Flexible Boundary Design for a Microgrid Powered by Landfill Solar Photovoltaic and Battery Storage

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**Background**

- Repurposing closed landfills for Solar PV and Battery Microgrids allows for use of lands with limited re-use opportunities.
- Improves resiliency, reliability and energy justice for disadvantage communities.
- Flexible boundaries allow the microgrid to expand and shrink based on the available power.
- It involves choosing the right intellirupter combination to open or close to ensure active and reactive power balance.
- This flexible boundary algorithm was designed for a proposed microgrid topology in Chattanooga, Tennessee.

**Microgrid Feeder Topology and Description**

- The Microgrid takes advantage of an existing radial feeder topology segmented by intellirupters into load sections.
- The Intellirupters are from SW1 to SW15, BRK is a circuit breaker, and the Load Sections are from Load section 1 to Load section 8.
- Landfill Solar PV and Battery Connected at SW15

**Flexible Boundary Search Algorithm**

- The flexible boundary algorithm was designed for this specific case study topology of the proposed microgrid in Chattanooga, and assumes a single source connection point.
- The algorithm selects the optimal intellirupter combination to open or close to achieve active and reactive power balance.

**Results**

- The connected load sections: Load section 2,3,4,6,7,8.

**Conclusion and Future Work**

- The flexible boundary logic was developed using Matlab.
- For future work, the microgrid with flexible boundary would be simulated in simulink to observe its operation in steady-state.