PRELIMINARY TECHNOLOGY ASSESSMENT – AUGUST 2024

Modular Vertically Integrated Microgrid

Technology Overview

A power grid is a vast network of electricity generation, storage, and distribution that services homes and businesses. A microgrid does the same, but is localized and at a smaller scale. Microgrids increase efficiency by generating power close to where it will be used with added resiliency because they can operate autonomously. Microgrids can still function when the whole grid is disrupted.

Modular vertically integrated microgrids address some of the challenges that have prohibited widespread adoption of microgrid infrastructure. Unlike most microgrids that are custom-designed for the site, which is expensive, labor-intensive, and inhibits scalability, modular vertically integrated microgrids are delivered in boxes that consolidate necessary hardware. The number of modules can be scaled according to power needs with various layouts to suit site-specific conditions. Vertical integration simplifies hardware replacement as technology advances. AI-driven software simplifies energy management and optimizes performance. Algorithms track real-time variables, like changing weather conditions and power needs, to modify the microgrid's operations and output.

Why is GSA Interested?

Modular vertically integrated microgrids are easy to install and provide a scalable solution to power distribution. The vendor estimates reduced installation costs and time by 60–80% compared to other microgrid systems. Scalability is especially beneficial for charging EV fleets. As a fleet grows and electricity needs increase, operations can be expanded. Software-based management integrates with existing facilities and optimizes load shifting to reduce energy costs. The vendor estimates deployed systems have an average uptime greater than 99%.

Deployment Potential

Modular vertically integrated microgrids are contained in weatherproof enclosures and can be implemented in any climate condition. The site should be large enough to install a local power generation source and have ample space to house a battery energy storage system. The vendor estimates modular vertically integrated microgrids to have a smaller footprint than other microgrid solutions.

Green Proving Ground (GPG), in collaboration with the U.S. Department of Energy, is evaluating the real-world performance of modular plug-and-play microgrids in federally owned buildings within GSA's inventory. The technology will be provided by Gridscape Solutions and coordinated with other ongoing evaluations of this technology.