

Presentation Title

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Business Cases and Technology Challenges for Wireless M2M Metering Solution Implementation

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Introduction

- Wireless M2M
- Business cases
- Energy Markets
- Technology Challenges
- Summary


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Business Cases for M2M Implementation

1. Automated Metering Solution for Electricity Redistribution and Resale in Shopping Centers
2. Automated Measurement and Verification of interval metering for Demand Response and Synchronized Reserve Services


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Wireless Technology Solutions

- Reduce installation cost
- Repeatable and consistent installation
- Utilization of utility grade meters
- On-site data storage
- Remote communication
- Automated measurement and verification
- Easily integrated into IT application
- Critical part of end-to-end solution


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Keys to Efficiently & Profitably Execute the Business Case

- Minimize the manual (man) intervention
- Fully Automate the Process (M2M)
- Provide a Fully Scalable Solution
- Provide Measurement and Verification (M&V)
- Provide a Complete End to End Solution

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Case Study #1

Automated Metering Solution
for
Electricity Redistribution and Resale System
in Shopping Centers

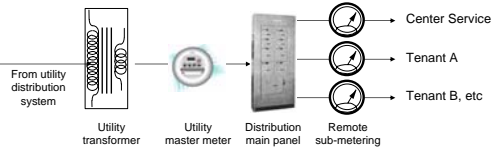
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Electricity Redistribution System

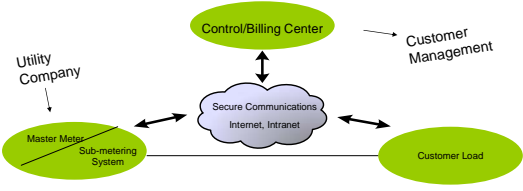


- Landlord pays master electric bill to utility at General Service Large Tariff
- Center Service is sub-metered and charged to Main Cost center at prior rates
- Individual tenants pay electric bills to the landlord at prior rates
- Profits generate from rate structure, aggregation, and reductions in power cost from rigorous and continuous demand management

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Electricity Redistribution & Demand Management System Architecture



- National Operations Control/Billing Center
- System intelligent adaptive software, rate engine and billing system
- Managed IP network communications - Internet, VPN, customer LAN or WAN
- Building gateway and graphical user interface
- Utility company interface - master and sub-metering systems
- Building Automation System


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Benefits to Shopping Center Landlord

- Immediately give landlord additional annual profit > \$75,000 per center (for average 500,000 sq ft center)
- Landlord reaps benefits - paying low rates for all usage, and charging more competitive rates to Main Cost Center and Tenants
- Freedom to structure improved tenant relationships – attraction, retention, risk management, and value proposition
- Opportunity to receive centralized automated monitoring, reporting, and alarming of shopping center energy consumption and performance
- Increased shareholder value – Everyone wins through aggregated redistribution system


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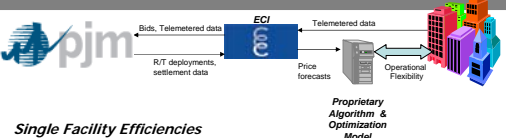
Case Study #2

Automated Measurement and Verification of interval metering for Demand Response and Synchronized Reserve Services

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Enabling Technology



Single Facility Efficiencies


- Reduces supplier energy expense
 - Reduce the expense and risk of buying shaped products from the market
 - Self-manage volume risk and imbalance price risk
- Creates market-based revenues
 - Sales of energy, capacity, regulation, and other ancillary services
 - Load and profile control and management

Regional Portfolio Economies

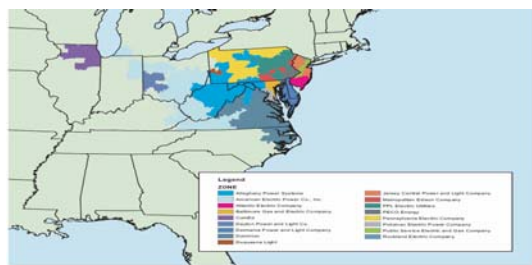

- Maps buildings to market opportunities
- Secures optimization flexibility and assured performance
- Provides joint and customized products responsive to the market
- Establishes scale necessary to participate in wholesale market

BAS and traditional energy management become strategic assets

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PJM - Geographic Footprint

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Challenges in Wireless M2M

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Customer Problem

- Value
 - Wireless networking increases the value of sensor and actuator communications. Examples are Advanced Metering Infrastructure (AMI) and Building Automation Systems (BAS)
 - With IP v6, sensors and actuators will become IP addressable
- Problem
 - The setup, administration and monitoring of IP networks with thousands of endpoints will be huge
 - The cost of networking infrastructure and administration in device networks is usually borne by a single entity. This will become a barrier to the proliferation of device networks unless adequately addressed


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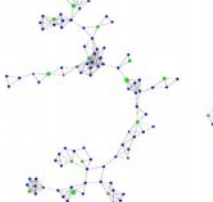

Self Configuration – Why it matters?

- Large scale – hence network is complex
- Example 1
 - IT department and computers
- Example 2
 - Eka deployment at Griffiss Utility Services

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Griffiss Utility Services




Griffiss Industrial Park, Rome NY

EkaNet
AMR Wireless
Mesh System

- Time-of-use billing: 15 min interval data
- Power quality data: voltage, current, power factor, reactive power
- Customer profiling: customer access to information
- Integrated framework: combine metering and SCADA
- Distribution monitoring: monitoring distribution transformers
- Steam and electric meters: integrated two utility services


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Benchmarks (Continued)

- Total cost of ownership
 - Over the life cycle of the systems
- Upgrade functionality
 - Over the lifecycle of the system
- Upgrade Service features
 - Over the lifecycle of the system
- IP V6
 - Way to go

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Other Benchmarks

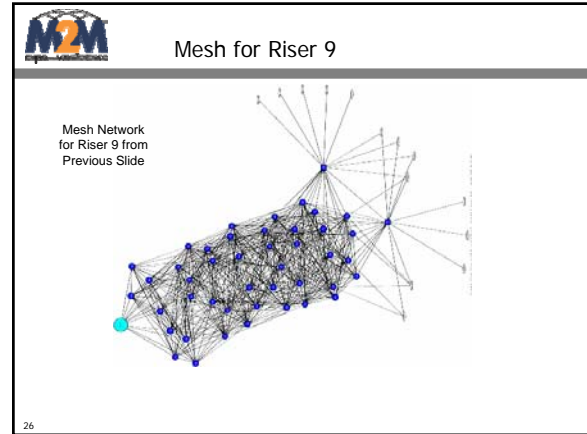
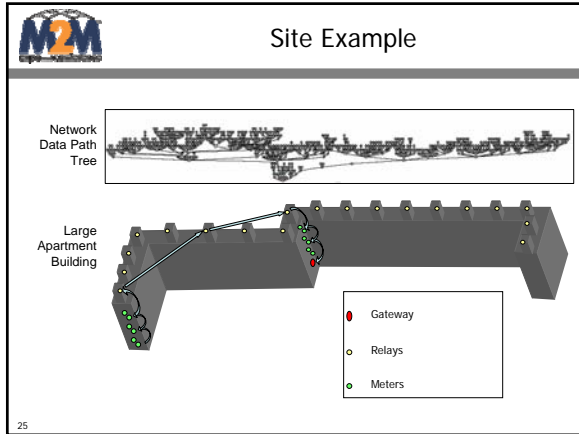
- What will happen in large installations when networks from different gateways merge together?
- Do nodes intelligently decide which Gateway to go to?
- If there is a failure in one gateway can they switch over to another without human intervention?
- How is data integrity preserved when failures occur? Is the data lost?
- Is there a near real time performance on large-scale networks to provide adequate functionality for AMI requirements?
- How fast does the network converge in case of an outage?

In large-scale systems all these failures can have large effects on the network

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- The diagram lists technology challenges. The number 27 is in the bottom left corner.
- Why Network?
 - Application mesh or Transport Network?
 - Applications
 - Widely varied with differing requirements
 - Impacts all layers of the communication system
 - Network
 - Combine power and routing awareness,
 - Application and networking must work together
 - Latency

-
- The diagram provides a summary of key points. The number 28 is in the bottom left corner.
- Well defined strategy & value proposition required in the short term
 - Clear technology/market advantages
 - Platform technology
 - Customer focused solutions
 - Standards
 - Need to be application oriented
 - Need to adapt based on working solutions