



## Intelligent dashboards for Smart grid using Tableau



Dashboards for smart grid to visualize Meter Data, Energy Auditing, Power Quality Management, Outage Management, Peak Load Management, GIS enabled real-time monitoring

### About winAMR

winAMR offers Smart Metering solutions for utilities globally. The solution comprises of a whole range of metering devices (MR), communication channels (AMI) that can support various technologies like RF mesh, PLCC, 6lowpan, GSM, GPRS etc. and Head end Server (IRIS) to interface between MR and utility MDMS systems.

Leveraging winAMR products, Utility companies can manage demand and load profile efficiently, thus saving extra cost of purchase during peak loads. By providing efficient, detailed, accurate/timely billing along with alerts on outages and due dates, these products enhance customer service.

### Business Challenge

winAMR did not have a centralized visualization layer in place to view & manage the voluminous data generated by the smart grid installation. As part of Indian government's smart grid initiative, winAMR was chosen to execute the pilot project for Jeedimetla industrial estate at Hyderabad, India. Below were the main challenges identified:

- Existing reports developed and deployed by winAMR were **unintuitive** and **lacked user friendliness**
- Quality of the data fed to the reporting layer was poor due to lack of a well-architected data model
- **Inconsistent data governance**
- **Irrelevant** data
- **Poorly designed user interface**, which was less flexible for user interaction
- **Live data tracking** at presentation layer was missing
- No self-servicing abilities were provided by the reporting framework forcing business users to rely on IT for even minor changes to the reports
- Lack of visualization—minimum or no dashboarding features

## Desired Outcome

The project's ultimate objective was to build and deploy a user interface layer which:

- Was more user friendly
- Provided the end user the ability to interact with visualizations
- Extracted and displayed live data feed, collected through various sources deployed at site
- Helped end users in analyzing the data through interactive dashboards
- Was appealing visually and enrich user-experience
- Provided reporting along multiple dimensions in line with objectives of various stakeholders—energy audit, quality management, outage management, peak load management teams

## Solution

winAMR invited Trinita during the finalization of the solution implementation stage. Trinita team then leveraged its expertise in the Tableau BI space together with its strong technical understanding of the database platform and performed the following:

- Created a single dashboard that gives one-stop access to all of customer data.
- Developed multiple dashboards across various areas like Meter Data Management System, Power Quality Management System and Outage Management System.
- Provided agile, flexible solutions within the estimated timeframe.
- Integrated open GIS map in Tableau.
- Created button/Icons for the dashboards to enhance the User interface.
- Used stored procedures to define a data source for Tableau to improve response time.
- Improved overall dashboards performance and redesigned data model applying Tableau Performance Tuning.

## Scope & Dashboards

Modules
Meter Data Management System
Energy Auditing
Power Quality Management System
Outage Management System
Peak Load Management System
JMSG GIS Monitoring
Billing Report
Consumer Portal

## Key Metrics Built

- Maximum KWh demand recorded at the meter level
- Power Factor, Voltage & Frequency recorded with the exception / alert dashboards
- Power failure / disconnection alerts monitoring
- Power consumption details at meter / consumer level
- Bulk energy consumption across various levels of power distribution hierarchy i.e. Area, Substation, Feeder, Transformer, DC serial no, meter level (1 phase, 3 phase & DTR meters)

# Sample Dashboards

SMART GRID PILOT PROJECT, JEEDIMETLA

Click on the below tabs to view the reports:

METER

Meter Data Management System

MONITOR

Energy Auditing

ANALYZE

Power Quality Management System

CONTROL

BI & Analytics Report

MANAGE

Outage Management System

Peak Load Management System

Consumer Portal

JMSG GIS

SMART GRID PILOT PROJECT, JEEDIMETLA, HYDERABAD

Last Refresh: 1/28/2019 8:31:00 PM

### Meter Data Management System

Area: All | Substation: All | Feeder: All | Transformer: All | DC Serial No: All | Interval Selection: 1 hour

Home | Latest Load Survey | Periodical kWh | Current & Block Energy | Hourly Report | GIS | Alerts

Substation	Feeder
172.44	172.44
DC	Less
172.44	0.00

DC wise Power Consumption kWh: 172.44

DC wise Phase Consumption: [Line Graph]

Latest Interval Response: [Map]

Power Factor (Meter#)	Voltage (Meter#)	Frequency (Meter#)
Critical	Critical	Critical
1 Phase	1 Phase	1 Phase
41	6	8

Event Notifications: 264

Service No.	Consumer Name	Contracted Load	MD kWh	Interval TimeStamp	MD Status
0322 01663	P GOWRI	1	1.8	28-01-2019 18:09:00	Exceeded
0322 01662	SRUJANA BHAMIDIPALLI	2	2.48	28-01-2019 08:53:00	Exceeded
0322 01655	SHAN ALLASARISHU	2	3.28	28-01-2019 20:05:00	Exceeded
0322 01642	BH SRUJANA	2	3.8	28-01-2019 08:53:00	Exceeded
0322 01636	V VENKATESWARA RAO	2	3.8	28-01-2019 20:22:00	Exceeded
0322 01634	V N K G S SASTRY	2	2.38	28-01-2019 07:16:00	Exceeded
0322 01606	BH SRUJANA	2	3.76	28-01-2019 15:05:00	Exceeded
0322 01596	A KISHORE KUMAR	2	2.08	28-01-2019 18:08:00	Exceeded

Threshold Values

Power Factor Rating	Voltage Rating	Frequency Rating
Critical (< 0.9pf)	Critical(<190V Or >270V)	Critical(<48Hz Or >52.01Hz)
Moderate (0.9pf To 0.99pf)	High(250V To 270V)	Moderate(48Hz To 49.8Hz Or 50.2Hz To 52Hz)
Normal (>0.9pf To 1.0)	Moderate(190V To 220V)	Normal(49.8Hz To 50.2Hz)

Power Factor Meter Response

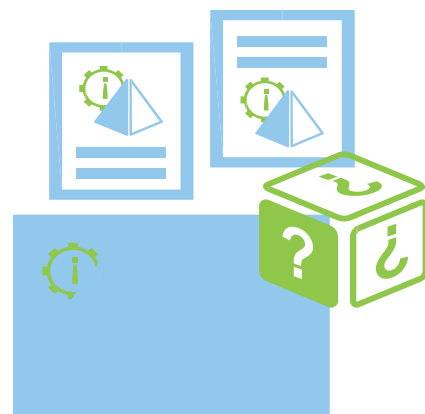
Critical (< 0.9pf)	Moderate (0.9pf To 0.99pf)	Normal (>0.9pf To 1.0)
1 Phase	1 Phase	1 Phase
985	1,060	1,055

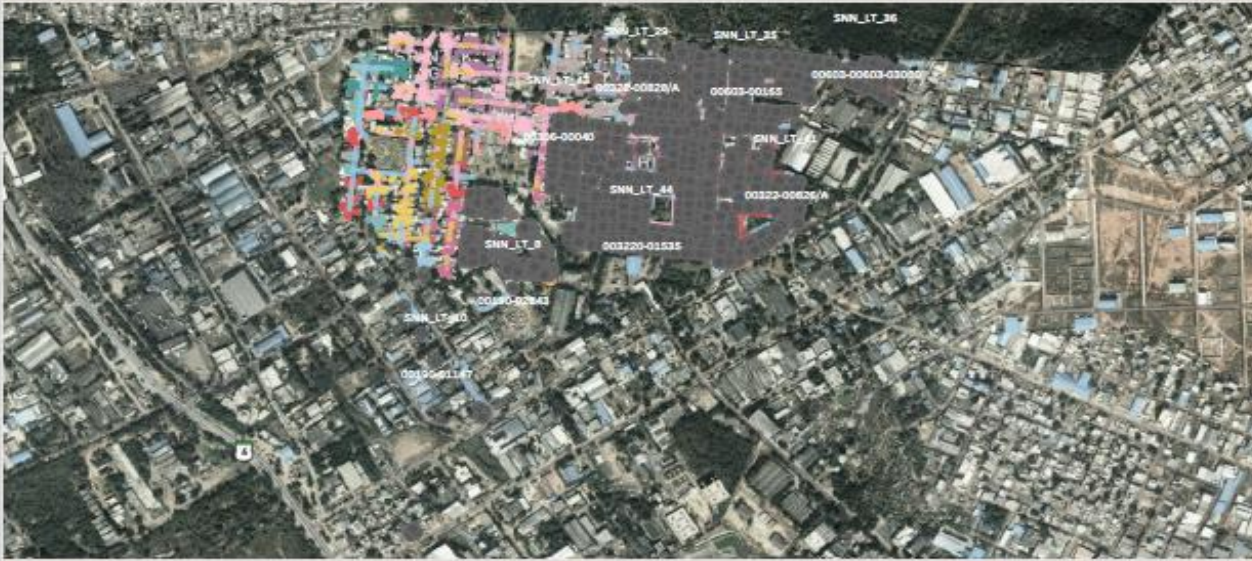
Voltage Meter Response

Critical(<190V Or >270V)	High(250V To 270V)	Moderate(190V To 220V)	Normal(220V To 250V)
1 Phase	1 Phase	1 Phase	1 Phase
436	1,076	127	629

Frequency Meter Response

Critical(<48Hz Or >52.01Hz)	Moderate(48Hz To 49.8Hz Or 50.2Hz To 52Hz)	Normal(49.8Hz To 50.2Hz)
1 Phase	1 Phase	1 Phase
273	67	1,079





## Business Benefits

Triniti guided the whole Tableau implementation, which minimized the gap between customer expectations and actual development.

As a result, winAMR gained the following business benefits:

- Expedited decision making.
- Improved Data Quality and Data Governance methods.
- Minimized complexity through the use of flexible and agile dashboards.