Moving Forward with Utility of the Future

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What Is Utility of the Future?

Vision

Transform the operation of our electric power grid by creating a networked infrastructure capable of delivering and receiving information from intelligent devices distributed across our power system, automating components of the distribution system, and leveraging the network for improved operational efficiencies and improved customer satisfaction.

Definition

The Utility of the Future is a networked, digital utility capable of retrieving and delivering information across all of the utility assets. By leveraging information from generation, transmission and distribution, including information from our customers' homes, operations will become more efficient resulting in energy and cost savings.

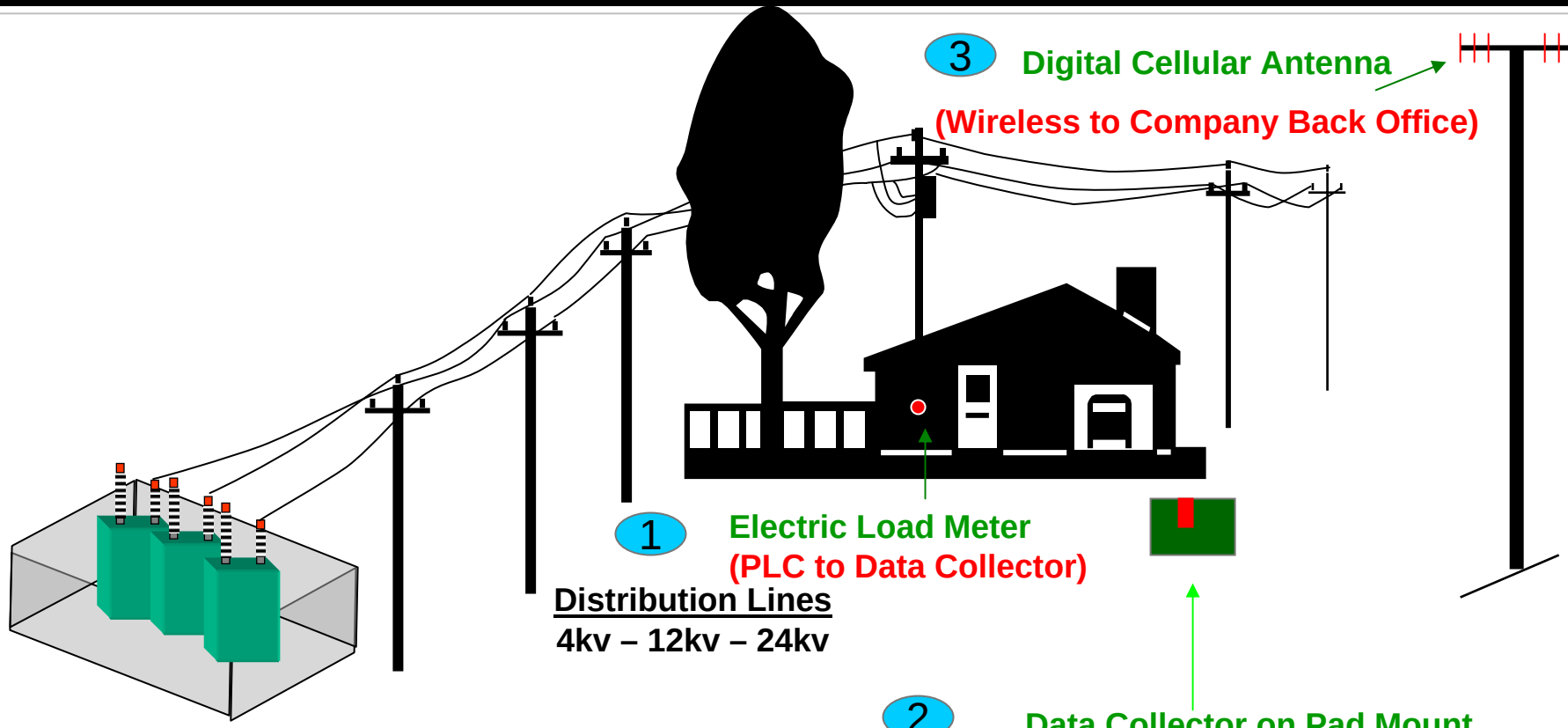
Current Status

- **Duke's efforts to date**
  - Three Deployment Areas –
    - Charlotte, NC -5,000 Echelon Meters with 9,000 more meters and supporting Communications Platform by end of 2008
    - Greenville, SC - 2,500 Echelon Meters and 5,000 GE Meters with supporting Communications Platform by end of 2008
    - Cincinnati, OH – Start in May 2008 to Deploy 50,000 Echelon Meters, 42,000 Gas Meters and supporting Communications Platform for both gas and electric meters
  - Potential installation of another 100,000 Meters and Supporting Communications Platform in 2008
  - We will build out the Duke system in all 5 states in the next 5-6 years

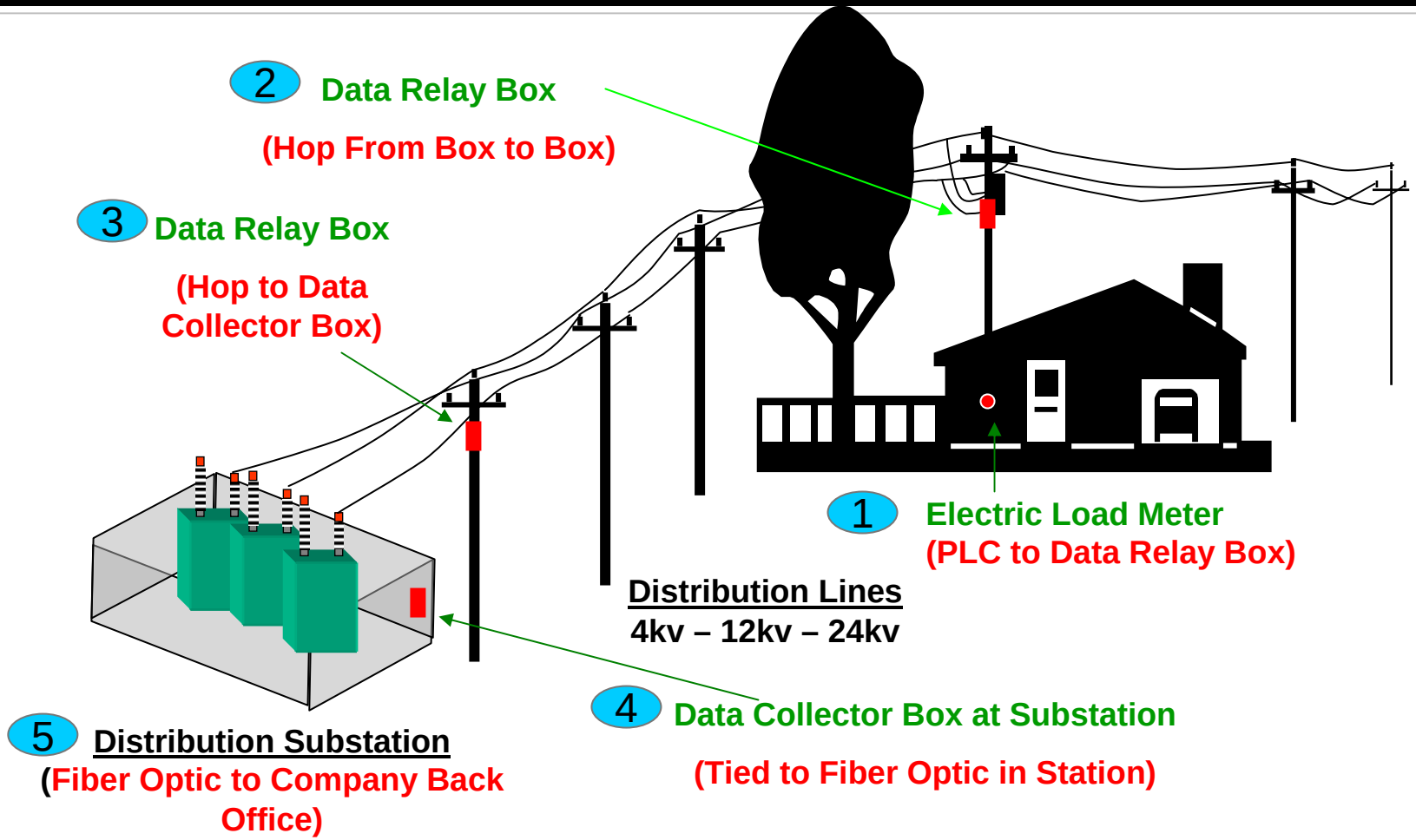
Communication Platform Configurations

- **Digital Cellular Application**
  - PLC from the Meter to a Data Collector box mounted on the transformer pole or pad mount transformer
  - Digital Cellular Modem from the Data Collector box to a Digital Cellular Antenna in the area
  - Digital Cellular from the Antenna as a back haul to Duke's back office
- **Mesh Wireless with Fiber Optic**
  - PLC from Meter to a Data Relay box mounted on a pole
  - RF 'Hop' from Data Relay to Data Relay back to Data Collector at Substation
  - Fiber Optic from Substation to Duke's back office
- **Mesh Wireless with Digital Cellular**
  - PLC from Meter to a Data Relay box mounted on a pole
  - RF 'Hop' from Data Relay to Data Relay back to a pole mounted Data Collector box
  - Digital Cellular from the Data Collector box to the Cellular Antenna in the area
  - Digital Cellular from the Antenna as a back haul to Duke's back office

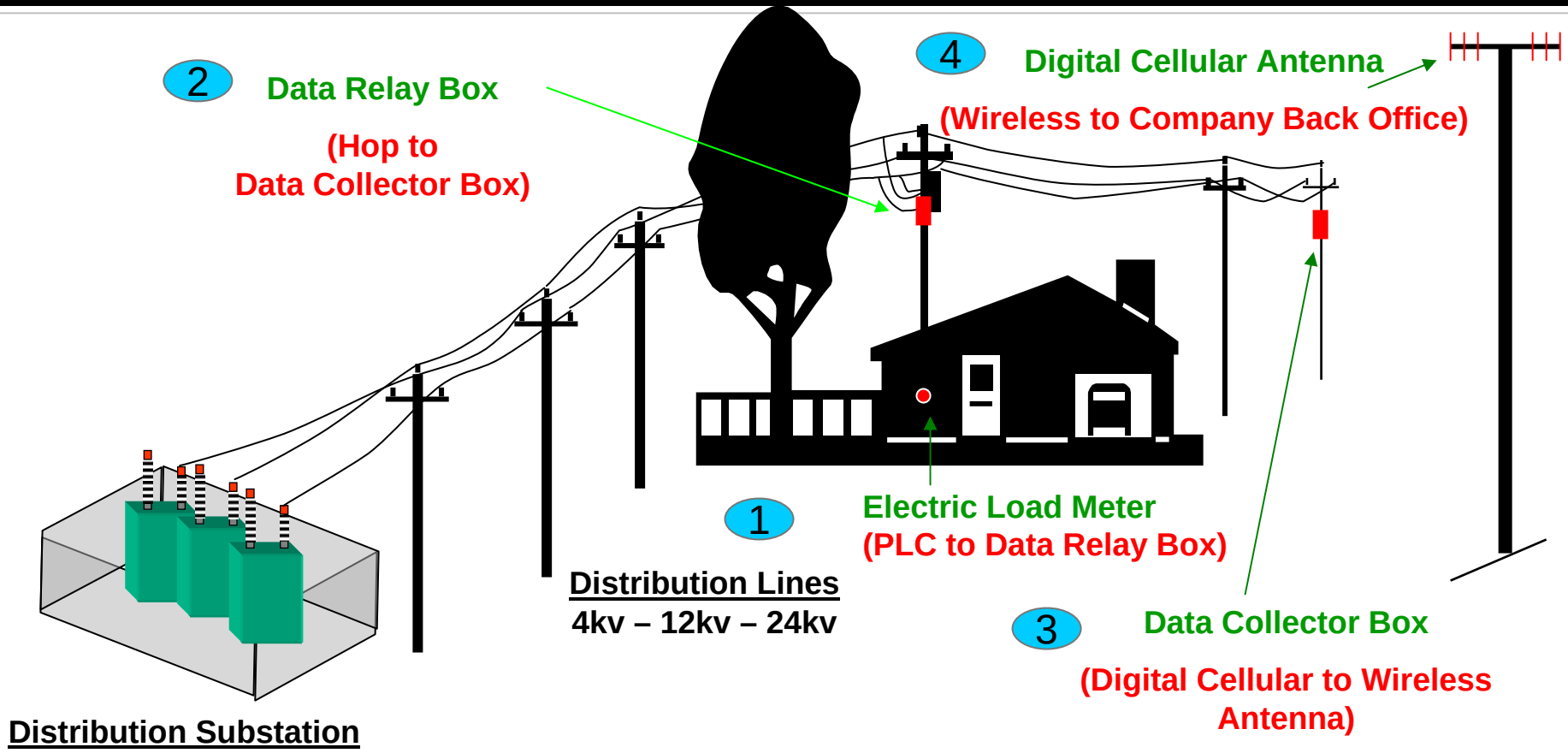
From Meter to Back Office (Digital Cellular)



From Meter to Back Office (Mesh Wireless to Fiber)



From Meter to Back Office (Mesh Wireless & Digital Cellular)



Lessons Learned

- **Build an Open Architecture and IP Based System**
  - You do not have control of Proprietary systems
  - Provides ability to add ‘Plug and play’ devices from multiple vendors
  - Scaleable
  - Distribution devices can be easily moved (sensors and etc)
- **Avoid Multiple Communication Platforms**
  - Work with Vendors to provide products that will work on your back bone communications platform
  - Multiple communications means greater cost (material, head end systems, more stock items, more cost for training, confusion for operations personnel, and etc

Summary

- Design the communications platform system for ‘plug and play’ devices
- Start with small deployments to develop your standards and work out the bugs
- Build partnerships with multiple vendors
- Provide good communications on the front end for customers to understand the purpose and benefit of the network being built