SunShot
U.S. Department of Energy

SHINES Kickoff Meeting 2016

Microgrid-Integrated Solar-Storage Technology (MISST)

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Introduction

- The proposed technology, referred to as **Microgrid-Integrated Solar-Storage Technology (MISST)**, will address availability and variability issues inherent in the solar photovoltaic (PV) technology by utilizing smart inverters for solar PV/battery storage and working synergistically with other components within a community microgrid

- The proposed MISST project will deploy high-power solar PV and a high-power Battery Energy Storage System (BESS) in the Bronzeville Community Microgrid (BCM), which is designed to be controlled by the DOE-funded microgrid cluster controller and to be connected to the DOE-funded 12 MW Illinois Institute of Technology (IIT) microgrid

- The total installed solar and storage capacity will be the required to achieve instantaneous PV/storage power penetration levels between 20% and 35% of the microgrid's peak load apparent power but higher penetration levels could be achieved.

Objectives

- Demonstrate the capabilities of MISST to accommodate high levels of solar PV generation through the following:
  1. *Smart Inverters*
  2. *Efficient Battery Storage*
  3. *Microgrid Control*

- Demonstrate the merits of solar PV energy coupled with battery energy storage to achieve better economic, resiliency and reliability outcomes in the context of a microgrid

- Enable widespread sustainable deployments of low-cost, flexible, and reliable PV generation in microgrids

Scope of Work

The technical tasks in the proposed three-year project include:

1. Design the integrated solar-storage system
2. Develop the proposed smart inverter technology
3. Enhance the existing microgrid controller
4. Design, procure, and deploy the solar PV system
5. Design, procure, and deploy the BESS
6. Collect data and conduct data analyses

Project Team

Commonwealth Edison (ComEd)

- will lead the overall project and will be responsible for the management and reporting of the project and the oversight of the testing.

Illinois Institute of Technology (IIT)

- will further develop the MISST solution and further develop the Smart Inverter Technology.

University of Denver (DU)

- will lead the data collection during the process and analyzing the test results of the controller operating in the physical microgrid and will advise in the design and test preparation procedure.

National Renewable Energy Laboratory (NREL)

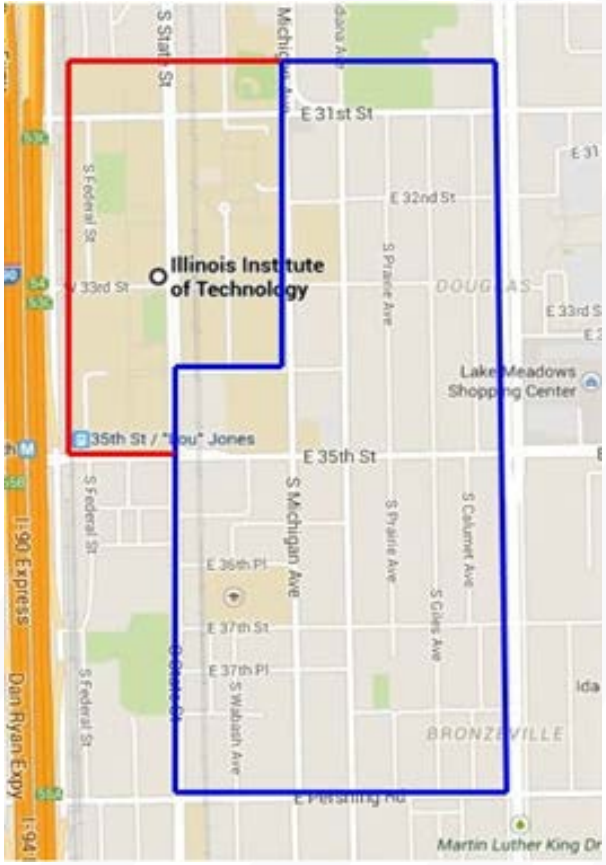
- will provide analysis of the solution to be used including a Cost Analysis of the proposed mitigation measures.

Argonne National Laboratory (ANL)

- will enhance the Microgrid Master Controller as well as providing analysis of the solution to be used.

Bronzeville Community Microgrid (BCM)

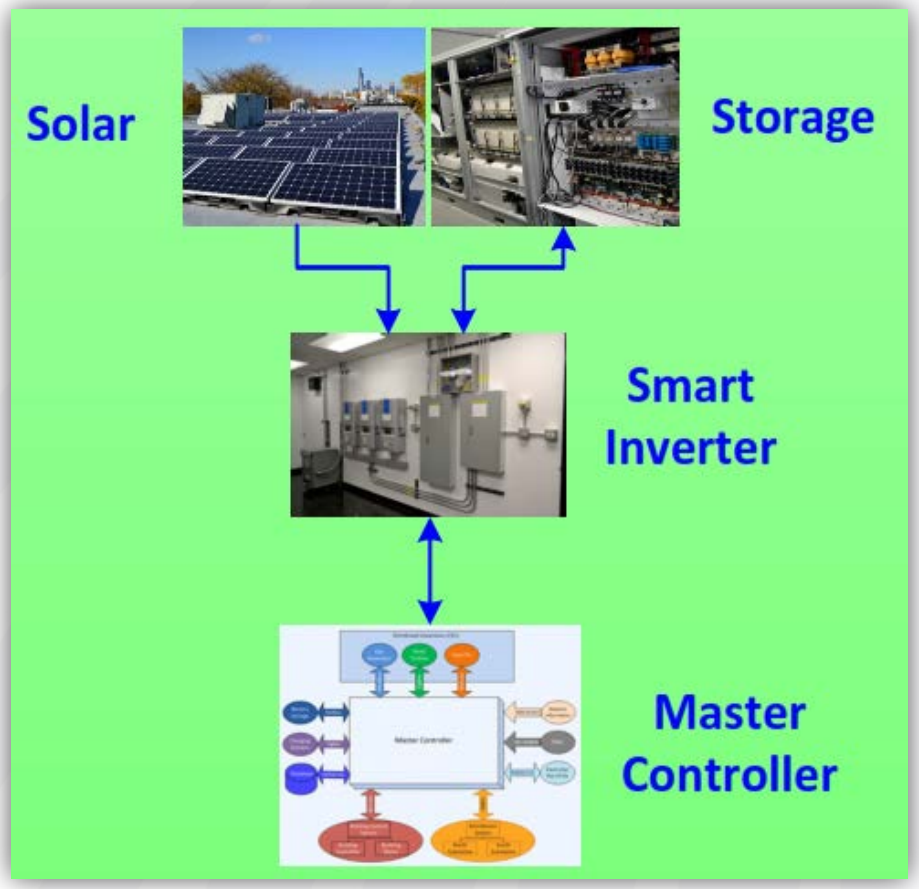
- The proposed Bronzeville footprint for the microgrid pilot is part of an urban electric circuit that has existed for decades. The Bronzeville area is supplied by 9 feeders from 4 different substations.



Summary

The MISST solution will have the following features:

1. Be grid-connected
2. Consist of solar PV plant and energy storage
3. Utilize smart inverters
4. Be capable of operating in conjunction with smart loads
5. Enable demand response
6. Incorporate solar and load forecasting into decisions
7. Be interoperable internally and externally using standard protocols



Q&A