UTC Conference

"Utility Applications of PLC"

Tim Frost
Consolidated Edison

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Our focus has been on utility applications

- **What we know, what we do**
  - Our Remote Monitoring System (RMS) that links us to 24,000 underground vaults utilizes PLC (using an older, slower technology)
  - The system was develop by Con Edison with a development partner more than 30 years ago and commercialized to other utilities
- **Attractive understanding of the PLC opportunities for utility applications**
- **Utility applications are key to the BPL business case**

Success in developing strategic partners to leverage our development efforts of PLC

- Ambient
- EarthLink
- NYSERDA

Strategically, technology and distribution grid design are hot topics for Con Edison

- "3G" project - development of a vision and a prototype of the Distribution grid of the future

- Our PLC initiatives become part of the same operating application development efforts

Creating an intelligent grid appears to be our highest technology priority

- **Focus will be on creating two-way systems**
  - Two-way communication system
  - Enable two-way electric flow

- **Math solutions with as much impact as hardware**
  - Reliability under uncertainty, more probabilistic modeling to identify the best investment alternative for achieving reliability
  - Dynamic, non-linear optimization models
    - Savings of energy and capacity
    - Locational value of assets
    - Value of flexibility (switches, sharing and movement)

- **Three technology components that create the smart grid**
  - Monitor and control devices through nanotechnology and digital power electronics
  - PLC communication networks to enable real-time two-way communications
  - Near real-time algorithms to process and act on the information

Comparison to the Critical Technologies of the CEA initiative:

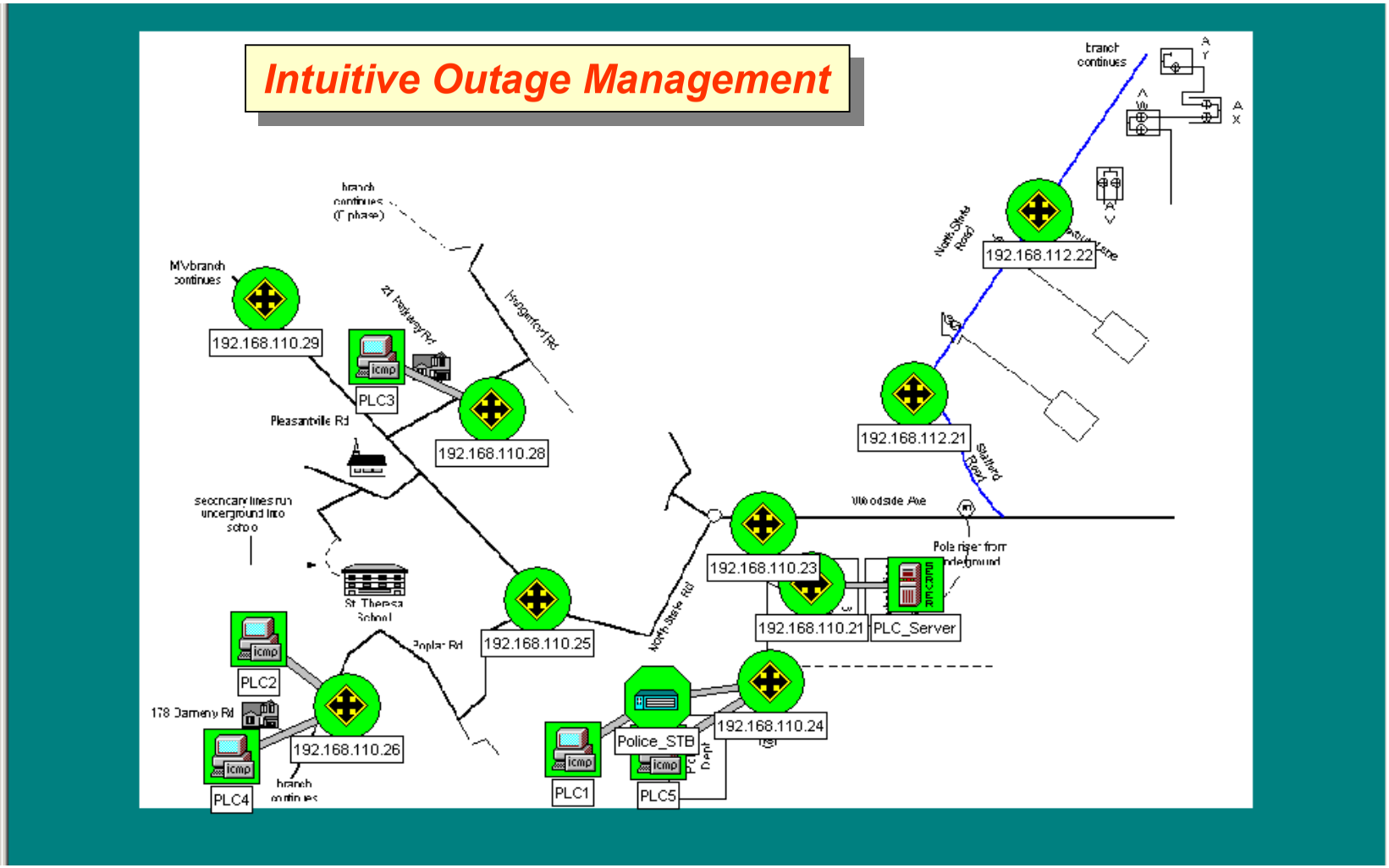
1. Asset Management IT system
2. Asset effectiveness monitoring
3. Automated fault detection and reporting
4. Broadband Over Power Line (BPL)
5. Device self-reporting
6. Reliability centered maintenance
7. Market based rates
8. Real-time dynamic load modeling
9. Photovoltaic (solar cells)
10. SCADA network penetration

Source: CEA Technologies Presentation at Distributech

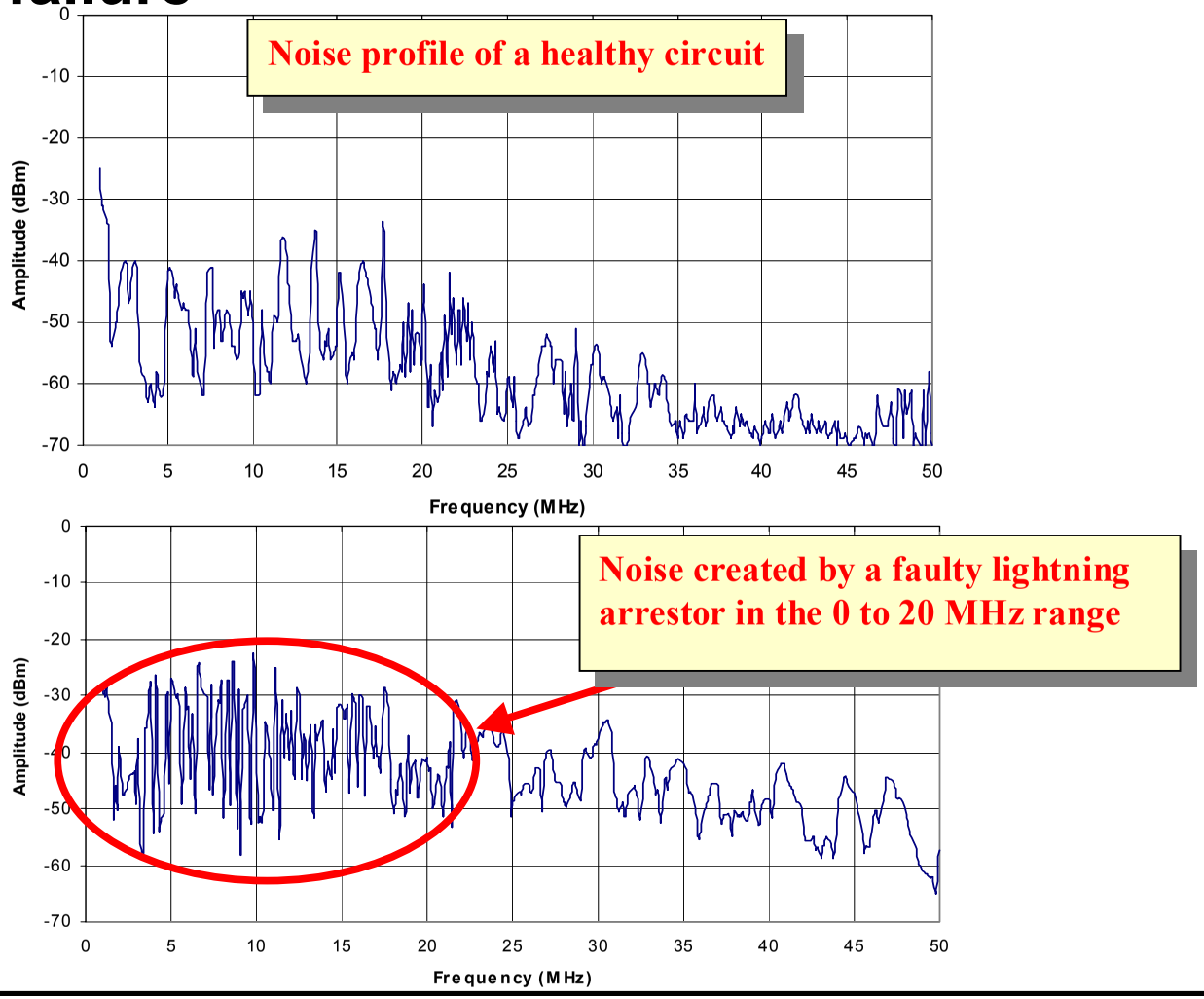
PLC appears to be central to the system of the future

Highlight specifics of what we have learned:

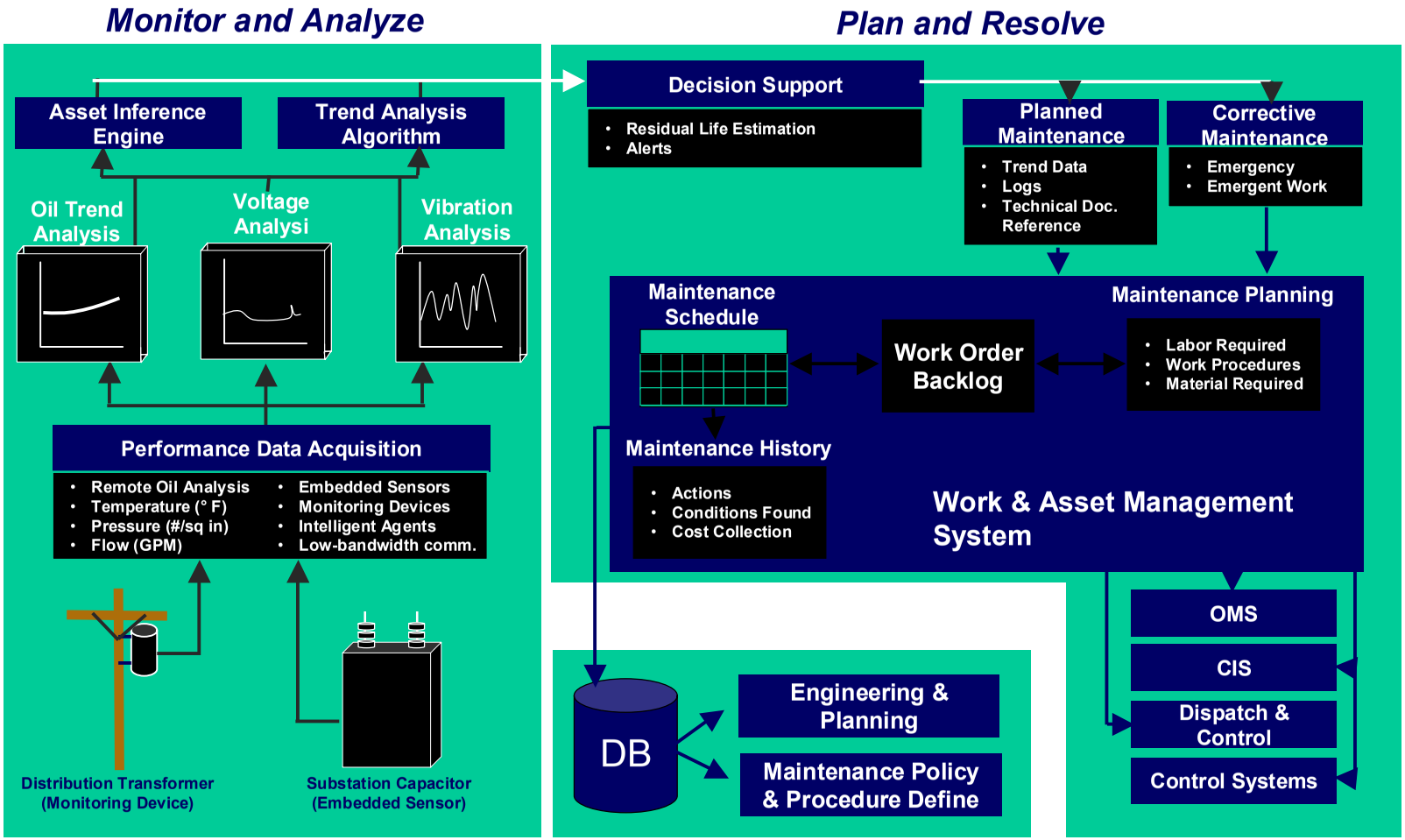
- Outage notification/management
- Asset management/Preventive maintenance
- Smart grid/optimization
- Load management
- Security/communication
- AMR
- Advanced SCADA - Sensoring, alarms and controls


Intuitive Outage Management
branch continues
branch continues (T phase)
M\branch continues
192.168.110.29
PLC3
Pleasantville Rd
192.168.110.28
21 Hemlock Rd
Hoagerford Rd
secondary lines run underground into schoo
St Theresa School
192.168.110.25
Poplar Rd
PLC2
178 Dameny Rd
192.168.110.26
PLC4
branch continues
North State Rd
192.168.110.23
192.168.110.21
PLC_Server
Woodside Ave
Pole riser from underground
192.168.110.24
Police_STB
PLC1
PLC5
192.168.112.22
192.168.112.21
Stafford Road
North State Road

PLC enables us to identify or even predict equipment failure



Resulting real time asset management system



Source of Graphics: IBM

PLC may enable our next generation T&D grid as a "Smart Grid"

- **Become part of an enhanced scada system**
  - Wide spread monitoring of conditions on a near real-time basis
  - Automation of controls and equipment of both utility and customer
  - Ability to enhance sensoring and alarms
- **Better demand forecasting**
- **Linkage to new dynamic operating systems**
  - No fixed capacity constraints
  - Optimize based on monitored conditions within the system
  - Enable better placement and monitoring/pricing of Distributed Resources
- **Potential for locational and near real time pricing**

Load management is a large potential value for utilities

- **CECONY is faced with significant substation construction costs.**
  - New Substation costs range from $200 million to over $400 million
  - Value of delay can be $40 million plus
- **Concepts for load control for residential customers, where traditional options are limited**
- **Longer-term, the politics may be compelling for a successful load management platform**
  - Green alternative for mass participation
  - “Bridging the digital divide”
  - Existing broad based load management efforts in:
    - Illinois – Electric City 50MW contract with Com Ed
    - Oregon – Comverge 50MW contract with PacifiCorp

For Security/communications situations, PLC may be a low cost alternative to running conduit

- Security for all utility facilities are being upgraded
- Early experience with Substation & Tunnel monitoring underway
- Externally, we are enabling and supporting university led efforts to to develop public security applications.

Full featured AMR is required to drive PLC

- **Build PLC into our existing Westchester AMR pilot**
  - Remove truck roll to RF system
  - Create Real time meter ability
  - Low cost

- **Believe that AMR business case requires more capability**
  - Once a month meter reading doesn't require high speed communications
  - Load forecasting, load management and automated customer service key potential differentiators
  - Bundled with Smart Grid optimization and stray voltage detection

Going forward thoughts:

- **Smart build = urban environments and the best near-term opportunity is multi-tenant buildings**

- **Utility applications are significant**
  - Utility applications will require work
    - More application development
    - Additional partnerships
  - Utility applications may make or break broadband commercialization

- **How could a smart grid to to other facets of existing electric infrastructure equipment?**