

# POWER DENSE CONVERTER ELECTRONICS FOR GRID TIED ENERGY STORAGE CONTAINERS

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Create will develop an innovative electrical energy storage and power generation technology that will reduce equipment cost and enable the integration of renewable energy sources such as wind and solar.

## Introduction

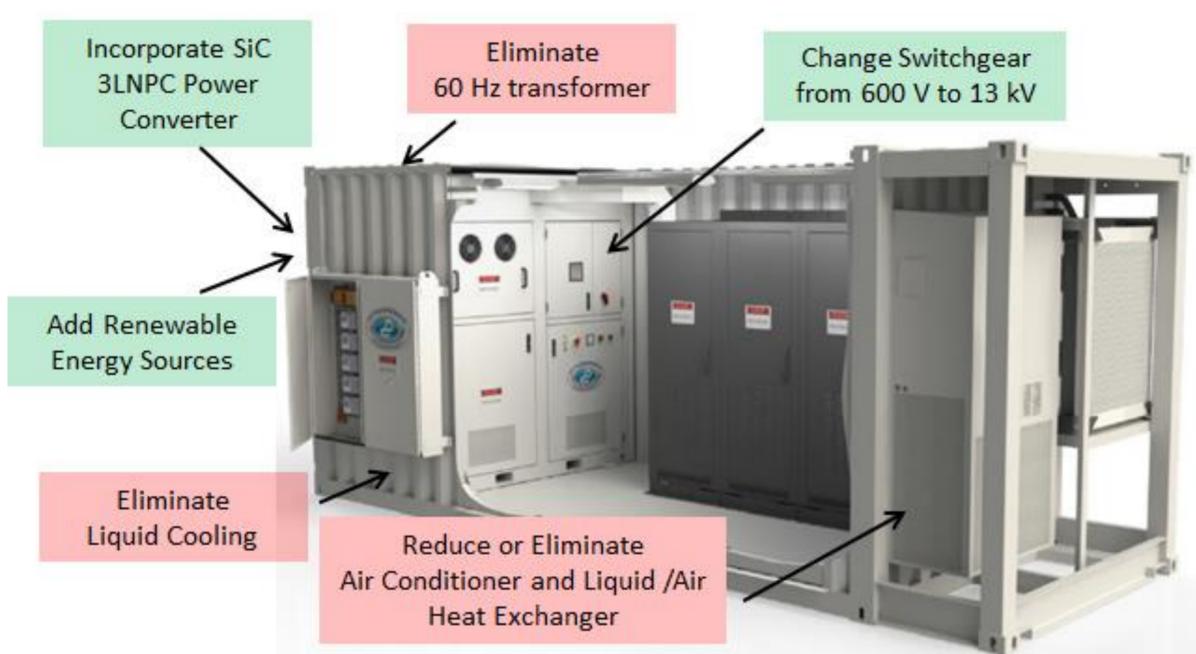
Increased electricity demand amid infrastructure development restrictions continues to foster innovation for distributed generation. However, advances in power converter efficiency, power density, and flexibility are required to enable competitive distributed generation methods to be realized.

## Methods

Wide Band Gap semiconductor devices offer benefits of increased efficiency, higher power density, and simplified thermal management at utility power levels. We aim to use these emerging devices to greatly improve the value proposition of energy storage based distributed generation by increasing power density and eliminating 60 Hz magnetics as well as liquid cooling.

Create is in the process of developing a full-scale, containerized grid tie energy storage system with greater than twice the power density over existing converters. This technology will find immediate commercial application to distributed electrical power generation equipment. Features include elimination of 60 Hz magnetics and allowance for interface with renewable energy sources, which provide benefits of reduced cost, greater revenue potential, increased source flexibility, and improved efficiency.

## Create's Grid Tied Generation Unit



Existing IPS-500 Solar Storage System
• 500 kW, 250 kW-hr
• 23 x 8 x 10 ft.
• Includes AC & DC switchgear
• Optional: solar recombiner (600 – 1000 V PV arrays)
• Optional: 4 x 2 x 4 ft. 480:480 transformer
• 3 x 7 x 10 ft. 250 kW-hr Li-ion battery
• Ramp rate control, frequency regulation, VAR support
• Seamless dynamic transfer

## Enabling Technologies



SiC Power Modules



Battery Manager

Features, Advantages, and Benefits		
Technical Feature	Competitive Advantage	Customer Benefit
• SiC based inverter	• Higher operating temperature and voltage than Si	• Greater power density
• Transformerless, convection cooling	• Smaller size, simpler design	• Lower investment and operating costs
• 12.47 kV, > 1 MW+	• Higher voltage, more power	• Greater revenue
• Renewables interface	• Enables solar, wind	• Greater source flexibility

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