Project Reference Grid and Scenarios for TE Simulation

Participants: CMU, PNNL, Vanderbilt, and others

Goal: to develop a reference grid design and interoperability requirements to in turn allow testing of different TE approaches using different simulationtools while producing comparable results for a set of agreed on scenarios.

* A reference grid design for different research teams to use different tools to model the same scenarios and get comparable results.
  + End product is a distribution system model, plus markets, plus inputs and outputs defined that together provide a common design that can be implemented in various simulation tools
  + This leads to comparable results between models when given the same inputs, assuming that the control approach is the same.
  + And then allows for testing of different TE approaches with comparable metrics to evaluate the TE approaches on the verified similar modeling platforms.
* A set of scenarios that can be used to exercise different kinds of grid challenges for which TE approaches can be tested.

Plan: develop a series of project steps (slowly adding complexity to scenarios):

1. Project setup:
   1. Develop/agree on a baseline distribution grid topology (substations, feeders, loads, DER) and some market design(s) that can be used to allow comparable results. [note: is there a need for a “simple” design that has less complexity for initial steps, or will some scenarios require more complexity?]
   2. Develop/agree on baseline scenario: ordinary, uneventful day. Define base case load schedules. Agree on control approach (probably common to today without any TE).
   3. Develop/agree on report formats and metrics to evaluate results.

(This should allow individual teams to try out their simulations independently and to compare results)

1. Add some transactive approach and run the baseline scenario to demonstrate a working model
2. Develop set of scenarios which add complexity and exercise the model over a range of grid challenges.
   1. Peak management on transmission grid level.
   2. Distribution system DER voltage control. Adding storage as needed.
   3. Distribution system dynamic instabilities.
   4. Other scenarios as agreed.
3. Document the project and results.