

[Eric Wesoff](#): October 6, 2011

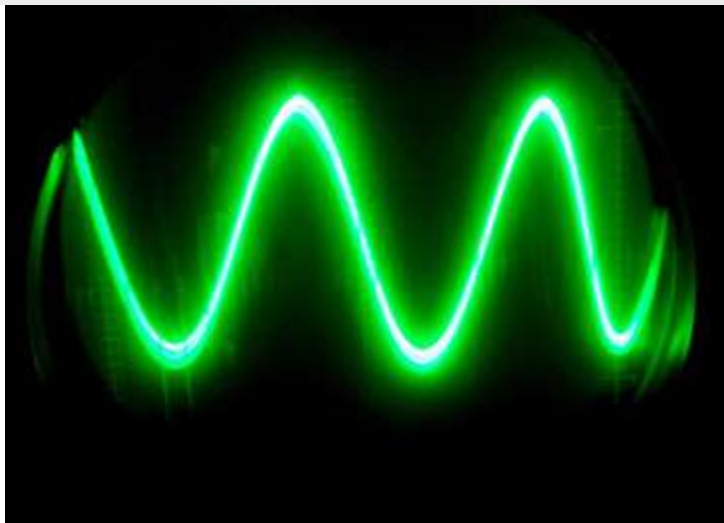
## ArrayPower: Solar AC Module Enabler Unstealths

A PV panel-level electronics firm with a very different approach.

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A few years ago I came across a PowerPoint presentation circulating among the VCs on Sand Hill Road from a PV panel electronics firm with an interesting patent, four unsalaried employees, and no funding.

Fast forward a few years, and the 35-employee and newly-named [ArrayPower is finally coming out of stealth](#) and publicly explaining its unique module panel electronics. The firm has venture capital funding and an interesting board of directors.



Investors include DFJ, Firelake Capital, Partech International, and Trident Capital. Board members include representatives of those VC firms as well as [Solaria's](#) Daniel Shugar and Chairman Kevin Surace of [Serious Energy](#).

Shugar, the CEO of Solaria, told us in email, "Array has some novel things going on with their device that ultimately result in lower LCOE and excellent reliability, and that's why I am serving on their board." Surace said, "I helped start the company 3 years ago. Balance of system needs a disruptive technology. I believe this has a chance at being that technology."

CEO Wendy Arienzo says on her LinkedIn page, "Array Converter converts the DC output of a photovoltaic panel to turbine-quality, 3 phase AC using a simple yet disruptive topology. My vision is to make Array Converter the de facto choice for 3 phase AC solar energy generation."

It's been called an "inverterless solar solution" by folks close to the firm and it doesn't fit neatly into the [panel level electronics categories we've explored](#) at Greentech Media:

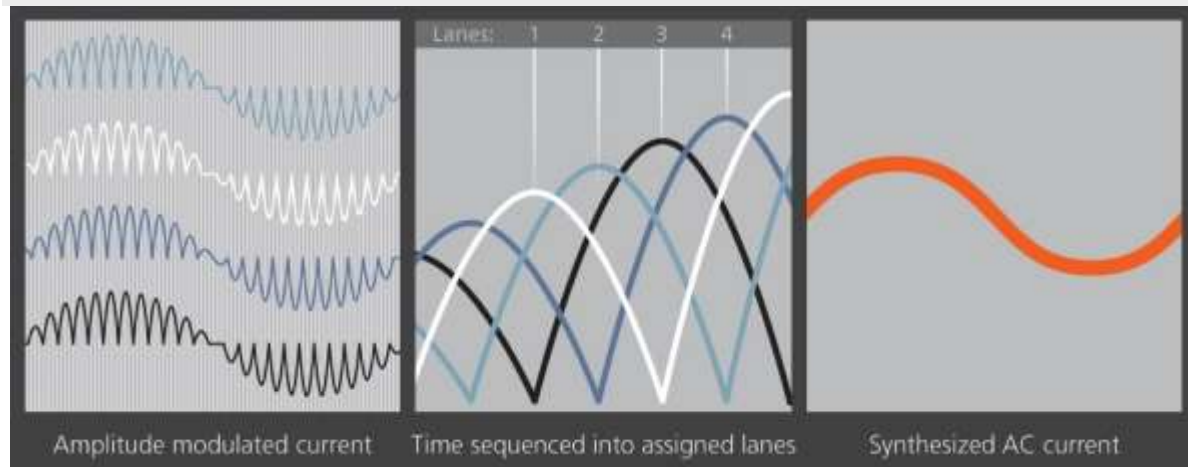
- DC-AC Microinverters from companies like [Enphase](#), SolarBridge, Enecsys, [Direct Grid](#), Azuray, etc.
- DC-at-the-panel methodologies with per panel Maximum Power Point Tracking (MPPT) from [SolarEdge](#), [Tigo](#), [eIQ](#), etc.

Arienzo called the device a "sequenced inverter" in an interview on Wednesday and is directing it at commercial-scale applications using crystalline silicon modules. As with all distributed electronics schemes -- these technology solutions seek to maximize energy harvest, minimize power attenuation

from shading and panel or thermal mismatch, and improve on the reliability and efficiency of [central solar inverters, the long-dominant technology](#).

ArrayPower's customers are the module manufacturers and the device is intended to corner mount directly on the panel frame.

ArrayPower's direct current to pulse amplitude modulated ("PAM") current converter system consists of distributed power modulators tied into an array controller. The pulse amplitude modulation (PAM) technology "senses the grid and synchs its pulse output" to the amplitude of the 50 Hz or 60 Hz grid waveform. Each unit's waveform is slightly shifted in time. When combined, those rough waveforms yield a grid-quality signal.



The firm claims to provide all of the function of a microinverter at the price of a string inverter without the necessity for storage, and hence has no electrolytic capacitors. The design uses standard power electronics components.

Nick Cravalho, the newly-hired VP of Business Development said that ArrayPower, "takes cost out of the system and out of the module" while providing "native three-phase for the commercial market. The ArrayPower approach does do away with the need for a junction box while providing "grid-quality AC power," according to Arienzo. The startup is in field trials in the U.S. and Europe and claims a 25-year warranty.

Array Converter is entering a market where there is price pressure on every element of the solar lifecycle, from module to installation to electronics. Residential solar inverters have a cost of about \$0.45 per watt, utility inverters are in the range of \$0.26 and there is pressure to drive those costs down while maintaining performance and reliability. The DOE's Steve Chu wants to see inverters at \$0.10 per watt.

Even assuming that this technology works and works reliably, ArrayPower is entering a bloodily competitive market where price is becoming the primary differentiation.

The relevant patents are:

[Pulse amplitude modulated current converter](#) - US Pat. 7719864 - Filed Apr 2, 2008 - Array Converter, Inc. Inventors: Kent Kernahan, Sorin Andrei Spanoche

[PULSE AMPLITUDE MODULATED CURRENT CONVERTER](#) - US Pat. 7884500 - Filed Apr 22, 2009 - Array Converter Inc. Inventors: Kent Kernahan, Sorin Andrei Spanoche

[DISTRIBUTED MULTIPHASE CONVERTERS](#) - US Pat. 12708357 - Filed Feb 18, 2010 - Array Converter Inc. Inventors: Kent Kernahan, Sorin Andrei Spanoche