

DEVELOPING LOCAL GOVERNMENT MICROGRIDS

TECHNOLOGY CHALLENGES



The technology behind developing and managing microgrids and their interfaces with offtakers and EDCs is evolving at a rate where technology is moving ahead of the regulatory community's capacity to absorb and integrate existing policies and regulations.

THE ONLY CERTAINTY IS CHANGE

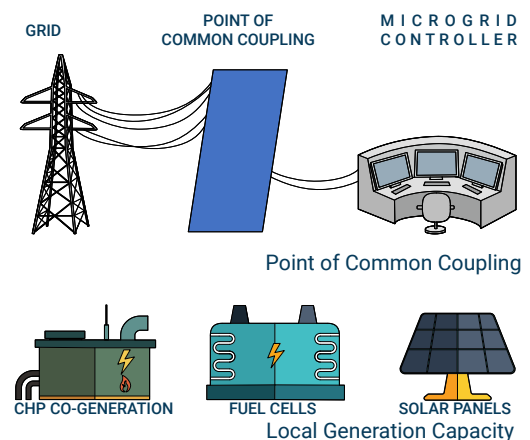
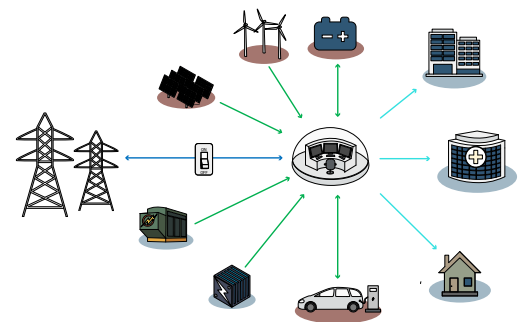
These changes also affect the larger energy ecosystem that includes wholesale and retail markets, regional supply, data management, distribution grid management, climate policy, energy efficiency (EE), and the technical/engineering aspects of managing electricity.

Once a microgrid is installed and operating, tech-driven disruption can affect its operation, cost structure, and energy supply contract. These changes include:

- Control technology at the point of common coupling (of the microgrid and the EDC) must continue to work seamlessly over time, even as other smart grid enhancements occur.

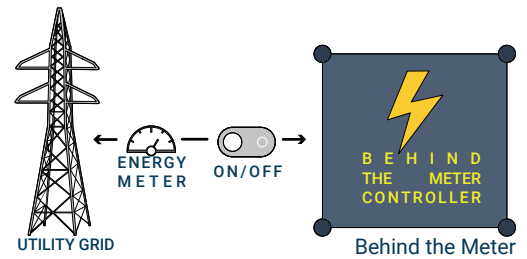
- Efficiency improvements in local generation capacity (CHP/Cogeneration, fuel cells, PV panels) may change the relative economics of the microgrid to alternatives.

- As microgrids and DER grow, they require new technical and digital tools to integrate and regulate supply on the EDC distribution grid.



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- Improved behind-the-meter microgrid and building management controls to manage the usage of the electricity generated can improve efficiency and reduce demand.



- Lower battery storage costs, charging characteristics, and improved battery efficiency can also disrupt cost projections and operational and upgrade plans.



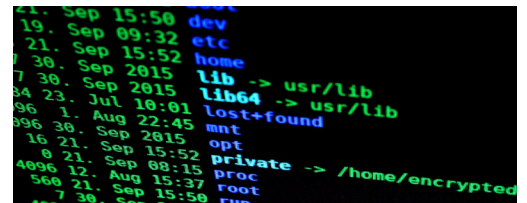
Battery Storage

- The trend toward increasing electrification of buildings and transportation along with improved EE practices adds uncertainty to capacity and distribution planning.



Electrification

- Collecting, storing, managing, and using the massive quantities of data generated by digital technology has technology management implications, drives market decisions, and raises related social policy issues, such as personal privacy concerns.



Data Management

Innovative microgrid designs may include components that have not yet been used in a wide array of commercial settings or may include combinations of resources for which risk understanding is still limited. Equipment suppliers may cover some of this risk with warranties. These elements can have the effect of reducing energy needs and supply costs to the offtaker. They can also result in increased supply needs that may affect ongoing maintenance and refurbishment costs.

Risks may be lower if the use case requires proven, off-the-shelf technology, but can sacrifice improved efficiency and cost savings.

