



PLC for AMI – Indian Perspective

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Advanced Metering Infrastructure (AMI)

- ▶ AMI is the system with smart meter and associated software for acquiring energy meter consumption details along with other electrical parameters remotely & data analytics.
- ▶ AMI provides consumers to have prepaid system or post paid system for energy consumption charges with greater insight on the pattern of energy consumption so that consumer can have better control of their energy consumption.
- ▶ AMI system provides a better control to utilities to monitor the consumers smart meters and to detect quickly any tampering in a near real time and provides quick action on defaulters for disconnection of electricity.
- ▶ The prepaid option provides a better financial control for both consumers and utilities.
- ▶ For a successful AMI system deployment, a reliable and cost effective communication system is essential.

Role of PLC in AMI

- ▶ Early experiments of AMI begun with Power Line Communication (PLC)
- ▶ PLC is widely used for AMI application in Europe.
- ▶ Low cost – low Capex and no Opex as PLC is owned by utility
- ▶ Simple installation and maintenance
- ▶ Modern power sector has a improved distribution network making PLC as a prime candidate for the communication channel

Indian Scenario of AMI

- ▶ Early experiments / field trial using PLC started way back 2000-2010.
- ▶ Advancement in communication technology and semiconductor chips are providing new outlook to PLC system for multiple electric utility applications including AMI.
- ▶ Now in India, the quality of distribution system has improved lot including good quality wiring of LV network and residential wiring.
- ▶ New township areas, rural areas under rural electrification scheme and through other schemes like R-APDRP, IPDS, RDSS etc., the distribution network of both urban and rural areas has improved lot making it suitable for large scale use of PLC based AMI system.
- ▶ Most of present AMI system rollout is happening through 4G mobile communications and 4G is going to be outdated soon and support from communication service providers for 4G is will be limited.
- ▶ 4G / 5G communications systems may not be available at all geographic locations especially in rural areas.
- ▶ The PLC has advantage of protecting over obsolescence atleast for next 5 to 8 years from the commissioning of AMI systems and which is completely under the utility control
- ▶ PLC has also an option to use in extending communication beyond distribution transformer for connecting to utility energy management centre through RF , 4G or MV PLC (11kV).


CPRI PLC Based AMR Prototype energy meters in field



AMR Control Centre – User Interface Screen

AUTOMATIC METER READING

System Manager HMI Reports Help



CPRI PILOT NETWORK

AUTOMATIC METER READING

POLING STATUS

COM: COM1
Baud: 1200
Data Bit: 8
Parity: NONE
Stop Bit: 1
Click SET after changing Comm Port-values
SET

REQUEST METER READING

ENTER METER NUMBER
123456789012
Click for Meter Number GO
METER READING
373.325
Traffic in progress

METER CUT OFF

ENTER METER NUMBER
Click for Meter Number GO

METER MONITORING

ENTER METER NUMBER
ENTER POLL TIME
20 (SEC)
Click for Meter Number GO STOP
Traffic in progress

user ID: CPRI 11:24 AM 9/8/2005

Zoom: 100%

METERNUMBER	METERREADING	DATE	TIME	REMARKS
123456789000	1540.45	9/1/2005	9:56:40 AM	GOOD
123456789000	1540.7	9/1/2005	10:14:45 AM	GOOD
123456789000	1540.976	9/1/2005	10:33:03 AM	GOOD
123456789000	1541.25	9/1/2005	10:51:19 AM	GOOD
123456789000	1541.5	9/1/2005	11:09:16 AM	GOOD
123456789000	1541.725	9/1/2005	11:27:06 AM	GOOD
123456789000	1541.96	9/1/2005	11:44:55 AM	GOOD
123456789000	1542.176	9/1/2005	12:02:45 PM	GOOD
123456789000	1542.426	9/1/2005	12:20:36 PM	GOOD
123456789000	1542.68	9/1/2005	12:38:24 PM	GOOD
123456789000	1542.9	9/1/2005	12:56:14 PM	GOOD
123456789000	1543.125	9/1/2005	1:14:00 PM	GOOD
123456789000	1543.36	9/1/2005	1:32:09 PM	GOOD
123456789000	1556.325	9/5/2005	10:37:10 AM	GOOD
123456789000	1556.576	9/5/2005	10:53:36 AM	GOOD
123456789000	1556.86	9/5/2005	11:10:01 AM	GOOD
123456789000	1557.1	9/5/2005	11:26:26 AM	GOOD
123456789000	1557.36	9/5/2005	11:42:53 AM	GOOD
123456789000	1557.626	9/5/2005	11:59:21 AM	GOOD
123456789000	1557.876	9/5/2005	12:15:45 PM	GOOD
123456789000		9/5/2005	12:32:28 PM	ERROR
123456789000	1558.4	9/5/2005	12:49:16 PM	GOOD

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BPL – Head End Equipment and CPE

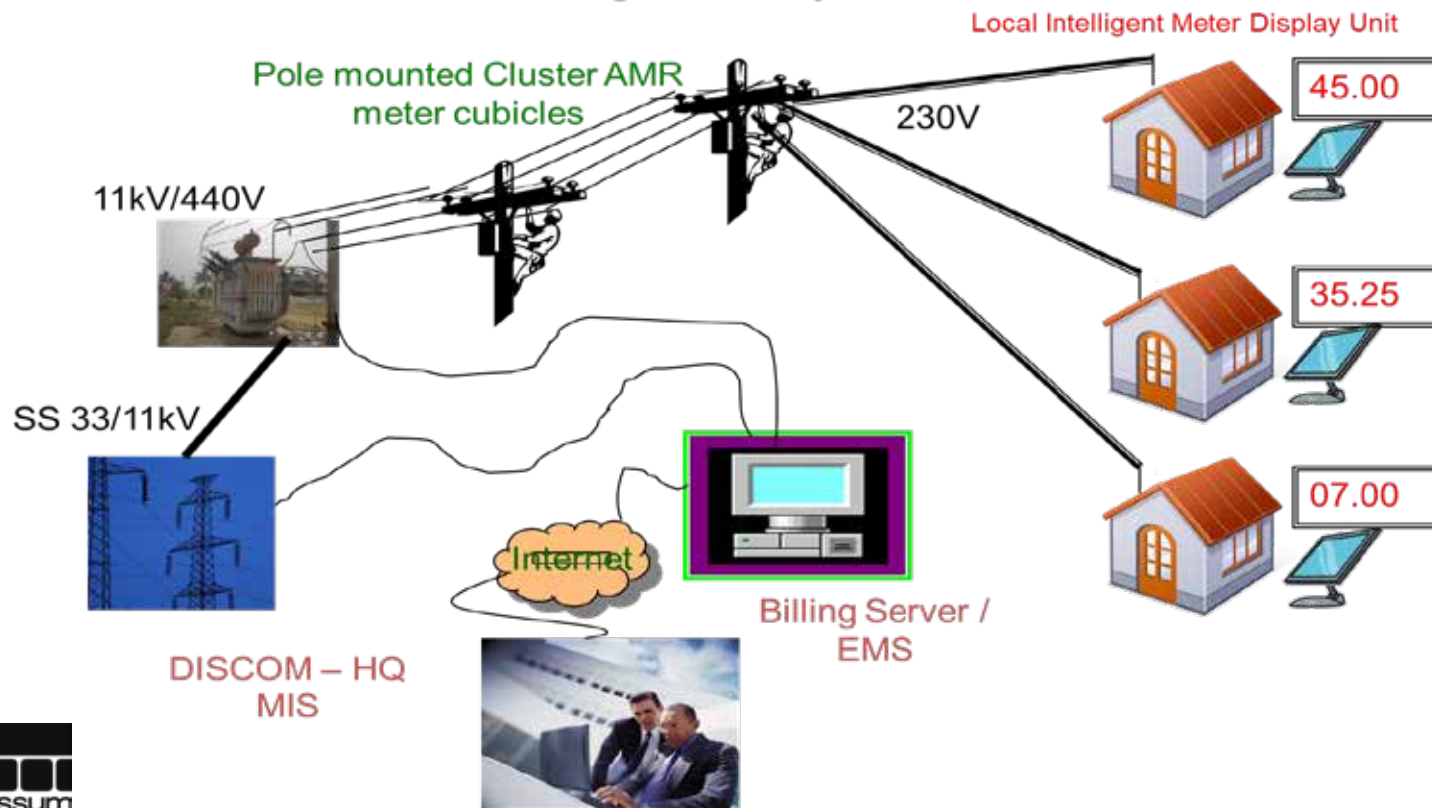


AMI under RDSS

- ▶ Government of India launched **Revamped Distribution Sector Scheme (RDSS)**, in July 2021 and earmarked Rs. 97,631 crore (GBS) for prepaid smart meters (total outlay of Rs. 3,03,758 Crore over 5 years).
- ▶ Under RDSS, Government has initiated mass rollout of AMI systems – expected to Install 250 million smart meters by FY 2027-28.
- ▶ Under RDSS, utility has the option to choose any communication technology including PLC.
- ▶ Potential opportunity exists for **AMI service provider to opt for PLC for AMI in upcoming tenders.**

Advanced Metering Infrastructure (AMI)

Meter Management System



Conclusion

- ▶ PLC is a potential candidate for communication channel for AMI application.
- ▶ Industry need to explore the opportunity.
- ▶ Government is supporting for Prepaid smart metering for both urban and rural areas.
- ▶ **Large scale PLC based AMI pilots provides confidence among the utilities, consumers and policy makers.**
- ▶ **Awareness among utilities needs to be created for PLC application for AMI and other areas like streetlight control etc.**
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