PECO Automated Meter Reading System

PA PUC DSR Working Group
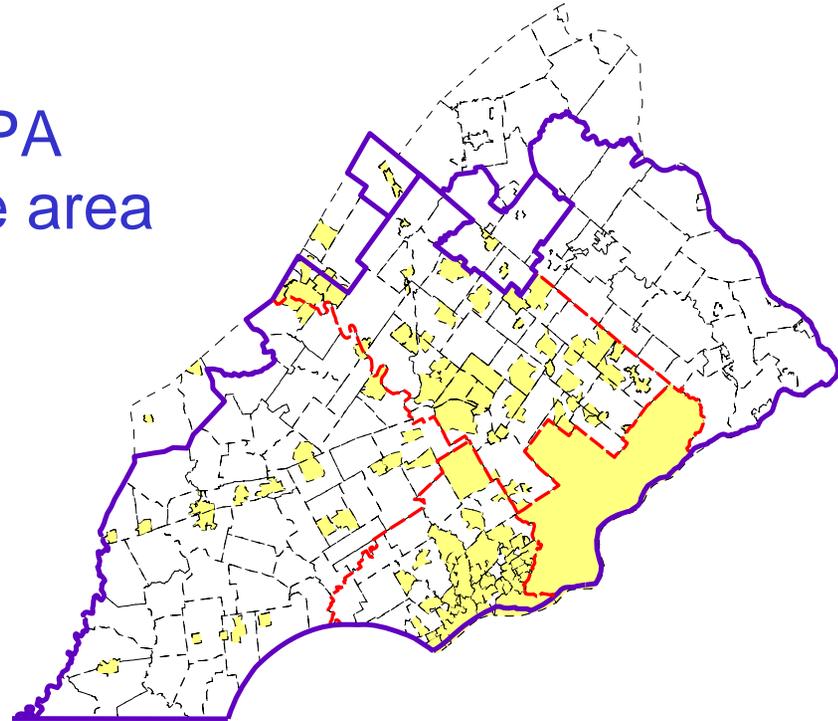
January 19, 2007

David Glenwright

Customer Profile

Service Area
Philadelphia & Southeastern PA
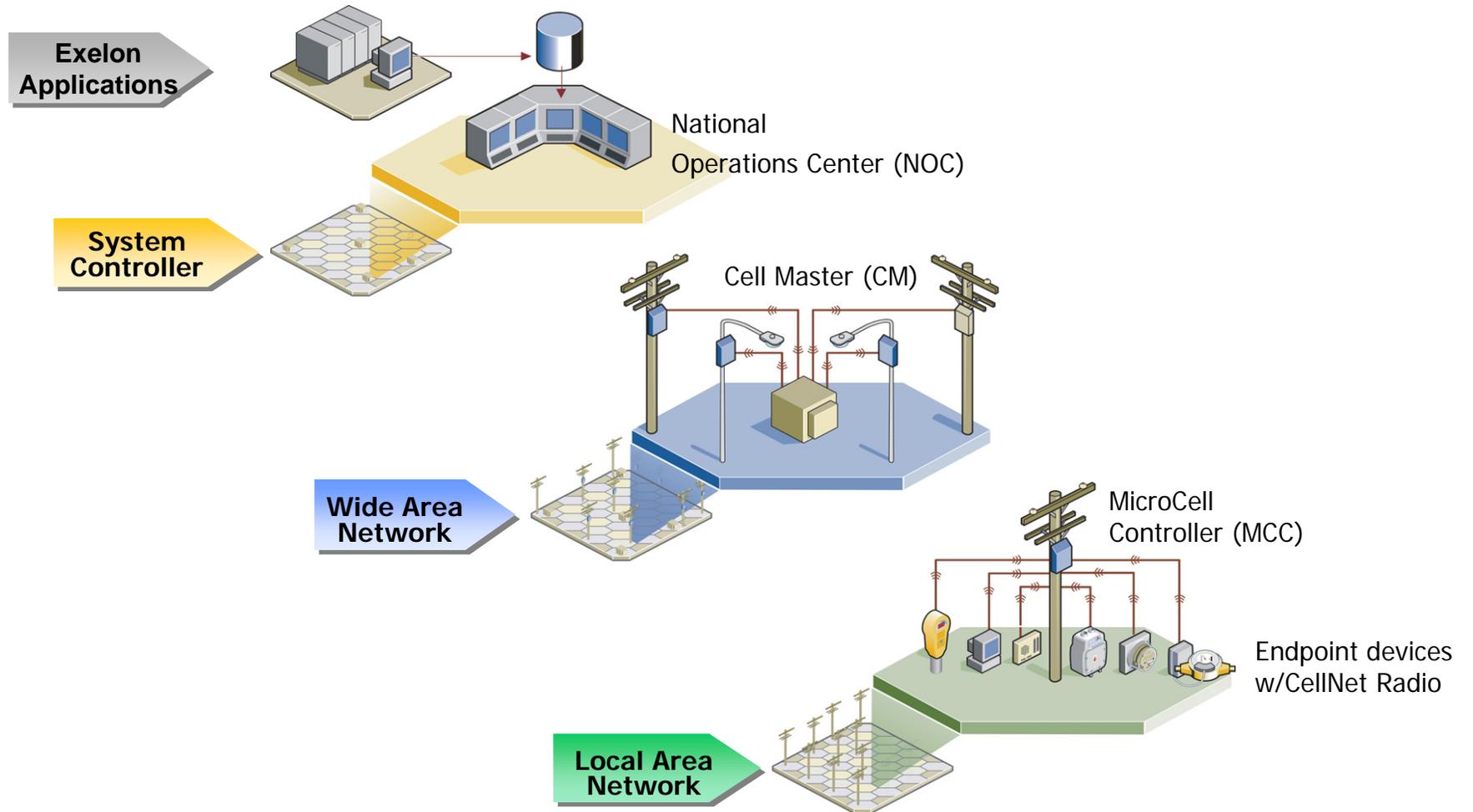Approx. 2,400 sq. mile service area

Customers
Electric = 1.7 million
Gas = 500 thousand

Automated Meters
2.2 million meters on Cellnet Fixed Network
3,000 Large C&I customers on MV- 90 & Metretek

PECO - AMR Journey

PECO An Exelon Company

1993	1999	2003	2007
Investigate & Outsource	Develop Business Case & Contract	Deploy	Create Additional Value

1993 — Investigate & Outsource
- Investigate AMR technology
- Outsource meter reading

1999 — Develop Business Case & Contract
- Evaluate internal options
- RFP for external market
- Sign agreement with Schlumberger / Cellnet

2003 — Deploy
- Completed in 42 months
- IT system changes
- Business process changes
- 2.2 M automated meters
- 91 Cell Masters
- 8,318 Micro Center Controllers

2007 — Create Additional Value
- Implement "day 2" benefits

Cellnet AMR Network Structure

Exelon Applications

National Operations Center (NOC)

System Controller

Cell Master (CM)

Wide Area Network

MicroCell Controller (MCC)

Endpoint devices w/CellNet Radio

Local Area Network

AMR network components

2.2 M Meters

~1.6 M Res. Electric

~455 K Res. Gas

~135 K Com. Electric

~42K Com. Gas

91 Cell Masters

8,318 MicroCell Controllers

Relationship with CellNet

- ## 15 year fee for service performance contract (through 2014)
- ## CellNet owns and operates the AMR System:
  - All network components – Micro Cell Controllers, Cell Masters
  - All solid state residential meters (approx. 1 million)
  - All meter modules (electric & gas)
- ## PECO purchases meter reads and other information and retains ownership of all customer data
- ## Maintenance contracts are in place between CellNet and PECO

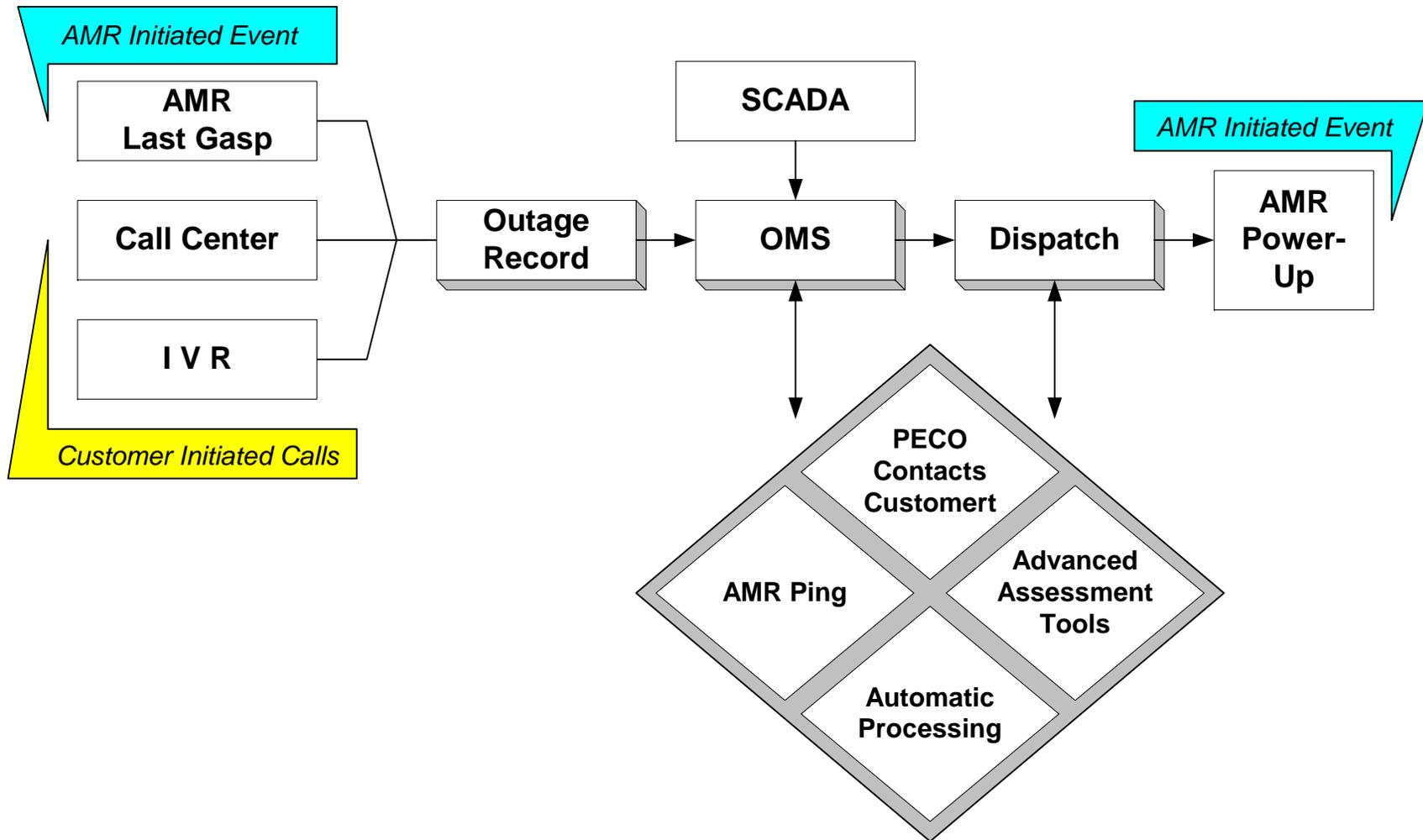# AMR Data Delivered

- Meters on the wireless fixed network
  - Electric meters
    - Basic Service Level
      - Daily readings
      - On-demand readings
    - Enhanced Service Level
      - Demand
      - Reactive energy (power factor)
      - Interval
      - Time of Use (TOU)
    - Flags and alarms
    - Real time – outage & restoration
  - Gas meters
    - Daily readings
    - Flags and alarms
- Mobile read electric and gas
  - Approx. 18,000 meters in rural areas
  - Monthly energy consumption
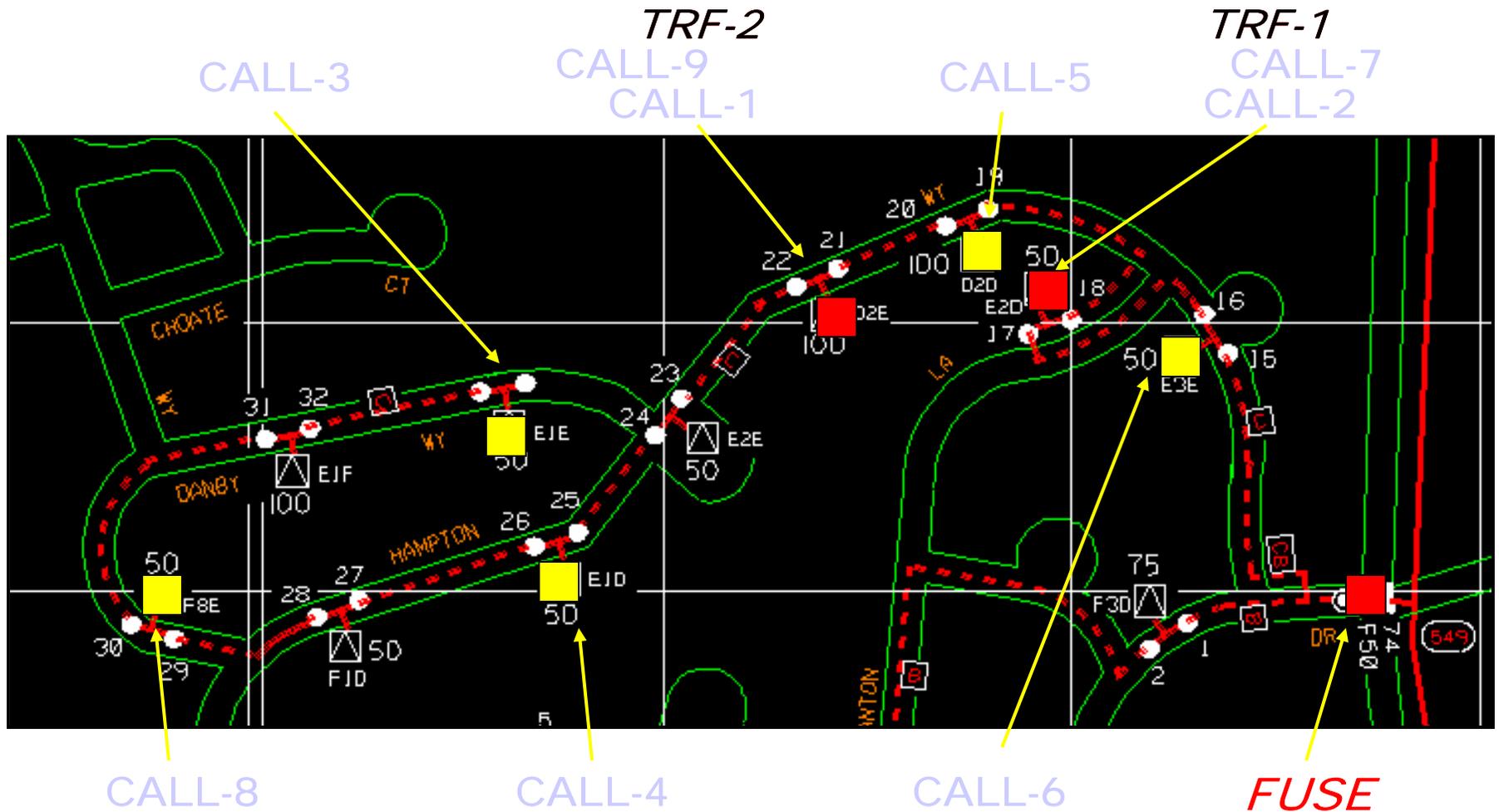 - Flags and alarms

Business Benefits of AMR

Customer Interface
- **Minimize inconvenience to customers who have difficult to read meters**
- **Reduce number of estimated bills**
- **Improve ability to answer questions on 1st call**
- **Provide more energy usage info.**
- **Improve customer satisfaction**

Financial Management
- **Improve the meter to cash cycle**
- **Continuous service - controls**
- **Increase revenue**
- **Improve power factor measurement**
- **Reduce lost revenue from theft**

Operational / System Reliability
- **Improve read rate and accuracy**
- **Reduce CAIDI by identifying, assessing and responding to outages more efficiently**
- **Improve productivity of field forces**
- **Reduce customer call volumes**
- **Reduce safety incidences**
- Increase asset utilization
- Improve ability to design electric distribution network
- Identify precursors to reliability event

Outage Management Process with AMR

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AMR Initiated Event

| | | SCADA | | | |

AMR Last Gasp

AMR Initiated Event

Call Center → **Outage Record** → **OMS** → **Dispatch** → **AMR Power-Up**

I V R

Customer Initiated Calls

PECO Contacts Customert

AMR Ping

Advanced Assessment Tools

Automatic Processing

Outage Example no AMR

Event Time: 11:49:00   **Customers Affected: 086**

Outage Example with AMR

Event Time: 11:34:00   **Customers Affected: 086**

Outage Management - Results with AMR

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- **Improved outage management performance**
  - Quicker response due to last gasp
  - More efficient use of field crews due to pinging (automated & manual)
  - Validate power restoration times using daily reports
  - Reduced customer average interruption rate by 5.5 minutes in 2005

	2004	2005	2006
Single Outages Cancelled	5,450	6,184	11,584
Outages Escalated	1,100	2,418	4,532
Last Gasp Messages Used	NA	31,027	16,116

Challenges of PECO's AMR System

- **Dumb meters – smart network design**
  - Network calculates demand and aggregates interval data
  - Electric meters transmit the past 9 readings every 5 minutes
- **Network designed to deliver daily reads**
  - Significant network modifications required to deliver large scale TOU and interval data
- **Contract performance standards**
  - Performance standards for interval and TOU is @ 98%
  - Network time synch to the hour is +/- 75 sec.
- **Pricing**
  - Higher fee for interval data and TOU than energy only read
- **PECO IT System**
  - Meter data management system may be required
  - Impact to customer information system needs evaluation
  - Customer presentment

Opportunities

- **Other Project**
  - Good Watts Pilot- Smart thermostat and load control devices using Invensys technology. Partnered with Comcast. Pilot discontinued in 2005.
- **Potential Opportunities**
  - Distribution equipment load management
  - Equipment failure prediction using outage and power restoration messages
  - Feeder load modeling for planning and analysis purposes
  - Smart Network – convergence of AMR and distribution automation
  - Evaluate future rate offerings
  - Revenue Integrity Service
  - Support new rate offerings.

Utilize the AMR system to extract as much value as we can for our customers and business