

ABB Automation & Power World: April 18-21, 2011

WPO-111-1

Experiences with Distribution Smart Grid Implementations using Advanced Communications

WPO-111-1 Experiences with Distribution System Smart Grid Implementations using advanced Communications

- Jonathan Sudduth – CenterPoint Energy
- Doug Voda – ABB

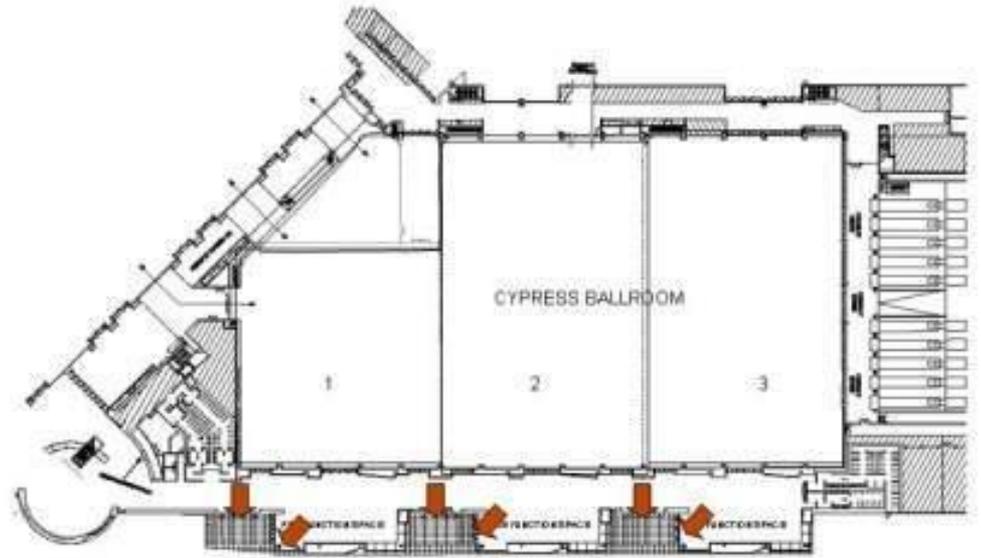
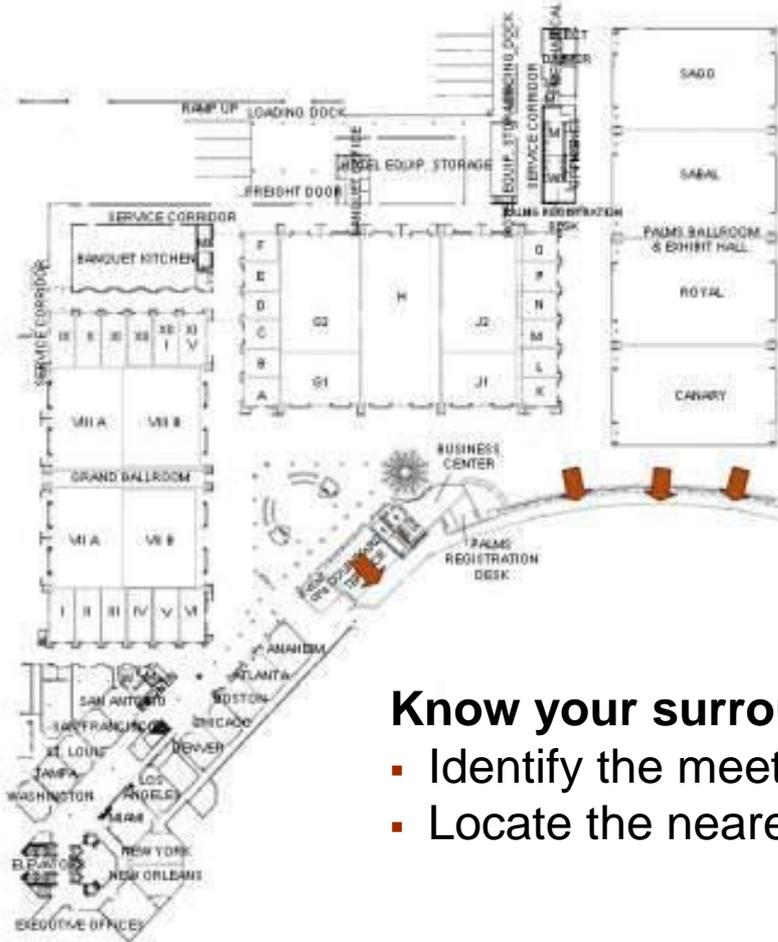
Your safety is important to us

Please be aware of these emergency procedures

- In the event of an emergency please dial ext. 55555 from any house phone. Do not dial 9-1-1.
- In the event of an alarm, please proceed carefully to the nearest exit. Emergency exits are clearly marked throughout the hotel and convention center.
- Use the stairwells to evacuate the building and do not attempt to use the elevators.
- Hotel associates will be located throughout the public space to assist in directing guests toward the closest exit.
- Any guest requiring assistance during an evacuation should dial “0” from any house phone and notify the operator of their location.
- Do not re-enter the building until advised by hotel personnel or an “all clear” announcement is made.

Your safety is important to us

Convention Center exits in case of an emergency



Know your surroundings:

- Identify the meeting room your workshop is being held in
- Locate the nearest exit

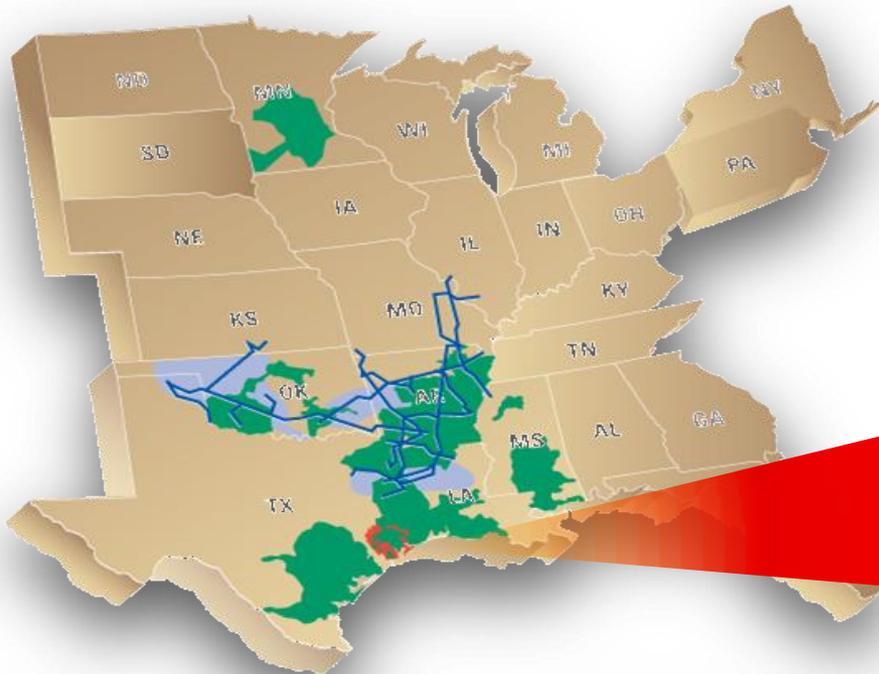
Houston's Smart Grid:

Transforming the Future of Electric Distribution & Energy Consumption

- Jon Sudduth
- Project Engineer, Intelligent Grid Deployment
- ABB Automation Power World
- April 21, 2011



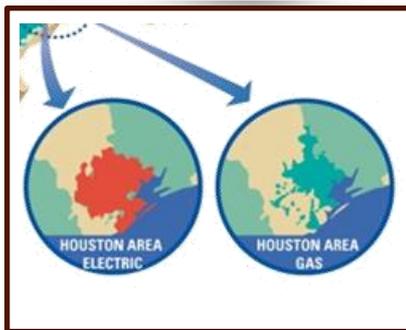
Who is CenterPoint Energy?



- Natural gas sales and delivery
 - Over three million residential, commercial and industrial customers in six states
- Competitive gas services
 - Over 11,000 commercial, industrial and wholesale customers across the eastern U.S.

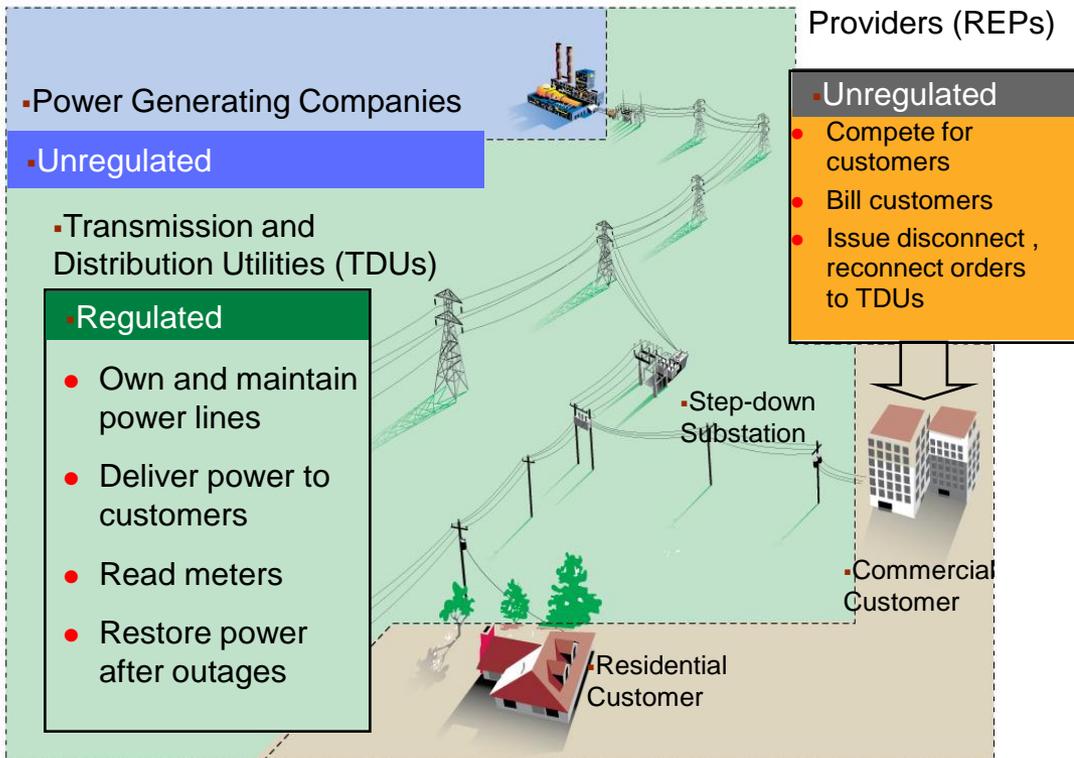
Electric transmission and distribution

- Over 2 million meters in the Houston area
- 16.4 GW peak demand
- 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

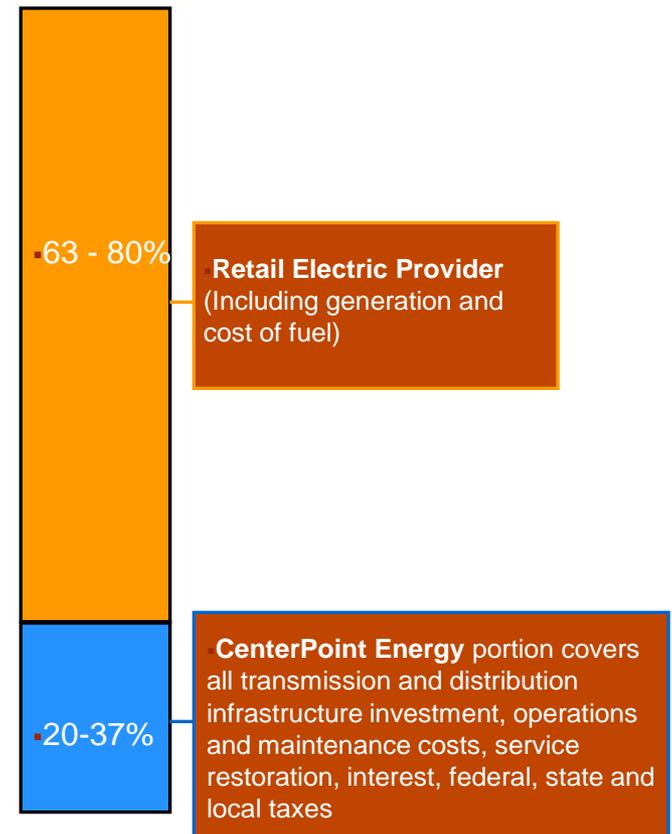


- Electric Transmission & Distribution
- Interstate Pipelines
- Field Services
- Natural Gas Distribution
- Competitive Natural Gas Sales & Services

The Texas Electric Market



Cost of electricity to residential customer

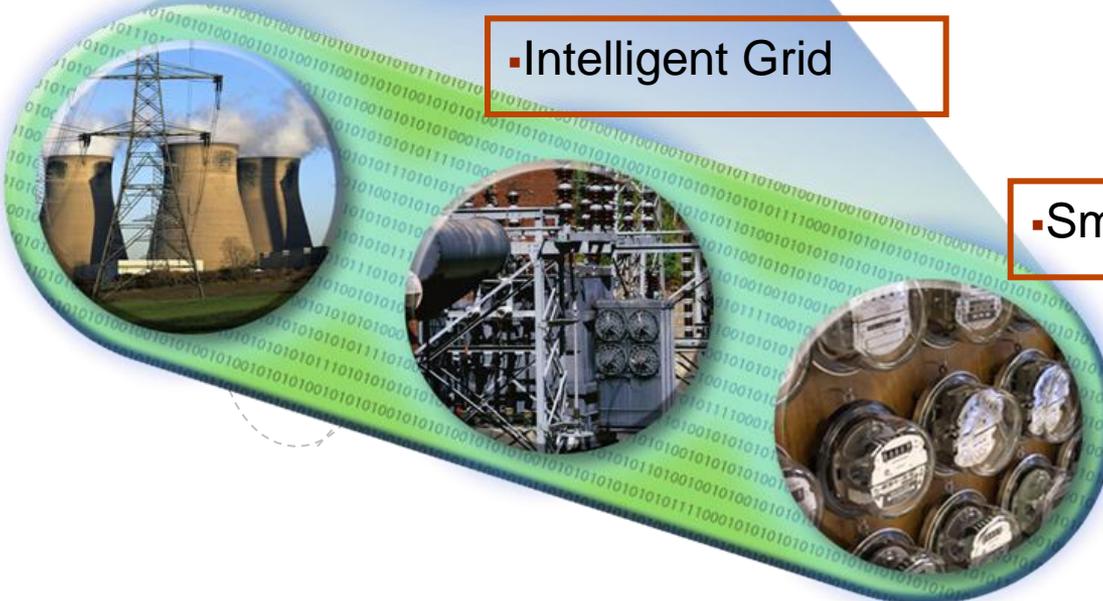


Three Components of a Smart Grid

▪ Expanded Energy Sources



▪ Intelligent Grid



▪ Smart Meters

Current Status

● **AMS infrastructure**

- Computer systems are installed
- 1.2 million smart meters deployed
- 3,580 cell relays and 90 take out points constructed
- Smart Meter Texas portal deployed
- Meter accuracy was validated by PUCT/Navigant Consulting

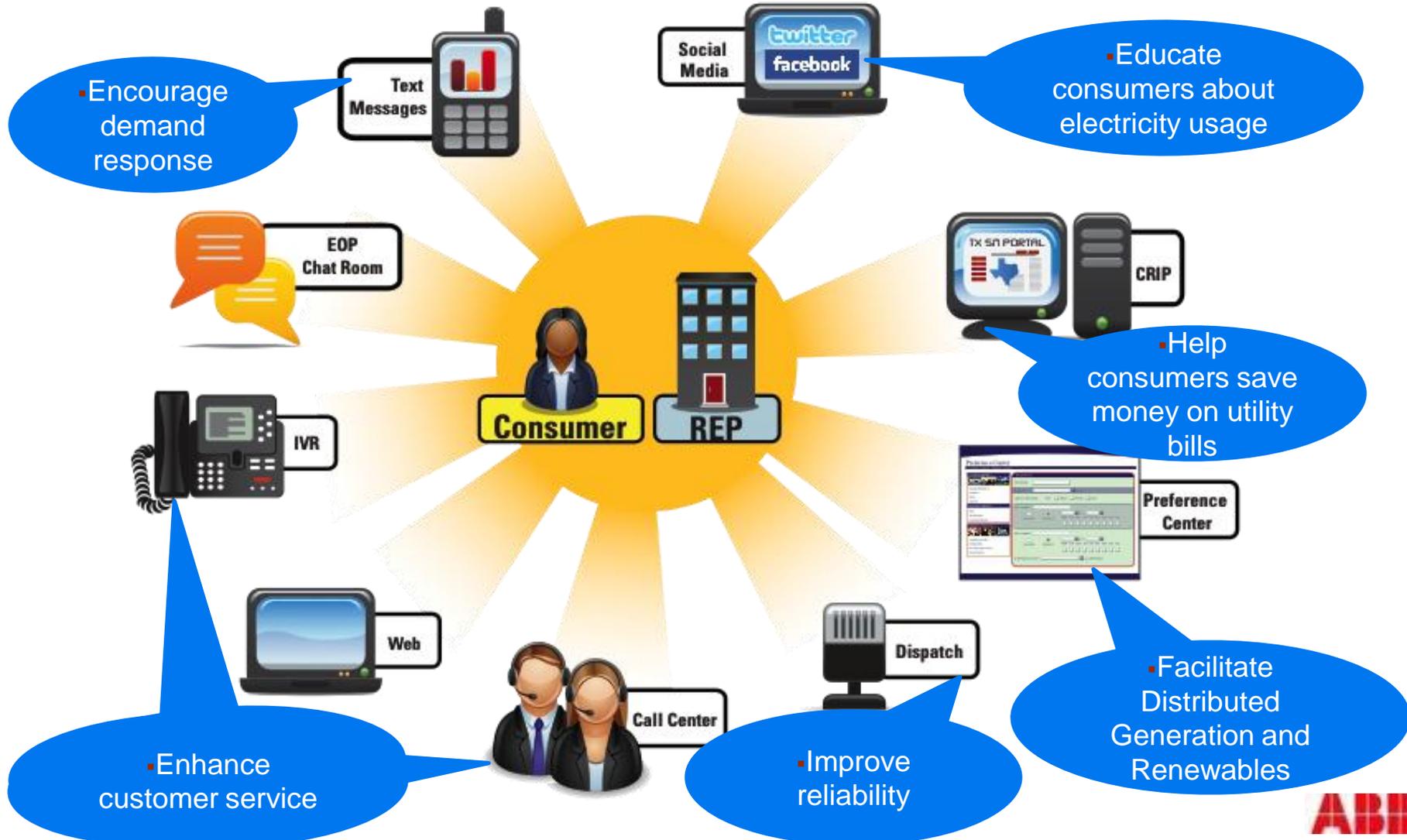
● **IG infrastructure**

- 90 switching devices installed
- Monitors installed on 12 power transformers and 6 substations have been upgraded.

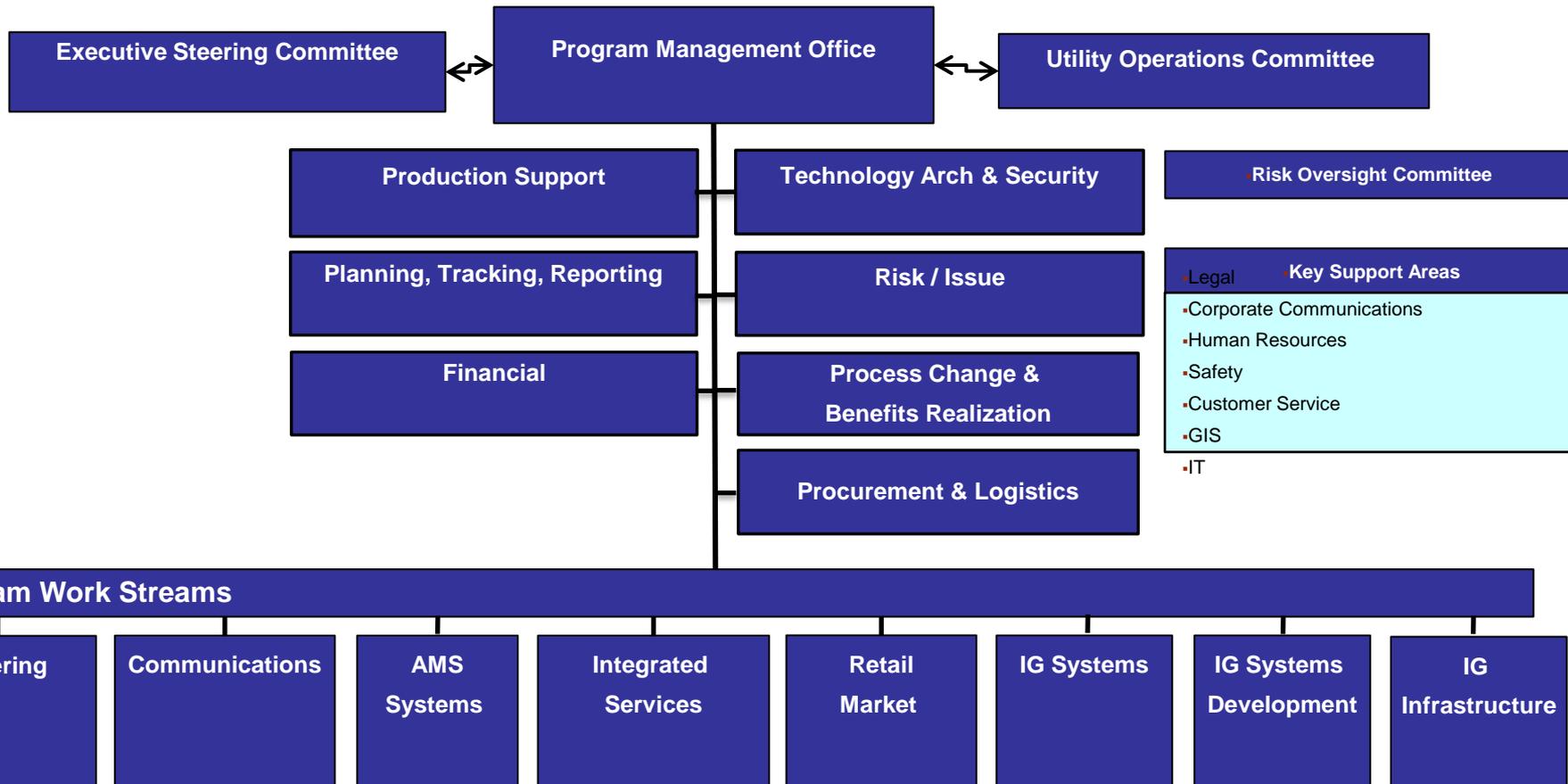
● **Benefits achieved**

- 1 million meters being read for billing electronically
- 780,000 service orders completed electronically
- Average electronic service order execution time is 30 minutes
- Smart Meter Texas portal makes consumption data available to 1 million consumers in CenterPoint Energy area

The Customer is Central to Enable a More Robust Market



Program Organization



Design



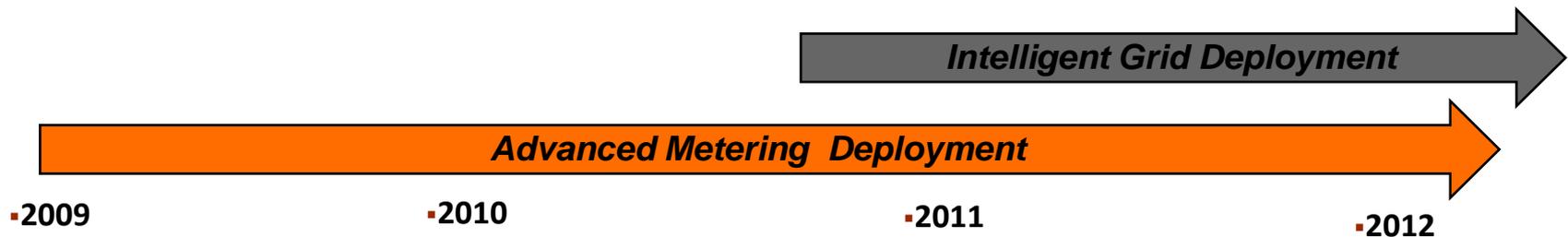
Combined with back office computer systems, IG technology, when fully deployed, will automatically identify the location of power outages, isolate faulted sections of the grid and re-route power from other sources, essentially “healing” the system.

Selection Process



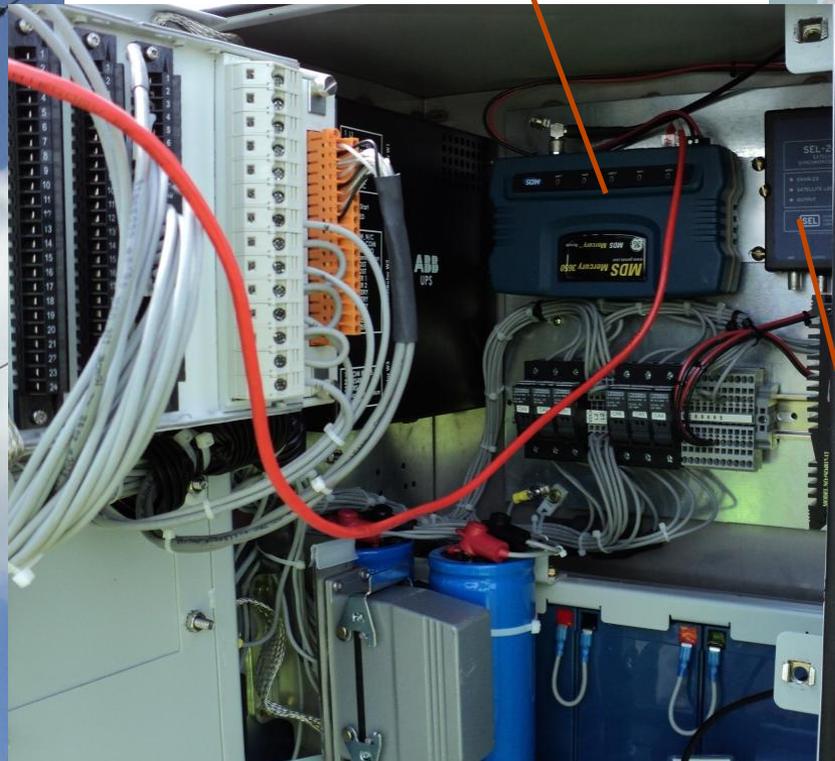
Selection Process – Cont.

	AMS	IG
Fiber backhaul	✓	✓
Microwave backhaul	✓	✓
WiMAX (Primary)	✓	✓
GSM (back-up)	✓	✓
Satellite (back-up)		✓



Implementation

Communications Equipment



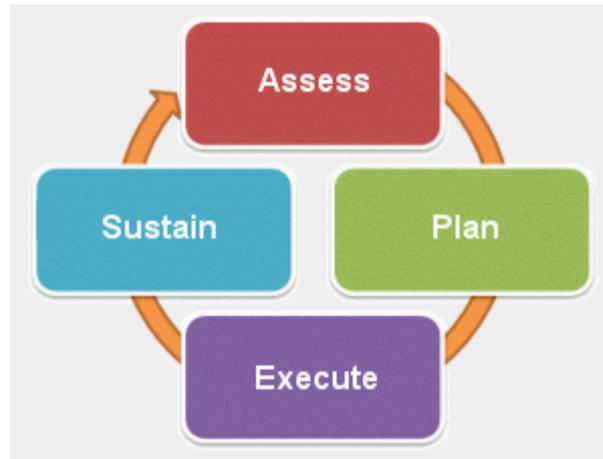
GPS Time Clock



Security



- The Process Change team was created in order to facilitate organizational and business process changes resulting from the deployment of the SmartGrid Program at CenterPoint Energy.



Keys to our Success

- ✓ Strong governance processes - including risk management, change management, financial management, project planning/scheduling, metrics/benefits reporting, technical architecture, etc.
- ✓ Integration and close alignment of project team, vendors and support functions
- ✓ Product standardization
- ✓ Installation standards and procedures
- ✓ Well designed and implemented deployment strategy
- ✓ Monitoring and exception management
- ✓ Operational strategy
- ✓ Leverage infrastructure

Challenges

- First of a kind deployment
- Performance at operational scale
- Knowledge transfer
- Volume of data
- Business transformation
- Stakeholder Management

What's Next?

Smart Meters Are Just The Beginning

Smart Meters



▪ HAN Devices

▪ Smart Appliances

▪ Intelligent Grid

- **Phase 1:**
- **Customer**
- **Insight**



▪ Price control / load control

▪ Electric vehicles

▪ Storage

- **Phase 2:**
- **Customer**
- **Engagement**



- **Phase 3:**
- **Customer**
- **Co-Creator**
- **of Value**

▪ Micro

▪ Advanced Self-Healing Grid

▪ Aggregated Demand Management

▪ 2010

▪ 2011

▪ 2012

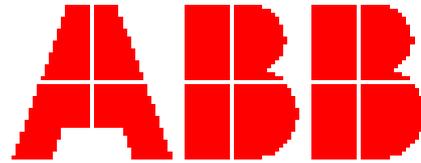
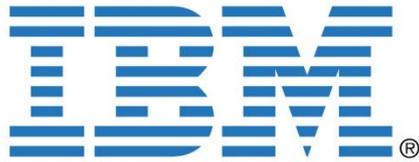
▪ 2013

▪ 2014

▪ 2020

We can't do it alone

energyInSightSM
from **CenterPoint Energy**



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- YanPei Chao – Trilliant

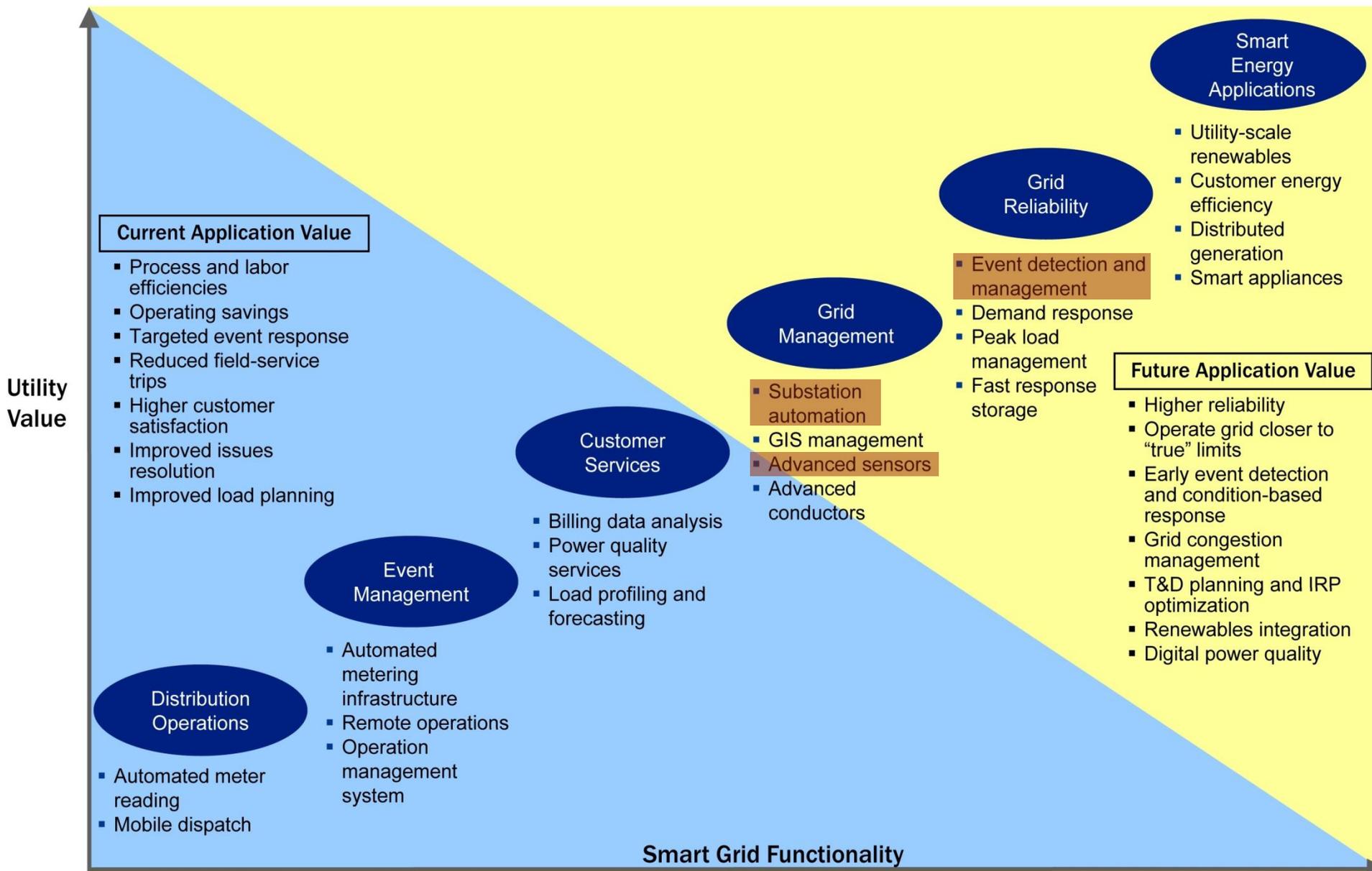
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Steps to identifying and Implementing Smart Grid Applications

- Identify building blocks that currently exist
- Select an application
 - AMI
 - FDIR
 - VVO
- Establish Project team
- Develop project goals
- Gather financial data
- Produce Request for Information
- Assimilate materials to perform pilot
- Measure performance to objectives
- Correct weak elements
- Deploy

A Strategic Focus



Strategic Focus

Basic

Expanded

Enhanced

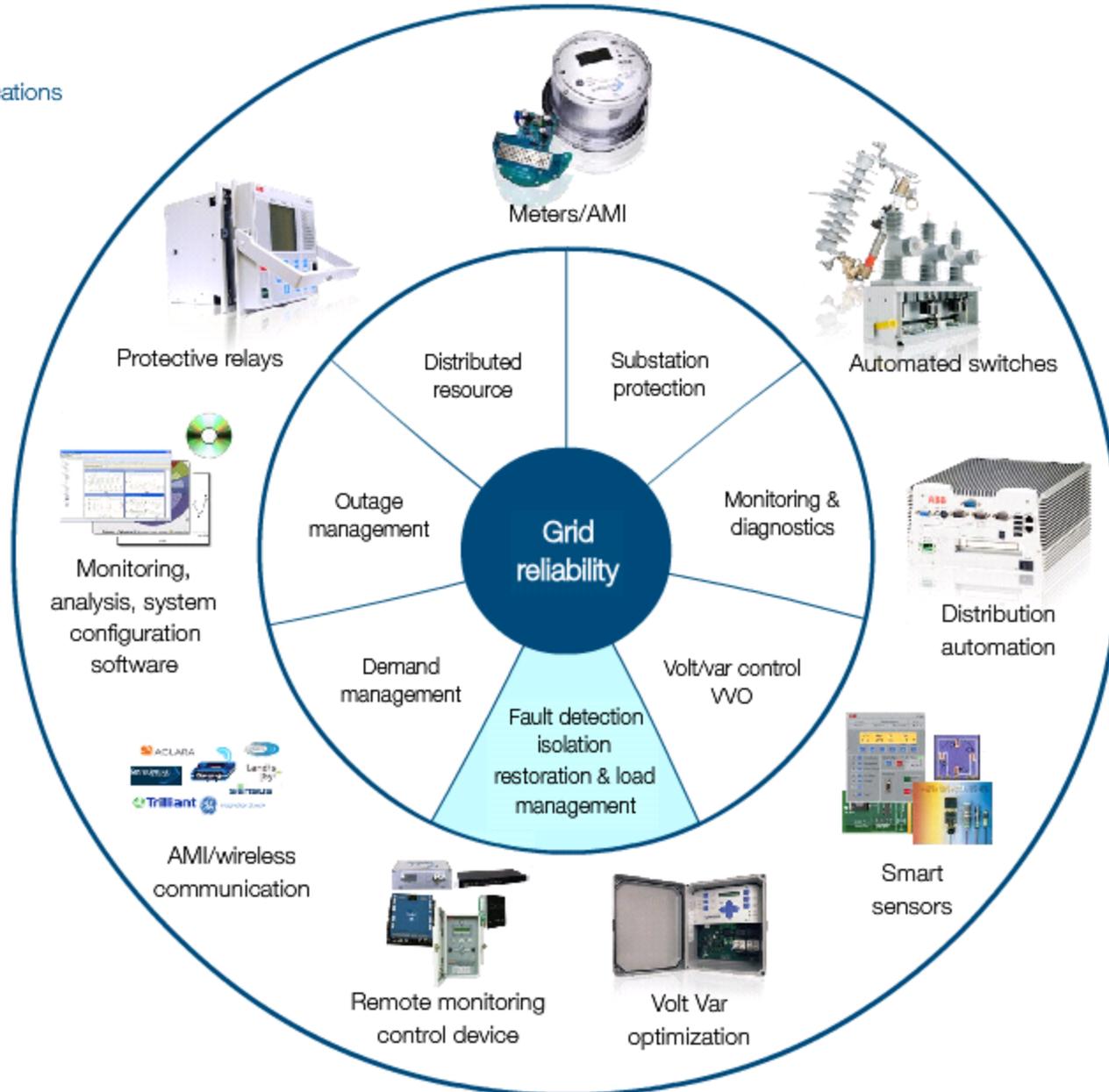
Example of FDIR Objective

•Deliver Application providing...

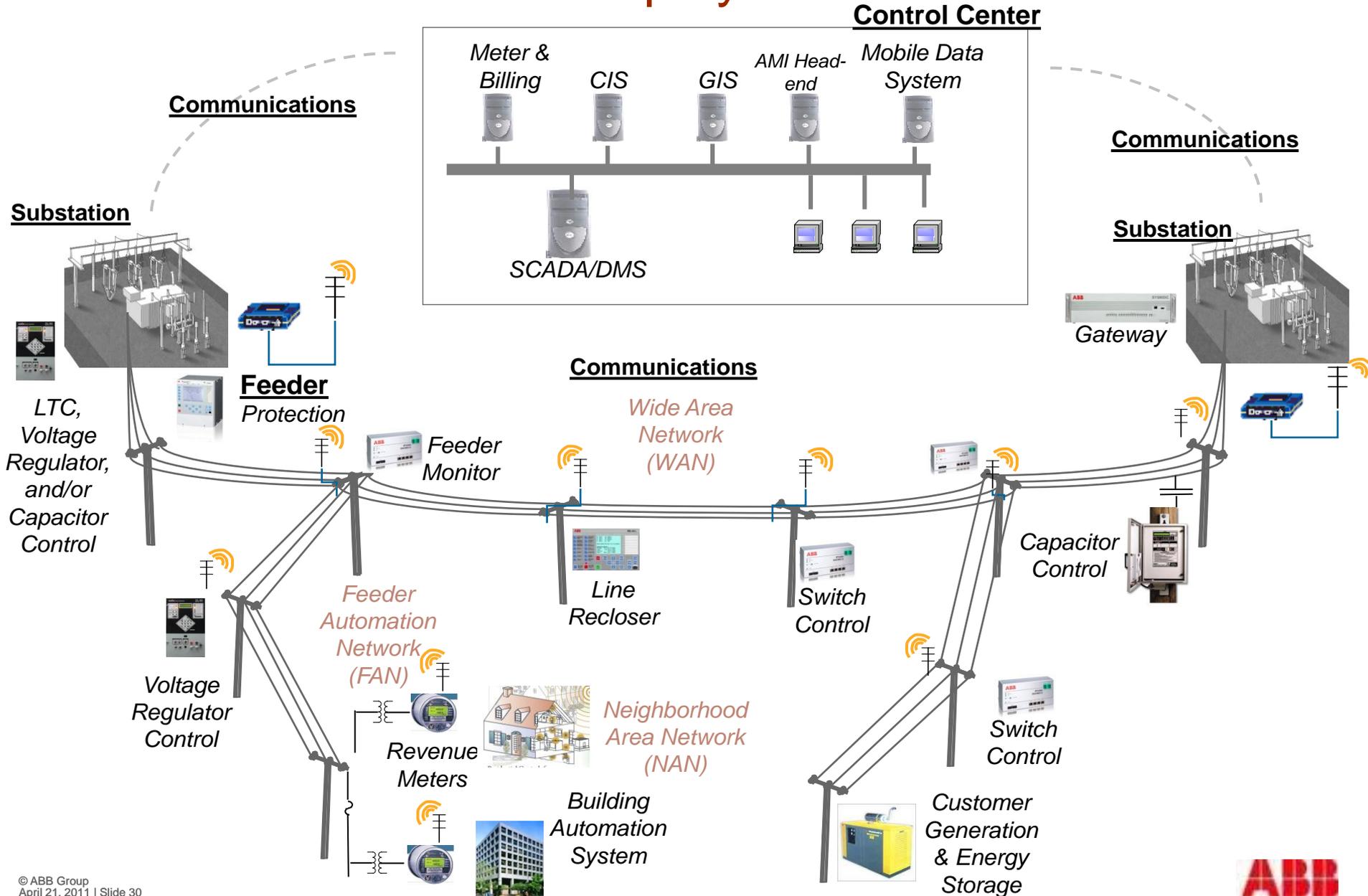
- Safety
- Reliability
- Security from intrusion (NERC/CIP)
- Predictability
- Fully interoperable (DNP/61850)
- Easy deployment
- Expandable

Smart Grid Diagram

- Grid management
- Grid reliability
- Smart energy applications



Distribution Smart Grid Deployment



Power and productivity
for a better world™

