Grid Storage Solutions

DUKE ENERGY® | CAPER Center for Advanced Power Engineering Research | NC STATE UNIVERSITY | Electrical and Computer Engineering

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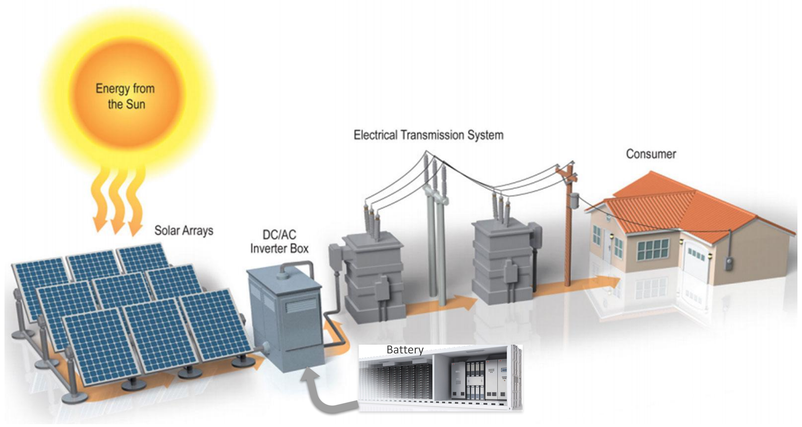
PROBLEM STATEMENT

Cost-effectively design a Battery Energy Storage System (BESS) capable of mitigating Voltage Sag, Flicker and Solar PV Intermittency.

PRODUCT REQUIREMENTS

- Optimally place and size BESS
- Develop BESS Dispatch Scheme
- Determine Net Present Value of incorporating BESS into PV system



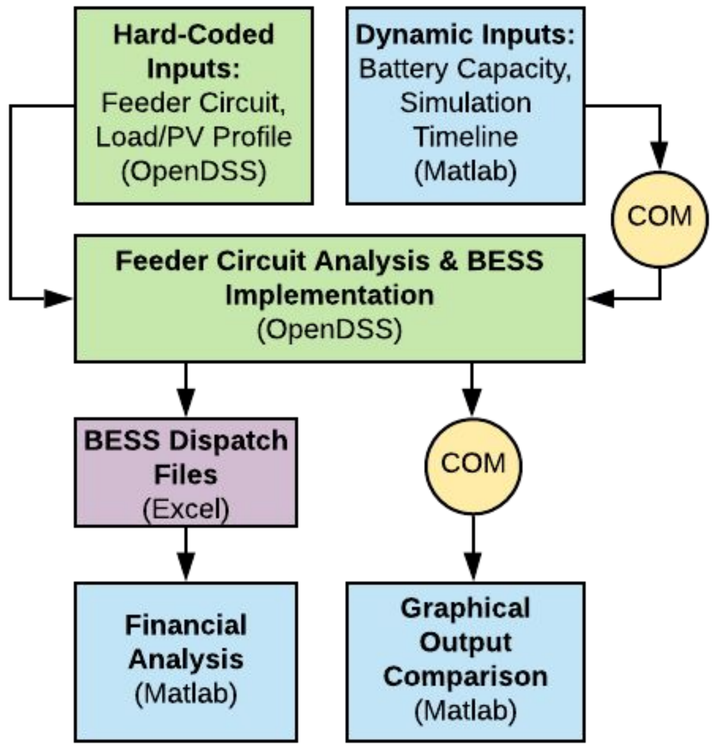
DESIGN CHALLENGES

- Insufficient access to CYME for OpenDSS circuit conversion
- Learning OpenDSS grid modeling
- Managing large amounts of data
- Quantifying cost savings of other potential BESS benefits

SOFTWARE

MATLAB OpenDSS Excel

SYSTEM DIAGRAM



FINAL RECOMMENDATION

- **NOT YET Financially Viable:**
  - Battery Capital Cost is too high for provided revenue
  - Financial rate structure does not align with feeder demand patterns

KEY RESULTS