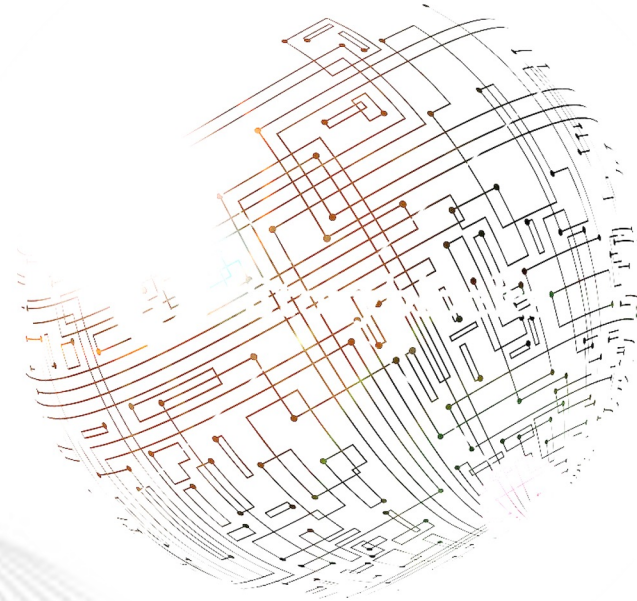
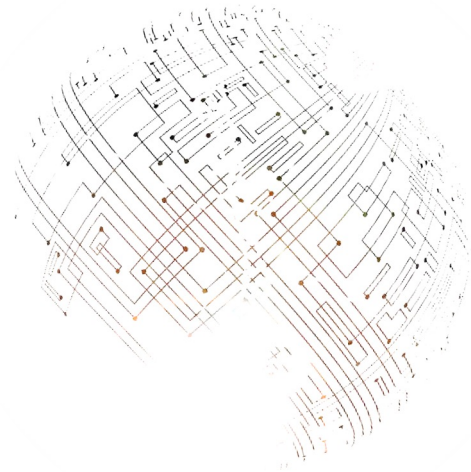




Verticross India Pvt. Ltd.

AMI Presentation

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Rukminipur, A S Rao Nagar, ECIL Main Road, Hyderabad
Telangana 500062



Advance Metering Infrastructure

“VERTICROSS” your data acquisition partner



An Introduction.....

AMI (Advanced Metering Infrastructure), is a fixed-network integrated technology that allows utilities and customers (consumers) to communicate bidirectionally.

The technology measures, acquires, stores, analyses, and displays data on energy usage on a real-time basis, resulting in enhancing operational efficiency.

AMI can help utility companies collect a range of data, including indicators of tampering, data collected at set intervals, details regarding power outages and the quality of electricity supplied.

Use of smarter technology helps to transform and shape the philosophy of creating a smart utility.

With rapid growth in communication technology, the possibility of integrating various components related to automation has become less challenging.



An Introduction.....

Quality of Power, Outage, Pilferage, tampers, alerts & alarms, Energy audit, Peak load management and Demand forecasting forms the Key Performance Indicators for the Utility. The use of technology is to minimise transmission and distribution losses.

Billing for actual usage with focus on consumer awareness is an essential feature of AMI. The entire system as mentioned in the architecture delivers the expected outcome without compromising on technology with more emphasis on cost saving measures.

The data management system is the central repository where all meter data is collected, stored, processed and analysed.

Forecasting and predictive analysis helps provide timely maintenance of various equipment's resulting in continuous quality power being provided to consumers. Machine learning helps strengthen the Grid operations and addresses various dependencies.

Workflow...



Data collection and transmission (Smart Meter / AMR / DCU)

Data reception and management (HES / MDAS)

Data processing and analysis (MDMS)

Outage notification and management

Revenue Management

Customer interface (Utilities – Consumers relationship)





Components of AMI

Smart Metering (GPRS / RF) for measurement and data acquisition.

AMR based data Acquisition For DTR

Mobile App based data Acquisition using OTG.

Data Loggers / Data concentration Units for Substation feeder meter.

Feeder Remote Terminal Unit for reading real time feeder status

Transformer Monitoring Unit for support and maintenance.

HES (Head End System).

MDAS (Meter Data Acquisition System)

MDMS (Meter Data Management system)

Consumer Portals.

Help Desk

Billing System

Asset Management

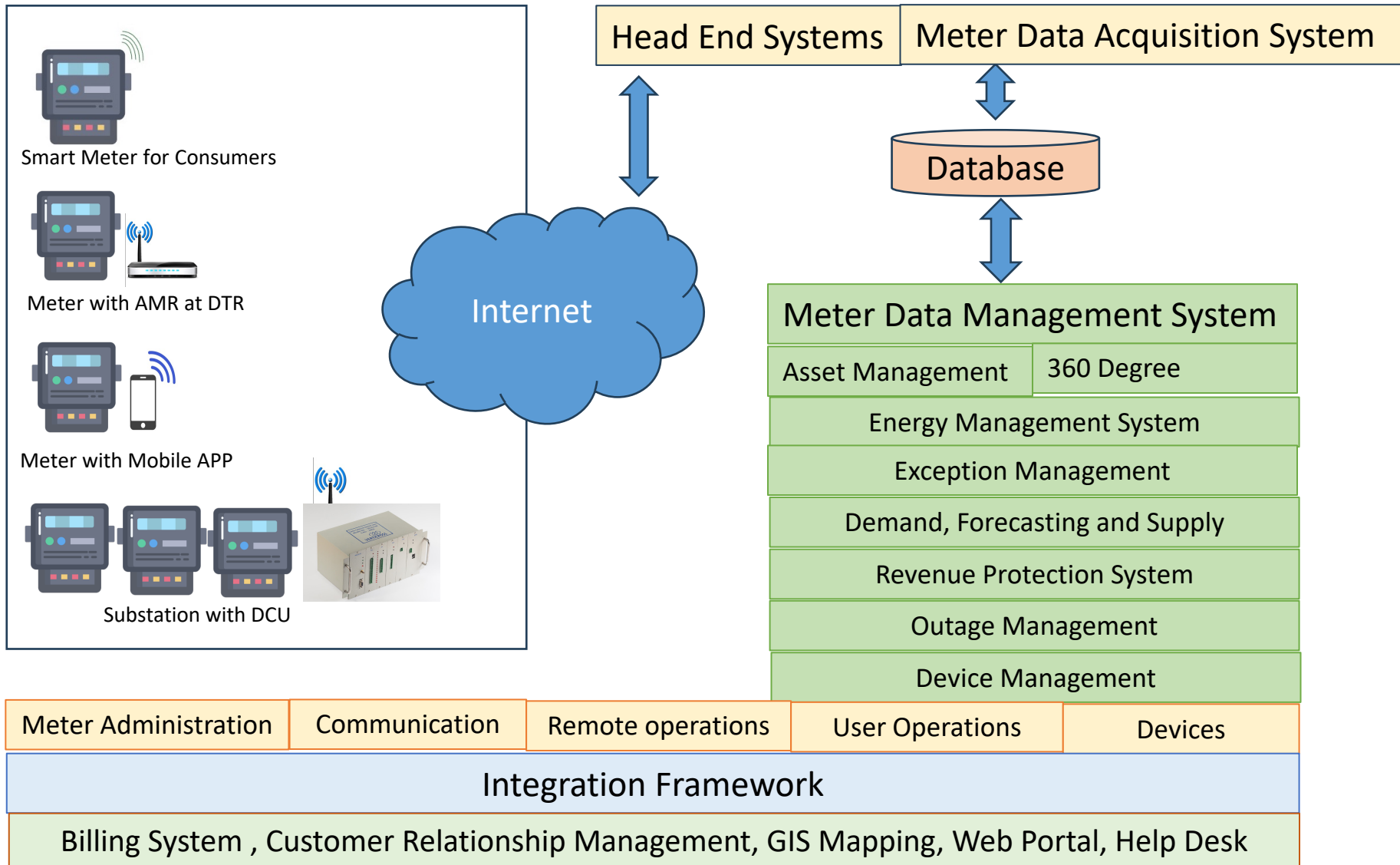
Analytics

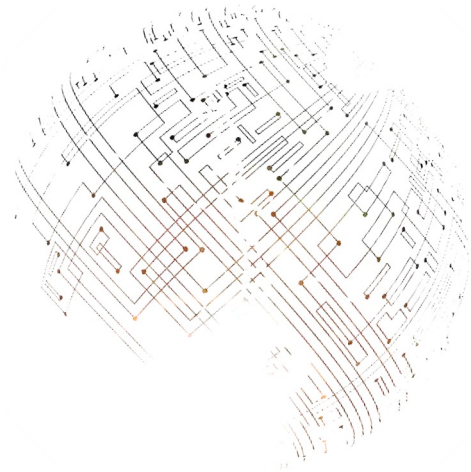
Installation & Commission, Support & Maintenance, Facility Management Services

Cloud infrastructure, Network Infrastructure (ISP, MPLS, RF, etc)



Architecture





Products & Services

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Vlink-09

GSM/GPRS (2G/3G/4G) – Intelligent / Transparent **AMR** Modem



Protocols

DLMS/COSEM, MODBUS, IEC,
Non-standard legacy protocol,
FTP, HTTP

Standards

IEC61000-4-2/3/4/5
CISPR22

Cellular

GSM/GPRS/EDGE/2G (850MHz,
900MHz, 1800MHz, 1900MHz)
WCDMA (1732 MHz, 2100MHz)
FDD-LTE (B1,B3,B5,B7,B8,B20)
TD-LTE (B38,B40,B41)

Chip

ARM Cortex M0+ Core
32 Mb Flash
SIM800C

Water & Dust Resistant

Rated IP55 under IEC60529

Ports

RS-232, RS-485,
Ethernet

Size & Weight

210 x 110 x 40 (mm)
480 gms

SIM Card

Single/ Dual SIM
Standard size

Functionalities

Remote meter data acquisition from
DTR/HT/LT consumer energy meters
Remote import & export
Programming Over The Air
Remote Diagnostics & Configuration

Accessories

Antenna 3/6 dbi
4 Core 0.5 sq.mm electrical cable
Comm Cable - Optical to DB9
RS232, RJ11 to DB9 RS232/
RS485, RJ9 to DB9 RS232

Environmental

Ambient Temp -10 °C to +60 °C
Humidity up to 95% non-
condensing

Power & Battery

60V – 500V AC Operating Voltage
3.7V Li-Ion 800mAh Rechargeable
Battery

VDLo-09

Data Logger / DCU / FRTU



Functionalities

Remote monitoring & data acquisition from sensors (all communicable probes), IED, MFT, feeder meters, breakers, etc.

Data scan rate @ 1ms

Local HMI

Data communication to HES using GSM/ GPRS, LTE and LAN.

Local data storage (alerts, alarms and 45 days data expandable to 180 days)

Time synchronization

Customizable & Scalable

Remote diagnostics & configuration

Remote firmware upgradation

Master/ Slave configuration

Processor

Dual Core ARM Cortex
500MHz

256 Mb Flash, 128 Mb RAM

Interface

8/16 Channel optically isolated
digital input card (Data scan rate
1ms)

8/16 Channel optically isolated
digital output card

8/16 Channel analog input card (0-
10mA, 4-20mA, 0-5V DC)

Power Supply

Redundant (Optional) power
supply card

90-270V AC, 24/48/110V DC

Surge protection up to 10KV

Ports

2 x RS-232 (expandable up
to 6), RS-485, Ethernet

Protocols

DLMS/COSEM, MODBUS,
IEC 60870-101/4, DNP 3,
SPORT, IEC 61850, Non-
standard legacy protocol,
UDP, PPP, FTP, HTTP

Standards

IEC61000-4-2/3/4/5
CISPR22

Operating system

Embedded real time
Linux 2.6 onwards /
Win CE 5 onwards

Environmental

Ambient Temp -10 °C to
+60 °C
Humidity up to 95% non-
condensing

Water & Dust Resistant

Rated IP55 under IEC60529

VNic-09

3G/4G – Communication Network Interface



Functionalities

Smart interface card for energy meters
Interface with MDMS application
Bidirectional communication
LED indication for power & network
32/64/128Mb External flash memory
for local storage
Programming Over The Air
Remote diagnostics & configuration
Push & alarm services
Meter reading schedule configurable

Accessories

Antenna 3/6 dbi

Interface

USART

Size & Weight

93 x 46 (mm)

75 gms

SIM Card

Single SIM

Standard size

Chip

ARM Cortex M0+ Core

32 Mb Flash

Power

5-12V DC

3.7V Li-Ion 150mAh Rechargeable

Battery (optional)

Standards

IEC61000-4-2/3/4/5

CISPR22

Cellular

GSM/GPRS/EDGE/2G/3G/4G

(850MHz, 900MHz,

1800MHz, 1900MHz)

WCDMA (1732 MHz,

2100MHz)

FDD-LTE

(B1,B3,B5,B7,B8,B20)

TD-LTE (B38,B40,B41)

Environmental

Ambient Temp -10 °C to

+60 °C

Humidity up to 95% non-
condensing

VSM-09

Single Phase Smart Energy Meter (5-30A)



Features

Class 1.0 accuracy compliance with IS/IEC standards
Programmable Time of Use metering.
Load Connect/Disconnect feature with inbuilt relays
Firmware download feature through remote communication
LED indications for Calibration and Meter status
Optical communication for local meter reading

Compliance Standards

Metrology Class1.0: IS13779
Data exchange, Tariff and Load control: IS15959 Part2
Smart Meter : IS16444
EMI/EMC: IEC61000
Environmental : IS9000

Specifications

Voltage :240V(L-N)
Basic Current: 5Amp
Maximum Current: 30Ams
Accuracy: Class 1.0
Connection: Single phase two wire
Operating Voltage: 96V to 290V AC
Starting Current : 0.4% of basic current
Power factor : Zero Lag-Unity-Zero Lead
Local Data download: Optical Port
Remote Data download: GPRS/RF
Standards : IS16444,IS15959-2,IS13779

Registers

Maximum Demand :Programmable
Billing Registers: Up to 12 months
Time of Use: Programmable time zones
Tariff Registers: Programmable Tariff registers

Communications

Local: Optical Port
Remote : 2G/4G/Nb-IoT/RF/SIGFOX/LoRa
Security: AES128 Encryption

VTM-09

Three Phase Four Wire AC Static Watthour Meter



Technical Details

Phase : Three Phase Four Wire

Application : LT Network

Parameters Available : kWh, KVAh, KVARh, V,I,PF

Applicable Standard : IS16444

Current Rating : 10-60A

Starting Current: 0.2% of Ib

Applicable Standards

IS16444

IS15959 Part2

IEC62052-11

IEC62056-21

IS13779

ENVIRONMENTAL

Operating Temp: -10 degrees to +60 degrees

Limit Temp. Range of storage: -20 degrees to +80 degrees

Relative Humidity: Up to 95% non-condensing

Specifications

Accuracy: Class 1.0

Local data reading: Optical port

Latest Micro controller based digital technology.

Back light LCD display with symbols for various critical events.

LCD/LED indications for tampering and phase availability.

Two separate metrology LEDs for accuracy testing of different energy types (Active and Reactive).

Display in absence of Power supply

Programmable load profile for 15 minutes or 30 minutes or 60 minutes interval for kWh, kW

MD, voltage, current

Communication module: GPRS/4G/Nb-IoT/RF

Load Connect/Disconnect feature 4 Latching Relays

Tamper proof design.

Meter records correct energy with same accuracy under reverse current connection.

No frequent adjustments required.

TOD Registers: up to eight

Tamper data: 20 events for each tamper with date and time

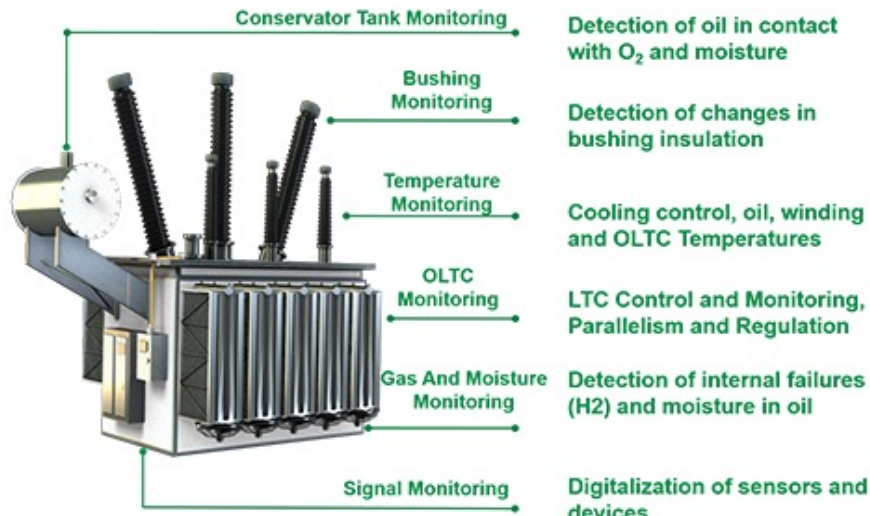
Auto scroll & manual scroll mode (push button mode)

Maximum demand registration.

Historical billing information

No mechanical wear & tear.

Transformer Monitoring Unit



Type of Sensors

M Magnetic Sensors

A Acoustic Sensors

H Chemical Sensors

I Current & Voltage Sensors

T Temperature & Humidity Sensors

P Pressure & Gas Sensors

V Acceleration & Vibration Sensors

F Fiber Optic Sensors

R IR Sensors

Features

Temperature: Monitoring a transformer's temperature in real time.

Alerts: A transformer monitoring system can send alerts when it detects a change in the transformer's condition.

Condition monitoring: This feature can track a transformer's operational status, performance indicators, and fault signals in real time or periodically.

Data logging and Event recording:

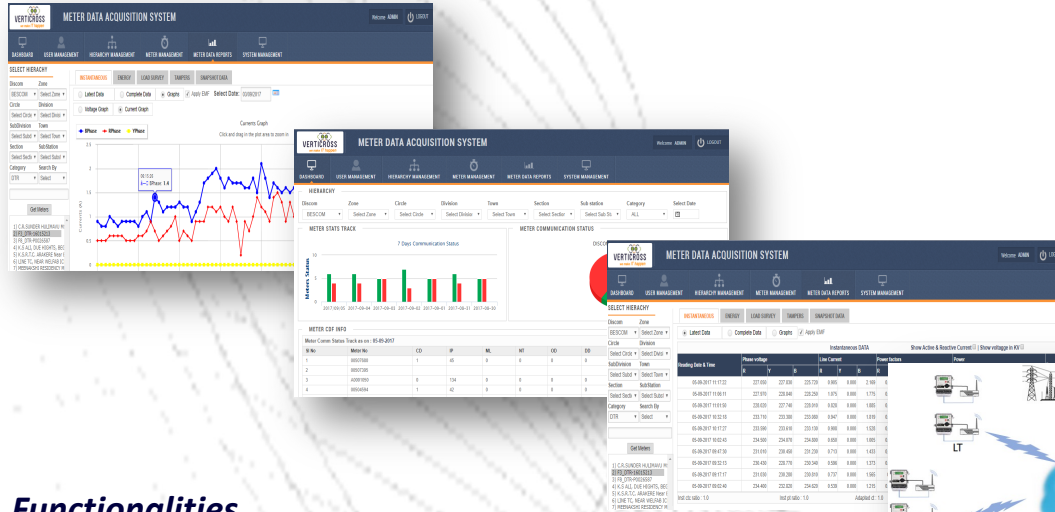
Communication protocols

Oil level: Oil level indicators, also known as liquid level indicators (OLIs), are a standard piece of equipment on most transformers.

Chemical sensors: Chemical sensors can monitor analytes that emerge from a malfunctioning transformer.

MDAS

Meter Data Acquisition System



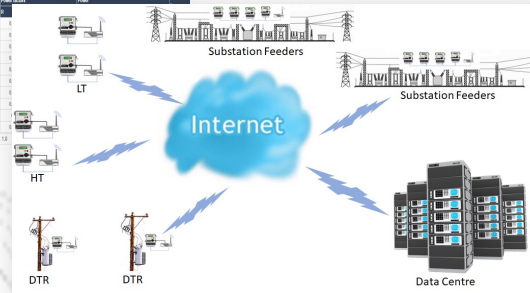
Functionalities

Acquires meter data from various makes & models of energy meters at DTR/LT/HT/Feeder locations.

Energy Data - Billing data, load survey data, tamper data, instantaneous data, alerts & alarms, active & reactive power, system outages / downtime, Meter data on demand.

Time synchronization

Integration with third party MDM



Functionalities

Device setup checks.

Flexible design to interface with energy meters of any make.

Remote configuration & diagnostics

Programming Over The Air.

Import & export of data in MIOs-XML format

Functionalities

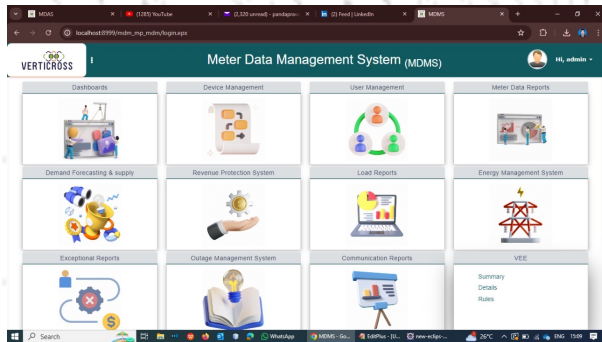
Modem communication failure, cumulative energy, energy consumption, generation of graphs, alerts & SMS for abnormal events, Interfaces with modules such as performance indicator & energy audit. Customized report generation.

MDMS

Meter Data Management System

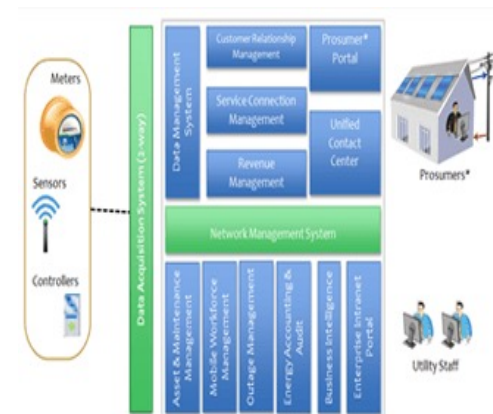


We provide one of the most sophisticated MDM Systems available in the market. It provides long term data storage and management of vast data delivered by smart metering solutions. The data is effectively used for analysis, fault diagnostics, identification and isolation, load balancing and load survey. The analytics provide visualization of data in graphical format for comparison, historical analysis, simple prediction using many vectors.



Functionalities

- Data management for smart meter data & AMR
- Asset management
- Load and demand forecasting
- Consumption data analysis
- Enhanced transparency for billing
- Ensured efficient data flow



Functionalities

- Improved energy efficiency
- Reduced energy waste
- Enhanced customer satisfaction
- Ensured long-term data storage
- Integration with Billing system
- Integration with GIS system

Mobile APP for Data Acquisition



Functionalities

Data Acquisition from Energy Meters

Data Upload to MDAS system

Data Validation

User friendly

Works on Android OS.

AMR related Diagnostics

Report Generation

Task / Work management

Baud rate management

Debug and production setting

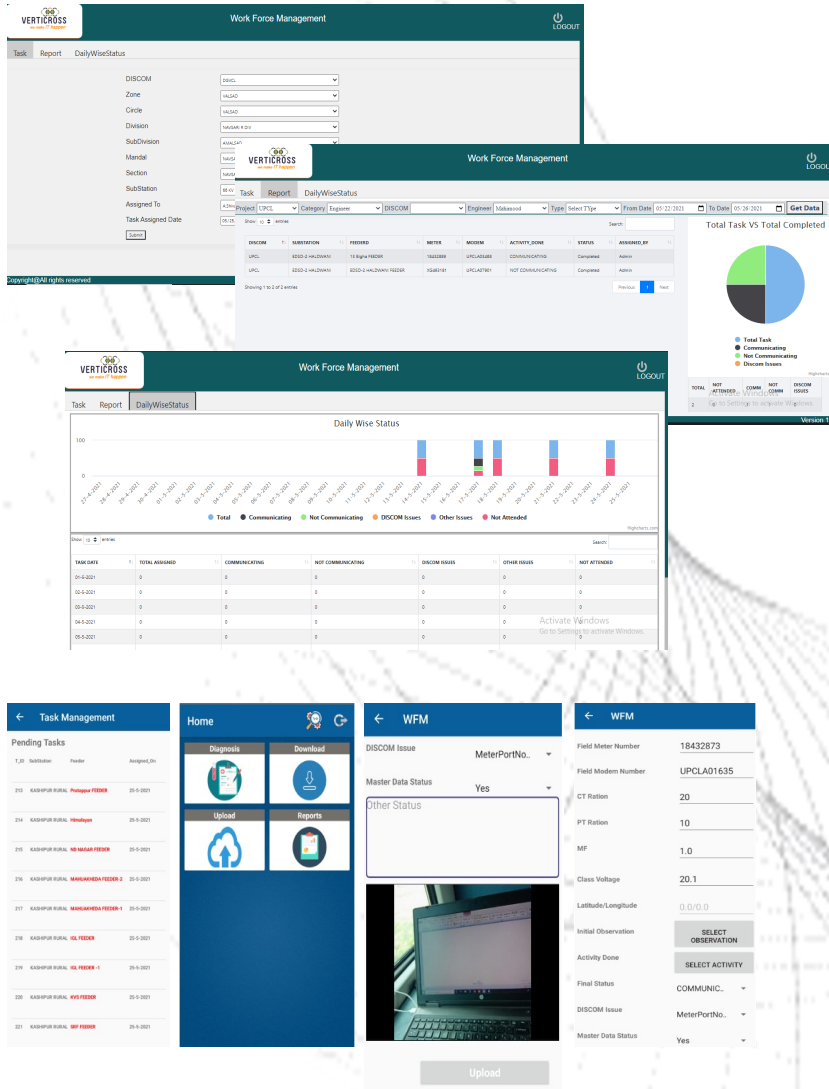
Event management

Communication configuration

Accessories

OTG Cable (RJ11 / optical with
USB Type C

Work Force management



Functionalities

- Mobile and web service based application
- Data collection (I&C) related and Site details on real time.
- Efficient Task Assignment
- Real-time Task Tracking
- Comprehensive Reporting
- Enhanced Collaboration: Mobile Accessibility
- Real time image of I&C
- Real time Latitude and Longitude recording
- Connected to cloud
- Web service provided for monitoring
- Attendance and working hours
- Effectiveness of productivity

Services



Consultancy

*Design and development of embedded systems.
Smart technologies.
Data acquisition.
Asset management.
Energy management.
Renewable Energy, SCADA,
Substation automation, Water distribution, Vehicle tracking system, Fuel station automation and Pump automation*



Facility Management & other services

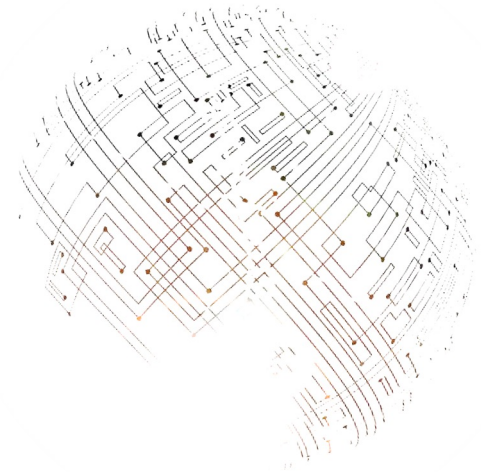
*Management & support of Data Center & recovery.
Setting up of design & development centers.
Project/Program management.
Consumer indexing and GIS.
Training
24x7 Help Desk*



Installation, Commissioning & Maintenance

*Survey
IT infrastructure and networking for DC & DR.
Meters, AMRs, Transformers, RTUs, FRTUs, DCUs, SCADA solutions, Solar panels/ PV modules, invertors, batteries, charge controllers, RMU, Sensors, Tank gauges, Probes, etc.
AMC*





Deployment Strategy

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Deployment Strategy

Consumers (HT / LT)

- Smart meters for high valued consumers with Connect / Disconnect facility.
- AMR for consumers that are already metered.
- Meter interface with Mobile APP for manual reading.

Distribution Transformers

- AMR for DTR locations (bidirectional communication is not required).

Substation

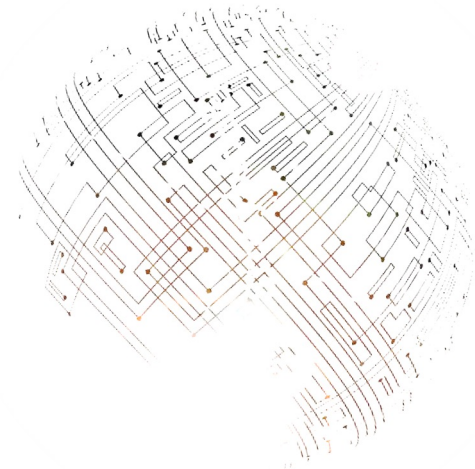
- Data Concentrator Unit for Substation feeder management.

Data Centre

- Set up localised Data Centre with MPLS network. OR cloud-based Data Centre.
 - HES Application
 - MDAS
 - MDMS
 - Database Management
 - Machine learning tools

Web Portal

- Consumers
- Utility



Functionalities

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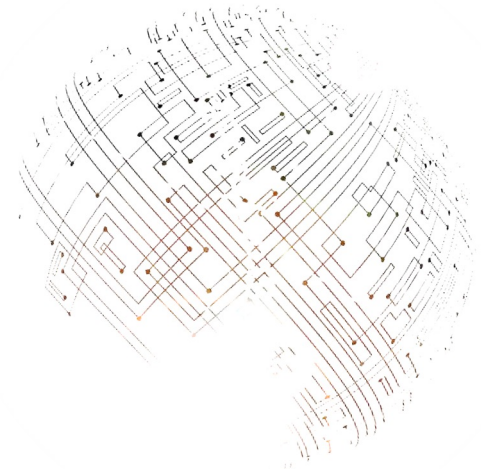
Functionalities and Features

- ***Precision in monitoring energy utilization.***
 - Billing based on utilisation.
 - Manage high consumption equipment's effectively.
 - Accuracy of measurement .
 - Alerts and Alarms management.
- ***Provides real time data acquisition***
 - GPRS / RF based data communication.
- ***“Time of Use” Pricing model***
 - Differential pricing structure based on peak or off-peak status.
 - Contract demand-based pricing.
- ***Improved outage deduction management***
 - Automated fault deduction.
 - Real time data analysis.
 - Rapid response and restoration.
 - Proactive notifications.
 - Feedback processes.



Functionalities and Features

- ***Asset health monitoring and maintenance.***
 - Help reduce losses and maintenance scheduling.
 - Use of sensors and IOT.
- ***Personalised energy management***
 - Web portal.
 - Help Desk.
- ***Consumer and Utility Empowerment***
- ***Improves efficiency and streamlines operations for utilities.***
- ***Smarter and resilient Grid Operations***
- ***Predictive maintenance and support - ML & AI***
 - Uptime efficiency and failure deduction.
 - Assess asset health.
 - Anomaly deduction.
 - Maximum demand and demand forecasting.



Business Development

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RDSS Schemes

Govt. of India has launched Revamped Distribution Sector Scheme (RDSS) with an outlay of Rs. 3,03,758 crores with estimated GBS of Rs. 97,631 crores.

Part-A

Upgradation of distribution infrastructure

Installation of 25 crore Smart Meters across the country.

Associated Advanced Metering Infrastructure (AMI)

Feeder and Distribution Transformer level with communicating feature

Part-B

Training & Capacity Building and other Enabling & Supporting Activities.

PFC and REC have been designated as Nodal Agencies.

- 19 states and UTs under covering 32 DISCOMs
- As of December 2023, PFC has disbursed a cumulative Rs 535.87 billion under RDSS to DISCOMs.
- Around 250 million smart consumer meters, 5.26 million DT meters and 0.18 million feeder meters have been sanctioned across the states.
- 116 million consumer smart meters, 4 million DT meters & 122,575 feeder smart meters have been awarded
- Only 11.6 Million Installed and commissioned till date



Challenges

- The smart meter manufacturing capacity in India stands at around 7 crore units per annum and is dominated by a few large players.
- Adequate supply chain will be important for quick ramp-up of meter.
- The pace of installation is likely to pick up in next two years only.
- The standard bidding document (SBD) prepared by National Smart Grid Mission (NSGM) for advanced metering infrastructure services provider (AMISP) is adequately structured, But not many participants.
- Very few agencies have complete solution
- The installation of smart meters for consumers having very low average energy consumption may not yield significant benefits.
- TOTEX model (CAPEX and OPEX)
- Testing Labs and processes



Competition... to name a few

Techno Electric and Engineering Company Limited : Secured an order worth Rs 10.41 billion for 727,000 smart meters in Kashmir

Polaris Smart Metering : Awarded two contracts worth over Rs 5,200 crore for smart prepaid metering in Uttar Pradesh

Adani Group : Bagged two contracts worth Rs 13,888 crore from Maharashtra State Electricity Distribution Company Ltd (MSEDCL) to install smart meters

HPL Electric and Power Limited : Secured an order worth Rs 2.4 billion for smart meters from AMISP clients in January 2024

GMR Smart Electricity Distribution Private Ltd : Received LoAs for smart metering projects in Uttar Pradesh, with an order value of Rs7,500 crores

Tata Power : Received an LoA to implement a smart metering project in Chhattisgarh with an order value of Rs1,700 crores

Genus Power Infrastructures : 3.75 Million Smart Meter Contracts worth 3500 Crores



Business Strategy..... AMI (2025)

Smart Meter

Phase I : New Vendor Registration – Acquire pilot orders (200,000 Qty) from 5 States

Phase II : Participate in tenders

Orders to be acquired

AMR – 50,000 Units

DCU - 3000 Units

FRTU – 500 Units

TMU – 200 Units

Mobile App – 10000 Licenses

HES, MDAS & MDMS – 5 State level Licenses

Target customers / Partners

- Transmission (State)
- Distribution (State)
- Others – Private Service providers
- SIs

- Meeting with Key stake holders (Govt & Non-Govt Agencies)



Business Strategy..... AMI (2025)

Smart Meters : State wise quantity

Gujarat – 38 L Awarded, 95 L Sanctioned

Himachal Pradesh – 9 L Awarded, 28L Sanctioned

Kerala – 0 L Awarded, 132 L Sanctioned

Madhya Pradesh – 43 L Awarded, 128 L Sanctioned

Punjab – 0 L Awarded, 87 L Sanctioned

Goa – 0 L Awarded, 7 L Sanctioned

Rajasthan - 0 L Awarded, 54 L Sanctioned

Tamil Nādu – 0 L Awarded, 300 L Sanctioned

West Bengal – 37 L Awarded, 207 L Sanctioned

Bihar – 10 L Awarded, 45 L Sanctioned

As per above list Total requirement = 859 L which is yet to be Awarded

At National Level, 12 Cr Awarded, 25 Cr Sanctioned, 11.6 million I&C



Thank You

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