
Intelligent Energy Management through Smart-Grid Technologies

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-: Marketing by :-

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Agenda

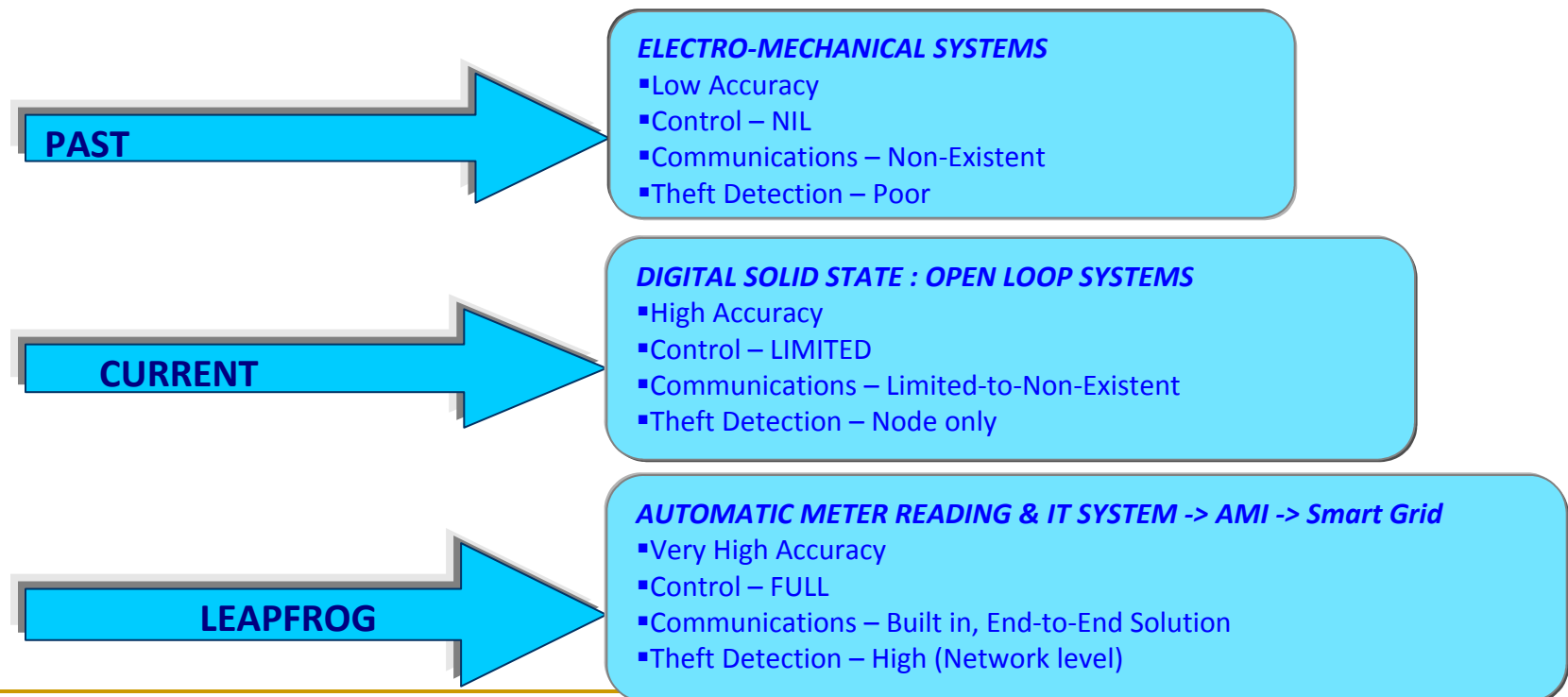
- Challenges
- Opportunity to Leapfrog
- IEM Solution & Phases
- IEM Solution Topology
- IEM Solution Phase : AMR
- IEM Solution Phase : AMR Prototype
- Summary

INDIA : CHALLENGES FOR T&D SECTOR

- The electric grid in India is based on inadequate technology
 - 33% of the power generated in India is lost during its transmission & distribution (T&D) mainly due to theft, poor billing, faulty metering
 - Revenue losses are estimated to be approximately \$7 billion annually.
- Antiquated infrastructure & Practices
 - Analog Electro-Mechanical Meters that can be easily tampered with
 - “Open-Loop” Communication - No feedback to utilities on loss-points
 - Manual Reading of Meters
- According to the Ministry of Power, India needs to invest hundreds of billions of dollars in the power sector (including T&D)
 - APDRP Program (<http://www.pfc.gov.in/apdrp/apdrp2.html>)

OPPORTUNITIES TO LEAPFROG

- Adopt “Smart-Grid” Technologies for Intelligent Sensing and Analysis
 - Automatic Meter Reading (AMR)
 - Advanced Metering Infrastructure (AMI)
 - End-to-End “Smart-Grid” Solutions



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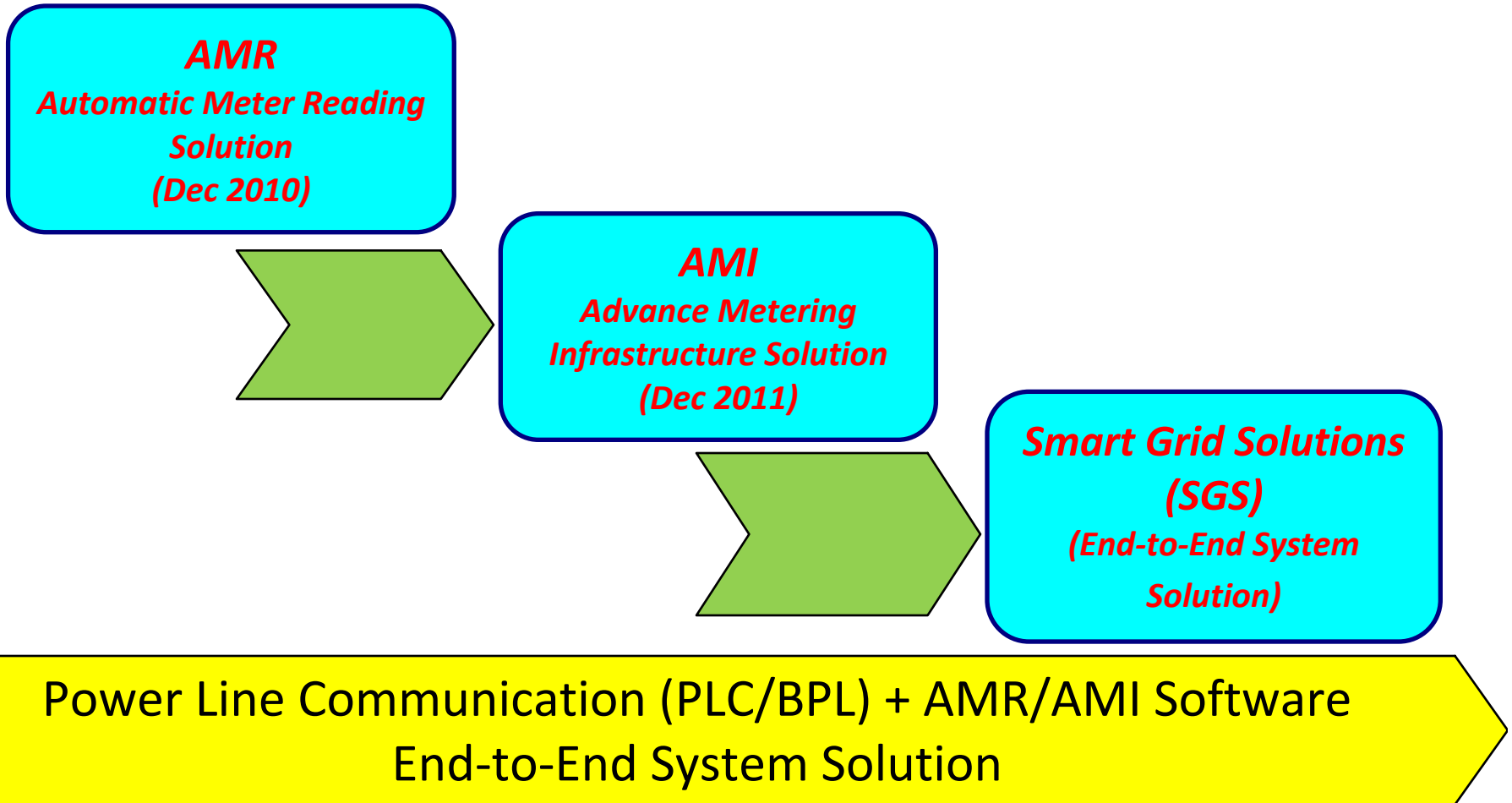
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IEM SOLUTION

- Our Solution will provide
 - Real time distribution grid visibility through intelligent sensing and analytics
 - Improve efficiencies of existing assets
 - Based on cutting edge communication technologies
 - Uses the existing electric power lines (PLC)
 - Based on emerging IEEE and Industry standards.
 - For both Intranet and Internet based applications over LAN/MAN/WAN infrastructure.

- A Phased Approach :
 - Automated Meter Reading (AMR) Solution ->
 - Advanced Metering Infrastructure (AMI) Solution ->
 - Smart Grid (SGS) Applications

IEM SOLUTION PHASES



IEM SOLUTION FINAL FEATURE SET

- Edge Devices
 - Automatic Meter Reading (AMR)
 - Tamper, Theft Detection & Notification
 - Remote DisConnect/Re-Connect based on customer operation/history/status
 - Real-time 2 Way Communication & Path to in-home display (HAN-Ready)
 - TOD Power Cost dissemination – Basic DR
- Loop Devices
 - Outage Detection and Visibility
 - Loss Measurements and Analysis
 - Health Monitoring : Heat/Oil pressure/other health attributes
 - Measurement of active/reactive energy flow
 - Load control
- Higher-Level Application
 - End-to-End System Visibility and Analysis
 - System automation

Critical Benefits from AMR

- Automatic Remote Meter Reading .
- Automating the process of measurement through digital communication techniques.
- Bring “intelligence” into the revenue cycle and manage it:
- Ability to detect tamper events and outage occurrences..
- Calculate transformer loading and sizing from interval data
- 15 minute interval data gives accurate load information for supply scheduling, switching operations, planning etc
- Monitor voltage at each premise to know conditions when to operate capacitor switches or regulators
- Consistent and granular data for improved accuracy
- Bring “intelligence” into the revenue cycle and manage it:

Metering ➡ Billing ➡ Operations ➡ Customer Service

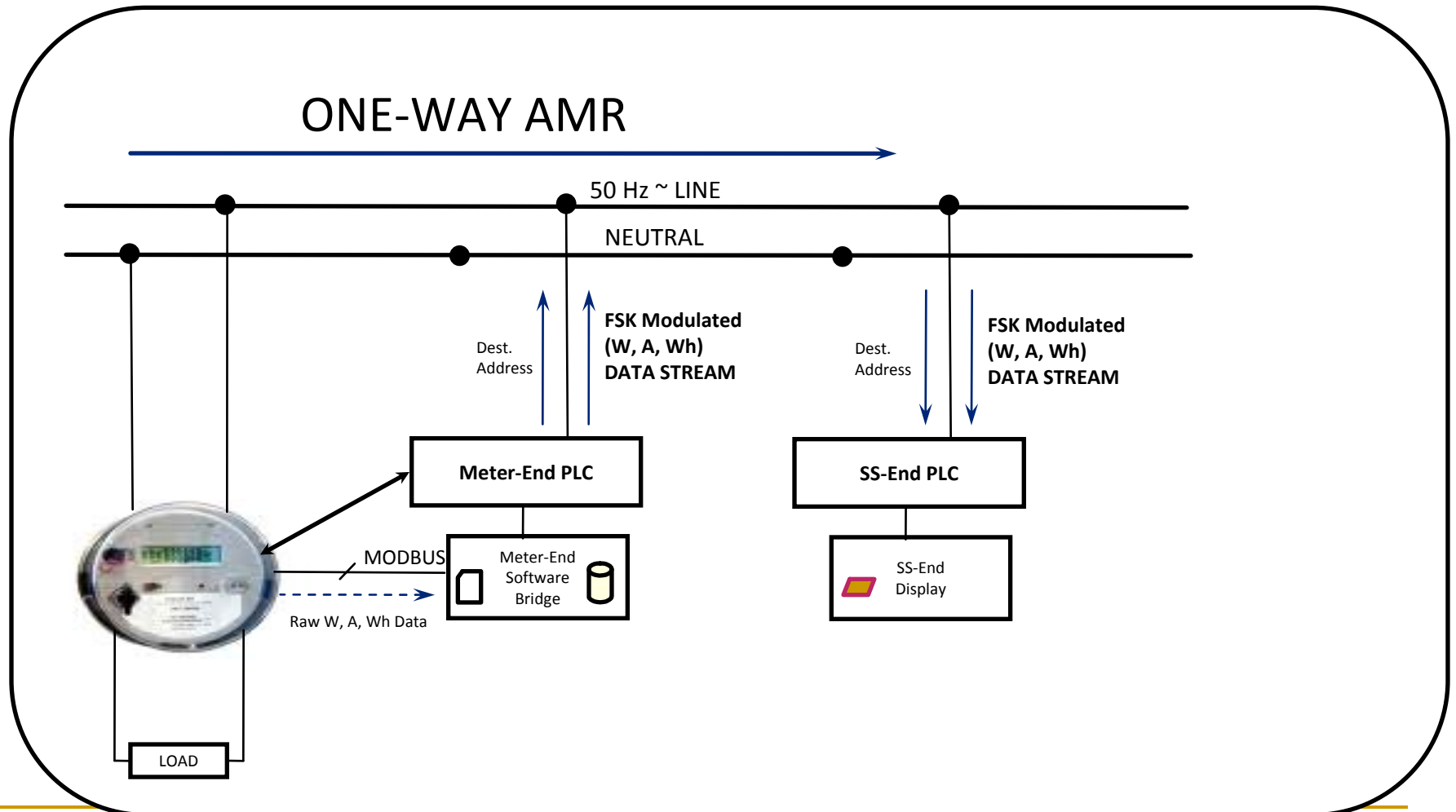
IEM SOLUTION PHASE : AMR

- PLC-Based AMR Solution (NOW)
 - Developed using PLC based technologies
 - Hardware + Software Solution
 - Available for demo with Meter Reading, Data Acquisition, Analysis and Transmission to Remote-End
 - Software Management for data acquisition, analysis and display of Energy, Load Parameters in Real-Time

IEM SOLUTION PHASE : AMR

- AMR Base : Power-Line Communication (PLC)
 - Most economically viable technology for transferring Meter data to Remote-End.
 - Need not recur additional operator cost of “overlay communication channel” as in GSM/Wireless Technologies
 - Uses existing power-line infrastructure belonging to Utility
 - Direct –to-Meter Solution
 - No issues about loss of signal for inaccessible meter locations such as Basements, Concrete/Industrial Structures
 - Mature & Reliable Technology
 - PLC has been used in Power Industry for Decades, but at low Bandwidths
 - Current solutions are Cost- and Data-optimized due to Standardization and Technological Advances

IEM SOLUTION PHASE : AMR Prototype



SUMMARY

- IEM's PLC based AMR solution for Intelligent Energy Management that offers following benefits currently
 - Smart automated processes instead of manual work
 - Accurate information from the network load to optimise maintenance and investments
 - Detection of tampering of Meters.
 - Consistent and granular data for improved accuracy
 - More intelligence to business planning.
- Backed by strong technical team as demonstrated with the prototype
- Expertise in the power domain

THANK YOU