Current Issues 2010
“The Santa Fe Conference”

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Regulated Operations Technology

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Summary

- Who is CenterPoint Energy
- The Texas Electric Market
- Major Areas of the Smart Grid
- Consumer Concept
- Smart Grid Implementation
- Texas Common Portal and Data Repository
- Smart Grid Benefits
- Smart Grid Ecosystem
Who Is CenterPoint Energy (CNP)

- **Natural gas sales and delivery**
  - Over three million residential, commercial and industrial customers in six states

- **Competitive gas services**
  - Nearly 10,000 commercial, industrial and wholesale customers across the eastern U.S.

- **Electric transmission and distribution**
  - Over 2 million customers in Houston area

- **Interstate natural gas pipelines**
  - Two pipelines in the mid-U.S., connecting to over 20 other pipelines

- **Natural gas gathering and processing**
  - 150 separate systems in major producing fields in Arkansas, Louisiana, Oklahoma and Texas

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- **Electric Transmission & Distribution**
- **Natural Gas Distribution**
- **Interstate Pipelines**
- **Competitive Natural Gas Sales & Services**
- **Field Services**
Texas Electric Market

Before Restructuring – One Company

The Integrated Utility

- Power Generation
  - Extend New Power Infrastructure
  - Operation & Maintenance of Infrastructure
    - Reliability
    - Power Restoration
    - Read Meters
    - Disconnect Service for Non-Payment of Bill
    - Reconnect Service for Payment of Bill
- Retail Sales (Electric Bill)

Transmission & Distribution

2002

After Restructuring – Separate Companies

Power Generation

- Wind
- Coal
- Nuclear
- Gas
- Solar

Retail Energy Providers (Retail Sales)

- Purchase The Electricity They Sell From Power Generators
- Send Electric Bills
- Service Offerings

Regulated Energy Delivery

Transmission & Distribution

- Extend New Power Infrastructure
- Operation & Maintenance of Infrastructure
  - Reliability
  - Power Restoration
  - Read Meters
  - Disconnect Service for Non-Payment of Bill
  - Reconnect Service for Payment of Bill
Interactive Grid Concept at the Consumer

ZigBee Programmable Communicating Thermostat

In Home Device Monitor (& Control)

Load Control
- Pool Pumps
- Fans
- Electric Water Heaters
- Electric Heaters
- Washer / Dryer

Smart Electric Meter

Network

Internet

Retail Energy Providers

CenterPoint Energy

Consumers

Fuel Cells

Distributed Generation

PHEV

Solar Panels

Micro Grid
Path To Smart Grid Implementation

2009 – 2014 Smart Meter Implementation

2009: Smart Meter Approval

Dec, 2008 PUCT Award

Oct, 2009 DOE $200mm

2010 Mid Grid Automation & Meter Acceleration

CNP Smart Grid

Diagnostics
Smart Grid detects overloaded substation grid and evenly distributes load to adjacent grids.

Self Healing
Outage Grid switches undamaged portions to adjacent substation grids.

City power substation grids with thousands of homes in each grid make up the System Power Network.

Grid Loading
Normal
Overloaded
Functionality (non-inclusive) –
Texas Common Data Repository and Portal:
- 15 Minute usage data
- Remote connect / disconnect within one hour
- Real time meter interrogation for power availability and register read
- Tamper notification
- Full security for multiple access
- Web access to usage data
- Meter reports outage and restoration
- Enables real time communication between AMS meters and HAN devices
- Distributed Generation/Renewables metering

After 2010, HAN support for:
- pre-payment services
- PHEV monitoring
- Improved pricing support for TOU, CPP and dynamic pricing
- Improved HAN device control support
- HAN messaging over AMS network
- Customer HAN device access permission/authorization
- HAN device performance evaluation
## CNP Smart Grid Benefits

### Key Stakeholder

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<thead>
<tr>
<th>Electric Utility</th>
<th>Benefits</th>
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<td>• Enables more effective loading of utility assets (lines, transformers…)</td>
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<td>• Enables increased monitoring and diagnostics to enhance the life of utility assets</td>
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<td>• Improved line fault detection and diagnostics</td>
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<td>• Remote connect / disconnect within one hour</td>
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<td>• Meter reports outages and tampering notices</td>
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<td>Consumers</td>
<td>• Power quality and reliability improvements</td>
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<td></td>
<td>• Friendly access to detailed consumption information to make informed choices and enable faster transactions (15 Minute web access usage data)</td>
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<td>• Enables and promotes energy conservation</td>
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<td>• Real time meter interrogation for power availability and register reads</td>
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<td>• Enables HAN devices</td>
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<td>Retailers</td>
<td>• Expands retailer’s ability to offer new service offerings</td>
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<td></td>
<td>• Enables time-of-use rates and critical peak pricing</td>
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<td>• Establishes platform to offer future home appliance monitoring and control</td>
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<tr>
<td>Environment</td>
<td>• Enables demand-side management</td>
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<td>• Facilitates integration of solar and wind generation into grid</td>
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<td>• Promotes energy efficiency through immediate energy consumption awareness</td>
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### CNP Smart Grid Transforms the Way We Buy, Deliver and Use Electricity
Continued market iterations of services, programs and devices to meet changing consumer expectations is the key to a successful smart grid initiative.