EPB Grid Edge Technologies Storage and Microgrids

August 2024



Agenda

- What are EPB's Generation Use Cases?
- How did we get into the Generation Business?
- What have we done so far?
- What's next?
- Research Needs



Why Energy Storage?

- Reliability/Resiliency
 - Critical Facilities
 - Radial Circuits
- Demand Savings
 - Wholesale Demand Charge from TVA
 - Summer: \$11.81/kW
 - Non-Summer: \$10.82/kW
- TVA Capacity
- Environmentally Friendly



EPB Learning Objectives

- Optimize MG sizing for flexible boundary MG's on the distribution system
- Continue to work on system protection design for MG's with inverter based generation
- Islanded Operations
- Develop standard processes and associated systems for
 - Operating the DER's for peak shaving
 - Initiating the operation of islanded MG's as a final step in distribution automation
- Identify opportunities for networked MG's



Distribution Automation

1200 Intellirupter Switches



- 750 kW, 150 Customers between Switches
- All switches communicate via EPB Fiber Optic System



Airport MG - Solar PV



Existing Solar

- 2.6 MW Solar PV
- Owned by Airport
- Interconnection to EPB

- Projected funded by ARPA-E
- UT-Knoxville is project lead



Airport Microgrid



EPB Batteries

- Two 280 kW / 255 kwh
- Controlled thru SCADA
- Interconnection to EPB

• Batteries used for demand reduction each month



Airport Microgrid



- Utilize Automated Switches, AMI Data from EPB
- MG Controller Integrated with EPB SCADA
- Completed testing in 2021





- 1.25 MW / 2.5 MWh
- Completed testing in 2022



Chatt State Battery

- 4 MW / 8 MWh battery
- Project Cost
 - EPB's Project Cost (battery & interconnect) = \$2.9M
- Business Case
 - Cost for EPB = \$2.9M
 - Annual Demand Savings = \$550k
 - Simple Rate of Return = 5 years
 - NPV (4%, 20 years) = \$3.5M
- This project was demand reduction project



- Utilized vacant substation site
- Shorter duration than MG sites



Sale Creek Microgrid



Automated Switch
Energy Storage

- Edge of EPB Service Territory
- No Ties to support restoration
- Historically poor reliability
- 2.5 MW / 10 MWh



Bakewell Microgrid



- Edge of EPB Service Territory
- No Ties to support restoration
- Historically poor reliability
- 2.5 MW / 10 MWh



EPB Storage Status

In Service							
Location	DER Asset	Capacity (kW AC)	Energy (kWh)	Available for Demand Reduction	Notes		
EPB Community Solar	Battery	1250	2500	Yes	Commissiioned Apr 2022		
Chattanooga Airport	Battery	560	510	Yes	Commissioned Jun 2018		
Amnicola Police / Fire Microgrid	Battery	500	1100	Yes	Commissioned Mar 2022		
Chatt St Subst	Battery	4020	8040	Yes	Commissioned Jun 2022		
Total		6330					

In Progress						
Location	DER Asset	Capacity (kW AC)	Energy (kWh)			
SAL202	Battery	2530	10120			
BAK202	Battery	2500	10000			
HAW201 - Trade School	Battery	1000	2000			
Total		6030				



What's Next

- 6 Remote Locations for Storage/Microgrids
- Future Plans
 - Large Scale Storage
 - Targeted Microgrids for Resiliency



Research/Product Needs

- Flexible Boundary Functionality in MG Controller
- Easily Configurable MG Controller vs. Custom Code
- Integration between FLISR and MG Controller
- Tiered coordination of Networked MG's
- Commercialization of this functionality!!!

