Engineering Services for Microgrids

The Power Systems Engineering team at Schneider Electric offers a wide range of STUDIES and SERVICES to ensure your microgrid is safe and reliable. This list includes the most common studies and services for microgrids; however, depending on the microgrid design and complexity, additional analyses may be recommended. For more information on the team's services please see https://download.schneider-electric.com/files?p_Doc_Ref=1910BR1205 (put this at the bottom of the handout).

Power System Analytical Studies

Short Circuit Analysis - Calculates the fault current levels throughout the power system. The interrupting duties of the devices being analyzed are compared with the available fault currents. *Required for all projects.*

Arc Flash Analysis - Determines arc flash incident energy levels and flash protection boundaries, and apply associated equipment labeling. *Required for all projects.*

Protective Device Time-Current Coordination Analysis - Evaluates the time-current coordination of an electrical system's protective devices, including relays, fuses and circuit breakers, and the equipment to which they are applied. *Required for all projects.*

Load Flow Analysis - Calculates real and reactive power flows, and associated voltage drops, during anticipated system operational configurations. *Required for all projects.*

Stability Analysis - Evaluates the transient performance of power sources when the system is subjected to fault conditions or sudden changes in loading. *Recommended for all projects that have islanding capability.*

Power Quality Harmonic Analysis - Calculates voltage and current distortion due to harmonics, for comparison against the requirements of IEEE std. 519. *Recommended for projects that have >20% inverter-based resources.*

Reliability Analysis - Estimates the probability that a system will be available to supply power, and associated indices. *Recommended for projects with an owner- or legally-defined mission-critical system component.*

Switching Transient Analysis - Simulates the transient currents and voltage occurring during switching events. Evaluation of switching device capability for unusual system conditions and for large capacitor bank applications. *Recommended for projects with a single power factor correction capacitor larger than 10MVAR.*

POWER SYSTEM SERVICES

Microgrid Feasibility Study – A combination of several engineering studies that may include: energy analysis for evaluating/estimating load and sizing on-site generation assets; review of electrical system topology to determine changes required to existing infrastructure to create a microgrid; evaluate system protection and metering; assess existing control systems for compatibility with new microgrid controller; and develop a conceptual plan for implementing electrical system changes. Outputs include 20% design drawing package, preliminary sequence of operations, and a Class 4 project cost estimate (AACE 56R

Table 1). *Recommended for customers to assess technical and financial project feasibility, at a 20% project definition.*

**Often, the cost of feasibility work reduces the scope of the full project electrical engineer of record tasks. The cost of a feasibility study can be seen as a subset of a total project cost.* (TBD if we want to include this).

Electrical Documentation - Preparation of conceptual, pre-construction, construction, and as-built engineering drawings for electrical system. *Recommended for all projects.*

Electrical component sizing & specification - Sizing and specification of switchgear, cables, transformers, switchboards, etc. for code compliance, adequate service to loads, and inclusion of applicable operational feature sets. *Recommended for all projects.*

Power System Grounding Design - Design of grounding infrastructure, and tie-in with existing grounding system infrastructure. *Recommended for all projects.*

Power Distribution System Design - Design of power distribution cabling and/or overhead lines 34.5kV or less. Interconnection of DG resources to existing power system infrastructure and/or to utility interface 34.5kV or below. *Recommended for projects with new distribution system infrastructure.*

Power Generation Design - New installation or upgrade generator connection solutions for permanent and temporary (trailer mounted) generators. Design and commissioning of parallel generators for reliability improvement, peak shaving and islanding applications. *Recommended for projects with generators.*

Renewable Energy Integration Design - Design of Renewable and/or Alternative Resource energy integration into the power system infrastructure. *Recommended for projects with renewable energy resources.*

Interconnection Agreement Application - Technical support for the utility Interconnection Agreement process. *Recommended for grid-tied microgrids.*

Protection System Design - Design of power system protection and associated controls including relay upgrades, protection of generators and utility interties, and reduction of Arc-Flash incident energy. *Recommended for projects with distribution voltages above 1000V, or lower voltages where protective relays are used.*

Some additional PSE marketing points:

Power Systems Engineering at Schneider Electric – National, Experienced, Knowledgeable

- 175+ professional power system engineers provide nationwide coverage.
- Licensed Professional Engineers registered in all 50 states
- Having a power system engineer close by assures familiarity with authorities having jurisdiction, local codes and standards, utility systems and operations.