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Integrating a Distributed Energy Resource Management System into the Distribution Control Room
The New Duke Energy

Electric Customers – 7.1 Million
Gas Customers – 500,000
Market Cap - $49 Billion
Employees – 29,250
Service Territory – 104,000 sq mi
Generation Capacity – 49,600 MW
Transmission Lines – 32,000 mi
Distribution Lines – 250,200 mi
Duke Energy International operates 4,300 MW’s of generation
Envision Energy: Field Asset Deployment

- **Substation**
  - Sherrill's Ford (Marshall), Rankin, and McAlpine Substations
  - Solar PV
  - Energy Storage
  - DMS
  - PMU
  - Weather monitoring
  - DERMS

- **Distribution Circuit**
  - 6 McAlpine circuits
  - 225 line sensors
  - Solar PV
  - Community Energy Storage
  - ~3,000 Comm. Nodes
  - Intelligent Switches
  - DERMS

- **Customer Premise**
  - ~60 homes served by McAlpine circuits
  - Solar PV
  - Home Energy Manager
  - PEV
  - Charging Stations
  - Smart Appliances
  - Demand Response
  - In-home load monitoring
Distributed Energy Resource Management System (DERMS)

- Management and forecasting of DER (DG, storage, DR)
- Integration of network, market, and renewable resource models for next-generation DMS.
- Advanced distribution modeling capability to accurately simulate/model smart grid operations.
- Accurate representation of the distribution system in real- or near-real-time (capture real-time topology).
- Interoperability with and seamless communication between other management systems and data bases used by the utility.
- Simulation of distribution systems based on real-time operational planning to analyze the benefits of smart grid assets.
e-terra distribution

Core Components and DERMS Extensions

**DERMS Extensions**

**DER-capable network applications:**
Powerflow, VVC, SC

**Modular DRBiznet applications:**
DR availability forecast, performance,..

**New applications**
DER forecast, DER schedule optimizer,

**DER Device Model:**
DG, DR, ES, ...

**Model Processing**
Import, export, synchronize, validate

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**Network Outage Management**

**System Simulator**

**Switching Operations**

**Network Operations User Interface**

**Network Operations Model**

**Call Center**

**Workforce Management**

**Customer Model (CIS)**

**Distribution Automation**

**Equipment Models (GIS, Graphical Editors)**

**Automated Metering (AMI)**

**NETWORK VIEW**
Knowledge of DERs
What, Where, DER Capabilities

Network Viewer

Geospatial Viewer
Efficiencies
Operator Focused
Questions

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