Distribution Control Center

Distribution Management Solutions
Outage Statistics *
- Substations: 55%
- Primary Distribution: 44%
- Secondary Distribution: 1%

Contribution to Reliability Calculations *
- Substations: 87%
- Primary Distribution: 5%
- Secondary Distribution: 8%

* Source: EPRI DA Report 2005
Contribution to Reliability Calculations*

- Substations: 87%
- Primary Distribution: 8%
- Secondary Distribution: 5%

* Source: EPRI DA Report 2005
Siemens EA Vertically Integrated Solutions

Business Analytics
Asset Planning and Optimization

Dynamic Asset “Health”

SmartGrid Control Centers
EMS/DMS/OMS

Advanced Analysis and Management of Intelligent ‘Agents’

Substations
Smart-Substation™

Intelligent Delivery and Condition Management

Hierarchical Control and Optimization (OT Integration)

Grid Reliability

Coordinated Intelligent Field Decisions

Smart Controllable Equipment

Recloser, Switch, Capacitor Bank, DER
## Clear Movement to Coordinated Decentralized Distribution Automation

### Decision/Control Hierarchy

<table>
<thead>
<tr>
<th>Distribution Automation Control Hierarchy</th>
<th>Decision Level</th>
<th>Decision Parameters</th>
<th>Target Configurations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control Center</td>
<td>Distribution Grid Supervision and Delivery Optimization</td>
<td>Substation Tie Capacity, Load and Voltage Analysis, Actual Feeder Connectivity, Energization, Fault</td>
<td>Total Distribution Grid, Substations, Feeders, Devices and All Interconnections</td>
</tr>
<tr>
<td>Super Substation (Groups of Substations)</td>
<td>Interconnected Substation and Feeder Circuits</td>
<td>Substation Tie Capacity, Load and Voltage Analysis, Actual Feeder Connectivity, Energization, Fault</td>
<td>Medium/High Load Substations/Feeders with Significant Substation Interconnections</td>
</tr>
<tr>
<td>Substation</td>
<td>Interconnected Feeder Circuits</td>
<td>Load and Voltage Analysis, Actual Feeder Connectivity, Energization, Fault</td>
<td>Medium/High Load Feeders with Significant Interconnections</td>
</tr>
<tr>
<td>Super Device (Group of Devices)</td>
<td>Feeder Circuit</td>
<td>Implied Feeder Connectivity, Energization, Fault</td>
<td>Low Load Radial Feeders with Few Interconnections</td>
</tr>
<tr>
<td>Individual Device</td>
<td>Feeder Circuit Section</td>
<td>Energization, Fault</td>
<td>Low Load Radial Feeders with Few Interconnections</td>
</tr>
</tbody>
</table>
Advanced DMS Solution

Enterprise Integration

- Business Intelligence
- Maintenance & Work Resource Optimization
- Planning Applications
- Historical Database
- Asset Performance Mgmt. System

Real-Time Control Systems
- Transmission Management System
- Capacitor Control System
- Intelligent Substations & Automation Devices
- Building & Home Energy Management Systems

Advanced Distribution Management System
- Dynamic Operating Model
- Equipment & Connectivity Information Resources
- CUE
- Outage & Mobile Workforce Management
- D-SCADA
- Direct Load Control & Energy Balancing
- Dist. Network Analysis

Customer Care Systems
- Call Handling Systems
- Interactive Voice Response
- Meter Data Management System
- Service Disconnect Notifications

Advanced DMS
- CIM Distribution Extensions, CIP, IEC61850, NIST Interfaces, Management of Intelligent “Agents”, Integrated Direct Load Control, Hierarchical Control, Network Optimization, Fault Location
- Operational Reference Site (Oncor), Integration Services

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Componentized ADMS Solution – Support

Advanced Distribution Management System

User Environment Integration
- Outage & Dispatch User Environment
  - Mobile Work Force Management
  - Outage Management System
  - Navigation Requests
- Load and Voltage Management
  - Control & Analysis User Environment
  - D-SCADA
  - Dist. Network Analysis
  - Distributed Resource Capacity Management

Application Integration
- Mobile Work Force Management
- Outage Management System
- Automated device status changes, l/v switch plan requests, safety tags

Model Integration
- Dynamic Operating Model
  - Dynamic Operating Model Augmented with Control & Analysis Attributes
  - Substation Model, Feeder Electrical Parameters, Load Models
  - Cuts/Jumpers

Data Sources
- Equipment & Connectivity Information Resources
  - Customer Information System
  - Geographic Information System
- Substation, Control & Analysis Information Resources
  - EMS
  - Planning

Feeder Equipment, Connectivity, Customer to Equipment Relationship

Substation Model, Control & Analysis Information Resources

Infrastructure & Cities Sector – Smart Grid Division
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Thank you for your attention!