SUPervisory control and critical infrastructure systems

SESSION no. 7
Distribution Management Systems (DMS)

- controls automation at distribution level (DA)

Components of DMS

Similar to EMS

- Front End Processor
- Real Time Data Base
- Display/HMI

Maybe Historian - DMS historian, separate historian on power usage for billing
Systems unique to DMS in front end processor

- Outage management system
  - In many cases utilities don't know someone's power is out unless they call
- More capable meters
  - Smart meters
    - Communicate back to DMS
    - Receive price information systems
    - Alert DMS if power goes out
    - Dramatically speeds response time
- Geospatial Information System (GIS)
- A very accurate map of locations of components
- Overlay with outage management
Reliability Indices
- average over set of customers over a year
  - Customer average interruption frequency index (CAIFI)
  - Customer average interruption duration index (CAIDIDI)
  - System level versions (SAIDI, SAIFI)
Customer Information System
- Sending information to customers
  - Price
  - Tracking their usage
- Helping identify inefficiencies
  - Equipment on verge of failure
- Potential issues with confidentiality
  - Data crossing between systems

1. 4
Other AMS components

- Asset management system
  - Tracking behavior of equipment
  - System health
  - Schedule maintenance
  - Defect replacement
  - Life extension
Distribution Automation
- looking at substations & feeder level
- controller in the substation
- controller receives set points from DDS
- voltage regulator
- conservator voltage regulator
- intelligent conservator regulator
- voltage regulators & power consumption decrease
- voltage regulator
- load
- power consumption
- power factor
FD12 - Fault detection, isolation and restoration

- Automating more of the process

Challenges with EMS & DMS

- Communication
- Volume of data
- Software tool data compatibility (esp. DMS)
- GIS data format
- Outage management system
- Distribution automation
- All of the tools have different formats.

- Easy Data Exchange
  - Common Information Model (for Electricity) - CIM
    - Substation Configuration Language (parallel effort)

- Planning tools
- Simulation & modeling
  - to design system
  - to choose operation
IEC - G1970-30

allows a single source
for database in utility

information pull

from

many small vendors

in different forms.

Different vendors' data

in some cases

good

need

adaptation

data.
Variant on DMS microgrids, which can generate local energy and operate as an island. Two main points:

1. Controlled interface at the point of common coupling, it behaves as a source/load on this microgrid.

2. Source microgrid can support interconnection.