation	A	R	C	C	C	R	I
SOP accessibility via AMI Platform (web and mobile)	A	R	C	C	R	R	I
Training completion certificate submission	A	C	C	C	C	R	I
<b>Stage 2 — Shadowing During SLA Stabilisation</b>							
SLA stabilisation period operations — GEL team operates independently	I	C	C	C	C	A/R	I
<b>Activity</b>	<b>BPM</b>	<b>BTT</b>	<b>BQA</b>	<b>GPM</b>	<b>GTT</b>	<b>GGA</b>	<b>GSF</b>
Bidder shadowing — available same-day, guidance on request	A/R	R	C	C	C	C	I
Monthly gap identification and follow-up training	A	R	C	C	C	R	I
Monthly SLA performance report preparation (stabilisation)	A/R	R	R	C	C	I	I
<b>Knowledge Transfer Completion</b>							
Knowledge Transfer Completion Assessment administration	A	R	C	C	R	R	I
Knowledge transfer gap identification and targeted follow-up	A	R	C	C	C	R	I

Knowledge Transfer Completion Certificate — joint sign-off	A/R	C	I	A/R	R	C	I
<b>Project Closure Documentation</b>							
Complete system documentation package preparation	A	R	R	I	C	I	I
As-built documentation and API specification handover	A	R	C	C	R	I	I
EVC driver source code package delivery and licence confirmation	A	R	C	C	R	I	I
Final asset inventory submission	A	R	R	I	C	I	I
CERT-In VAPT final clearance confirmation	A	R	R	C	R	I	I
<b>Formal Acceptance</b>							
Project Go-Live acceptance review	A	C	C	A/C	R	R	I
Full project Go-Live acceptance certificate issuance	I	I	I	A/R	R	C	I

## 10.8 O&M Period Activities

Activity	BPM	BTT	BQA	GPM	GTT	GGA	GSF
<b>Platform Operations — Stage 3 Support Model</b>							
24/7 AMI Platform monitoring	A/R	R	C	I	C	I	I
Platform performance management and optimisation	A	R	C	I	R	I	I
Software updates and security patch application	A	R	R	C	R	I	I
Helpdesk ticket receipt and response within SLA	A/R	R	C	I	C	I	I
GEL helpdesk ticket raising and status tracking	I	I	I	C	C	A/R	I



Remote diagnostics and remote issue resolution	A/R	R	C	I	C	I	I
On-site field dispatch for unresolved incidents	A/R	R	C	I	C	R	I
<b>Hardware Maintenance</b>							
Quarterly preventive maintenance — Modems, MIUs, antennas, enclosures	A/R	R	R	I	C	C	I
PM schedule and maintenance work order generation	A/R	R	C	I	C	I	I
PM logbook maintenance and quarterly submission	A/R	R	R	I	C	I	I
Battery replacement per maintenance schedule	A/R	R	C	I	C	C	I
Corrective maintenance — Modem/MIU faults	A/R	R	C	I	C	R	I
Hardware replacement and re-commissioning	A	R	R	I	C	C	I
<b>Device Maintenance Management (Platform)</b>							
Maintenance schedule configuration and upkeep	A	R	C	I	C	I	I
Condition-based maintenance work order generation	A	R	C	I	R	I	I
Maintenance compliance dashboard review	I	I	I	C	A/C	R	I
<b>SIM and Connectivity Management</b>							

Activity	BPM	BTT	BQA	GPM	GTT	GGA	GSF
SIM health monitoring and TSP coordination	A/R	R	C	I	C	I	I
SIM replacement on failure	A/R	R	C	I	I	I	I
Monthly connectivity summary report	A/R	R	C	I	C	I	I

<b>SLA and Invoice Management</b>							
Quarterly SLA compliance report — EMS generation	A/R	R	R	I	C	I	I
Quarterly invoice preparation and submission	A/R	C	I	C	I	I	I
GEL SLA compliance verification — EMS review	I	I	I	A/C	R	C	R
GEL invoice processing and 70% payment release	I	I	I	C	C	I	A/R
GEL 30% SLA-linked payment release after verification	I	I	I	C	C	I	A/R
SLA penalty computation and deduction	I	I	I	A/C	R	I	R
<b>Security and Compliance</b>							
Annual CERT-In VAPT execution	A	R	R	C	R	I	I
Critical and High VAPT finding remediation	A	R	R	C	R	I	I
Annual cybersecurity review	A	R	R	C	R	I	I
Annual platform health and EOL/EOS assessment	A	R	C	C	R	I	I
Annual asset condition report	A/R	R	R	I	C	C	I
Periodic password and credential rotation	A	R	R	I	R	I	I
<b>Enhancements and New Onboarding</b>							
AMI Platform configuration changes — GEL requests	A	R	C	C	R	C	I
New EVC/PD meter onboarding — field installation and commissioning	A/R	R	C	I	C	R	I
<b>Activity</b>	<b>BPM</b>	<b>BTT</b>	<b>BQA</b>	<b>GPM</b>	<b>GTT</b>	<b>GGA</b>	<b>GSF</b>
New EVC OEM driver development (if applicable)	A	R	R	C	R	I	I
<b>Training During O&amp;M</b>							

Annual refresher training delivery per Section 7.3	A	R	C	I	C	R	I
New staff on-boarding training delivery	A	R	C	I	C	R	I

## 10.9 Cross-Cutting Activities Throughout Implementation

Activity	BPM	BTT	BQA	GPM	GTT	GGA
<b>Project Management</b>						
Weekly progress report preparation and submission	A/R	C	I	C	I	I
Monthly milestone status report	A/R	R	C	C	I	I
Monthly project review meeting	A/R	C	C	C	C	C
Risk register update and review	A/R	R	C	C	C	I
Change Request preparation and processing	A	R	C	C	R	C
Issue register maintenance and punch point tracking	A/R	R	C	C	R	C
<b>Quality Management</b>						
Quality assurance across all activities	A	C	R	C	C	I
Quality control at installation and testing activities	A	R	R	C	C	I
Non-conformance identification, reporting and resolution	A	R	R	C	R	I
<b>QHSE Management</b>						

Activity	BPM	BTT	BQA	GPM	GTT	GGA
Safety management at all field sites	A/R	R	R	C	C	R
PESO and OISD compliance at hazardous area locations	A/R	R	R	C	R	R
Incident reporting and investigation	A/R	R	R	C	C	R
Environmental compliance	A/R	R	C	C	C	C
<b>Documentation</b>						
Project document control and version management	A	R	R	I	C	I
Milestone deliverable submission and tracking	A/R	C	I	C	C	I

## 11 Payment Terms

### 11.1 Overview and Principles

The AMI project is delivered under the **DBFOOT model** — the Bidder bears all capital costs during implementation and recovers its investment through quarterly OPEX payments over the five-year O&M Period. The following principles govern all commercial transactions under this contract:

- **Mobilisation advance.** On contract award, GEL provides a one-time mobilisation advance of 5% of the total contract value, secured against a Bank Guarantee. This advance is the only payment GEL makes before the Go-Live acceptance certificate is issued.
- **No further payment until full project Go-Live.** Apart from the mobilisation advance, GEL shall not make any payment to the winning Bidder till the issuance of the Go live. The Bidder shall finance all implementation activities — hardware procurement, installation, platform deployment, integration, testing and the SLA stabilisation period — at its own cost.
- **Quarterly OPEX from full project Go-Live.** From the date of GEL's full project Go-Live acceptance certificate, GEL shall make the quarterly payment against the rate quoted in the SOR by the Bidder. In each quarter, GEL shall release **95%** of its OPEX cost, as the initial 5% would have been paid to the Bidder during the initial phase of the project.
- **Pro-rata billing.** Each device shall be billed for the number of calendar days it was live and operational in the billing quarter. A device commissioned mid-quarter is billed only from its commissioning date to the last day of that quarter.
- **SLA-linked payment split.** Each quarterly invoice is split 70% on submission and 30% on SLA verification. GEL shall release 70% of the payment upon submission of invoice however, the remaining 30% shall be released after the in-depth evaluation of SLAs during a particular quarter. This SLA review shall be undertaken through the EMS report only.
- **Payment basis is actual commissioned devices.** SOR quoted rates are used for evaluation and contract award. Actual payments are calculated based on the count and commissioning dates of devices actually live and operational in each quarter, as recorded by the EMS.

### 11.2 Mobilisation Advance

GEL shall provide a one-time mobilisation advance of **5% of the total contract value** to the Bidder on contract award, subject to the following conditions:

- The Bidder shall submit a Bank Guarantee (BG) for an equivalent amount — 5% of total contract value — from a scheduled commercial bank acceptable to GEL. The BG shall be valid for a minimum of **12 months from the date of contract award** and shall be submitted in GEL's prescribed format within **15 working days of contract award**. Release of the mobilisation advance is conditional on receipt of the BG.
- The mobilisation advance shall be recovered by GEL through equal proportionate (5%) deductions from quarterly OPEX invoices commencing from the **first quarterly invoice** post full project Go-Live acceptance.

- The mobilisation advance is provided to assist the Bidder in financing early procurement and mobilisation activities. It does not constitute payment for any milestone or deliverable and does not alter the Bidder's obligation to finance the full implementation at its own cost.
- If the Bidder fails to achieve full project Go-Live within the agreed timeline and GEL has not issued a written extension, GEL reserves the right to invoke the BG in full and recover the advance. Where a partial extension is granted, GEL may invoke the BG proportionately at its sole discretion.
- On full recovery of the mobilisation advance through invoice deductions, GEL shall return the BG to the Bidder within 15 working days, provided no material breach of contract is outstanding.

### 11.3 Implementation and Stabilisation Phase

- From T1 (contract award) to the date of the full project Go-Live acceptance certificate, no OPEX payment shall be made by GEL to the Bidder. The only payment during this period is the mobilisation advance.
- The Bidder shall invest all capital required for hardware procurement, platform deployment, installation, testing, integration and parallel operations during this period.
- Milestone acceptance by GEL during the implementation phase is for project tracking and quality control purposes only and does not trigger any financial payment.
- The 3-month SLA stabilisation period (from implementation Go-Live to full project Go-Live acceptance certificate) shall be part of the OPEX payment period.

### 11.4 Post Go-Live OPEX Payment — Overview

From the date of GEL's full project Go-Live acceptance certificate, the five-year O&M Period commences and quarterly OPEX billing shall commence.

**O&M Payment Period:** 5 years (20 quarters) from the date of the issuance of Go-Live certificate.

**Billing Unit:** Per device per day, calculated from the annual per-device rate as quoted in the SOR.

### 11.5 Pro-Rata Billing Mechanism

Devices commissioned at different points in time are billed for the actual number of days they were live and operational in each billing quarter. The Bidder is compensated from the day each device comes online; GEL shall commence the payment against that particular device from its commissioning date.

**Mechanism:**

1. Each quarter (Q1 through Q20) has a defined start date and end date anchored to the full project Go-Live acceptance certificate date.
2. For each device, the EMS records the exact commissioning date — the date the device was accepted into the AMI Platform and verified for billing-quality data transmission.

## 11.6 Annual Rate Structure

The Bidder is required to quote per device annual rate from Year 1 to Year 5 for each device and / or line item, as mentioned in the SOR. Annual rates shall be quoted and fixed at contract award. Bidder may propose 10% variation from its previous year's quoted rate.

O&M Year	Applicable Rate
Year 1	As quoted in SOR (base year)
Year 2	Maximum 10% variation from Year 1 rate
Year 3	Maximum 10% variation from Year 2 rate
Year 4	Maximum 10% variation from Year 3 rate
Year 5	Maximum 10% variation from Year 4 rate

The applicable rate for any device commissioned during the O&M Period is the rate for the O&M year in which it is commissioned, based on the issuance of Go live.

## 11.7 Deliverables during the O&M phase

Sr. No.	Milestone	Deliverables
1	Quarterly OPEX payment	<ul style="list-style-type: none"> <li>Quarterly Preventive Maintenance (PM) report</li> <li>Device uptime / SLA report, generated through EMS (covering both field devices and application infrastructure)</li> <li>Attendance of each of the deployed resources</li> <li>Quarterly Preventive Maintenance Report</li> <li>Installation and Commissioning certificate / confirmation issued by GEL in case of new deployment.</li> </ul>

## 11.8 Payment Release Conditions

### 11.8.1 Primary Payment — 70%

The 70% primary component shall be released by GEL within **30 calendar days** of invoice receipt, subject to:

- Invoice is complete with all required documents.
- EMS-generated SLA compliance report is submitted with the invoice
- Quarterly resource deployment confirmation is submitted
- No material breach of contract obligations is pending

## 11.8.2 SLA-Linked Payment — 30%

The 30% SLA-linked component shall be released by GEL within **30 working days** of invoice submission, after GEL verifies the SLA compliance report. The 30% component is subject to:

- GEL's verification of the EMS SLA compliance report against all metrics in Section 12
- Completion of all scheduled preventive maintenance activities for the quarter, with PM logbooks submitted
- Resolution of all open incidents within SLA timelines per Section 12 — any incident open beyond its resolution SLA at the quarter end is subject to penalty deduction
- GEL's confirmation that no material non-compliance event occurred during the quarter

Where SLA penalties apply, they shall be deducted from the 30% SLA-linked component. Penalty deductions shall not exceed the 20% component for most SLA breaches. Specific exceptions are identified in Section 12.

## 11.9 Enterprise Management System (EMS) for Payment Calculation

### 11.9.1 EMS Requirement

The Bidder shall supply, deploy and maintain an Enterprise Management System (EMS) for automated SLA monitoring and payment calculation as part of the AMI System scope. The EMS is the authoritative and sole source of SLA performance data for quarterly invoice verification and payment calculation.

The EMS shall:

- Automatically capture, record and report all SLA metrics defined in Section 12 in real time and on a quarterly summary basis
- Track device-level uptime and availability for every commissioned device, recording exact commissioning dates, offline events, restoration times and downtime durations
- Calculate per-device billable days for each billing quarter, accounting for commissioning dates, planned maintenance exclusions and SLA breach deductions
- Generate a device-wise quarterly SLA compliance report automatically at quarter end, with device-level drill-down covering all Section 12 metrics
- Calculate and display the SLA performance score and applicable penalty amounts against the penalty framework in Section 12
- Maintain an immutable, timestamped log of all SLA events — offline events, data collection failures, billing data delivery failures and recovery events — that cannot be modified by the Bidder
- Provide GEL with real-time and historical read-only access through a dedicated GEL administrative view, independent of the Bidder's access

### 11.9.2 EMS Access and Independence

- GEL shall have direct, independent access to the EMS at all times without requiring any Bidder action or approval.



- The EMS shall be hosted such that GEL can access historical SLA records for any period within the contractual duration without Bidder involvement.
- The Bidder shall not modify, delete, or override any SLA event record. Corrections to incorrectly recorded events shall follow an approved exception process requiring GEL's prior written consent.
- In any dispute between the Bidder's invoice and GEL's verification, the EMS data is the authoritative reference. Manual Bidder-submitted records shall not override EMS data.
- Only designated officers of GEL shall be authorised to download SLA compliance reports from the EMS for payment clearance purposes.

### 11.9.3 EMS Deployment Condition

The EMS is part of the AMI System scope. EMS deployment, GEL access confirmation and a live audit of EMS SLA tracking shall be a mandatory condition of full project Go-Live acceptance. The EMS shall be operational before the first quarterly invoice is submitted.

## 11.10 Non-Attributed Meters — 12-Month Commissioning Window

Where certain meters could not be commissioned at full project Go-Live for reasons not attributable to the Bidder, the following mechanism applies:

#### Qualifying Reasons (Non-Attributed):

A device is classified as non-attributed where the inability to commission is caused by factors outside the Bidder's direct control, including:

- Inability to access the metering location due to customer refusal of entry, pending GEL commercial resolution, or ongoing customer dispute
- GEL-issued written instruction to hold commissioning of specific devices
- Force majeure events at the specific location

Factors that are **not** qualifying reasons for non-attributed classification include: Bidder driver development delays, subcontractor failures, supply chain delays for hardware, or protocol integration issues with OEMs in GEL's network at contract award.

#### Process:

- At the time of full project Go-Live acceptance, the Bidder shall submit a **Non-Attributed Device Register** to GEL listing each uncommissioned device with: Device ID, location, hardware installation date, reason for non-commissioning, supporting evidence and proposed resolution action.
- GEL shall review and respond to the register within **15 working days**, accepting or contesting each classification. Devices whose classification is contested shall be treated as Bidder-attributable until the dispute is resolved.
- Non-attributed devices accepted by GEL shall be excluded from SLA performance calculations and from penalty computations until commissioned.

#### Commissioning and Billing:

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- The Bidder shall commission each accepted non-attributed device within **12 months from its hardware installation date**. The hardware installation date is the date recorded in the SAT sign-off for that device.
- On commissioning within the 12-month window, the device becomes billable from its actual commissioning date at the **Year 1 annual per-device rate**, regardless of which O&M year applies at the time of commissioning.
- If a non-attributed device is not commissioned within 12 months of its hardware installation date without GEL's written agreement for an extension, it shall be removed from the contracted scope. GEL shall have no financial obligation for that device.
- The Bidder shall update GEL on the status of each non-attributed device at every quarterly review during the resolution period.

## 11.11 New Device Onboarding During O&M Period

New EVC and PD meter locations onboarded during the O&M Period are billed at the annual perdevice rate applicable for the O&M year in which they are commissioned, per the SOR. The prorata, day-weighted billing mechanism applies — the device is billed from its commissioning date for the remaining days of the current quarter.

## 11.12 Payment Deductions and Penalties

- SLA-based penalty deductions shall be applied to the 30% SLA-linked component of the quarterly invoice.
- Penalty calculations shall be based on EMS-generated data and computed against the penalty matrix in Section 12.
- In no event shall penalty deductions in a single quarter exceed the 30% SLA-linked component of that quarter's invoice, except for critical SLA breaches identified in Section 12 as subject to uncapped or separately calculated penalties.
- Penalties for non-availability of billing data on a scheduled billing date shall be separately calculated and applied per Section 12, given the direct commercial impact on GEL's revenue operations.
- Where GEL withholds payment for non-performance or SLA breach, the Bidder shall be notified in writing with the specific SLA metric, EMS reference and calculated deduction amount. The Bidder may contest deductions through the contract's dispute resolution mechanism but shall not suspend services during a dispute.

# 12 SLAs and Penalty Framework

## 12.1 Framework and Principles

### 12.1.1 Measurement Authority

All SLA measurements shall be based on data generated by the **Enterprise Management System (EMS)**. The EMS is the authoritative and sole reference for SLA performance calculation and penalty computation. Manual records, Bidder-submitted logs, or any data source other than the EMS shall not override EMS-generated measurements. GEL reserves the right to conduct independent ad hoc measurements at any time and where a discrepancy exists between GEL's measurement and the EMS, GEL's measurement shall prevail.

EMS SLA will be audited by GEL at initial stage of deployment by conducting certain trials and checking the uptime. Only Designated Officers of GEL will be allowed to download report from EMS before payment clearance.

### 12.1.2 Measurement Conditions

Platform performance response SLAs shall be measured under the following standard conditions:

- System operating under normal load — up to 70% of the designed capacity
- Up to 50 concurrent users accessing the platform
- Communications under typical network conditions
- Standard dataset sizes as defined during UAT

### 12.1.3 Scheduled Maintenance Exclusions

Pre-approved scheduled maintenance windows shall be excluded from availability SLA calculations, subject to:

- Prior notification to GEL at least 72 hours in advance
- Maintenance not scheduled on any GEL billing date
- GEL's written approval for the maintenance window

### 12.1.4 SLA Stabilisation Period

During the 3-month SLA stabilisation period (T1 + 6 to T1 + 9 months), all SLAs are measured and recorded, but **financial penalties shall not be levied**. This period is to allow the system to stabilise and for the Bidder to resolve any commissioning issues post the issuance of Go live.

### 12.1.5 Contract Termination Trigger

During the O&M Phase, if the total SLA penalty levied in any quarter exceeds **20% of that quarter's OPEX payment for two consecutive quarters**, the SLA performance in the third quarter will be determinative. If penalties again exceed 20% in the third quarter, GEL reserves the right to terminate the contract and invoke the Performance Bank Guarantee. If critical infrastructure is impacted on a repetitive basis with no permanent resolution (and in a Max one-month time), GEL may invoke the termination clause immediately.

## 12.1.1 AMI Platform Availability SLAs

Quarterly payment refers to the overall quarterly invoice raised by the bidder including all components of SOR. Penalty will be calculated based on the total of all the components for SOR.

### 12.1.1.1 Overall System Availability

**SLA:**  $\geq 98\%$  per quarter across all AMI Platform components (web platform, data collection services, VEE engine, billing integration and mobile application)

**Measurement:** Quarterly, by EMS, as the percentage of total scheduled operational minutes in which the platform was available for use.

**Exclusions:** Pre-approved scheduled maintenance windows, force majeure events accepted by GEL.

System Availability (Quarterly)	Penalty (% of Quarterly Payment)
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≥ 98%	No penalty
< 98% to ≥ 97%	5% of quarterly payment
< 97% to ≥ 96%	10% of quarterly payment
< 96% to ≥ 95%	15% of quarterly payment
< 95% to ≥ 94%	20% of quarterly payment
< 94%	30% of quarterly payment (maximum SLA cap)

### 12.1.1.2 High Availability Target

**SLA:** ≥ 99.95% per month (excluding pre-approved maintenance windows) **Measurement:** Monthly, by EMS.

Monthly Availability	Penalty (% of Quarterly Payment)
≥ 99.95%	No penalty
< 99.95% to ≥ 99.5%	2% of quarterly payment
< 99.5% to ≥ 99%	4% of quarterly payment
< 99% to ≥ 98.5%	6% of quarterly payment
< 98.5% to ≥ 98%	8% of quarterly payment
< 98%	10% of quarterly payment
Further, every drop of 0.5% in SLA shall attract 2% of penalty against the quarterly payment.	

### 12.1.2 Cloud Infrastructure SLAs

Sr. No.	Parameter	SLA	Penalty
1	Cloud Service Availability	≥ 99.9% monthly	< 99.9% to ≥ 99%: 2% of quarterly payment; < 99% to ≥ 98%: 4% of quarterly payment; < 98% to ≥ 97%: 6% of quarterly payment
			For every drop of one percentage in SLA, 2% of penalty shall be levied with the cap of 20% of quarterly payment.
2	Disaster Recovery — RTO	≤ 4 hours from declared primary site failure	5% of quarterly payment per breach
3	Disaster Recovery — RPO	≤ 1 hour of data loss at time of failure	5% of quarterly payment per breach
4	Data Backup Completion	Daily automated backup (Hourly backup)	INR 10,000 per missed backup instance
5	Backup Restoration Capability	Restoration completed within 2 hours of initiation	10% of quarterly payment if restoration exceeds 2 hours 20% of quarterly payment if restoration exceeds 4 hours
6	MeITY Empanelment Maintenance	CSP empanelment maintained throughout contract	If empanelment lapses, Bidder migrates within 30 days at own cost; INR 50,000 per day of non-compliance beyond 30 days

## 12.1.3 Field Hardware and Device Availability SLAs

### 12.1.3.1 Device Uptime

**SLA:**  $\geq 99\%$  availability per device per month (measured as percentage of scheduled data collection windows in which the device successfully transmitted data)

**Measurement:** Monthly, per device, by EMS. Downtime is recorded from the moment the EMS detects a device communication failure to the moment the device resumes successful data transmission.

Device Availability (Monthly — Network-wide Average)	Penalty (% of Quarterly Payment)
$\geq 99\%$	No penalty
$< 99\%$ to $\geq 98\%$	2% of quarterly payment
$< 98\%$ to $\geq 96\%$	4% of quarterly payment
$< 96\%$ to $\geq 94\%$	6% of quarterly payment
$< 94\%$ to $\geq 92\%$	8% of quarterly payment
$< 92\%$ to $\geq 90\%$	10% of quarterly payment
$< 90\%$	Additional 1% per 0.5% downtime below 90%; penalty cap at 20% of quarterly payment

### 12.1.3.2 Communication Success Rate

**SLA:**  $\geq 98\%$  of scheduled data collection attempts per device per rolling 30-day period result in successful data receipt by the AMI Platform.

Communication Success Rate	Penalty
$\geq 98\%$	No penalty
$< 98\%$ to $\geq 96\%$	INR 500 per device per month below threshold
$< 96\%$	INR 1,000 per device per month below threshold

## 12.1.4 Data Collection and Quality SLAs

Sr. No.	Parameter	SLA	Penalty
1	Data Collection Completeness — Standard Daily Read	$\geq 98\%$ of scheduled daily reads received per device per rolling 30-day period	$< 98\%$ to $\geq 95\%$ : INR 200 per device per month below threshold; $< 95\%$ : INR 500 per device per month
2	Hourly Granular Data Completeness	$\geq 95\%$ of scheduled hourly reads received per device per rolling 30-day period	$< 95\%$ to $\geq 90\%$ : INR 100 per device per month; $< 90\%$ : INR 300 per device per month
3	Real-Time Alarm Notification Latency	$\leq 5$ minutes from event occurrence at device to AMI Platform dashboard notification	INR 5,000 per breach per incident
4	Tamper Alert Latency	$\leq 1$ minute from tamper event at MIU to AMI Platform notification	INR 10,000 per breach per incident — tamper events are safety-critical

5	VEE Processing Completion	100% of daily collected data processed through VEE within 2 hours of collection	INR 5,000 per device-day of VEE processing failure beyond 2-hour window
6	Duplicate / False Data Records	Zero accepted into processed data store	INR 10,000 per confirmed instance of duplicate or false record accepted into billingquality data

## 12.1.5 Billing Integration SLAs — CRITICAL

Billing data delivery is the single most commercially critical SLA under this contract. Failure to deliver validated data to SAP Billing on a scheduled billing date directly impacts GEL's ability to bill its customers and constitutes a material breach.

### 12.1.5.1 Billing Data Availability Target

**SLA:** 100% of commissioned meters in the AMI System must have validated billing determinants available for SAP Billing on or before each customer's scheduled billing date.

**Measurement:** Per meter per billing date, by EMS and verified against SAP Billing records.

### 12.1.5.2 Billing Date Delivery SLA

Billing Data Delivery Performance	Penalty
100% of meters billed on schedule	No penalty
99.5% to < 100% of meters billed on schedule	5% of quarterly payment
99% to < 99.5%	10% of quarterly payment
98.5% to < 99%	15% of quarterly payment
< 98.5%	20% of quarterly payment

### 12.1.5.3 Billing Date Non-Delivery — Additional Penalty

Where a meter's billing data is not available on the scheduled billing date and GEL is unable to raise a bill for that customer as a direct result:

- **Per meter per missed billing date:** INR 2,000 per instance
- This penalty is **in addition to** the percentage-based penalty in 12.5.2
- This penalty is **not subject to the 30% SLA cap** — it is calculated and deducted separately
- The Bidder shall also arrange alternate data collection (manual read) at its own cost to enable GEL to raise the bill without delay, where billing data is missing

### 12.1.5.4 SAP Integration Availability

**SLA:** SAP Billing integration available and operational **100%** of the time during GEL's billing processing windows (windows to be defined with GEL's SAP team).

SAP Integration Availability During Billing Windows	Penalty
100%	No penalty
Any unavailability during a billing window	INR 50,000 per hour of unavailability during billing window

## 12.1.6 Platform Performance Response SLAs

Sr. No.	Parameter	SLA	Penalty
1	Dashboard / Screen Navigation Response	< 2 seconds	INR 5,000 per incident
2	Data Display Refresh	< 3 seconds	INR 5,000 per incident
3	Report Generation — Standard	< 10 seconds	INR 5,000 per incident
4	Report Generation — Complex / Historical	< 60 seconds	INR 5,000 per incident
5	Historical Data Query — Daily Data	< 5 seconds	INR 5,000 per incident
6	Historical Data Query — Monthly Data	< 30 seconds	INR 5,000 per incident
7	Data Export — Standard Format (CSV/XLSX)	< 30 seconds	INR 5,000 per incident
8	User Authentication (Login)	< 2 seconds	INR 5,000 per incident
9	Alarm Display Update	< 1 second	INR 5,000 per incident
10	Mobile App — Screen Navigation	< 2 seconds	INR 5,000 per incident
11	Mobile App — Data Refresh	< 5 seconds	INR 5,000 per incident
12	Mobile App — Startup	< 5 seconds	INR 5,000 per incident
Sr. No.	Parameter	SLA	Penalty
13	On-Demand Pull Read — Device Response	< 1 hour for 95th percentile of requests	INR 10,000 per breach per incident

## 12.1.7 GEL Staff Mobile Application SLAs

The GEL Staff Mobile Application is an operational tool used by GA Teams for real-time monitoring, alarm management and field task execution. The following SLAs apply to the mobile application independently of the broader platform.

### 12.1.7.1 Mobile Application Availability

**SLA:** ≥ 98% availability per quarter (same overall target as the AMI Platform). The mobile application must be accessible and functional on iOS and Android devices for authorised GEL users at all times, including public holidays.

Mobile App Availability (Quarterly)	Penalty
≥ 98%	No penalty
< 98% to ≥ 97%	3% of quarterly payment
< 97% to ≥ 96%	6% of quarterly payment
< 96%	10% of quarterly payment



Every deep of 1% of SLA shall result into an additional penalty of 2% with the maximum cap of 20%

### 12.1.7.2 Mobile Application Performance Response SLAs

(In addition to the platform performance)

Sr. No.	Parameter	SLA	Penalty
1	App startup — cold launch	< 5 seconds	INR 5,000 per confirmed incident
2	Screen navigation	< 2 seconds	INR 5,000 per confirmed incident
3	Dashboard data refresh	< 5 seconds	INR 5,000 per confirmed incident
4	Device status search and display	< 3 seconds	INR 5,000 per confirmed incident
5	Report load — standard	< 10 seconds	INR 5,000 per confirmed incident
6	Alarm list load	< 2 seconds	INR 5,000 per confirmed incident
7	Offline mode transition on loss of connectivity	< 3 seconds	INR 5,000 per confirmed incident
8	Offline data sync on reconnection	< 10 seconds	INR 5,000 per confirmed incident

### 12.1.7.3 Push Notification Delivery SLA

**SLA:** Critical alarm push notifications shall be delivered to all authorised mobile users within **5 minutes** of the alarm event at the field device or AMI Platform.

Push Notification Delivery	Penalty
≤ 5 minutes	No penalty
> 5 minutes to ≤ 15 minutes	INR 5,000 per incident
> 15 minutes	INR 15,000 per incident — delayed alarm notification may have operational safety consequences

*Note: Notification delivery is dependent on device connectivity and OS notification settings outside the Bidder's control. The Bidder's SLA obligation is measured from alarm trigger to push notification dispatch from the AMI Platform server. Delivery confirmation tracking per notification shall be available in the EMS.*

### 12.1.7.4 Mobile Application Update SLAs

Sr. No.	Parameter	SLA	Penalty
1	New app version published following platform update	Within 14 calendar days of platform update affecting mobile functionality	INR 10,000 per day of delay beyond 14-day target
2	Critical security patch to mobile app	Within 30 days of patch availability	INR 7,000 per day of delay beyond 30-day target



3	Bug fix release for P1/P2 mobile incidents	Within 7 calendar days of root cause identification	INR 10,000 per day of delay beyond 7-day target
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### 12.1.7.5 Platform Compatibility and OS Support SLAs

Sr. No.	Parameter	SLA	Penalty
1	iOS version support	App shall remain compatible with the current and immediately preceding major iOS version at all times	INR 7,000 per day of incompatibility beyond 30 days of a new iOS major release
2	Android version support	App shall remain compatible with Android versions covering $\geq 90\%$ of active Android devices globally (per Google Play Console data) at all times	INR 7,000 per day of noncompliance beyond 30 days
3	App Store / Play Store availability	App shall remain published and downloadable from Apple App Store and Google Play Store throughout the O&M Period	INR 50,000 per day the app is unavailable on either store due to Bidder's noncompliance

### 12.1.8 Incident Based SLAs

All incidents shall be classified into one of four priority levels at the time of logging. Classification may be escalated by GEL at any point if operational impact increases. **12.1.8.1 Incident**

#### Priority Definitions

Priority	Definition	Examples
<b>P1 — Critical</b>	AMI Platform fully or substantially unavailable; SAP Billing integration down; billing data not available on a billing date; data loss event	Platform outage, SAP integration failure during billing window, mass device communication failure ( $>20\%$ of network)
<b>P2 — High</b>	Significant data collection failure affecting $>5\%$ of devices in a zone; alarm notification not functioning; device communication failure affecting billing completeness	Zone-wide communication outage, alarm push failure, VEE engine failure
<b>P3 — Medium</b>	Individual device failures, non-critical platform feature unavailability, delayed data delivery not affecting billing	Single Modem/MIU failure, report generation errors, dashboard display issue
<b>P4 — Low</b>	Minor issues, cosmetic platform defects, informational queries	Formatting issues, configuration change requests, non-urgent enhancement requests

#### 12.1.8.2 Unincident Response and Resolution SLAs

Priority	Acknowledgement	Resolution Target	Penalty for Missed Resolution
<b>P1</b>	$\leq 15$ minutes	$\leq 4$ hours	INR 7,000 per hour beyond 4-hour target
<b>P2</b>	$\leq 30$ minutes	$\leq 8$ hours	INR 10,000 per hour beyond 8-hour target
<b>P3</b>	$\leq 2$ hours	$\leq 24$ hours	INR 2,000 per hour beyond 24-hour target
<b>P4</b>	$\leq 4$ hours	$\leq 3$ business days	INR 500 per day beyond 3-business-day target

*Acknowledgement is defined as the Bidder's CST confirming receipt of the incident and assigning it to a technical resource with a ticket reference. Acknowledgement via phone, email, or the helpdesk platform are all valid.*

### 12.1.8.3 Field Visit SLAs

Visit Type	SLA	Penalty
Emergency field visit — P1 hardware incident	Technician on-site within 24 hours	INR 5,000 per hour beyond 24-hour target
Standard corrective maintenance — P2/P3 hardware	Technician on-site within 48 hours	INR 2,000 per hour beyond 48-hour target
Routine corrective maintenance — P4 hardware	Technician on-site within 72 hours	INR 500 per hour beyond 72hour target
Hardware replacement and recommissioning	Within 5 business days of site visit	INR 1,000 per day beyond 5day target

## 12.1.9 Manpower Availability SLAs

### 12.1.9.1 Implementation Phase

Resource	Leave Allowance	Penalty for Non-Availability
Project Manager	2 days per month	INR 10,000 per day of absence beyond 2 days of leave
AMI Technical Lead / System Architect	2 days per month	INR 10,000 per day of absence beyond 2day allowance
AMI Expert, HES/MDMS Integration Expert, Modem/MIU Expert	2 days per month	INR 5,000 per day of absence beyond 2day allowance
All other central team roles	2 days per month	INR 5,000 per day of absence beyond 2day allowance

*A backup resource of equal or higher qualification must be deployed when the primary resource is unavailable. If no backup is deployed, the penalty applies from Day 1 of absence.*

### 12.1.9.2 O&M Phase

Requirement	SLA	Penalty
Project Coordinator	2 days per month	INR 6,000 per day of absence beyond 2 days of leave

## 12.1.10 Security and Compliance SLAs

Sr. No.	Parameter	SLA	Penalty
1	Critical security patch application	Within 30 days of patch availability	INR 50,000 per day beyond 30-day target
2	Non-critical security patch application	Within 90 days of patch availability	INR 10,000 per day beyond 90-day target

3	Annual cybersecurity review — report submission	Within 30 days of review completion	INR 25,000 per day of delay beyond 30-day target
4	CERT-In VAPT — critical finding remediation	Before Go-Live (see Milestone A6)	Go-Live acceptance blocked; INR 50,000 per day if contract is delayed
5	Device credential update (periodic)	All devices updated at least once every 6 months	INR 5,000 per device found with expired or default credentials at audit
6	EOL/EOS component identified mid-contract	Migration to supported version within 60 days of identification	INR 25,000 per day beyond 60-day target
7	Technology stack — any component reaching EOS without prior migration	Zero tolerance — migration must complete before EOS date	INR 50,000 per day any component operates beyond its EOS date
8	Web portal — incompatibility with current major browser release (Chrome, Edge, Firefox, Safari)	Compatibility update deployed within 14 calendar days of new browser version reaching general availability	INR 25,000 per day per browser beyond 14-day target
9	Web portal — incompatibility with current major Windows release	Compatibility update deployed within 21 calendar days of new Windows major version reaching general availability	INR 25,000 per day beyond 21-day target
10	Mobile app — incompatibility with current major iOS release	Updated app published to App Store within 21 calendar days of new iOS major version reaching general availability	INR 25,000 per day beyond 21-day target
11	Mobile app — incompatibility with current major Android release	Updated app published to Play Store within 21 calendar days of new Android major version reaching general availability	INR 25,000 per day beyond 21-day target
12	Technology compatibility testing calendar	Submitted to GEL at each quarterly review	INR 10,000 per day of delay beyond the quarterly review date
13	Transmission-layer integrity — rejected packet alert	GEL notified within 4 hours of any packet authentication failure or tampered packet detection	INR 10,000 per incident of delayed notification beyond 4 hours
14	Database integrity scan — anomaly alert to GEL	GEL notified within 4 hours of any integrity scan anomaly	INR 25,000 per incident of delayed notification beyond 4 hours

15	HES-to-MDMS reconciliation — unresolved discrepancy escalation	Discrepancy escalated to alarm within 1 hour if not autoresolved	INR 5,000 per device per hour of unresolved discrepancy beyond the 1-hour escalation trigger
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#### 12.1.10.1.1 New EVC Driver and EVC Replacement SLAs

Sr. No.	Parameter	SLA	Penalty
1	New EVC OEM driver development — from receipt of complete OEM documentation	Fully tested driver delivered within 30 calendar days	INR 25,000 per day beyond the 30-day target; if delay exceeds 15 days beyond target, GEL may commission an alternative driver developer at the Bidder's cost
2	OEM documentation delay notification to GEL	Written notification within 5 calendar days of first OEM request if documentation has not been received	INR 10,000 per day of delay beyond the 5-day notification window
3	New EVC OEM driver deployment — from GEL's written acceptance of the tested driver	Deployed to production AMI Platform within 1 calendar day	INR 50,000 flat penalty per day of delay beyond 1-day target
4	EVC replacement — AMI Platform commissioning and first data read	Within 12 hours of GEL's notification that physical replacement is complete	INR 10,000 per hour beyond the 12-hour target
5	EVC replacement — Bidder acknowledgement of GEL notification	Within 30 minutes of GEL's replacement notification	INR 5,000 per incident of acknowledgement beyond 30minute target
6	EVC replacement — historical data continuity confirmation	Confirmed within 12 hours along with first data read	INR 25,000 per instance where historical data is not preserved or is incorrectly associated postreplacement
7	EVC replacement — SAP Billing continuity for current billing cycle	No billing gap or duplication for the current cycle due to EVC replacement	INR 50,000 per customer billing record affected by a gap or duplication caused by EVC replacement

#### 12.1.11 Reporting SLAs

Sr. No.	Report	SLA	Penalty
1	Automated daily email report (consumption and alarm summary)	Delivered by 08:00 IST daily	INR 5,000 per missed daily report

2	Weekly parallel operations reconciliation report (during implementation)	Submitted by end of day Monday for the preceding week	INR 10,000 per late or missed weekly report
3	Monthly SLA performance report	Submitted within 5 business days of month end	INR 10,000 per day of delay beyond 5-day target
4	Quarterly EMS SLA compliance report	Submitted simultaneously with quarterly invoice	Invoice not processed until report is submitted
5	Quarterly preventive maintenance report	Submitted within 5 business days of quarter end	INR 5,000 per day of delay
6	Annual cybersecurity review report	As per Section 12.10	As per Section 12.10
<b>Sr. No.</b>	<b>Report</b>	<b>SLA</b>	<b>Penalty</b>
7	Annual asset condition report	Submitted within 30 days of the O&M year end	INR 5,000 per day of delay

### 12.1.12 Implementation Phase SLAs — Milestone Delays

Delay Type	SLA	Penalty
Milestone A2 — Survey and BoQ delay	Completion by T1 + 1 month	0.1% of total contract value per week of delay (solely attributable to Bidder)
Milestone A3 — Platform deployment delay	Completion by T1 + 2 months	0.1% per week for first 4 weeks; 0.2% per week for next 4 weeks; 0.5% per week thereafter
Milestone A5 — Installation and Commissioning	T1+5 months	0.1% of total contract value per week of delay 0.2% per week for next 4 weeks; 0.5% per week thereafter (solely attributable to Bidder)
Full project Go-Live delay beyond T1 + 6 months	Go-Live by T1 + 6 months	0.2% of total contract value per week of delay

### 12.1.13 Penalty Deduction Process

1. The EMS generates the quarterly SLA compliance report automatically at quarter end.
2. The Bidder submits the quarterly invoice with the EMS SLA report attached.
3. GEL reviews the SLA report within 21 calendar days and calculates any penalty deductions.
4. GEL notifies the Bidder in writing of the deduction amount, the specific SLA metric, EMS reference and calculation basis before deducting.
5. The Bidder may raise a formal dispute within 7 calendar days of GEL's deduction notice. The Bidder shall continue to provide all services without interruption during any dispute period.
6. Disputes shall be resolved through the contract's dispute resolution mechanism. EMS data is the primary reference.
7. Penalty deductions are applied to the 30% SLA-linked component of the quarterly invoice.

8. The uncapped billing date non-delivery penalty (Section 12) is calculated and deducted separately from the quarterly invoice, regardless of the 30% cap on other SLAs.
9. Where the total deduction from the 30% SLA component in a quarter reaches the cap, no further deductions apply to the 30% component for that quarter. Uncapped penalties apply independently.

### 12.1.14 Overall Penalty Cap

Notwithstanding any individual SLA penalty calculation in this Section:

- Total financial penalties levied by GEL on the Bidder across all SLA heads shall not exceed **10% of the total contract value** over the full contractual period.
- In any single O&M year, total financial penalties shall not exceed **2% of the total contract value** for that year.
- Where cumulative penalties in a single O&M year approach or reach the 2% annual cap, GEL reserves the right to review the Bidder's operational performance and, if the root cause is not resolved to GEL's satisfaction within 60 days of the cap being reached, to invoke the contract termination clause.
- The above caps apply to SLA-based financial penalties. They do not apply to: liquidated damages for implementation milestone delays (Section 12), which have a separate 10% cap; compensation payable under specific contract warranties; or amounts recoverable under Performance Bank Guarantee invocation.
- The billing-date non-delivery penalty (Section 12) is included within the annual 2% cap.

### 12.1.15 SLA Exclusions

The following circumstances are excluded from SLA measurement and penalty calculation, subject to written notification to GEL within 24 hours of the event:

- Pre-approved scheduled maintenance windows (notified  $\geq 72$  hours in advance and not on billing dates)
- Force majeure events as defined in the contract
- Outages directly caused by GEL's own actions (e.g., SAP system unavailability, GEL network outages)
- Third-party network operator outages affecting SIM connectivity, where the Bidder can demonstrate it took all reasonable actions within its control to restore service (this exclusion applies to connectivity SLAs only; data collection SLAs are not excluded if the device had a functional secondary SIM on a different operator)

GEL reserves the right to determine the validity of any SLA exclusion claim. The Bidder shall provide documentary evidence within 5 business days of claiming an exclusion.

**Devices Not Attributable to Bidder:** Where a device is offline or not collecting data due to reasons exclusively within GEL's control — including but not limited to: EVC replacement pending at a Category C location (GEL's scope), PD meter replacement pending at a Category P3 location (GEL's scope), GEL-directed site access restrictions, or GEL's own maintenance activities on the meter — that device shall be excluded from the Bidder's SLA calculations for the affected period. The EMS shall support flagging of such exclusion events with a GEL-approved reason code. All

exclusion claims shall be submitted by the Bidder in writing to GEL within 5 business days of the event and shall be subject to GEL's written acceptance before being applied.

## 13 Schedule of Rates

### 13.1 Part A:

Sr. No.	Material/Service SAP Master Code*	Description	UoM	1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> Year	4 <sup>th</sup> Year	5 <sup>th</sup> Year
1)	TBC	Cloud hosting charges (excluding DR) as per Qty. (Nodes)	Yearly	4500	4,725	4,950	5,175	5,400
2)	TBC	Cloud hosting charges for DR as per Qty. (Nodes)	Yearly	4500	4,725	4,950	5,175	5,400
3)	TBC	CAMC of AMI Mobile application User License (Android & iOS)	EA	122	122	122	122	122
4)	TBC	CAMC of AMI Web Application User License	EA	62	62	62	62	62
5)	TBC	SIM Communication charges	Yearly	9000	9450	9900	10350	10800
6)	TBC	CAMC for the <b>Modem</b> as per detailed Technical specifications and Scope of Work given in the tender <small>Refer Notes</small>	Yearly	3200	3,350	3,500	3,650	3,800
7)	TBC	CAMC for the <b>MIU</b> as per detailed Technical specifications and Scope of Work given in the tender <small>Refer Notes</small>	Yearly	1300	1,375	1,450	1,525	1,600
8)	TBC	Integration of new make / model of EVC with AMI System	EA	1	1	1	1	1
9)	TBC	Integration of new make / model of PD Meter with AMI System	EA	1	1	1	1	1



10)	TBC	Removal of Modem/MIU along with all associated hardware	EA	10	10	10	10	10
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Sr. No.	Material/Service SAP Master Code*	Description	UoM	1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> Year	4 <sup>th</sup> Year	5 <sup>th</sup> Year
11)	TBC	Reinstallation of Modem/MIU along with all associated hardware	EA	10	10	10	10	10
12)	TBC	AMI System Integration with SAP ECC	EA	1				
13)	TBC	AMI System Integration with SAP S4 HANA	EA	1				
14)	TBC	AMI System Integration with SCADA	EA	1				
15)	TBC	AMI System Integration with CMP	EA	1				
16)	TBC	AMI System Integration with GIS	EA	1				
17)	TBC	AMI System Integration with CRM	EA	1				
18)	TBC	AMI System Integration with other GEL software	EA	2				

## 13.2 Part B:

Sr. No.	Material/Service SAP Master Code*	Description	UoM	6 <sup>th</sup> Year	7 <sup>th</sup> Year	8 <sup>th</sup> Year	9 <sup>th</sup> Year	10 <sup>th</sup> Year
1)	TBC	Cloud hosting charges (excluding DR) as per Qty. (Nodes)	Yearly	5400	5,625	5,850	6,075	6,300
2)	TBC	Cloud hosting charges for DR as per Qty. (Nodes)	Yearly	5400	5,625	5,850	6,075	6,300
Sr. No.	Material/Service SAP Master Code*	Description	UoM	6 <sup>th</sup> Year	7 <sup>th</sup> Year	8 <sup>th</sup> Year	9 <sup>th</sup> Year	10 <sup>th</sup> Year
3)	TBC	CAMC of Mobile application (Android & iOS)	EA	122	1	1	1	1
4)	TBC	CAMC of AMI Web Application User License	EA	62	1	1	1	1
5)	TBC	SIM Communication charges	Yearly	10800	11250	11700	12150	12600
6)	TBC	CAMC for the <b>Modem</b> as per detailed Technical specifications and Scope of Work given in the tender Refer Notes	Yearly	3800	3,950	4,100	4,250	4,400
7)	TBC	CAMC for the <b>MIU</b> as per detailed Technical specifications and Scope of Work given in the tender Refer Notes	Yearly	1600	1,675	1,750	1,825	1,900
8)	TBC	Integration of new make / model of EVC with AMI System	EA	1	1	1	1	1
9)	TBC	Integration of new make / model of PD Meter with AMI System	EA	1	1	1	1	1
10)	TBC	Removal of Modem/MIU along with all associated hardware	EA	10	10	10	10	10
11)	TBC	Reinstallation of Modem/MIU along with all associated hardware	EA	10	10	10	10	10

12)	TBC	Support for AMI System Integrations	EA	<b>1</b>
13)	TBC	AMI System Integration with other GEL software	EA	<b>2</b>

## Notes for Bidders:

1. Initial Qty. (Modem + MIU) during implementation period is considered as 4500 Nos.
2. Additional EVC Qty. of 50 Nos. in each year from 2<sup>nd</sup> year onwards is considered. Qty. count shown above is cumulative (including previous year count).
3. Similarly, additional PD Meters Qty. of 200 Nos. in each year from 2<sup>nd</sup> year onwards is considered. Qty. count shown is cumulative (including previous year count).
4. The specified quantity is indicative for tendering and placement of Annual Rate Contract. Ordering with firm quantities will be carried out based on GEL Operational requirement within the Supply contract validity period.
5. Bidder to commit the rates (In Part B of SOR) for 6<sup>th</sup> to 10<sup>th</sup> year at the time of Bidding. Separate contract shall be issued to the bidder based on these rates after the successful completion of initial contractual period. No rates revision shall be considered once Initial Contract (for 5 years period) is awarded.
6. Commercial evaluation shall be done based on overall quoted price (Part A + Part B).
7. Charges towards aforementioned SOR line items shall be payable till the respective services are taken by GEL during the contract duration.
8. For Part A: CAMC includes Supply, Installation, Testing, Commissioning, Operation and Maintenance for the entire contract duration.
9. For Part B: CAMC includes Operation and Maintenance for the entire contract duration.

## 14 Technical Bid Submission Documents

This section defines the comprehensive list of technical documents and submissions required from the Bidder as part of their technical proposal. All documents shall be submitted in the prescribed format and shall demonstrate full compliance with the technical specifications, functional requirements and project scope defined in this RFP.

### 14.1 Mandatory Technical Submission Documents

#### 14.1.1 Hardware Specifications and Technical Datasheets

The Bidder shall provide a detailed Hardware Compliance Matrix addressing each requirement specified in Section 5 of this RFP.

##### **EVC Modem:**

- Make, model, manufacturer, technical specifications, environmental ratings and certification details
- Manufacturer Authorisation Form (MAF) from the Modem OEM
- PESO and ATEX certification for hazardous area installation
- Communication technology support (NB-IoT, 4G LTE) with relevant type approvals
- Dual-SIM capability and failover specifications
- IP rating (minimum IP54) and operating temperature range
- Power consumption specifications and battery backup calculations
- Physical dimensions, weight and mounting configuration
- Firmware version and OTA update capability

##### **PD Meter MIU:**

- Make, model, manufacturer, technical specifications, environmental ratings and certification details
- Manufacturer Authorisation Form (MAF) from the MIU OEM
- PESO and ATEX certification for hazardous area installation
- Communication interface specifications (pulse input, RS-485/232, or equivalent)
- IP rating and operating temperature range
- Physical dimensions and mounting configuration
- Compatibility matrix against PD meter makes and models covered in Annexure A

##### **Junction Boxes, Antennas and Ancillary Hardware:**

- Make, model, manufacturer and specifications for all ancillary hardware proposed

- IP rating and hazardous area classification for all items installed in the field
- Mounting configuration and cable entry specifications

## 14.2 Software Specifications and Licensing Documentation

### AMI Platform Software Specifications:

The Bidder shall provide comprehensive AMI Platform software specifications including:

- Software name, version and vendor information for each component (HES, MDMS, NMS, EMS)
- Manufacturer Authorisation Form (MAF) from the AMI software OEM or vendor for each component
- System architecture documentation showing all four functional layers (HES, MDMS, NMS, EMS) and the interfaces between them
- Scalability specifications — minimum 5,000 metering points, expandable to 7,000 without architectural change
- Communication protocol support: Modbus RTU/TCP, DLMS/COSEM, MQTT, REST and all proprietary EVC OEM protocols in GEL's network
- Data management and billing integration capabilities including SAP Billing integration
- User licensing specifications — as per SOR
- Cloud deployment specifications and MeITY empanelment proof for the proposed Cloud Service Provider
- Mobile application capabilities and distribution model (Apple App Store and Google Play Store)
- HES-MDMS pre-integration evidence — one of: unified COTS, same-OEM pre-integrated, or documented different-OEM partnership with prior reference deployment

### Cloud Infrastructure Software:

The Bidder shall provide specifications for all cloud infrastructure software including:

- Cloud platform services: Provider name, service specifications, MeITY empanelment certificate and SLA commitments
- Manufacturer Authorisation Form (MAF) from the Cloud Service Provider
- Backup and recovery software: Name, version, capabilities and recovery time objectives (RTO  $\leq 4$  hours, RPO  $\leq 1$  hour)
- Manufacturer Authorisation Form (MAF) from the backup software vendor
- Monitoring and management software: Name, version, capabilities and integration features •  
Disaster Recovery site location and separation from primary site

### Licensing Documentation:

The Bidder shall provide detailed software licensing information including:

- Licence type (subscription or perpetual) and terms for each component
- User licence specifications and expansion options — including the cost model for additional users beyond the contracted baseline
- Development and testing environment licensing
- Third-party software licensing requirements and restrictions
- Cloud infrastructure licensing and usage terms
- Mobile application licensing and distribution terms
- Software maintenance and support terms during the 5-year O&M period

## 14.3 System Architecture and Design Documentation

### Overall AMI System Architecture:

The Bidder shall provide comprehensive system architecture documentation including:

- High-level AMI System architecture diagram showing all four functional layers (HES, MDMS, NMS, EMS), field hardware, cloud infrastructure and enterprise system integration points
- Network architecture diagram covering field-to-platform communication paths (NB-IoT, 4G LTE), WAN configuration, APN design and GEL office connectivity
- Data flow diagram from field device through HES, MDMS, NMS and EMS layers to enterprise systems (SAP, SCADA, CRM, GIS, WFM)
- Security architecture covering field-to-platform encryption (TLS 1.2+), device authentication, RBAC, MFA, Active Directory integration and IEC 62443 compliance
- Cloud infrastructure architecture showing primary and DR sites, failover mechanism, backup configuration and MeITY compliance
- Integration architecture for all enterprise system interfaces (SAP Billing, SCADA, CMP, CRM, GIS, WFM, ESB)

### Detailed Design Documentation:

The Bidder shall provide detailed design documentation including:

- HES configuration: device registration workflow, protocol driver deployment, multi-OEM communication strategy and retry and re-dial policy
- Communication network design: technology selection per site (NB-IoT, 4G LTE), dual-SIM configuration, APN setup and bandwidth estimates per GA office
- Database design: capacity planning, 10-year data retention architecture, archival and retrieval procedures and performance optimisation approach
- Mobile application architecture: platform (iOS and Android), offline capability design and field operations workflow
- Cybersecurity implementation: specific technologies, encryption standards, RBAC model, audit logging and CERT-In VAPT schedule

## 14.4 Bill of Materials and Procurement Documentation

### Comprehensive Bill of Materials:

The Bidder shall provide a detailed Bill of Materials including:

- GA-wise and location-type-wise breakdown of all hardware components (EVC Modems, PD meter MIUs, antennas, junction boxes, power supplies and ancillary items)
- Part numbers, specifications and quantities for each line item
- Manufacturer information and model numbers
- Unit prices and total costs for 100% of contracted quantities
- Delivery schedules and lead times for each component
- Spare parts recommendations — minimum 2% of deployed quantity per component type — and availability commitments

### Unpriced BoM for Initial Procurement:

The Bidder shall provide an unpriced Bill of Materials for sixty percent (60%) of total equipment quantities within three weeks of order placement, including:

- Detailed item descriptions and specifications
- Manufacturer part numbers and model information
- Quantities for the initial procurement phase
- Technical specifications and compliance documentation
- Delivery schedules for initial procurement items

## 14.5 Power and Load Calculations

### Electrical Load Analysis:

The Bidder shall provide comprehensive power calculations for all field installations including:

- Individual equipment power consumption under normal operating and worst-case communication conditions
- Total power requirements per installation type (EVC IMS location, PD meter location)
- Power quality requirements and conditioning needs
- Solar power system sizing where applicable
- Electrical protection and grounding requirements

### Battery Backup Calculations:

The Bidder shall provide detailed battery backup calculations including:

- Battery-only installations: demonstrated calculation showing a minimum five-year operational life under the specified data collection and communication duty cycle
- Mains-powered installations with battery backup: demonstrated calculation showing a minimum 72-hour (3-day) backup capability on a full charge

- Battery state-of-health monitoring capability and replacement trigger thresholds
- Charging system specifications for mains-powered installations
- Environmental considerations (temperature range, humidity) and their impact on battery performance

## 14.6 Communication and Network Design

### Network Design Documentation:

The Bidder shall provide comprehensive communication network design including:

- Communication technology selection per location (NB-IoT, 4G LTE) with justification based on coverage availability and SLA feasibility
- Dual-SIM configuration, failover mechanism and SIM operator selection rationale
- APN design and secure network configuration
- Bandwidth requirements per GA office location for platform access
- Redundancy and failover mechanisms at network level
- Network monitoring and diagnostic capabilities (NMS layer)

### Protocol Implementation Details:

The Bidder shall provide detailed protocol implementation documentation including:

- Modbus RTU and Modbus TCP implementation and configuration for EVC communication
- DLMS/COSEM implementation for applicable device types
- MQTT and REST API configuration for cloud-native device communication
- Proprietary EVC OEM protocol implementation details for each OEM in Annexure A
- Store-and-forward capability and backfill mechanism per device type • Communication testing and validation procedures

## 14.7 EVC OEM Driver Development Documentation

The Bidder shall provide the following documentation specific to EVC OEM driver development:

- Driver development plan covering all EVC OEMs in GEL's network as listed in Annexure A, with timeline for completion before installation at those locations
- Driver testing and validation procedure for each OEM, including test cases and acceptance criteria
- Protocol interface specification for each OEM driver, including register map, data types and communication parameters used



- Driver licence terms and the irrevocable, royalty-free licence grant to GEL
- Evidence of prior deployment of each proposed driver on a live utility installation, where available
- For OEM drivers not previously deployed: a Field Trial plan demonstrating successful communication before full-scale installation at those locations begins

## 14.8 SIM Management and Connectivity Documentation

The Bidder shall provide documentation covering SIM management for the contracted deployment including:

- SIM procurement plan: operator(s) selected per geographic area, rationale for selection and dual-SIM operator pairing strategy
- SIM registration procedure: process for registering all SIM cards in Bidder's name
- APN configuration specifications per operator
- SIM lifecycle management procedure: SIM activation, monitoring, fault resolution, replacement and deactivation
- Data usage monitoring and management approach to prevent unexpected data plan overruns
- TSP escalation procedure for network-level issues affecting GEL's deployment
- SIM performance reporting format proposed for monthly submission to GEL

## 14.9 Integration and Interface Documentation

### GEL Enterprise System Integrations:

The Bidder shall provide detailed integration plans for all enterprise systems including:

- SAP Billing integration: data format, API or file transfer specification, billing cycle alignment and fallback to manual entry procedure
- SCADA integration: interface specification, data exchange protocol and testing procedure
- CRM/CIS integration: customer data synchronisation specification and service request routing workflow
- GIS integration: coordinate synchronisation specification and map layer consumption approach
- Workforce Management integration: service order routing specification and outcome synchronisation workflow

- Centralised Monitoring Platform (CMP) integration: API specification and data exchange format
- Enterprise Service Bus (ESB) integration: protocol, payload format and event catalogue

#### **API and Data Exchange:**

The Bidder shall provide integration specifications for open APIs including:

- Complete API documentation in OpenAPI/Swagger standard for all northbound, southbound and integration interfaces
- API gateway architecture, authentication model and rate limiting specifications
- Webhook event catalogue and payload specifications
- Data lineage architecture showing audit trail from field device to enterprise system delivery
- Third-party system interface specifications for any additional integration identified during FRS/SRS development

## **14.10 Project Implementation and Execution Plans**

#### **Project Execution Methodology:**

The Bidder shall provide comprehensive project execution plans including:

- Phase-wise project plan aligned to the six-milestone framework (Milestones A1 through A6) defined in Section 6, with detailed activity breakdown and resource allocation per milestone
- Geographic Area deployment sequence and rationale
- Parallel operations plan — zone-level schedule for the mandatory parallel operations period (minimum 30 days per zone), data reconciliation methodology and GEL sign-off procedure
- Data migration plan covering: historical data mapping from the existing AMI system, migration methodology, validation procedures, rollback plan and billing continuity assurance
- Quality assurance and quality control procedures aligned to the approved QAP
- Risk management register identifying key implementation risks, probability, impact and mitigation measures
- Stakeholder coordination and communication plan covering GEL's GA Teams, billing team, IT team and SAP team

#### **Installation and Commissioning Plans:**

The Bidder shall provide detailed installation and commissioning plans including:

- Field installation procedure for EVC Modems: sequence, ATEX/PESO compliance steps, junction box placement (minimum 1.5m from metering skid), cabling, antenna mounting and SIM configuration
- Field installation procedure for PD meter MIUs: sequence, compliance steps and commissioning checklist

- - FAT procedure: scope, third-party inspection agency nomination, test cases, acceptance criteria and GEL witnessing protocol
  - SAT procedure: per-location test cases, PD meter mechanical index vs MIU-captured index simultaneous read verification and dual sign-off workflow
- UAT procedure: test plan covering all functional requirements, all integrations, all report types, mobile application, DR failover test and CERT-In remediation sign-off

## 14.11 Training and Support Documentation

The Bidder shall provide a compliance checklist against the training and capacity building requirements detailed in Section 7, together with:

- Training programme curriculum covering all user roles: GEL GA Team Operators, Billing Team Users, IT Administrators and Management Dashboard Users
- Training delivery plan: schedule, venue, duration per module and trainer qualifications
- Training materials in English covering web portal operations, mobile application, alarm management, report generation, VEE rule configuration and platform administration
- Role-specific assessment procedures and competency verification approach
- Refresher training schedule during the O&M period
- Knowledge transfer plan for GEL's IT team covering platform administration, user management, integration monitoring and first-line troubleshooting

## 14.12 Hazardous Area Certifications

The Bidder shall provide PESO and ATEX certifications for all equipment installed in hazardous areas including:

- EVC Modem: PESO certificate, ATEX/IECEx certificate, Zone classification covered and certificate validity date
- PD Meter MIU: PESO certificate, ATEX/IECEx certificate, Zone classification covered and certificate validity date
- Junction boxes for Modem and MIU installations: hazardous area rating and certificate
- Antennas and cable assemblies for hazardous area use: certification details
- Installation and maintenance procedure approvals for hazardous area work

## 14.13 Compliance and Certification Documentation

**Cybersecurity Compliance:**

The Bidder shall provide evidence of compliance with all applicable cybersecurity standards including:

- IEC 62443 compliance declaration for the AMI Platform and field communication infrastructure
- NCIIPC compliance declaration
- ISO 9001 information security management certification for the Bidder's organisation

- CERT-In empanelled security auditor nomination for the pre-Go-Live penetration test
- Cybersecurity incident response procedure

#### **Quality Management Certifications:**

The Bidder shall provide quality management documentation including:

- ISO 9001 quality management system certification for the Bidder's organisation
- Manufacturing quality control certifications for all proposed hardware OEMs
- Software development quality assurance procedures
- Testing and validation quality control measures

## **14.14 Operations and Maintenance Documentation**

The Bidder shall provide comprehensive O&M service delivery documentation aligned to the requirements in Section 8, including:

- O&M service delivery framework: team structure, roles, responsibilities and escalation matrix
- Preventive maintenance schedule per device type (EVC Modem, PD meter MIU): inspection intervals, battery replacement triggers and maintenance activity checklists
- Corrective maintenance and field incident resolution procedure: fault classification, response time commitments per priority and resolution documentation
- Platform and software operations: patch management process, version upgrade procedure, change management and rollback capability
- SIM management and TSP coordination procedure during O&M
- Performance monitoring and SLA reporting framework: EMS data, quarterly compliance reports and invoice validation reports
- Spare parts management: stocking strategy, replenishment triggers and minimum inventory levels
- End-of-contract handover documentation: as-built documentation package, data export, licence transfer and structured asset transfer procedure

## **14.15 Scope Deviations and Exceptions**

#### **Technical Scope Deviations:**

The Bidder shall clearly document any deviations from the specified technical scope including:

- Hardware specifications that differ from the requirements in Section 5
- Alternative technical approaches or methodologies proposed
- Functionality limitations or constraints in the proposed AMI Platform

- Timeline or implementation approach modifications

Any SLA targets in Section 12 that the Bidder believes are technically unachievable and the Bidder's proposed alternative

#### **Commercial and Contractual Exceptions:**

The Bidder shall document any commercial or contractual exceptions including:

- Terms and conditions that cannot be accepted as specified
- Warranty and support terms that differ from RFP requirements
- Licensing terms and restrictions that may impact implementation
- Liability and risk allocation concerns
- Alternative commercial structures or payment terms proposed

## **14.16 Innovation and Value-Added Proposals**

The Bidder may propose enhancements and innovations beyond the minimum RFP scope including:

- Advanced analytics and machine learning capabilities for consumption forecasting, anomaly detection, or predictive maintenance
- Enhanced cybersecurity features beyond IEC 62443 baseline requirements
- Improved UI/UX features, accessibility enhancements, or additional mobile application capabilities
- Additional integration capabilities or future-ready interfaces not specified
- Next-generation communication technologies or future upgrade pathways
- Operational optimisation features: predictive maintenance, condition-based servicing, enhanced revenue protection analytics, or energy efficiency monitoring tools

All value-added proposals shall be clearly labelled as optional, separately priced in the SOR and shall not affect the Bidder's compliance with the mandatory requirements.

## **14.17 Document Submission Requirements**

All technical submission documents shall be:

- Submitted in PDF format with searchable text
- Organised with clear section dividers and a table of contents
- Numbered pages with consistent headers and footers
- Accompanied by an executive summary for complex technical documents
- Cross-referenced between related documents and sections

- 
- Submitted in both soft copy (email/USB) and hard copy (two sets)

All submitted technical documents will be reviewed for completeness and compliance with RFP requirements, evaluated for technical adequacy and implementation feasibility, assessed for alignment with project objectives, validated against applicable industry standards and used as the basis for technical evaluation and Bidder selection.

**Technical Submission Documents — Summary Table**

Document Category	Specific Documents Required	Key Content Requirements	Critical Details
Functional Compliance	<ul style="list-style-type: none"> <li>• AMI Platform Functional Specification Compliance Matrix (Section 4)</li> </ul>	<ul style="list-style-type: none"> <li>• Compliance for all functional requirements in Section 4</li> <li>• Detailed explanation for each compliance response</li> <li>• MAF from all software OEMs</li> </ul>	<ul style="list-style-type: none"> <li>• Exact requirement text from Section 4</li> <li>• Implementation methodology per sub-section</li> <li>• Supporting documentation references</li> </ul>
Hardware Specifications	<ul style="list-style-type: none"> <li>• EVC Modem datasheets and compliance matrix (Section 5)</li> <li>• PD Meter MIU datasheets</li> <li>• Junction box and ancillary hardware datasheets</li> </ul>	<ul style="list-style-type: none"> <li>• Make, model, manufacturer details</li> <li>• MAF from all hardware OEMs</li> <li>• Technical performance parameters</li> <li>• Environmental ratings and IP certifications</li> </ul>	<ul style="list-style-type: none"> <li>• PESO and ATEX certifications as per RFP</li> <li>• Dual-SIM capability confirmation</li> <li>• Battery backup calculation evidence</li> <li>• OEM authorisation validity</li> </ul>
Software Documentation	<ul style="list-style-type: none"> <li>• AMI Platform specifications (HES, MDMS, NMS, EMS)</li> <li>• Cloud infrastructure software</li> <li>• Licensing documentation</li> </ul>	<ul style="list-style-type: none"> <li>• Software architecture covering all four AMI layers</li> <li>• MAF from AMI software OEM</li> <li>• Licence types and user capacity (as per SOR)</li> <li>• Scalability to 7,000 metering points</li> </ul>	<ul style="list-style-type: none"> <li>• MeITY empanelment proof for Cloud Service Provider</li> <li>• HES-MDMS pre-integration evidence</li> <li>• 10-year data retention architecture</li> <li>• Security compliance certifications</li> </ul>
System Architecture	<ul style="list-style-type: none"> <li>• Overall AMI System architecture diagrams</li> <li>• Network design documentation</li> <li>• Security architecture</li> <li>• Integration architecture</li> </ul>	<ul style="list-style-type: none"> <li>• Four-layer AMI architecture (HES, MDMS, NMS, EMS)</li> <li>• Communication paths and protocols</li> <li>• IEC 62443 security implementation</li> <li>• Enterprise system integration design</li> </ul>	<ul style="list-style-type: none"> <li>• Dual-SIM and APN design</li> <li>• Data flow from field device to SAP</li> <li>• DR site architecture and failover</li> <li>• RBAC and MFA implementation</li> </ul>



Document Category	Specific Documents Required	Key Content Requirements	Critical Details
Bill of Materials	<ul style="list-style-type: none"> <li>Complete GA-wise BoM (100% quantities)</li> <li>Unpriced BoM (60% quantities)</li> <li>Spare parts recommendations</li> </ul>	<ul style="list-style-type: none"> <li>Item-wise specifications with part numbers</li> <li>Quantities per GA and location type</li> <li>Delivery schedule and lead times</li> </ul>	<ul style="list-style-type: none"> <li>All locations across 29 GAs</li> <li>Minimum 2% spare parts per component type</li> <li>Lead times for long-lead items</li> <li>Alternative supplier options for critical components</li> </ul>
Power Calculations	<ul style="list-style-type: none"> <li>Electrical load analysis per installation type</li> <li>Battery backup calculations</li> </ul>	<ul style="list-style-type: none"> <li>Power consumption per device type</li> <li>Total power per installation type</li> <li>Battery backup duration demonstration</li> </ul>	<ul style="list-style-type: none"> <li>5-year battery life for batteryonly installations</li> <li>72-hour (3-day) backup for mains-powered installations</li> <li>Battery health monitoring and replacement triggers</li> </ul>
Communication Design	<ul style="list-style-type: none"> <li>Network topology per GA and location type</li> <li>Protocol implementation details</li> <li>SIM management documentation</li> </ul>	<ul style="list-style-type: none"> <li>Technology selection (NB-IoT, 4G LTE) per location with justification</li> <li>Dual-SIM failover configuration</li> <li>Store-and-forward capability</li> </ul>	<ul style="list-style-type: none"> <li>APN design and secure network configuration</li> <li>Bandwidth estimates per GA office</li> <li>TSP selection and operator pairing rationale</li> <li>SIM registration in Bidder's name</li> </ul>

EVC Driver Development	<ul style="list-style-type: none"> <li>• Driver development plan for all OEMs in Annexure A</li> <li>• Driver test and validation procedures</li> </ul>	<ul style="list-style-type: none"> <li>• Timeline for driver completion before installation</li> <li>• Test cases and acceptance criteria per OEM</li> </ul>	<ul style="list-style-type: none"> <li>• One driver per OEM in GEL's network</li> <li>• Royalty-free licence grant to GEL</li> <li>• Field Trial plan for unproven drivers</li> <li>• Prior deployment evidence where available</li> </ul>
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Document Category	Specific Documents Required	Key Content Requirements	Critical Details
Integration Plans	<ul style="list-style-type: none"> <li>• SAP Billing integration specification</li> <li>• SCADA integration specification</li> <li>• CRM, GIS, WFM integration plans</li> <li>• API documentation (OpenAPI/Swagger)</li> </ul>	<ul style="list-style-type: none"> <li>• Billing determinant format and delivery schedule</li> <li>• API gateway architecture</li> <li>• Webhook event catalogue</li> <li>• Data lineage specification</li> </ul>	<ul style="list-style-type: none"> <li>• SAP integration mandatory and Go-Live gate</li> <li>• SCADA integration configured and tested before Go-Live</li> <li>• Complete API documentation at Go-Live</li> <li>• Data lineage for all data points</li> </ul>
Implementation Plans	<ul style="list-style-type: none"> <li>• Milestone project plan (Milestones A1–A6)</li> <li>• GA deployment sequence • Parallel operations plan • Data migration plan</li> </ul>	<ul style="list-style-type: none"> <li>• Milestone A1–A6 activity breakdown per Section 6</li> <li>• Zone-level parallel operations schedule (min 30 days per zone)</li> <li>• Historical data migration methodology and rollback plan</li> </ul>	<ul style="list-style-type: none"> <li>• Billing continuity assurance during migration</li> <li>• GEL sign-off gate</li> <li>• Risk register with mitigation measures</li> </ul>

Training Documentation	<ul style="list-style-type: none"><li>• Training programme curriculum</li><li>• Training materials</li></ul>	<ul style="list-style-type: none"><li>• Role-based training for all user types (GA Team, Billing, IT Admin, Management)</li><li>• English language materials</li></ul>	<ul style="list-style-type: none"><li>• Hands-on training for web portal and mobile application</li><li>• Refresher training schedule during O&amp;M</li><li>• Competency assessment procedures</li></ul>	
O&M Documentation	<ul style="list-style-type: none"><li>• 5-year O&amp;M service framework</li><li>• Preventive maintenance schedules</li><li>• Technical support procedures</li></ul>	<ul style="list-style-type: none"><li>• Team structure, escalation matrix and SLA commitments</li><li>• Preventive maintenance per device type</li><li>• Patch management and version upgrade procedures</li></ul>	<ul style="list-style-type: none"><li>• Battery replacement triggers and schedule</li><li>• Spare parts stocking and replenishment</li><li>• End-of-contract structured asset transfer</li><li>• EMS quarterly compliance reporting</li></ul>	
Document Category	Specific Documents Required	Key Content Requirements		Critical Details
Compliance Certifications	<ul style="list-style-type: none"><li>• IEC 62443 compliance declaration</li><li>• ISO 27001 certification</li><li>• CERT-In auditor nomination</li><li>• PESO/ATEX certificates for all field hardware</li></ul>	<ul style="list-style-type: none"><li>• Cybersecurity standards compliance</li><li>• Hazardous area certifications for all fieldinstalled components</li></ul>		<ul style="list-style-type: none"><li>• Certificate validity dates</li><li>• CERT-In empanelled auditor for pre-Go-Live VAPT</li><li>• NCIIPC compliance declaration</li></ul>

*All documents shall be submitted in PDF format with searchable text, organised with clear section dividers, numbered pages and executive summaries for complex technical documents. Soft copy (email/USB) and two hard copy sets are required. Cross-references between related documents shall be provided.*



## 15 Tentative Monitoring and Control Parameters

The list of signals below is tentative and minimum list of signals to be fetched from each system. However, final list of signals for interfacing with AMI for each system shall be finalized during detail engineering and provided to bidder for interfacing.

All works required for interfacing of signals, including supply of all hardware and software required at both ends shall be included in scope of the bidder.

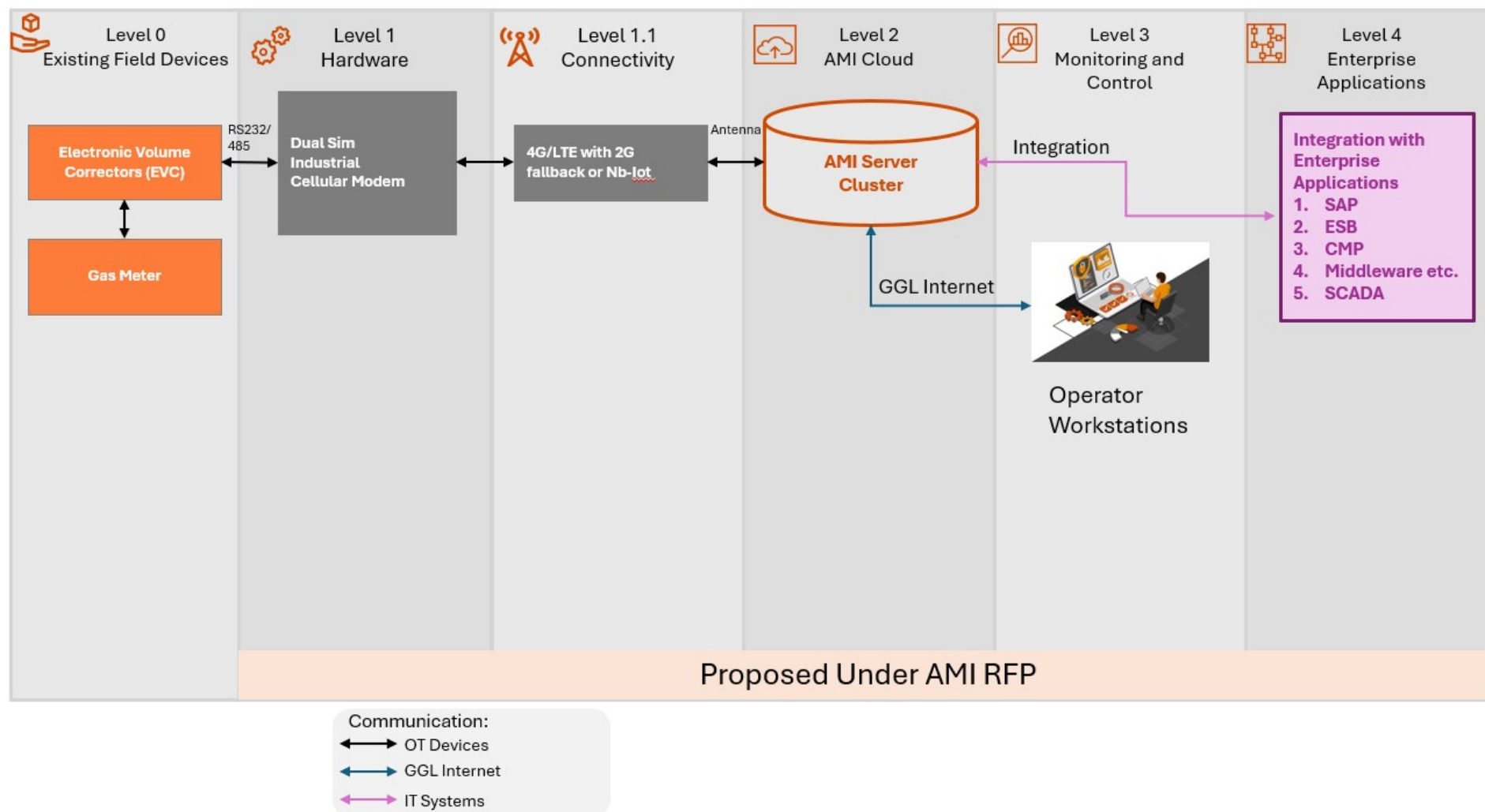
S.No.	Type of Site	Function	Parameters
1	Metering Skid with EVCs	MONITORING	<ul style="list-style-type: none"> <li>Corrected Flow Rate</li> <li>Uncorrected Flow Rate</li> <li>Corrected Consumption (Today, Last 24 hrs, Cumulative)</li> <li>Uncorrected Consumption Values</li> <li>Interval/Hourly/Daily/Monthly Logs</li> <li>Gas Pressure</li> <li>Gas Temperature</li> <li>Correction Factor</li> <li>Active and Memorized Alarms</li> <li>Event and Parameter Logs</li> <li>Battery Status</li> <li>Set threshold values of Flow Max and Min</li> <li>Data Push Capability</li> <li>On-demand Data Pulling</li> <li>Security Switch of EVC status</li> </ul>
		CONTROL	<ul style="list-style-type: none"> <li>NONE</li> </ul>

	Metering Sites with PD Meters	MONITORING	<ul style="list-style-type: none"> <li>• Uncorrected Flow Rate</li> <li>• Uncorrected Consumption Values</li> <li>• Interval/Hourly/Daily/Monthly Logs</li> <li>• Active and Memorized Alarms</li> <li>• Event and Parameter Logs</li> <li>• Battery Status</li> <li>• Set threshold values of Flow Max and Min</li> <li>• Data Push Capability</li> <li>• On-demand Data Pulling</li> <li>• Signal Strength</li> </ul>
		CONTROL	<ul style="list-style-type: none"> <li>• • NONE</li> </ul>



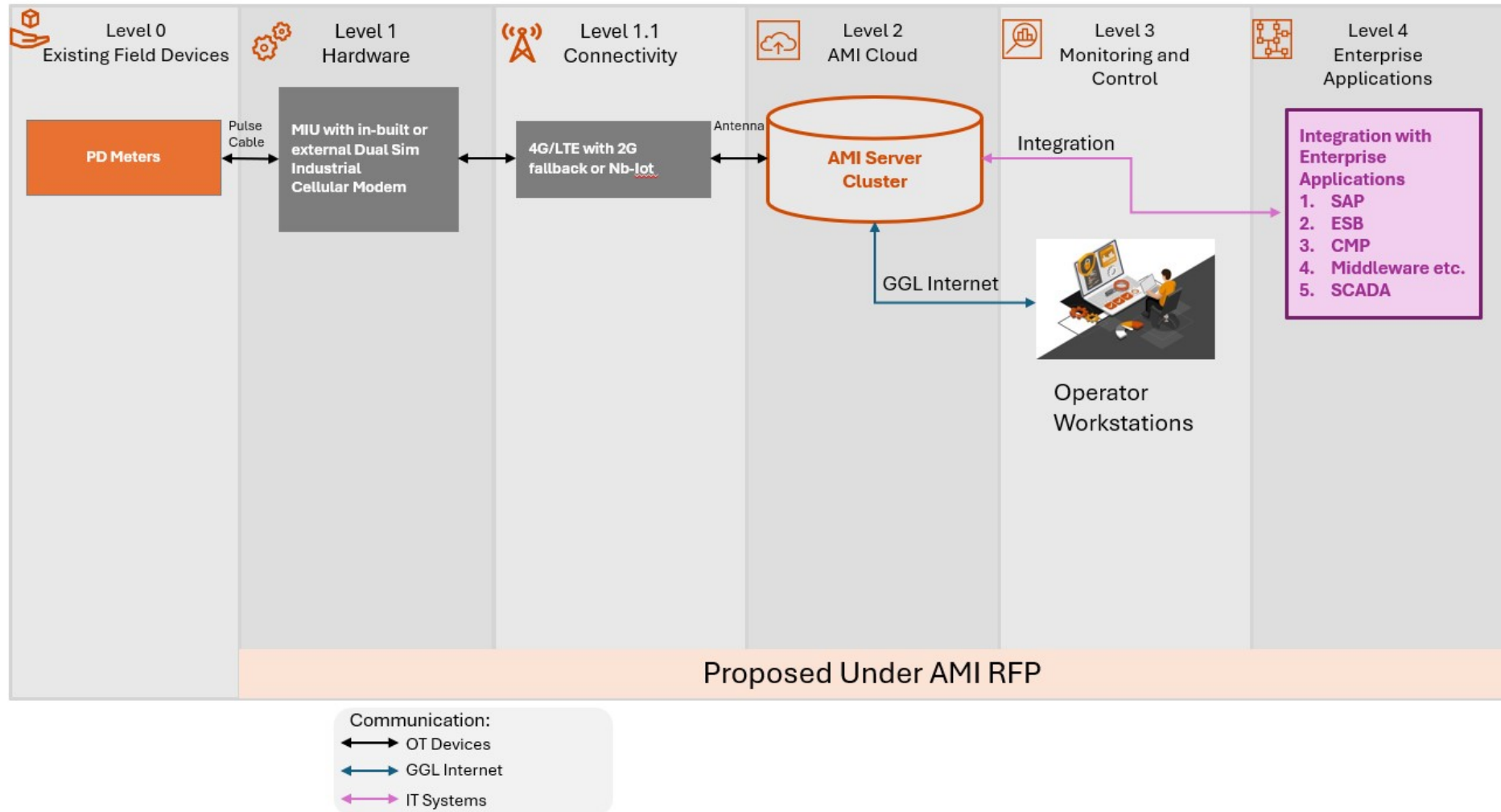
# 16 Indicative Architecture

## 16.1 Metering Sites with EVC





## 16.2 Metering Sites with PD Meter



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## **17 Annexure A - Indicative List of Existing EVCs and PD Meters**

**EVC Metering sites by GA, Make and Model**

<b>GA Name</b>	<b>Qty.</b>
Morbi	843
BND	591
Valsad	526
S'nagar	308
Surat+Hazira	243
Rajkot	182
Thane	100
B'nagar	91
Panchmahal	75
DNH	65
Ahmd. Rural	56
J'nagar	35
G'nagar	30
Nadiad	27
Amritsar	25
Anand	19
Navsari	18
Kutchh	15
Dahod	4
Amreli	4
JS	2
<b>Grand Total</b>	<b>3259</b>

<b>Make</b>	<b>Model</b>	<b>Qty.</b>
Itron/Actaris	Corus	1635
Elgas	ELCOR lite	1259
Elgas	midi ELCOR	100
Elgas	ELCOR PLUS	84
RMFTEK	Rflo-Micro Z3	62
Elgas	mini Elcor	60
ROMET	ADEM PTZ	36
ROMET	ECM-2	18
PLUM	MacBat V	2
INSTROMET	INSTROMET	1
DRESSER	DRESSER	1
ROMET	ECM-2-AT	1
	<b>Grand Total</b>	<b>3259</b>

**PD Metering Sites by GA, Make and Index Type**

<b>GA Name</b>	<b>Qty.</b>
Rajkot	396
Valsad GA	267
Surat	189
Bharuch,Narmada & Dahej	184
Jamnagar	114
S'nagar	70
Navsari	41
Bhavnagar	37
MORBI	19
Panchmahal	14
Thane	13
DNH	10
Anand	9
Ahmedabad Rural GA	9
Nadiad	7
Amritsar	6
Kutch (WEST)	6
Amreli	3
Bathinda	2
Jalore & Sirohi	1
<b>Grand Total</b>	<b>1420</b>

<b>Make</b>	<b>Qty.</b>
ltron	756
Apator	472
GMT	93
Others	64
Pietro	24
BK	8
Capital	2
Raychem RPG	1
<b>Grand Total</b>	<b>1420</b>

<b>Index Type</b>	<b>Qty.</b>
Cyble Based	677
Magnetic Standard Index	702
Other	41
<b>Grand Total</b>	<b>1420</b>