

Sandia National Laboratories

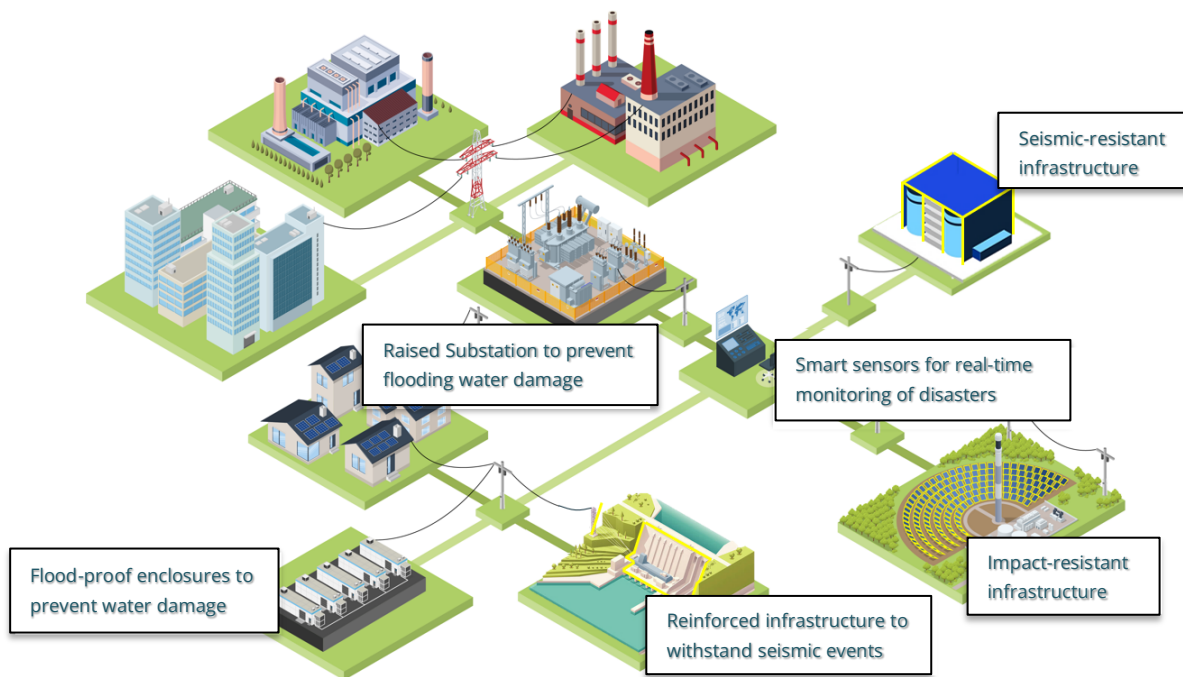
Handout 3: Upgrading Microgrid Infrastructure

Jack D. Flicker, Rachid Darbali-Zamora, and Jeewon Choi



Upgrading Microgrid Infrastructure for Disasters

To operate in extreme conditions, microgrid components must be hardened. Key improvements include:



Microgrid Implementing Several Hardening Techniques.

Generation Assets (SMR, CHP, Hydro)

- ✓ Impact-resistant combined heat & power (CHP) infrastructure
- ✓ Reinforced hydroelectric plant infrastructure to withstand seismic events
- ✓ Seismic-resistant SMR infrastructure

Energy Storage Systems (Batteries & Grid Storage)

- ✓ Flood-proof battery enclosures to prevent water damage
- ✓ Fire-resistant materials to withstand wildfires & overheating
- ✓ Advanced cooling systems for extreme heat resilience

Control & Communication Systems

- ✓ Wireless & satellite backup to prevent loss of communication
- ✓ Smart sensors for real-time monitoring of disasters
- ✓ Predictive analytics to forecast power demand & generation

Hardware Infrastructure (Transformers, Switchgears, Breakers)

- ✓ Weather-resistant transformers to handle extreme temperatures
- ✓ Lightning-proof breakers & surge protection
- ✓ Earthquake-resistant circuit disconnects for stability

