



# Establishment of PLC Testbeds in India – *IEEE Industry Connection Activity WG summary*

Dr. A. Paventhan  
Senior Director / R&D  
ERNET India (Under Ministry of Electronics & IT)



# PLC Testbed WG Objective & outcomes

## *summary*

- ▶ Objective:
  - Demonstrate at least 3 PLC testbed with typical application use case
  - Report PLC opportunities for India
  - Organize workshops / events highlighting PLC-based solution for emerging Indian market
  - Possible contribution to standards
- ▶ Outcomes:
  - Pilot deployment of 3 PLC testbeds reported
  - PLC case studies from academia, utilities and R&D labs
  - Brought out gaps, identified PLC opportunities for India
  - Contributions from premier academic institutions, R&D labs, state/private utilities, vendors, chip/device manufacturers etc.



### **OPPORTUNITIES FOR POWER LINE COMMUNICATION (PLC) IN INDIA: EXPERIENCES AND RECOMMENDATIONS**

Authored by

IEEE Establishment of PLC Testbeds in India  
Industry Connections Working Group

Not for Redistribution. ERNET INDIA. Downloaded on February 21, 2025 at 08:41:38 UTC from IEEE Xplore. Restrictions apply.

# PLC Testbeds

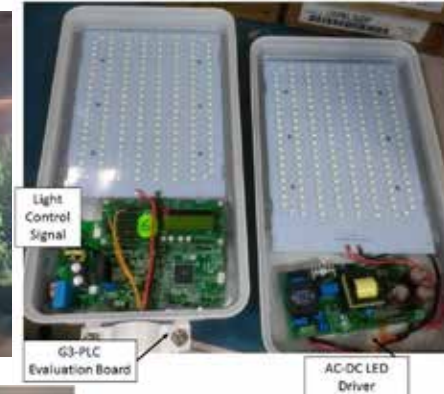
## ▶ Smart Building PLC Testbed

- Indoor air quality, temp, occupancy, smart plug, lux
- Executed by IIT Madras & ERNET India
- Supported by SLS, STMicroelectronics
- Energy management algo, dashboard/analytics



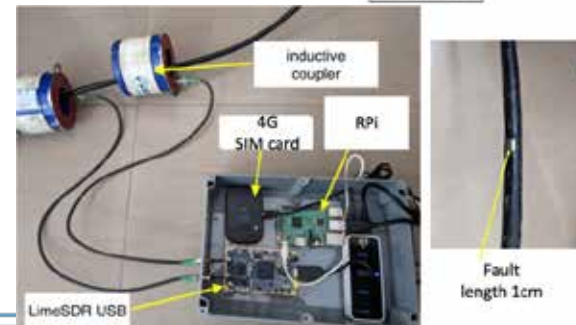
## ▶ Smart Streetlighting using PLC

- LED streetlight control using PLC deployment at STMicroelectronics campus, Noida, INDIA
- Uses G3-PLC at the Physical layer, 6LoWPAN for monitoring and control



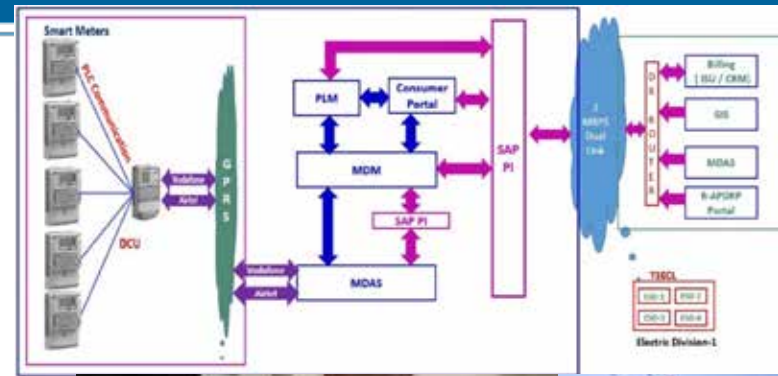
## ▶ Cable fault diagnostics using PLC

- Homeplug AV2 PLC modem to identify underground signal cabling fault detection for railways
- Inductive couplers used for sensing multiple cable section
- Pilot project by IISc research scholar



# PLC Case Studies

- ▶ CPRI case study – Narrowband PLC for AMR and Broadband PLC for internet access
- ▶ Smart Metering by Tripura State Electricity Corporation Limited (TSECL)
  - AMI, peak load management, demand response, advanced analytics and integration with existing RAPDRP billing
  - Total of 43000 users – residential and commercial – largest PLC deployment to date in India.
- ▶ Surface Wave Communication using PLC
  - Electromagnetic (EM) wave energy is concentrated along the surface of a power line to support data communication
  - Executed by Amrita Engineering College, Bangalore with support from Intel – 33 Electric poles connected
- ▶ Consumer Indexing
  - Adani Electricity Mumbai Ltd. implemented PLCC-based consumer indexing and network mapping solution to map their electrical network



# PLC Gaps, opportunities and Recommendations

- ▶ **PLC Technology awareness:** Importance of creating awareness among utilities and end-users on PLC technologies.
- ▶ **Pilot Deployment:** Small-scale pilots on a commercial scale shall be encouraged under various schemes of government for implementing AML/transformer monitoring/power quality monitoring
- ▶ **Deployment challenges due to cellular network options**  
(4G to 5G migration related issues)
- ▶ **PLC in newer installations, last mile broadband over powerline**
- ▶ **PLC – cost effective solution in long run**
- ▶ **Recommendations:**
  - Narrowband PLC and RF Mesh Hybrid Network

