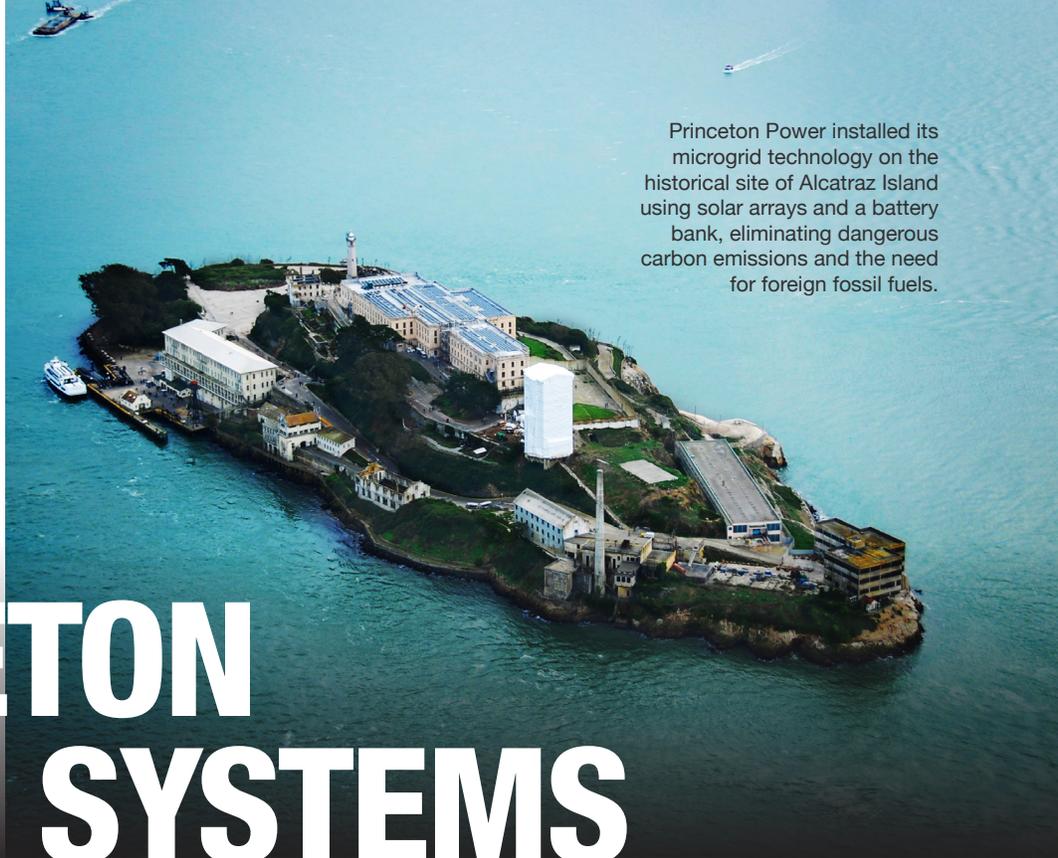




SBIR/STTR SUCCESS



Princeton Power installed its microgrid technology on the historical site of Alcatraz Island using solar arrays and a battery bank, eliminating dangerous carbon emissions and the need for foreign fossil fuels.

PRINCETON POWER SYSTEMS

With all of the talk of renewable energy going on in the media, it's impossible to avoid the terms "microgrids" and "energy storage." As ubiquitous as these concepts may be, very few companies have the wherewithal, knowledge, and talent to impact positive and proactive change. Enter Princeton Power Systems – a local New Jersey company that creates products and software for energy management, microgrid operations, and electric vehicle charging. What once started as a four-person team has flourished into a regional and soon-to-be worldwide powerhouse, whose beginnings were marked with a Phase I SBIR award through the Navy.

PHASE III SUCCESS

Over \$15 million in 2014 - \$40 million total in phase III revenue and commercial sales

NOTABLE ACHIEVEMENT

Grew from 4 employees to 50. Very loyal to New Jersey local economy, purchasing over 50,000 sq. ft. of production space in the Princeton area and employing local personnel.

AGENCIES

DOD (NAVY), DOE

PRINCETON POWER SYSTEMS

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To understand the importance of microgrids, one first must understand its logistics. Electricity is dispersed to homes and businesses using a typical grid that connects buildings to central power sources. This interconnectedness is the reason why when there is an outage, everybody in the area is affected. A microgrid, on the other hand, while still tied to the traditional grid, can operate on its own using local energy generation in times of crisis like storms or power outages.

Princeton Power Systems takes this technology one step further. The company's products can run with and without an electric grid, and are therefore safe from power outages. Users may "disconnect" from the grid using a combination of solar arrays and batteries. Besides being safe from storms and outages, microgrids have a host of other benefits. Take for instance Alcatraz, the once-infamous prison turned historical site. Alcatraz was emitting dangerous carbon emissions all around the San Francisco Bay area, in addition to running up large monthly electricity bills. Key government personnel wanted to change that, so in 2011 they reached out to Princeton Power Systems to install a microgrid using solar arrays and battery banks. Today, Alcatraz Island runs almost entirely on renewable energy, saving taxpayers 80% on fuel use, and significantly reducing the need for fossil fuels. This catapulted Princeton Power Systems into the limelight, and soon many major organizations and prime contractors, all of which saw the huge potential power in the commercial marketplace, were contacting the company.

Just two years prior, Princeton Power Systems began its journey in the SBIR program, and had received a Phase I and II SBIR award from NAVSEA to develop a system for future all-electric warships. The goal was for these ships to have a greater demand for compact power conversion equipment, high conversion efficiency, and electrical system

flexibility and reliability, while increasing the power density of power converters without compromising functional performance. AC-link power conversion technology and high-voltage silicon carbide switches allowed for a small, more efficient and more flexible product that provided simplified ship design, improved ship efficiency, and improved electrical system control. While the company eventually sold these units to Northrup Grumman, the core of this technology has stayed with them every step of the way.

“Our products consist of digital controllers and software that are adaptable to the application,” explains Co-Founder and Chief Strategy Officer Darren Hammell. “The control board was developed partially through the SBIR program and that control board is used in all of our product lines; this key piece we could not have developed without the help of the SBIR program.”

A simultaneous Phase I SBIR with the Department of Energy helped the company to develop prototypes, and formed the basis for its commercial product line. “Through this particular grant, we found several commercial customers for the product, and NREL testing facilities purchased the equipment,” added Hammell.

Princeton Power Systems continues to work in three areas – microgrid technology, energy storage systems, and electric vehicle charging. Since all of its manufacturing is done in-house, the company is working on efficiently building the systems and shipping them out the door. Princeton Power Systems is currently producing large battery systems as part of its energy storage unit that supplements its microgrid technology. These stationary battery banks can be tied up directly to the electric grid and provide back up power for local businesses. The batteries can also be dispatched to provide services to the electric utility companies and grid operators by correcting irregularities and managing peak demand. One battery system can provide a number of different services, leveraging recent advances in battery technology. For instance with lithium ion or advanced batteries – as performance continues to go up, and prices come down, there has been increasing demand for stationary energy storage. Princeton Power Systems’ technology provides the interface between those batteries and the electric grid.

While most projects are domestic – largely taking place on the West Coast, Texas, and the North East – about 20% of Princeton’s business is happening internationally. Hammell just recently came back from Cuba, where he is helping the country achieve its goals of developing renewable energy sources and reducing its reliance on imported fuels. Princeton Power is also working with the Haitian Government to tap into the country’s massive solar energy potential. After the devastation of the 2010 Earthquake that severely damaged Haiti’s infrastructure and left two thirds of the country without access to electricity, Haiti is looking to move toward the expansion of renewables and distributed generation.

In the upcoming area of electric vehicle charging, Princeton Power Systems is working on new standards for car chargers, including moving toward a universal “fast” car charger that is compatible with all electric cars. In addition to a partnership with the City of San Diego to install car chargers in the parking lots of the San Diego Zoo, Princeton Power Systems was chosen to design the first fleet of bidirectional electric vehicle charging stations at the Los Angeles Air Force Base (LAAFB). The company answered this challenge by developing thirteen CHAdeMO-based charging stations using its patented UL-Certified bi-directional multi-port inverter – the GTIB-30. This was a milestone in competing in the electrical utility ancillary service market and allowed Princeton Power Systems to provide energy-related services to Department of Defense (DOD) facilities. It is intended that this will help drive cost reduction and the revenue will partially offset EV fleet lease expense with the potential to improve energy security on base. Just recently, the pilot program was extended to Fort Hood and Andrews Air Force Base.

It’s no wonder that 2014 was a banner year for Princeton Power Systems, and the company recorded its highest revenue to date – over \$15 million. Although both domestic and international demand for its coveted technologies is soaring each month, the company is proud to have its roots in the New Jersey soil. Princeton Power Systems is committed to bolstering and supporting the local economy from which it grew.



Princeton Power’s bidirectional electric vehicle charging stations installed at the Los Angeles Air Force Base