Abstract
Team Forecast's objective is to design a voltage management system for two existing feeders with distributed solar generation. The team must provide recommendations to Benton PUD regarding their system's maximum photovoltaic (PV) generation capacity based on equipment setting changes, demonstrating a firm grasp of IEEE standards, model analysis techniques, inverter technology, and wireless communication.

Background
With increasing popularity in solar generation, it is imperative to be prepared for the impact this addition may have on the distribution system. When dealing with investors, we must consider interests concerning location and size. In order to understand the effects, we will test several locations for potential solar farms.

Building a Model in WindMil
- Convert condensed feeder models from SynerGEE to WindMil
  - Map conductor data
  - Add system equipment with specs
  - Calculate and implement distributed and point loads

Load Forecasting & Generation
- Using metering data, create a solar generation curve and forecast curves for each customer type
  - A single load curve is made for each feeder based on the distribution of different customer types

Simulation Results
- Tested at hours 8, 13, 16, and 21
- Two solar generation locations

Simulation Results
- Tested at hours 8, 13, 16, and 21
- Three solar generation locations

Recommendations
- Max generation was obtained at location 2, with a peak generation size of 1.463 MW.
  - To optimize location one:
    - Adjust capacitor bank (OID 65) to inject less kVAR
    - Operate DG at 97 during low solar hours
  - To optimize location two:
    - Remove Capacitor Banks (OID 57/81) from base case
    - Lowered the regulator target value from 124 to 122 V

Broader Impacts
- Environmental impacts:
  - Potentially visually unappealing
  - Extended loss of sunlight/dependency
  - Land use/habitat loss
  - Hazardous materials used in manufacturing
- System impacts:
  - Protection reconfiguration
  - System harmonics

Future Work
- Zigbee communication
  - Wireless communication protocol to transfer information from IEDs and meters to SCADA

Glossary

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