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A practical guide for decision-makers and project developers on the available energy storage solutions and their successful applications in the context of islands communities. The report also includes various best practice cases and different scenarios and strategies. It is developed as part of the IRENA Renewables in Islands Initiative (IRII).

Johnson Controls has been awarded a \$40 million energy conservation contract that includes a remote microgrid on the Marshall Islands, designed to boost resiliency and cut diesel use for the U.S. Army.

A partnership of Johnson Controls and the U.S. Army Engineering and Support Center, the multi-stage project is underway at the U.S. Army Garrison Kwajalein (USAG-KA) on Meck Island, part of the Kwajalein Atoll in the Ralik Chain.

The microgrid consists of an island-wide, 2.4-MW solar photovoltaic (PV) system and a 2 MW/3-MWh lithium-ion battery storage system expected to reduce diesel consumption by 55 percent, said Greg Downes, vice president, Johnson Controls Federal Systems.

There are many islands in the US Army Garrison Kwajalein Atoll (USAG-KA), and each island has its own generating system. The islands are not part of a larger utility-grade generation system, but rather, each island (including Kwajalein, Roi-Namur, Meck, and others) has its own independent utility, said Downes. On Meck Island, the power comes from diesel generators. Power is distributed to the military facilities through government-owned and operated underground power lines and transformers.

"The Solar PV plus storage element of our solution for USAG-KA at Meck Island is built to be an integrated generation asset that serves the existing electrical distribution grid on the island," he said. "Instead of tying into a master meter that comes onto Meck from an offsite utility, our system actually ties into the power plant to offset its usage of diesel and diesel generator run time."

The system includes an integrated and distributed microgrid control network. This will control the solar PV, energy storage, and the existing diesel generator assets by deciding which asset is most efficient and reliable at any given point in time.

"The new 2.4-MW solar PV system and 2 MW/3-MWh energy storage system was designed to minimize the runtime of the diesel generator assets for operational and energy related benefits," Downes said.

The project began in September 2016 when Johnson Controls received a notice to proceed with the microgrid as part of a broader energy-saving contract.



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"We went through a development process with the U.S. Army Corps of Engineers support center," Downes said. "That process vetted a number of ideas and potential solutions to bring energy security and energy and operational savings to the garrison. The process led to an award for the first phase of the multi-phase project."

The second and third phases will focus on other islands and may include small wind, solar and storage applications.

"We're trying to understand the challenges of microgrids on remote islands in the middle of the Pacific. There's logistical complexity," he said.

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