



Smart Information for a Sustainable World

Use of Data in a Smart Grid Environment

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Smart Information for a Sustainable World

Use Smart Grid data to derive additional value from DR at the operational level.

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A Few Years Ago ...

- Monthly Meter Readings, Total Energy Consumed
- Limited SCADA
- Phone Calls for Outages
- Network Model Updated Annually or Semi-Annually
- Very Limited Data
- Heavily Reliant on Experience

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Data Available Today

- Smart Meters (AMI)
- Supervisory Control and Data Acquisition (SCADA)
- In-home Devices (HAN)
- Equipment operating characteristics
- Weather (Historical, current, forecast)
- Spot Energy Market Prices
- Customer Information System (CIS)
- Geographic Information System (GIS)
- Work Management System (WMS)

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What is Smart Grid?

- Collection of data, analysis of data and decision support and implementation to optimally manage the electric generation, transmission and distribution network for:
 - Efficiency
 - Security
 - Reliability
 - Safety
 - Environment
 - Distributed generation
 - Promote competition
 - Economics
 - Regulation

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Smart Grid Problem

- Many Data Inputs
 - Multiple formats, frequency from annual to 30/sec, currency from historical, to real time to forecast, huge volume, lack of format and communications standards
- Decision Making
 - Forensic, real time, planning out many years, automatic to consensus required or outside approval
- Execution
 - Automated to manual, almost instantaneous to many years
- Goals
 - Many often conflicting, vary by interest group

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What's Needed?

■ Operational Database Management

- Data from multiple sources
- Distribute data where needed

■ Smart Grid Analytics (DMS)

- Predict where and when peak events are likely to occur
- Determine impact of peak events
- Evaluate potential responses and select optimum
- Monitor response vs. actual conditions and evaluate need to adjust
- React in real time to actual conditions
- Forensics, what happened, when, where, what response, result?

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Primary Smart Grid Initiatives

- Peak management
 - Demand management
 - ▶ Consumer Incentives (TOU Pricing)
 - ▶ Direct Load Control
 - ▶ Load Shedding
 - Network optimization
 - ▶ Network Reconfiguration
 - ▶ Voltage/VAR Optimization
- Distributed Generation/Storage
 - “Green” energy sources
 - Consumer owned energy sources

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Uses of Smart Grid Data

- AMI data can build accurate load forecasting
- Load can be accurately accumulated actual network load profile
- Current “switched” state of the network used for all analysis
- Volt/VAR Reduction is more precise
- Faster and more complete outage information

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Operational Benefits of Peak Reduction

- By knowing where load is on the network and where DR resources are on the network you can:
 - Reduce power losses
 - Increase life and reliability of equipment
 - Eliminate/shorten outages
 - Optimize existing infrastructure
 - Improve customer relations
 - Defer/eliminate equipment upgrades

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