



# NABCEP

## Continuing Education CONFERENCE

April 3-6, 2016 / San Diego, CA

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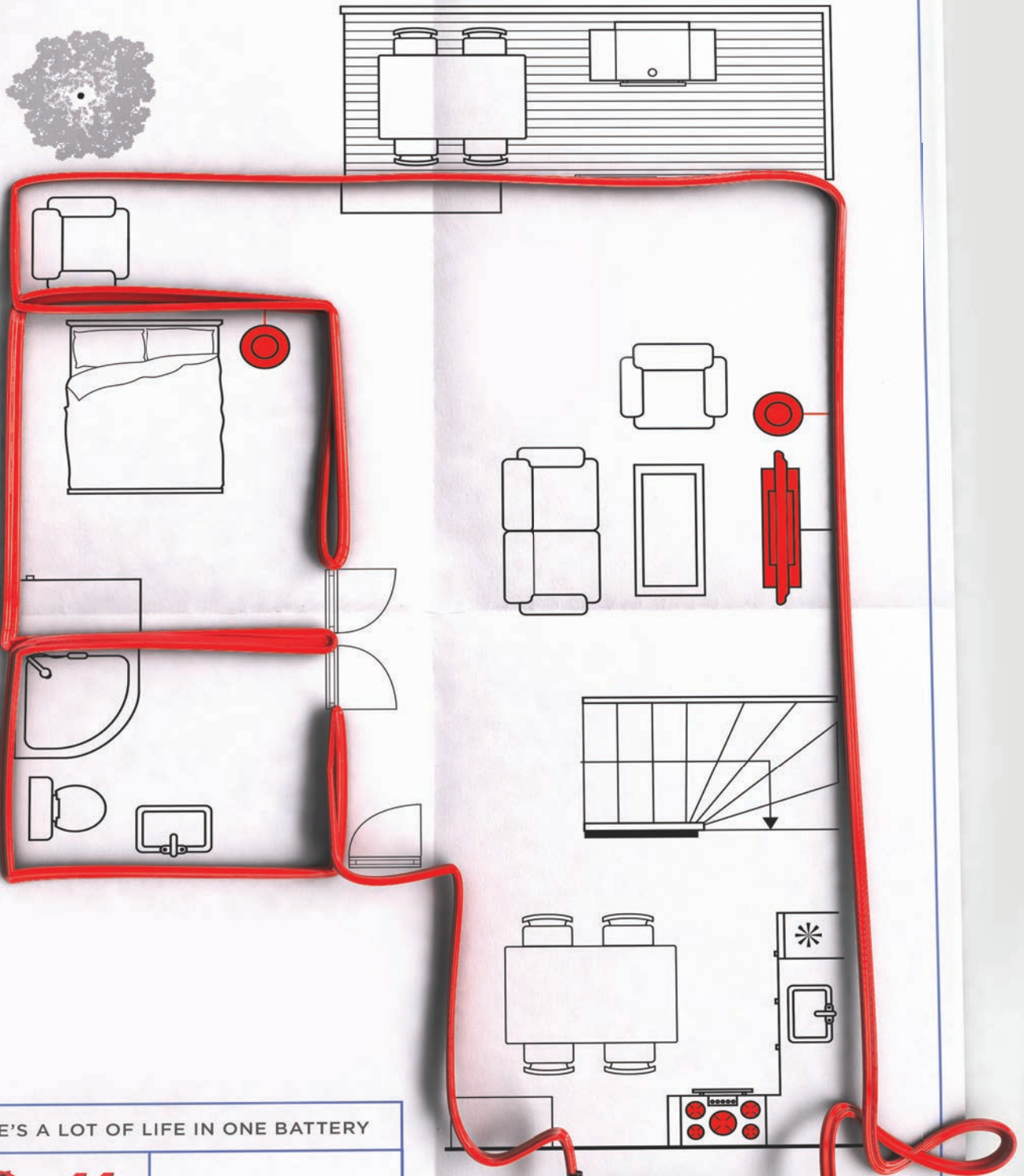
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# NABCEP

## Continuing Education CONFERENCE

April 3-6, 2016 / San Diego, CA



**On behalf** of the NABCEP Staff and Board of Directors, I'd like to personally welcome each of you to the Fifth Annual NABCEP Continuing Education Conference. As we gather this year in beautiful San Diego, there are many encouraging trends that point to continued growth and opportunity for our industry. The extension of the Investment Tax Credit, the historic Paris Agreement and impressive numbers from the 2015 Solar Jobs Census reinforce that the solar industry is a force to be reckoned with, as we work toward a clean energy future.

Whether you are currently a NABCEP Certified Professional, working toward certification, or an employee of a NABCEP Accredited Company, your Conference participation positions you as part of the solution to sustaining industry growth and ensuring we evolve in a way that supports quality, safety and consumer confidence.

As we do each year, we've worked closely with your peers to identify which technical topics, regulatory issues and best practices you are most interested in hearing about, and most likely to benefit from. Then, we invited the best regional and national experts in their fields, on topics ranging from energy storage options to worker safety, to the intersection of the NEC and solar installations. Committed to staying current with the latest technology and trends? Your active participation guarantees you will have an opportunity to not only learn from the experts, but also contribute to discussions shaping the direction of our industry. The learning here goes both ways—our exhibitors and other industry representatives are eager to hear from you.

Because of this, please take advantage of the many resources and networking opportunities available at this year's Conference. It's not just about technical sessions and formal learning; our networking meals and refreshment breaks create space for industry leaders and solar industry professionals to exchange ideas on technology trends and best practices. NABCEP is proud of our role as convener, and we know that the conversations you have here will be some of the most relevant and interesting that you will have all year—until the next NABCEP CE Conference!

I would like to take a moment to thank our generous sponsors and all of the exhibitors for their contributions that make this event a success year after year. We value you not only for the resources you bring to the table to support quality education, but for your formidable technical expertise. Thank you for sharing your innovations and best practices with us. We continue to be committed to convening the very best PV professionals and their vendor partners to network and learn from one another. Attendees—please take advantage of the expertise at your disposal in the exhibit hall, and say 'thank you' to our exhibitors who make this event possible. Thank you again for joining us this year. Please be sure to stop by the NABCEP booth, say 'hi' and let us know what you are working on and how we can continue to support you.

Sincerely,

Richard Lawrence, Executive Director



Dear NABCEP CE Conference Participants,

On behalf of our entire hospitality community, I would like to welcome you to our beautiful city of San Diego. We are privileged to have you and NABCEPs Continuing Education Conference here April 3-6, 2016.

Along with sunshine, gorgeous scenery, world-class attractions, and sensational dining, San Diego embodies a relaxed and friendly spirit that characterizes the best of the Southern California lifestyle. The Paradise Point Resort is a great representation of that and is dedicated to service excellence and providing you with an environment that promotes a focused educational experience.

Again, it is my pleasure to welcome you to San Diego, and I wish you an enjoyable and productive conference.

Best regards,

A handwritten signature in black ink, reading 'Joe Terzi' in a cursive script.

Joe Terzi  
President & CEO



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Sunday - April 3, 2016

# Conference Schedule

12:00 - 6:00 pm	Exhibitor Move-In	Sunset Pavillion
5:00 - 9:00 pm	Registration Open	Bay View/Sunset Foyer
6:00 - 7:00 pm	Opening Keynote - Presented by John Perlin	Sunset III, IV & V
7:00 - 9:00 pm	Welcome Reception	Sunset Pavillion & Terrace

Monday - April 4, 2016

7:00 - 8:00 am	Continental Breakfast		Sunset Pavillion & Terrace - Sponsor						
7:00 am - 6:00 pm	Conference Registration		Bay View/Sunset Foyer						
CLASSROOMS	Dockside	Bay View	Garden	Mission Bay	Sunset I	Sunset II	Sunset III	Sunset IV	Sunset V
8:00 - 9:30 am	Installing Energy Storage in "The Year of Energy Storage" Outback Power Technologies	Commerical Inverters ABB	Enphase Home Energy Solution Enphase Energy	Quick Rack and Solar Roofing Best Practices Quick Mount PV	Introduction to RT-[E] Mount - Rail-less PV mounting, the only system with integrated flexible flashing certified by the ICC Roof Tech, Inc.	Solar Array Design for Commercial Buildings ISA Corp.	MidNite Solar's Rapid Shutdown System MidNite Solar	Creating Simply Better Installations Using Stion Frameless Modules Stion	Aqueous Hybrid Ion (AHI) Battery Product Training Seminar Aquion Energy
9:30 - 10:00 am	MORNING BREAK -		EXHIBIT HALL - SUNSET PAVILION & TERRACE		Sponsor				
10:00 - 11:30 am	Optimizing system design with Aurora Solar Aurora Solar	KACO Inverter Solutions KACO new energy	SolarEdge, It's Never Been Easier to Optimize SolarEdge	Designing and Installing the Apollo II System CertainTeed Solar	The Perfect Combination: Rooftop Solar and Metal Roofing S-5!	Get off the Roof Faster! Lean Installation Practices! Unirac	Dynamic Power - Open new markets with residential self-consumption Schneider Electric - Solar Business	Roof Mount for Pitched and Flat Roofs IronRidge, Inc.	Energy Storage - Battery Bank Sizing, Care, Troubleshooting, Do's & Don'ts Rolls Battery Engineering
11:30 - 1:00 pm	NETWORKING LUNCH -		EXHIBIT HALL - SUNSET PAVILION & TERRACE		Sponsor				
CLASSROOMS	Dockside Room		Mission Bay Room		Sunset I, II, III		Sunset IV, V		
1:00 - 3:00 pm	<b>Grounding &amp; UL2703</b> <b>Sponsored by SnapNrack</b> <small>Solar Mounting Solutions</small> Moderator: Jeff Spies, Quick Mount PV Invited Panel: Greg McPheeters, SnapNrack Solar Mounting Systems Steve Jones, Oceanside, CA/IAEI Mostafa Kashe, LA County		<b>C&amp;I Energy Storage &amp; Demand Response</b> Moderator: Rebekah Hren, Solar Energy International Invited Panel: CJ Colavito, Standard Solar John Berdner, Enphase Energy Greg Smith, Sonnen, Inc. Kent Sheldon, Greensmith		<b>System Design Tools</b> <b>Sponsored by UNIRAC</b> Moderator: Andrew Truitt, Dividend Solar Invited Panel: Paul Grana, Folsom Labs, Inc. Kareem Dabbagh, Aurora Solar Derek Mitchell, Solar Design Tool Ernest Gallegos, Unirac, Inc. Michael Palmquist, PV Permit Design		<b>Utility Rate Structures</b> Moderator: Catherine Kelso, Ambassador Energy Invited Panel: Adam Gerza, Energy Toolbase Daniel Sullivan, Sullivan Solar Power Brad Heavner, CALSEIA		
3:00 - 3:30 pm	AFTERNOON BREAK -		EXHIBIT HALL - SUNSET PAVILION & TERRACE		Sponsor				
3:30 - 5:30 pm	<b>Finance Options</b> <b>Sponsored by BOVIET</b> <small>USA</small> Moderator: Catherine Kelso, Ambassador Energy Invited Panel: Ken Johnson, Mitsubishi Electric Chris Doyle, Dividend Solar Dave Loomis, Ygrene Energy Fund Michael Kirby, Alliance NRG Representative, Sunnova		<b>Code Compliant Interconnections</b> Moderator: Kristen Nicole, Women in Solar Energy Invited Panel: Ken Parks, SDG&E Patrick Healy, County of San Diego Additional, TBD		<b>Proven Energy Storage Options</b> <b>Sponsored by Trojan</b> <small>BATTERY COMPANY</small> Moderator: Don Warfield, Ameresco Solar Invited Panel: Steve Higgins, Rolls Battery Engineering Brad Berwald, Morningstar Corporation Kalyan Jana, Trojan Battery Company		<b>Microgrids and Advanced Inverter Functionality</b> <b>Sponsored by Fronius</b> Moderator: Brian Lydic, Fronius USA Invited Panel: Brian Lydic, Fronius USA John Berdner, Enphase Energy Additional, TBD		
5:30 - 9:00 pm	NETWORKING RECEPTION/DINNER -		Sponsor				EXHIBIT HALL - SUNSET PAVILION & TERRACE		



Tuesday - April 5, 2016

# Conference Schedule

**7:00 - 8:00 am** Continental Breakfast Sunset Pavillion & Terrace - Sponsor  **ENPHASE.**




**7:00 am - 6:00 pm** Conference Registration Bay View/Sunset Foyer

CLASSROOMS	Dockside	Bay View	Garden	Mission Bay	Sunset I	Sunset II	Sunset III	Sunset IV	Sunset V
<b>8:00 - 9:30 am</b>	NEC 2014 Arc Fault & Rapid Shutdown <i>Yaskawa-Solectria Solar</i>	Solar Solutions for Grounding, Bonding, & Wire Management <i>Burndy, LLC</i>	Monitoring PV systems with the e-Gauge 3 series meter <i>e-Gauge Systems LLC</i>	Many Ways to Proof the Roof and Stand the Land through SunModo Racking <i>SunModo Corp.</i>	Introduction to RT-[E] Mount - Rail-less PV mounting, the only system with integrated flexible flashing certified by the ICC <i>Roof Tech, Inc.</i>	Magnum Energy Battery Based Applications <i>Magnum Energy</i>	Identification and Wire Management in the 2014 NEC <i>HellermannTyton</i>	AC vs DC coupling: The right solution the first time <i>Schneider Electric - Solar Business</i>	Energy Storage - Battery Bank Sizing, Care, Troubleshooting, Do's & Don'ts <i>Rolls Battery Engineering</i>

**9:30 - 10:00 am** MORNING BREAK - **EXHIBIT HALL - SUNSET PAVILION & TERRACE** Sponsor  **ENPHASE.**

<b>10:00 - 11:30 am</b>	Installation Training - Lithium Battery Energy Storage <i>Sonnen, Inc.</i>	Uno 7.6/8.6kW Inverter and Rapid Shutdown <i>ABB</i>	Enphase Home Energy Solution <i>Enphase Energy</i>	Quick Rack and Solar Roofing Best Practices <i>Quick Mount PV</i>	Advanced Battery Configuration with Morningstar's ProStar MPPT controller <i>Morningstar Corp.</i>	Deep-Cycle Battery Technologies, Proper Maintenance and System Selection for Renewable Energy Applications <i>Trojan Battery Company</i>	System Design and Optimization with HelioScope <i>Folsom Labs</i>	Intro to Ground Mount <i>IronRidge</i>	Installing Energy Storage in "The Year of Energy Storage" <i>Outback Power Technologies</i>
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**11:30 - 1:00 pm** NETWORKING LUNCH - **EXHIBIT HALL - SUNSET PAVILION & TERRACE** Sponsor  **ENPHASE.**

CLASSROOMS	Dockside Room	Mission Bay Room	Sunset I, II, III	Sunset IV, V
<b>1:00 - 3:00 pm</b> Panel Sessions (Parallel Sessions)	<b>Customer Acquisition &amp; Business Development Strategies</b> Sponsored by  Moderator: Bernadette del Chiaro, CALSEIA Invited Panel: Boaz Soifer, BayWa r.e. Solar Systems, LLC Vincent Battaglia, RenovaPLUS Mycrogrid Shellina Danforth, Solar Reviews Barry Cinnamon, Spice Solar	<b>Roofing Topics for Solar Professionals</b> Sponsored by  Moderator: Tony Diaz, Century Roof and Solar Invited Panel: John Schehl, RISE Tom Pappas, Western States Roofing Alliance Chris Fisher, CertainTeed Solar Mouli Vaidyanathan, SolarPod Mouli	<b>Module Level Power Electronics Options</b> Sponsored by  Moderator: Jason Fisher, SolarCity Invited Panel: John Berdner, Enphase Energy Cameron Stewart, SolarEdge Josh Tatel, Namaste Solar TBD, APsystems	<b>Emerging Energy Storage Options</b> Moderator: Jeff Spies, Quick Mount PV Invited Panel: Greg Smith, Sonnen, Inc. Phil Undercuffler, Outback Power Technologies Nick Carter, Tesla Powerwall

**3:00 - 3:30 pm** AFTERNOON BREAK - **EXHIBIT HALL - SUNSET PAVILION & TERRACE** Sponsor  **ENPHASE.**





<b>3:30 - 5:30 pm</b>	<b>Effective Sales Techniques</b> Moderator: Kevin Mulvey, Sullivan Solar Power Invited Panel: Ken Johnson, Mitsubishi Electric David Savarese, Sullivan Solar Power Michael Bishop, OnGrid Solar Kelly Smith, Ambassador Energy	<b>Managing Worker Safety</b> Moderator: John Schehl, RISE Invited Panel: Guy Snow, G&G Systems John Krys, Professional Contractor Supply	<b>Large Scale 1000V System Design</b> Moderator: Ryan Mayfield, Renewable Energy Associates Invited Panel: Jim Kadakia, Mitsubishi Electric Michael Nieman, Yaskawa-Solectria Solar Coel Schumacher, Solar BOS Brian Mehalic, Solar Energy International	<b>Rapid Shutdown Requirements and Solutions</b> Sponsored by  Moderator: Ward Bower, Ward Bower Innovations, LLC Invited Panel: Jason Fisher, SolarCity Robert Lowe, ABB John Berdner, Enphase Energy Ryan Stankevitz, MidNite Solar, Inc. Cameron Stewart, SolarEdge
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**5:30 - 9:00 pm** NETWORKING RECEPTION/DINNER - Sponsor  **EXHIBIT HALL - SUNSET PAVILION & TERRACE**

Complimentary WiFi Access / Network: nabcep Password: nabcep2016

# Conference Schedule

Wednesday - April 6, 2016

7:00 - 8:00 am		Continental Breakfast		Sunset Pavillion & Terrace - Sponsor 
7:00 - 8:30 pm		Conference Registration		Bay View/Sunset Foyer
CLASSROOMS	Dockside	Bay View	Sunset I, II	Sunset III, IV, V
8:00 - 12:00 pm	<b>Grid-tied Battery-based System Design &amp; Installation</b>  Kelly Larson, Solar Energy International Rebekah Hren, Solar Energy International	<b>Economics of Solar</b>  Michael Bishop, OnGrid Solar	<b>PV System Maintenance and Troubleshooting</b>  Bill Hoffer and Brian Mehalic, Solar Energy International	<b>PV and the 2014 NEC</b>  Ryan Mayfield Renewable Energy Associates
9:30 - 10:00 am		MORNING BREAK - EXHIBIT HALL - SUNSET PAVILION & TERRACE		Sponsor 
12:00 - 1:00 pm		NETWORKING LUNCH - EXHIBIT HALL - SUNSET PAVILION & TERRACE		Sponsor 
3:00 - 3:30 pm		AFTERNOON BREAK - SUNSET PAVILION & TERRACE		Sponsor 
3:30 - 5:00 pm	<b>Grid-tied Battery-based System Design &amp; Installation</b>	<b>Economics of Solar</b>	<b>PV System Maintenance and Troubleshooting</b>	<b>PV and the 2014 NEC</b>
5:00 - Conference Adjournment - Have a safe journey home.				

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## Sunset Pavilion

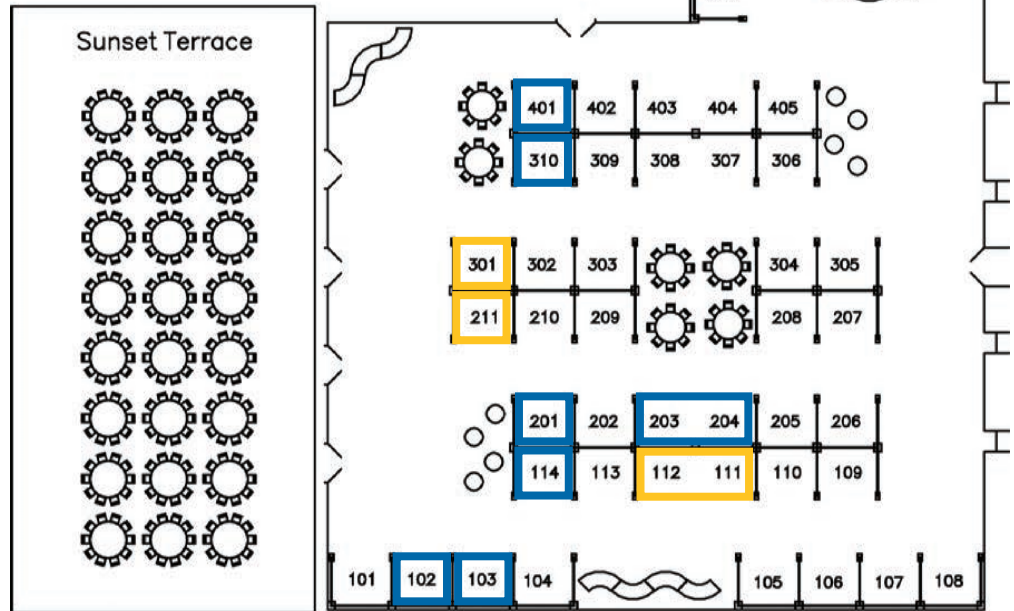
Gold and silver highlighted booths represent our event Gold and Silver Sponsors. Please take time visit with our Sponsors and all NABCEP Exhibitors to learn about the latest products and best practices, and thank them for making this event possible.

### Gold Sponsors:

Enphase Energy – Booth #301  
Outback Power Technologies – Booth # 111/112  
Rolls Battery Engineering – Booth #211

### Silver Sponsors:

ABB – Booth #203/204  
KACO new energy – Booth #114  
Quick Mount PV – Booth #310  
Schneider Electric – Booth #401  
Ubiquiti Energy, LLC – Booth #103  
Unirac – Booth #201  
Yaskawa-Solectria Solar – Booth #102



### Company Name

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## ABB

Booth # 203/204



ABB has one of the widest portfolios of solar inverters ranging from small micro-inverters and three-phase string inverters up to megawatt-sized central inverters. This extensive range of solar inverters is suitable for the smallest residential photovoltaic (PV) systems right up to multi-megawatt PV power plants. Backed by a 130 year old Power and Automation company, few companies in in Solar can provide the cutting edge technological solar history with the bankability of a Fortune 500 company. <http://new.abb.com/power-converters-inverters/solar>

## AEE Solar

Booth # 604



For over 35 years, AEE Solar has delivered the products, training and support our customers need to succeed. We work with top manufacturers to introduce you to the latest tools and technology that help you run your business more efficiently and profitably. [www.aeesolar.com](http://www.aeesolar.com)

## APsystems

Booth # 509



Since its founding in Silicon Valley in 2009, APsystems has emerged as an industry leader through innovative solar products including dual-module microinverters and the first true 3-phase, four-module unit. APsystems ranked no. 2 in global market share among microinverter suppliers by shipments in 2014 (source: GTM Research). APsystems USA has offices in Cupertino, Calif., and Seattle, with manufacturing in Washington state. The company also maintains offices in China, the Netherlands, and Australia. [www.APsystems.com](http://www.APsystems.com)

## Aquion Energy

Booth # 207



Aquion Energy manufactures clean and sustainable saltwater batteries that outlive and outperform traditional battery chemistries. [www.aquionenergy.com](http://www.aquionenergy.com)

## Aurora Solar

Booth # 210



Aurora's cloud-based solar sales and design platform is quickly emerging as the leading choice for solar sales and design professionals to give them an edge against the competition. Aurora launched in January of 2015 and is now processing over 6,000 projects a week from a growing number of leading solar installers across the US and overseas. [www.aurorasolar.com](http://www.aurorasolar.com)

## BayWa r.e. Solar Systems, LLC

Booth # 307/308



BayWa r.e. Solar Systems is a national solar distributor dedicated to supporting local, independent installers – the foundation of a robust and healthy solar industry. We offer only a select group of best-in-class products coupled with unrivaled customer

support. Our strong global presence and our focus on creating meaningful, long-lasting partnerships, soundly positions BayWa r.e. Solar Systems to support our growing network of partners well into the future. <http://us.baywa-re.com/en/>

## Boviet Solar USA

Booth # 101



Boviet Solar USA, a subsidiary of Powerway Group Co., provides a full service platform for turnkey solar installations with the highest ratio of quality and value. By combining end-to-end support with high quality modules manufactured in the largest state-of-the-art solar facility in Vietnam, Boviet Solar is able to deliver a compelling, one-stop solar solution. Focused on customer service, the company is headquartered in California with 6 warehouses across the U.S. to accelerate deliveries. [www.bovietsolarusa.com](http://www.bovietsolarusa.com)

## Burndy, LLC

Booth # 309



As the solar industry's technology continues to advance at a rapid rate, Wiley and BURNDY lead the way with a commitment to innovation and quality solutions. Industry-leading companies specify the Wiley family of products more often than any other brand in projects. The Wiley engineers work closely with solar manufacturers and installers to develop products that address the evolving needs of the PV industry in bonding, grounding, and wire management. [www.burndy.com](http://www.burndy.com)

## CALSEIA

Booth # 603



CALSEIA is the nation's oldest state-based solar energy association. Since the 1970s, CALSEIA has advanced the common interests of the California solar industry, helping make California's solar market the most robust in the United States. Comprised of California solar contractors, manufacturers, distributors, developers, utilities, engineers, consultants and educational organizations, CALSEIA represents a diverse membership committed to growing the California solar industry. [www.calseia.com](http://www.calseia.com)

## CertainTeed Solar

Booth # 302



CertainTeed is a leading North American manufacturer of building materials including roofing, solar, vinyl siding, trim, fence, railing, decking, insulation, gypsum, and ceilings products. CertainTeed offers a portfolio of unique solar products and systems. From the clean lines of the integrated Apollo II series, to the confidence of a 110+ year old company backing your products and installation workmanship, CertainTeed Solar has you covered. [www.certainteed.com](http://www.certainteed.com)

## DPW Solar

Booth # 106



DPW Solar mounting structures are manufactured by Preformed Line Products (PLP) in Albemarle,

NC. We are a major manufacturer and supplier of innovative and reliable PV mounting hardware solutions since 1993. <http://www.dpwsolar.com>

## EcoFasten Solar

Booth # 507



Industry leader EcoFasten Solar designs, engineers, and manufactures patented, watertight solar roof mounts such as Rock-It System, GreenFasten, SimpleGrip, QuikFoot, CorruSlide, and more. The company provides mounting solutions that are easy to install, cost-effective, rugged in fabrication, and unsurpassed in quality. Comprised of a seasoned and growing team of professionals with talent, ability, and drive, all EcoFasten Solar products are precision-designed with the installer in mind. [www.ecofastensolar.com](http://www.ecofastensolar.com)

## e-Gauge Systems, LLC

Booth # 104



The eGauge energy meter displays real-time data for renewable energy systems, utility feeds, and electricity consumption of sub-panels, circuits, and equipment. The hardware features a 30-year data-logger, built-in web server, and ports for 12 current transformers. Communication options include Ethernet and PLC. There are no subscription fees for the eGauge platform, which makes it a very cost effective way to control and own your data. [www.egauge.net](http://www.egauge.net)

## Enphase Energy

Booth # 501



Enphase Energy, a global energy technology company, is leading the charge to bring smart, connected solar energy to every home, business and community. The company delivers simple, innovative and reliable energy management solutions that advance the worldwide potential of renewable energy. Enphase has shipped approximately 10 million microinverters, and over 370,000 Enphase residential and commercial systems have been deployed in more than 95 countries. [www.enphase.com](http://www.enphase.com)

## Folsom Labs, Inc.

Booth # 205



Folsom Labs makes HelioScope, the industry-leading sales and engineering toolkit for solar installers. Companies of all sizes use HelioScope to design and deploy high-quality solar arrays for both residential and commercial systems. HelioScope is easy to learn, fast to use, with CAD-caliber layout tools and fully-bankable energy yield calculations. [www.folsomlabs.com](http://www.folsomlabs.com)

## Fronius USA

Booth # 503



Fronius USA is the technology leader in the solar inverter industry, with a full product line that offers the flexibility necessary to fulfill all the power conversion needs in solar: from the small family home to the largest of commercial facility or solar farm. Fronius USA develops and innovates



# Exhibitor Listing

products based upon the principle of 24 hours of sun: a world powered by 100% renewables.  
[www.fronius-usa.com](http://www.fronius-usa.com)

## HellermannTyton

Booth # 304

With specialized fastening and labeling solutions and industry code compliance leadership, HellermannTyton is an ideal partner for solar engineering, procurement and construction (EPC) firms; installers; electrical contractors and OEM rack manufacturers, large and small. Only HellermannTyton provides the Solar Advantage - Solar Ties, Solar E-Clips and Solar Identification products - smart, innovative solutions for the solar photovoltaic (PV) market, that can't be found anywhere else. <http://www.hellermanntyton.us/>

## HiQ Solar

Booth # 605

Founded in 2009, the company draws on decades of industry experience in high-tech, with a veteran team from the precision communications test and measurement field. With a successful track record of bringing leading-edge products to market, we use a systematic approach to reliability and user-focused design. We are privately held and based in Silicon Valley, a world center for innovation.  
[www.hiqsolar.com](http://www.hiqsolar.com)

## Interplay Learning

Booth # 209

Interplay Learning has developed the Solar3dSim, which is a Residential Troubleshooting Course providing 12 Hours of approved NABCEP training. The simulation progresses you through troubleshooting over 60 faults on four different system types. This simulation was built in conjunction with NYSEDA, and is the first of its kind in the solar industry to use simulation based learning to improve your and your team's effectiveness in the field. Please come by and see the future of solar training. [www.solar3dsim.com](http://www.solar3dsim.com)

## IronRidge, Inc.

Booth # 208

IronRidge designs and manufactures structural hardware for residential and commercial solar systems. For nearly 20 years, we have worked closely with solar professionals across the globe to build products that are strong, simple and cost-effective.  
<http://www.ironridge.com>

## ISA Corp.

Booth # 405

ISA Corporation manufactures racking systems for commercial rooftops and for parking structures. The CSS Racking has the fewest number of posts/penetrations and the WSS Racking is a Trellis style that allows the array to be elevated to eliminate shading and allow easy access for re-roofing. All systems are customized to conform to the specific roof shape. Racking quotes include 3D layouts of the racking/array on the specific building.  
[www.isa-corporation.com](http://www.isa-corporation.com)

## KACO new energy

Booth # 114

KACO new energy is amongst the world's largest manufacturers of solar inverters. With offices in 16 countries, the company offers inverters for every size from the smallest to the largest solar plants. Based in San Antonio, TX, product facilities there, in Germany and Asia have supplied around 7 Gigawatts since 1999. Stop by and see our Residential and Commercial line of inverters including our innovative ultraverter.  
<http://kaco-newenergy.com/us>

## Kaplan Clean Tech Energy

Booth # 602

Kaplan Clean Tech Education offers everything you need to enter the clean energy industry. With blended, online and classroom-based training options, our courses will fit your busy life and unique learning style. Our programs feature hands-on training, on-demand webinars, and online e-learning portals. Study materials include interactive exercises, study guides, question & answer handbooks, downloadable training apps, flashcards, and more! [www.kaplandcleantech.com](http://www.kaplandcleantech.com)

## Magnum Energy

Booth # 105

Magnum Energy is a leading manufacturer of premium inverter/chargers for Renewable Energy applications. Shipped worldwide, our products use the highest quality components to respond to the extreme conditions of variable climates. For reliable power regardless of grid connectivity, Magnum inverter/chargers, interconnection system equipment, and accessories are a solid base to build a battery back-up, AC Coupled or off-grid power system. [www.magnum-dimensions.com](http://www.magnum-dimensions.com)

## MidNite Solar, Inc.

Booth # 113

MidNite Solar is an innovative manufacturer of electronics and balance of system components for the renewable energy industry. They are the largest manufacturer of combiner boxes in North America and their line of Disconnecting Combiner boxes is another industry first, meeting all of the new NEC requirements for this class of equipment. MidNite Solar products are designed and manufactured in the USA and installed in renewable energy systems around the world. [www.midnitesolar.com](http://www.midnitesolar.com)

## Morningstar Corporation

Booth # 109

Morningstar Corporation is a world-leading supplier of solar charge controllers & inverters, with over 3 million units installed in over 112 countries. Morningstar's products have been recognized in international solar markets as the most advanced and highest quality products available. Our products exceed all other PV controllers & inverters for protection against extreme environments, corrosion, lightning surges and harsh ambient operating temperatures. [www.morningstarcorp.com](http://www.morningstarcorp.com)

## NABCEP/ProSight

Booth # 305

The North American Board of Certified Energy Practitioners (NABCEP) is the most respected, well-established and widely recognized national certification organization for professionals in the field of renewable energy. NABCEP offers entry level knowledge assessment, professional certification, and company accreditation programs to renewable energy professionals throughout North America. Stop by the booth to learn about our partnership with ProSight Specialty Insurance! **ProSight Specialty Insurance** is committed to Solar Contractors offering a comprehensive all-lines insurance program with coverages that can be expanded or altered as your business needs change. Coverage includes commercial, industrial, residential, rooftops, groundmounts, and carports.  
<http://www.nabcep.org>  
<http://nabcep.prosightspecialty.com>

## OutBack Power Technologies

Booth # 111/112

OutBack Power is the leading designer and manufacturer of advanced power electronics for renewable energy, backup power, marine and mobile applications. Whether the application is village micro-grids in Africa, rural electrification projects in Latin America, remote off-grid cabins in Alaska, or a suburban home in Southern California, OutBack Power has set the bar for delivering high quality, cutting edge power conversion electronics.  
[www.outbackpower.com](http://www.outbackpower.com)

## Quick Mount PV

Booth # 310

Quick Mount PV is the leader in flashed waterproof attachments for rooftop solar installations. Quick Mount PV has solutions for most roofing types and is committed to producing the industry's most advanced solar mounting systems with industry-leading R&D, engineering, product testing and ISO 9001:2008 certified manufacturing in California. <http://www.quickmountpv.com/index.html>

## RBI Solar

Booth # 206

RBI Solar, Inc. designs, engineers, manufactures and installs solar mounting systems for large commercial and utility scale projects. As a specialist in ground mount, roof mount, and custom designed specialty solar structures, RBI focuses on providing best-in-class racking systems and project management capabilities to serve owners and integrators. RBI Solar offers a broad range of solar racking systems to support every PV module manufacturer. <http://www.rbisolar.com/>

## RenovaPLUS Mycrogid

Booth # 511

RenovaPLUS Mycrogid designs, installs and is a distributor for commercial and residential battery systems, with companies such as Sonnen.  
<http://www.mycrogid.com/>

# Exhibitor Listing

## Rolls Battery Engineering Booth # 211



Located in Springhill, Nova Scotia, Surrette Battery Company produces a wide range of Rolls-branded premium deep cycle batteries for use in off-grid, grid-tied and standby Renewable Energy applications. Rolls 4000, 4500 & 5000 Series flooded models as well as the popular maintenance-free sealed AGM & GEL ranges are internationally recognized for their dependability, outstanding quality and industry-leading manufacturer warranties. <http://www.rollsbattery.com>

## Roof Tech, Inc. Booth # 601



Roof Tech is a subsidiary of Yanegiken, a Japanese company founded in 1968 to research and develop roofing technologies. Utilizing a unique flashing method that adheres PV module mounts to asphalt roofing systems, Roof Tech has completed the rigorous process to obtain the ICC-ESR 3575, being to date, the only PV Mounting system with a third party evaluation report for its flashing system. RT E Mount, Roof Tech's signature rail-less PV mounting system comes integrated with RT Butyl. [www.roof-tech.us](http://www.roof-tech.us)

## S-5! Booth # 403/404



S-5!® is the world's leading manufacturer of attachment solutions for metal roofing. S-5! now offers exposed-fastened metal paneling attachment

solutions and is the premier solution provider for the attachment of solar panels with the newly redesigned S-5-PV Kit, which fits the majority of panels and roofs on the market and costs as little as \$0.06 per watt! [www.s-5.com](http://www.s-5.com)

## Schneider Electric-Solar Business Booth # 401



Inverter/electrical BOS manufacturer.  
[www.sesolar.com](http://www.sesolar.com)

## SimpliPhi Power Booth # 505



Founded in 2002 as LibertyPak/Optimized Energy Storage, SimpliPhi Power designs and manufactures efficient, non-toxic and enduring energy storage and management systems that utilize lithium ferro phosphate (LFP). Based in Ojai California, SimpliPhi combines non-hazardous energy storage chemistry (LFP) with its proprietary cell and battery architecture, methods of assembly and Battery Management System (BMS) to create safe, reliable, durable and highly scalable on-demand power solutions for the residential, commercial, military, emergency response and film industries.  
<http://simpliphipower.com>

## SnapNrack Solar Mounting Systems Booth # 502



SnapNrack, owned by Sunrun, is a leading manufacturer of innovative solar mounting solutions

designed to reduce installation costs, improve installation quality and safety, and make the job of solar installers easier. SnapNrack roof and ground mount systems feature a single tool installation, pre-assembled snap-in hardware, integrated wire management, integrated grounding/bonding and Class A Fire Rating in accordance with UL2703/UL1703 standards. [www.SnapNrack.com](http://www.SnapNrack.com)

## Solar Reviews Booth # 508

Solar Reviews came about because we found a gap between what consumers in the solar industry wanted and what was available. The ability to view reviews on an Installer and to directly contact them was limited, often forcing consumers to choose "3-quotes" sites. Add to this the fact that the consumer did not know the companies and you often had an unhappy experience for both installers and consumers. Solar Reviews is trying to both inform consumers as to installer performance, and to promote valid installers to consumers.  
[www.solarreviews.com](http://www.solarreviews.com)

## SolarEdge Booth # 110



SolarEdge Technologies, global leader in the DC power optimizer market, provides module-level electronics for solar power harvesting and monitoring systems for residential, commercial and utility-scale solar photovoltaic installations.

Expand the possibility of energy independence, self-consumption, and secure backup power.

Conext™ XW+  
Hybrid inverter



The scalable hybrid solution for off-grid solar, self-consumption, and long-term backup for homes, small businesses, and remote communities.

[solar.schneider-electric.com](http://solar.schneider-electric.com)

Life Is On





# Exhibitor Listing

The SolarEdge portfolio of products includes power optimizers and a web portal for module-level optimization and monitoring, as well as PV inverters specialized to work with power optimizers. SolarEdge Technologies Inc. is a publicly-traded company on NASDAQ. [www.solaredge.us](http://www.solaredge.us)

## **Solar-Log** Booth # 512



Solar-Log is a global market leader in web-enabled monitoring for PV plants. Solar-Log is monitoring over 240,000 plants world-wide, through nearly 1 million connected inverters, with generating power totaling over 10 GW. Solar-Log monitors plant performance, provides real-time error detection and status information, and offers revenue-grade metering. This industry-leading functionality maximizes plant performance, optimizes self-consumption, provides grid feed-in controls and fleet management.

<http://www.solar-log-america.com/>

## **SolarPod Mouli** Booth # 504



Until now placing solar panels on roofs came with endless worries. Would the roof leak? Would it damage roof structure? Would it cost too much? Can solar be placed any roof material? Would I need to replace roof? Not anymore. Introducing SolarPod Crown, a breakthrough gable roof solar installation. Simply place a smartly designed panel assembly on the roof. SolarPod Crown is based on a revolutionary new design that is wind tunnel tested to 130 mph wind loads, UL Listed & Fire Class A rated.

[www.mysolarpod.com](http://www.mysolarpod.com)

## **Solar Roof Hook** Booth # 402



SolarRoofHook.com has a wide range of innovative products for mounting solar panels onto residential roofs. We offer solutions for Asphalt Shingle, Flat and Spanish Tile, and Stone Coated Steel roofs. Our factories can produce custom products from start to finish in 60 days and are continually working with installers to deliver the best products needed for any type of roof. Products are stocked in Livermore, CA and Rock Hill, SC. SolarRoofHook.com is a division of Quick-screws International Corp.

[www.solarroofhook.com](http://www.solarroofhook.com)

## **SolarWorld** Booth # 510



SolarWorld has been the largest solar manufacturer in the Americas since 1975. Vertically integrated from silicon to complete turn-key systems, SolarWorld manufactures cells and modules in the United States and offers complete solar-power solutions to all types of customers. SolarWorld's engineering and experience provide the best product and power-performance guarantees in the industry. [www.solarworld.com](http://www.solarworld.com)

## **Soligent Distribution** Booth # 107

Soligent Distribution is the largest solar distributor in the Americas, supplying thousands of solar installers with equipment, engineering services, and project financing solutions. Soligent has been a pioneer in the industry for decades, driving the market forward with our commitment to sustainable energy. With distribution centers in NJ, NorCal and SoCal, Soligent is well positioned to bring the reach, know-how and collaborative spirit needed to ensure our dealer's success. [www.soligent.net](http://www.soligent.net)

## **Sollega Inc.** Booth # 506



Sollega Inc., is a leading solar PV racking manufacture specializing in ballasted commercial flat-roof and ground mount racking solutions since 2009. Our mission is to provide the easiest to install and most cost effective solar PV mounting solutions available. Our goal is to enable the installation of solar PV on every suitable flat surface in the world. [www.sollega.com](http://www.sollega.com)

## **Sonnen, Inc.** Booth # 501



Sonnen is the pioneer of smart energy storage systems having installed 10,000 storage solutions globally. Coupled with a solar-energy system, the sonnenBatterie eco systems supply homeowners with up to 100 percent of their energy, provide backup power and take advantage of different tariff structures for off-peak vs. on-peak use. For commercial customers, sonnenBatterie pro helps reduce demand spikes and allows businesses to participate in utility demand response programs throughout the U.S.

<http://www.sonnen-batterie.com>

## **Spice Solar** Booth # 108



Spice Solar with Built-In Racking™ is a complete system that reduces parts, labor and engineering cost on every job. With 35 years of solar experience, Spice Solar is the leading rooftop installation technology to quickly connect and ground modules for all orientations and roof types, while maintaining module warranty integrity. Spice Solar modules and components deliver unprecedented strength over rack-less systems, for certified reliability in even the most extreme wind and snow load conditions. [www.spicesolar.com](http://www.spicesolar.com)

## **Stion** Booth # 202



Stion is a US manufacturer of CIGS thin film PV modules based in San Jose, CA. Our factory is located in Hattiesburg, MS. [www.stion.com](http://www.stion.com)

## **SunModo Corp.** Booth # 306



SunModo, meaning "the way of the sun," is a private U.S. company based in Vancouver, Washington focusing on innovative racking and mounting

solutions for professional installers in the fast-growing solar industry. We are energized every day by a desire to make solar installation easier, more reliable and more affordable. Our commitment to innovation can be seen across our entire product line, which included 14 industry-shaping patents. [www.sunmodo.com](http://www.sunmodo.com)

## **Trojan Battery Company** Booth # 303



Trojan Battery is the world's leading manufacturer of deep-cycle batteries, with a complete portfolio of advanced deep-cycle flooded, AGM and gel batteries offering maximum long-lasting performance to meet the requirements of today's advancing renewable energy systems. To address the impact of Partial State of Charge in renewable energy applications, Trojan Battery features Smart Carbon™ in its Industrial and Premium batteries, offering increased life, improved charging and recharging. [www.trojanbattery.com](http://www.trojanbattery.com)

## **Ubiquiti Energy, LLC** Booth # 103



Ubiquiti Energy (NASDAQ: UBNT) has launched a disruptively-priced product: sunMAX, a full, plug-&-play, grid-tied, residential system designed for new contractors to quickly sell/install solar at \$1/W (installed cost after ITC). Using a simple rail-less mounting design of 4 parts, sunMAX hardware install is fast & easy. Panels/microinverters work efficiently & are backed by competitive warranties. Free training, design, permitting, sales & monitoring software let you compete at the highest level. [www.ubnt.com/sunmax](http://www.ubnt.com/sunmax)

## **Unirac** Booth # 201



EXPERIENCE THAT MAKES A DIFFERENCE. UNIRAC is the leading manufacturer of PV mounting systems in North America. We provide the best mounting solutions to our customers through high quality, competitively priced products, responsive customer support, industry leading engineering services and excellence in supply-chain management.

- Unmatched Experience
- Progressive Products
- Certified Quality
- Engineering Excellence
- Bankable Warranty
- Design Tools
- Permit Documentation

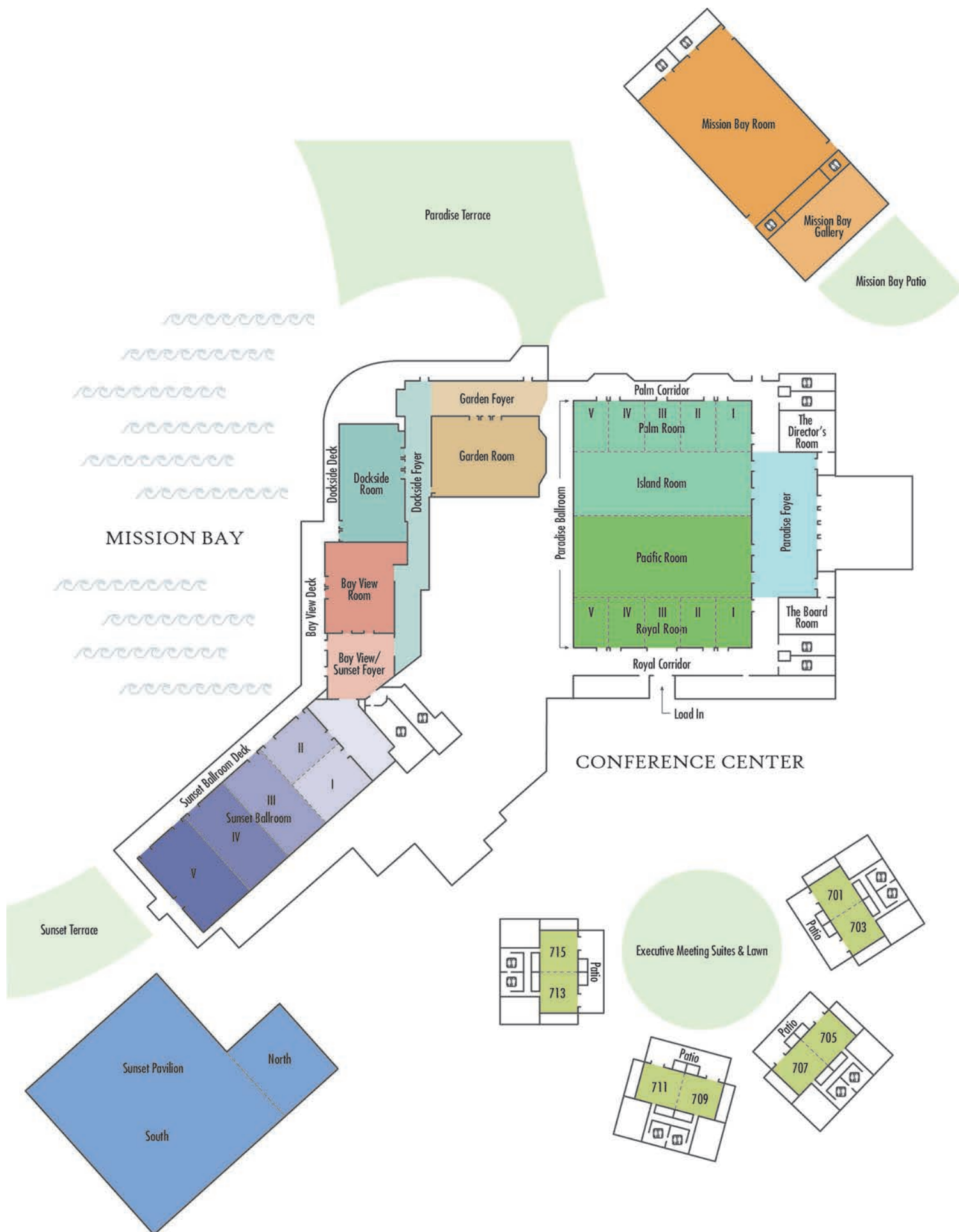
<http://unirac.com>

## **Yaskawa-Solectria Solar** Booth # 102



Yaskawa – Solectria Solar, a wholly-owned subsidiary of Yaskawa America, Inc., is the largest commercial inverter manufacturer in the U.S. Solectria's products include 3.8 to 750 kW inverters, string combiners and web-based monitoring for all size solar systems. Solectria is backed by over 100 years of power electronics and inverter experience. All of Solectria's three-phase central inverters are made in the USA. [www.solectria.com](http://www.solectria.com)

# Meeting Rooms



“Providing Mitsubishi Electric products is an integral part of our philosophy to match our top-quality service offering with the highest quality equipment.”

We've installed more than 22 MW of Mitsubishi Electric solar panels on residential rooftops without a single warranty claim due to panel malfunction. We trust Mitsubishi Electric will continue to satisfy our customers with excellent products for years to come.

-Michael Ito  
Alternate Energy Inc., Hawai'i



Meet us at NABCEP CE Conference 2016



Ken Johnson  
Business Development Manager  
[ken.johnson@meus.mea.com](mailto:ken.johnson@meus.mea.com)

Speaking on Finance Options, Monday at 3:30pm, and Effective Sales Techniques, Tuesday at 3:30pm



Jim Kadakia  
Senior Engineering Manager  
[jim.kadakia@meus.mea.com](mailto:jim.kadakia@meus.mea.com)

Speaking on Multi-MW & 1000V System Design, Tuesday at 3:30pm



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## KEYNOTE PRESENTATION

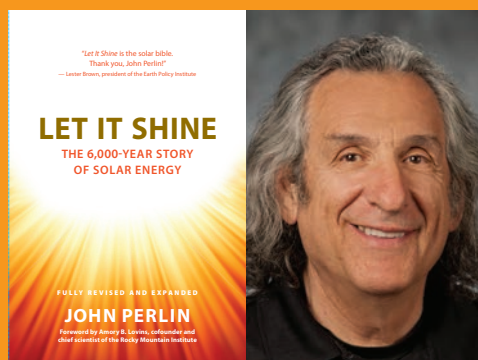
SUNDAY, APRIL 3, 2016

6:00 pm – 7:00 pm

Sunset III, IV & V

### Let It Shine: The One-Hundred and Forty Year Story of Photovoltaics

John Perlin's keynote will cover the one-hundred and forty year story of photovoltaics, beginning with the discovery in 1876 of the first solid-state material that could convert sunlight directly into electricity. When British scientists, Professor William Grylls Adams and his student Richard Day, exposed selenium in 1876 to candlelight, they discovered a completely new scientific phenomenon — that light could directly generate the flow of electricity in a solid material. Although scientists did not have a clue how the new discovery worked, eleven years later Charles Fritts of New York built in 1884 the first photovoltaic modules based on selenium and installed them on his New York City rooftop. The discovery of the photon in 1905 by Albert Einstein provided science with a thorough understanding of photovoltaics. Though the selenium cells never generated enough power from light for practical purposes, the cells combined with Einstein's insights and the semiconductor revolution that began in the late 1940s set the stage for the advent of the silicon solar cell in 1954, the first solar cell capable of transforming sufficient sunlight into electricity for practical pursuits and the sire of today's booming photovoltaic industry, beginning in space and now covering the rooftops of the world.



**Keynote Speaker:** John Perlin has written four highly acclaimed books on solar energy and forestry: *A Golden Thread: 2500 Years of Solar Architecture and Technology*; *A Forest Journey: The Story of Wood and Civilization*; *From Space to Earth: The Story of Solar Electricity*; and *Let It Shine: The 6000 Year Story of Solar Energy*. Harvard University Press has chosen *A Forest Journey* as a Harvard Classic in Science and World History and as one of the one-hundred great books published by the press. Nobel Laureate Dr. Walter Kohn invited Mr. Perlin to join the department of physics at the University of California, Santa Barbara to collaborate on the movie *The Power of the Sun*, which tells the story of the evolution of the science of light and its role in the development of photovoltaics. He currently works under a NASA contract at the department of physics as a research scholar at the University of California, Santa Barbara and has lectured throughout the world on solar and forestry topics. For more details, go to [john-perlin.com](http://john-perlin.com)

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# MONDAY, APRIL 4, 2016

## Installing Energy Storage in "The Year of Energy Storage" Presented by OutBack Power Technologies

Monday, April 4, 2016  
8:00 am - 9:30 am  
Dockside Room  
1.5 CEU Credits

For several years the industry has been full of buzz about the rapid growth in storage implementation "just around the corner." What's different now is that 1. that corner is here, and 2. OutBack Power has emerged as a leader in the storage category. In this workshop OutBack will cover the most practical angles for adding energy storage to your grid-connected business, both in new and retrofit opportunities. Focus areas will include:

- DC and AC coupling system design and installation
- New power conversion technologies and topologies for residential energy storage applications
- Nano-Carbon batteries as a cost-effective entry into storage for the home and small business

## Commercial Inverters Presented by ABB

Monday, April 4, 2016  
8:00 am - 9:30 am  
Bay View Room  
1.5 CEU Credits

The ABB Solar Product Technology course introduces to the audience the TRIO-20.0 and 27.6 as well as the new 50kW three-phase commercial string inverters. The course starts with the inverter specifications followed by a discussion about maximum power point tracking and some other inverter features. After viewing the physical layout, the class will take a look at some installation basics before moving on to the LCD interface and the menus it contains. The course concludes with inverter communications and monitoring.

## Enphase Home Energy Solution Presented by Enphase Energy

Monday, April 4, 2016  
8:00 am - 9:30 am  
Garden Room  
1.5 CEU Credits

Learn how our newest products build the foundation for a complete Home Energy Solution that controls and manages energy generation, tracks consumption, and leverages load shifting storage. Class topics include:

- New features of the Envoy-S

- Installation methods and operations
- Lowering costs with built in revenue grade metering
- Setting up consumption monitoring
- Storage system overview

## Quick Rack and Solar Roofing Best Practices Presented by Quick Mount PV

Monday, April 4, 2016  
8:00 am - 9:30 am  
Mission Bay Room  
1.5 CEU Credits

This presentation is a combination of Quick Mount PV's popular Solar Roofing Best Practices training and Quick Rack: Design & Installation training for rail-free systems. Solar Roofing Best Practices will guide solar professionals through codes, standards, best practices, and proper product application for various rooftop mounting systems. Quick Rack: Design and installation will give an overview of rail-free racking systems and a brief hands-on demonstration.

## Introduction to RT-[E] Mount - Rail-less PV Mounting, the Only System with Integrated Flexible Flashing Certified by the ICC Presented by Roof Tech, Inc.

Monday, April 4, 2016  
8:00 am - 9:30 am  
Sunset I  
1.5 CEU Credits

This training workshop covers best practices for



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2016

# MONDAY, APRIL 4, 2016

installing the RT-[E] Mount® and E Mount Air® Rail-less PV mounting system which is designed for fast, easy installations on pitched asphalt roofs. You will learn how to install the product to meet code and learn more about the engineering and rigorous testing that led to RT-[E] Mount's ICC Evaluation report, ASTM 2140 and UL2703.

## Solar Array Design for Commercial Buildings Presented by ISA Corp.

Monday, April 4, 2016  
8:00 am - 9:30 am  
Sunset II  
1.5 CEU Credits

This course provides tools to evaluate a commercial building for its solar capacity — based on its size, roof geometry, shadowing effects, and its structure. Specific tools are introduced including calculators for building weight, solar accessible areas and comparison of solar capacity vs. array height.

Alternatives for maximizing solar capacity on roofs are presented along with their relative costs.

Procedures, check-off lists and spreadsheets for obtaining roof data for rack mounting, and for providing information needed for structural analysis are presented.

Description and assembly instructions for raised/elevated racking for commercial buildings are presented.

## MidNite Solar's Rapid Shutdown System Presented by Midnite Solar, Inc.

Monday, April 4, 2016  
8:00 am - 9:30 am  
Sunset III  
1.5 CEU Credits

This session will provide participants with a working knowledge of MidNite Solar's Rapid System Shutdown system and how it satisfies the requirements of NEC Article 690.12

Topics to be covered include:

- The fundamentals of NEC Article 690.12
- A discussion of the Rapid Shutdown from a firefighter's perspective
- Shutdown and wiring considerations unique to various system configurations, such as battery and non-battery based grid-tie and stand alone systems, and isolated and non-isolated inverters
- Overview of how to specify and install Midnite Solar's Rapid Shutdown system components
- Wiring diagrams for various system configurations
- Verifying proper system function of the Midnite Rapid System Shutdown System

## Creating Simply Better Installations Using Stion Frameless Modules Presented by Stion

Monday, April 4, 2016  
8:00 am - 9:30 am  
Sunset IV  
1.5 CEU Credits

Stion's CIGS thin film solar modules produce 5-10% more energy compared to competing Si technologies. Stion's training will focus on its frameless line of panels and share proven best practices to:

- Increase business by including Stion frameless modules in your product portfolio
- Reduce costs and boost performance by integrating ground and roof mount systems designed specifically for Stion's frameless panels
- Stion's solar modules are 100% MADE IN USA, and produce more energy per kW when compared to traditional silicon panels due to an industry leading lower temperature coefficient and minimal degradation. For more information visit [www.stion.com](http://www.stion.com).

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CHANCE TO WIN

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**GET OFF THE ROOF FASTER THAN EVER BEFORE**

- OPTIMIZED COMPONENTS
- PRE-ASSEMBLED PARTS
- INTEGRATED BONDING - LOSE ALL THE COPPER & LUGS



### RM | ROOF MOUNT

**FASTEST INSTALLATION IN THE INDUSTRY**

- TWO MAJOR COMPONENTS
- MODULAR DESIGN
- INTEGRATED BONDING

**Point. Click. SCALE**



**STREAMLINED**  
SOLAR PROJECT LAYOUT & DESIGN

# EXPERIENCE THAT MAKES A DIFFERENCE



### **Aqueous Hybrid Ion (AHI) Battery Product Training Seminar Presented by Aquion Energy**

Monday, April 4, 2016  
8:00 am - 9:30 am  
Sunset V  
1.5 CEU Credits

Aquion Energy manufactures safe and sustainable saltwater batteries that contain no heavy metals or toxic chemicals and are non-flammable and non-explosive, making them the cleanest and safest batteries in the world. This presentation will introduce attendees to Aquion and our patented Aqueous Hybrid Ion (AHI™) technology, and provide in-depth training on sizing, integration, and installation of Aquion batteries.

### **Optimizing System Design with Aurora Solar Presented by Aurora Solar**

Monday, April 4, 2016  
10:00 am - 11:30 am  
Dockside Room  
1.5 CEU Credits

When was the last time you carefully analyzed a site's shading, assessed every equipment combination in your inventory, and figured out the optimal design for your site – to generate the best design for your customer? Does "best" mean total energy, or maximizing savings based on utility rates?

Aurora's industry-leading platform has design automation covered, and the new Aurora Optimizer takes that to the next level. Join our technical session focusing on advanced system design, including stringing, equipment variations, shading, and performance. We will demonstrate the power of the new optimization engine, showing you how Aurora can evaluate hundreds of options within seconds and improve your bottom line with optimized system designs.

### **KACO Inverter Solutions Presented by KACO new energy**

Monday, April 4, 2016  
10:00 am - 11:30 am  
Bay View Room  
1.5 CEU Credits

Why sit steady in a market that is growing year in and year out, when you can leverage one of the world's largest solar manufacturer with your business. Offering inverters for every application: residential and small commercial grid-tied PV systems. You will learn:

- KACO products featuring blueplanet string inverters and the innovative ultraverter
- Best installation practices and safety features
- Faster installs with simple and quick designs
- Rapid Shutdown
- Electrical code requirements
- Hands on

The course is oriented to a technical audience but includes useful information for anyone interested in selling the KACO product line including electricians, electrical PV contractors and suppliers, and sales representatives.

### **SolarEdge, It's Never Been Easier to Optimize Presented by SolarEdge**

Monday, April 4, 2016  
10:00 am - 11:30 am  
Garden Room  
1.5 CEU Credits

It's not that hard to have a best in class solar solution. Join the team at SolarEdge and learn how easy it can be to optimize your next PV project. Get more energy, greater design flexibility, production data at the module level and a safer, more reliable electrical system with SolarEdge's optimized inverter solutions.

### **Designing and Installing the Apollo II System Presented by CertainTeed Solar**

Monday, April 4, 2016  
10:00 am - 11:30 am  
Mission Bay Room  
1.5 CEU Credits

CertainTeed's Apollo II series includes slim, low-profile solar shingles and tiles designed to aesthetically integrate into either asphalt shingle or concrete tile roofs. While the Apollo II modules function similarly to standard solar modules, they also function as the roof itself. This session will explore their dual functions and highlight key differences in designing and installing these types of systems as opposed to more traditional rack mounted systems. The session will conclude with a hands on installation of the Apollo II products.

### **The Perfect Combination: Rooftop Solar and Metal Roofing Presented by S-5!**

Monday, April 4, 2016  
10:00 am - 11:30 am  
Sunset I  
1.5 CEU Credits

During this one hour course you will learn the actual value of solar on a metal roof, how easy it is to install on a metal roof, the cost associated with installing PV on a metal roof, proper installation techniques and the best practices when mounting solar on a metal roof.

### **Get off the Roof Faster! Lean Installation Practices! Presented by Unirac**

Monday, April 4, 2016  
10:00 am - 11:30 am  
Sunset II  
1.5 CEU Credits

Learn some simple strategies to cut your crew's time on the roof. Installation factors including division of labor, racking style, supplemental parts & hardware, tools and warehouse pre-

assembly can all help save time and money. Increase your expertise using different racking styles for each type of installation through tips & tricks to improve efficiency and make your life easier.

### **Dynamic Power - Open New Markets with Residential Self-consumption Presented by Schneider Electric - Solar Business**

Monday, April 4, 2016  
10:00 am - 11:30 am  
Sunset III  
1.5 CEU Credits

The installer will learn how to design and sell PV systems that best meet the needs of the client. Learn how to leverage primary XW+ features to target incentive programs and rate structures and maximize ROI.

### **Roof Mount for Pitched and Flat Roofs Presented by IronRidge, Inc.**

Monday, April 4, 2016  
10:00 am - 11:30 am  
Sunset IV  
1.5 CEU Credits

In this presentation, we cover the key code requirements for solar roofs, and review products and procedures to ensure you're installing code-compliant, long-lasting solar roof mount systems. We will also introduce several new products and tools including the new IronRidge Tilt Mount System and updated IronRidge Design Assistant tools for Pitched Roof and Flat Roof applications.

### **Energy Storage - Battery Bank Sizing, Care, Troubleshooting, Do's & Don'ts Presented by Rolls Battery Engineering**

Monday, April 4, 2016  
10:00 am - 11:30 am  
Sunset V  
1.5 CEU Credits

Proper selection and sizing of battery banks for off-grid and grid-connected systems will be discussed, as well as inspection and installation, system setup, programming of charging set points, as well as ongoing battery maintenance and care to retain capacity and ensure long cycle life. Identifying charging issues, causes of capacity loss and other troubleshooting techniques will also be covered.

Complimentary WiFi Access

Network: nabcep

Password: nabcep2016

## Grounding and UL 2703

Sponsored by: **SnapNrack**  
Solar Mounting Solutions

Moderator: Jeff Spies, Quick Mount PV

INVITED PANEL:

Greg McPheeters, SnapNrack Solar Mounting Systems

Steve Jones, Oceanside, CA/IAEI

Mostafa Kashe, LA County

Monday, April 4, 2016

1:00 pm - 3:00 pm

Dockside Room

2 CEU Credits

Equipment grounding is among the most discussed and debated topics in solar. The recent debate about UL 2703 for rack mounted PV systems has focused considerable attention on the proper methods for bonding/grounding of PV systems. This panel will address the current requirements of UL 2703 and outline the work underway to interpret and refine the language of the Standard. Steve Jones, Building Inspection Manager from the City of Oceanside and 2016 IAEI President, and Mostafa Kashe, Chief Electrical Inspector from LA County, will explain the efforts underway in California to interpret and implement UL 2703 for permitting and inspection of PV systems.

## C&I Energy Storage and Demand Response

Moderator: Rebekah Hren, Solar Energy International

INVITED PANEL:

CJ Colavito, Standard Solar

John Berdner, Enphase Energy

Greg Smith, Sonnen, Inc.

Kent Sheldon, Greensmith

Monday, April 4, 2016

1:00 pm - 3:00 pm

Mission Bay Room

2.0 CEU Credits

Opportunities and benefits associated with pairing solar and storage in commercial and industrial applications are quickly expanding - including energy management functionality, such as reducing demand charges or time-shifting energy consumption; grid support through advanced inverter functionalities; and providing backup power during utility outages. This panel will explore the current landscape for energy storage and demand response for the commercial and industrial sector, including perspectives from manufacturers, system designers and integrators.

## System Design Tool Options

Sponsored by: **UNIRAC**

Moderator: Andrew Truitt, Dividend Solar

INVITED PANEL:

Paul Grana, Folsom Labs, Inc.

Kareem Dabbagh, Aurora Solar

Derek Mitchell, Solar Design Tool

Michael Palmquist, PV Permit Design

Ernest Gallegos, Unirac, Inc.

Monday, April 4, 2016

1:00 pm - 3:00 pm

Sunset I, II & III

2.0 CEU Credits

Design tools for PV systems have been around for decades, but as the solar industry has grown rapidly in recent years the number of design software options has grown with it. This session will expand on last year's panel by looking at some new cloud-based tools, and diving into some fresh offerings from tools that have been around for a while.

Complimentary WiFi Access

Network: nabcep Password: nabcep2016



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## Utility Rate Structures Impact on Solar Business and System Designs

*Moderator: Catherine Kelso, Ambassador Energy*  
INVITED PANEL:  
Adam Gerza, Energy Toolbase  
Daniel Sullivan, Sullivan Solar Power  
Brad Heavner, CALSEIA

Monday, April 4, 2016  
1:00 pm - 3:00 pm  
Sunset IV, V  
2.0 CEU Credits

All across the country utilities are reacting to the growth of solar by changing, or attempting to change, the rates that customers with and without solar are charged for energy and utility service. Utility rate structures can have dramatic impacts on the economics of solar. It's important for everyone working in the solar industry to understand the impacts of rate changes on solar business, the economics of solar for customers and system design choices.

## Finance Options

Sponsored by: **BOVIET** USA

*Moderator: Catherine Kelso, Ambassador Energy*  
INVITED PANEL:  
Ken Johnson, Mitsubishi Electric  
Chris Doyle, Dividend Solar  
Dave Loomis, Ygrene Energy Fund

Michael Kirby, Alliance NRG  
TBD, Sunnova

Monday, April 4, 2016  
3:30 pm - 5:30 pm  
Dockside Room  
2.0 CEU Credits

There is no debate that one of the most significant drivers behind the growth of the solar industry in recent years has been the ability for customers to finance upfront system costs. Numerous finance options now exist for solar customers, including loans, leases, PACE, and PPAs. This session will explore the pros and cons of each so that you can effectively evaluate what different finance partners have available for you and your customers and discuss the various options with them.

## Code Compliant Interconnections

*Moderator: Kristen Nicole, Women in Solar Energy*  
INVITED PANEL:  
Ken Parks, SDG&E  
Patrick Healy, County of San Diego  
Additional, TBD

Monday, April 4, 2016  
3:30 pm - 5:30 pm  
Mission Bay Room  
2.0 CEU Credits

This session will explore the current state of the art in utility interconnection strategies for solar energy systems. What are utilities doing to automate the interconnection process? How are updates to IEEE 1547 impacting customer interconnections? And what can be done to ensure reliable, timely, cost-effective, and code-compliant solar interconnections?

## Proven Energy Storage Options

Sponsored by: **Trojan**  
BATTERY COMPANY

*Moderator: Don Warfield, Ameresco Solar*  
INVITED PANEL:  
Steve Higgins, Rolls Battery Engineering  
Brad Berwald, Morningstar Corporation  
Kalyan Jana, Trojan Battery Company

Monday, April 4, 2016  
3:30 pm - 5:30 pm  
Sunset I, II & III  
2.0 CEU Credits

The lead-acid battery has a long history of use with solar electric systems and is still by far the dominant energy storage solution used in the majority of systems installed today. This session will explore the different lead-acid technologies available today and how to successfully integrate them into your grid-connected and off-grid systems.

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MONDAY, APRIL 4, 2016

### Microgrids and Advanced Inverter Functionality

Sponsored by:



Moderator: Brian Lydic, Fronius

INVITED PANEL:

Brian Lydic, Fronius USA

John Berdner, Enphase Energy

Additional, TBD

Monday, April 4, 2016

3:30 pm - 5:30 pm

Sunset IV, V

2.0 CEU Credits

Inverters now do much more than just converting DC to AC. Learn about the advanced functions of the latest inverters on the market today, what they will be able to do for customers and utilities in the near future, and the driving forces behind this evolution.

### Magnum Energy Battery Based Applications Presented by Magnum Energy

Tuesday April 5, 2016

8:00 am - 9:30 am

Sunset II

1.5 CEU Credits

This session will provide a detailed understanding of Magnum Energy products used in DC coupled battery based scenarios and grid tied AC coupled applications with battery back-up. The presentation will also include installation and setup information on our new PT-100 MPPT charge controller, as well as a brief overview of our interconnection system equipment and remote controls. The discussion will conclude with our recently announced micro grid-tied product to be launched this summer.

## TUESDAY, APRIL 5, 2016

### NEC 2014 Arc Fault & Rapid Shutdown Presented by Yaskawa-Solectria Solar

Tuesday April 5, 2016

8:00 am - 9:30 am

Dockside Room

1.5 CEU Credits

Yaskawa - Solectria Solar will explore the primary considerations of achieving compliance with NEC 2014 for arc fault detection and rapid shutdown requirements. NEC 2014 has been recently adopted by Colorado. Information in this training is also valuable for those having to comply with NEC 2011 arc fault detection requirements. Topics discussed will include:

- Achieving AFDI and rapid shut down compliance for central inverters using string combiners
- Achieving AFDI and rapid shut down compliance for three-phase string inverters
- Arc fault detection technology basics
- Introduction to Solectria's new arc fault compliant string combiner (ARCCOM)

### Solar Solutions for Grounding, Bonding, & Wire Management Presented by Burndy, LLC

Tuesday April 5, 2016

8:00 am - 9:30 am

Bay View Room

1.5 CEU Credits

A deep dive, technical discussion and interactive experience with proper installation of WEEB® washers for compliance with NEC requirements. Project applications from residential to utility scale will be covered with best practices and where to install WEEB® washers and Lugs. Product samples are handed out and various racking/module frame assemblies are passed around for an up-close inspection and better understanding. In addition, wire management will be covered since inspectors are clamping down on using better methods for these long term applications.

### Monitoring PV Systems with the e-Gauge 3 Series Meter Presented by e-Gauge Systems, LLC

Tuesday April 5, 2016

8:00 am - 9:30 am

Garden Room

1.5 CEU Credits

This session will provide an overview of the e-Gauge monitoring platform. Topics will include: system components, installation procedure, user interface features, consumption monitoring, and lead generation methods.

### Many Ways to Proof the Roof and Stand the Land through SunModo Racking Presented by SunModo Corp.

Tuesday April 5, 2016

8:00 am - 9:30 am

Mission Bay Room

1.5 CEU Credits

This technical continuing education program will offer a comprehensive solution set for every PV application. In a detailed process view, the impositions to structural soft costs will be analyzed in the areas of site surveys, due diligence, engineering, procurement, project management, and installation. SunModo's trainer, Jeremy Taylor, holds both NABCEP PV Technical Sales and NABCEP PV Installation Professional Certifications. He will joyfully share his multifaceted wisdom that has been gleaned from the maturing industry since 2002. So, just like the way of the sun, SunModo offers a mode to harvest sun energy in an evolving, precise, and efficient manner.

### Introduction to RT-[E] Mount - Rail-less PV Mounting, the Only System with Integrated Flexible Flashing Certified by the ICC Presented by Roof Tech, Inc.

Tuesday April 5, 2016

8:00 am - 9:30 am

Sunset I

1.5 CEU Credits

This training workshop covers best practices for installing the RT-[E] Mount® and E Mount Air® Rail-less PV mounting system which is designed for fast, easy installations on pitched asphalt roofs. You will learn how to install the product to meet code and learn more about the engineering and rigorous testing that led to RT-[E] Mount's ICC Evaluation report, ASTM 2140 and UL2703.

### Identification and Wire Management in the 2014 NEC Presented by HellermannTyton

Tuesday April 5, 2016

8:00 am - 9:30 am

Sunset III

1.5 CEU Credits

This course outlines the specific types of labels that are allowed, where they should be placed and what information needs to be communicated to satisfy the AHJ, inspector and customer. It relates all requirements back to the code so that there is no question of compliance. The NEC 2014 code helps solve the problem of standardization and this course helps steer contractors in the right direction to help save them time, labor, and money.

This presentation will also cover Wire Management on PV installations. It's the details that distinguish a great installation from one that underperforms or fails over time. In this presentation, we'll show you what we've seen — from the worst to the best — in PV system installation and cable management.

### AC vs DC Coupling: The Right Solution the First Time Presented by Schneider Electric - Solar Business

Tuesday April 5, 2016

8:00 am - 9:30 am

Sunset IV

1.5 CEU Credits

After participating in this session, attendees will understand the key differences and benefits to design of hybrid inverter systems with DC coupled or AC coupled solutions

### Energy Storage - Battery Bank Sizing, Care, Troubleshooting, Do's & Don'ts Presented by Rolls Battery Engineering

Tuesday April 5, 2016

8:00 am - 9:30 am

Sunset V

1.5 CEU Credits

Proper selection and sizing of battery banks for off-grid and grid-connected systems will be

**TUESDAY, APRIL 5, 2016**

discussed, as well as inspection and installation, system setup, programming of charging set points, as well as ongoing battery maintenance and care to retain capacity and ensure long cycle life. Identifying charging issues, causes of capacity loss and other troubleshooting techniques will also be covered.

### **Installation Training - Lithium Battery Energy Storage Presented by Sonnen, Inc.**

Tuesday April 5, 2016  
10:00 am - 11:30 am  
Dockside Room  
1.5 CEU Credits

This training session primarily covers the installation process for the sonnenBatterie lithium-ion battery storage system and the safety and NEC articles for storage/PV. Also learn how to recommend the right energy storage solution with a comparison of various lithium battery types, an overview of energy storage use cases, the proper techniques for right sizing a system and the financial implications of installing residential and commercial energy storage systems.

### **Uno 7.6/8.6kW Inverter and Rapid Shutdown Presented by ABB**

Tuesday April 5, 2016  
10:00 am - 11:30 am

Bay View Room  
1.5 CEU Credits

The ABB training course introduces to the audience the just released ABB UNO-7.6/8.6 single-phase string inverter and rapid shutdown solution (RSD). The class will learn some basics about mounting, wiring, and commissioning the inverter as well as the ways in which the installer, field service professional, and owner can interface it. The second section of the class provides a refresher on the requirements listed in 2014 NEC, Article 690.12 regarding a means of rapid shutdown for PV electric systems. After seeing the architecture of a system containing an RSD, the course moves on to choosing a kit based upon installation scenarios, the physical layout of an RSD enclosure, and the basics about inverter installation.

### **Enphase Home Energy Solution Presented by Enphase Energy**

Tuesday April 5, 2016  
10:00 am - 11:30 am  
Garden Room  
1.5 CEU Credits

Learn how our newest products build the foundation for a complete Home Energy Solution that controls and manages energy generation, tracks consumption, and leverages load shifting

storage. Class topics include:

- New features of the Envoy-S
- Installation methods and operations
- Lowering costs with built in revenue grade metering
- Setting up consumption monitoring
- Storage system overview

### **Quick Rack and Solar Roofing Best Practices Presented by Quick Mount PV**

Tuesday April 5, 2016  
10:00 am - 11:30 am  
Mission Bay Room  
1.5 CEU Credits

This presentation is a combination of Quick Mount PV's popular Solar Roofing Best Practices training and Quick Rack: Design & Installation training for rail-free systems. Solar Roofing Best Practices will guide solar professionals through codes, standards, best practices, and proper product application for various rooftop mounting systems. Quick Rack: Design and installation will give an overview of rail-free racking systems and a brief hands-on demonstration.

**Complimentary WiFi Access**

**Network: nabcep Password: nabcep2016**

## **Sell More Solar With Quick Mount PV**

“ We use virtually every Quick Mount PV product for mounting rooftop solar systems. It's a no-brainer for us. We tell our customers: You have a 30-year roof, why would you use a mount that only lasts 10 years?

And Quick Mount PV delivers not just the best product, but also the best training, technical, and sales support. We use Quick Mount's website, literature and informative videos to help sell the customer on the value proposition.

No doubt about it - Quick Mount PV helps us sell more solar. ”

- A. Dean Rafaat

Owner, *Wired into the Future Solar*

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quickmountpv.com



### Advanced Battery Configuration with Morningstar's ProStar MPPT Controller Presented by Morningstar Corp.

Tuesday April 5, 2016  
10:00 am - 11:30 am  
Sunset I  
1.5 CEU Credits

This course will provide a brief overview of Morningstar's new ProStar MPPT controller features and then go into detailed setup of new advanced programming options for both sealed lead acid as well as emerging battery chemistries. Topics include charge stage configuration, low temperature charge foldback, absorption extension and voltage ceiling limits for certain load types. The ProStar MPPT is a listed product and is optimized for professional mid-range off-grid systems requiring maximum power point tracking and DC load control in a single package.

### Deep-Cycle Battery Technologies, Proper Maintenance and System Selection for Renewable Energy Applications Presented by Trojan Battery Company

Tuesday April 5, 2016  
10:00 am - 11:30 am  
Sunset II  
1.5 CEU Credits

Learn the basics of battery selection, system sizing and proper maintenance to get the most out of your deep-cycle battery investment, while understanding the key differences between flooded and VRLA technologies. In addition, learn how Trojan Battery addresses the impact of Partial State of Charge (PSOC) on deep-cycle batteries in renewable energy applications. Trojan Battery manufactures a complete line of true deep-cycle products for the renewable energy industry.

### System Design and Optimization with HelioScope Presented by Folsom Labs, Inc.

Tuesday April 5, 2016  
10:00 am - 11:30 am  
Sunset III  
1.5 CEU Credits

In this training, attendees will learn how to use HelioScope software to quickly and effectively design and sell residential and commercial solar projects. This training will cover techniques to save time, to engage with customers for improved closing rates, and to divide work across teams to improve turnaround time.

We will also cover best practices for system optimization, including component selection, shade tolerance, and system layout rules.

Finally, we will showcase a number of third-party tie-ins that can further increase installer productivity and reduce costs.

### Intro to Ground Mount Presented by IronRidge, Inc.

Tuesday April 5, 2016  
10:00 am - 11:30 am  
Sunset IV  
1.5 CEU Credits

In this presentation, we review the factors affecting Ground Mount systems, and show you how to use Design Assistant to quickly optimize cost. Topics include: Ground Mount foundation types, IronRidge Ground Mount products, and IronRidge Design Assistant tool.

### Installing Energy Storage in "The Year of Energy Storage" Presented by Outback Power Technologies

Tuesday April 5, 2016  
10:00 am - 11:30 am  
Sunset V  
1.5 CEU Credits

For several years the industry has been full of buzz about the rapid growth in storage implementation "just around the corner." What's different now is that 1. that corner is here, and 2. OutBack Power has emerged as a leader in the storage category. In this workshop OutBack will cover the most practical angles for adding energy storage to your grid-connected business, both in new and retrofit opportunities. Focus areas will include:

- DC and AC coupling system design and installation
- New power conversion technologies and topologies for residential energy storage applications
- Nano-Carbon batteries as a cost-effective entry into storage for the home and small business

### Customer Acquisition & Business Development Tools and Strategies

Sponsored by:  BayWa r.e. renewable energy

Moderator: Bernadette del Chiaro, CALSEIA  
INVITED PANEL:  
Boaz Soifer, BayWa r.e.  
Vincent Battaglia, RenovaPLUS Mycrogrid  
Shellina Danforth, Solar Reviews  
Barry Cinnamon, Spice Solar

Tuesday April 5, 2016  
1:00 pm - 3:00 pm  
Dockside Room  
2.0 CEU Credits

As equipment prices decline, soft costs become an increasing percentage of overall system expenses. New tools and techniques for acquiring and managing customers, generating sales proposals, and managing business operations are helping to drive efficiency and increase competitiveness.

### Roofing Codes and Best Practices for Solar Installation

Sponsored by:  SOLARPOD

Moderator: Tony Diaz, Century Roof and Solar  
Invited Panel:  
John Schehl, RISE  
Tom Pappas, Western States Roofing Alliance  
Chris Fisher, CertainTeed Solar  
Mouli Vaidyanathan, SolarPod Mouli

Tuesday April 5, 2016  
1:00 pm - 3:00 pm  
Mission Bay Room  
2.0 CEU Credits

One of the most confusing topics in rooftop solar is defining code requirement for waterproofing and structural attachment. We will explore the varying methods for structurally attaching a solar system to a steep slope or low slope roofs, and discuss how to interpret code requirements for waterproofing solar penetrations. We will also discuss industry best practices for installing solar on a range of roof types including shingle, tile, and low slope roofs.

### Module Level Power Electronics Options

Sponsored by:  APsystems  
ALTENERGY POWER

Moderator: Jason Fisher, SolarCity  
INVITED PANEL:  
John Berdner, Enphase Energy  
TBD, APsystems  
Josh Tatel, Namaste Solar  
Cameron Stewart, SolarEdge

Tuesday April 5, 2016  
1:00 pm - 3:00 pm  
Sunset I, II & III  
2.0 CEU Credits

Module Level Power Electronics have continued to grow in popularity across the U.S. as more installers select them for their projects. Knowledge of MLE devices have even reached homeowners who are increasingly demanding them for their systems. Several distinct strategies exist for controlling the power from a solar module and more manufacturers are entering this market. Explore the different strategies out there and the reasons an installer might select one for their project in this lively panel discussion.

### Emerging Energy Storage Options

Moderator: Jeff Spies, Quick Mount PV  
INVITED PANEL:  
Greg Smith, Sonnen, Inc.  
Phil Undercuffler, Outback Power Technologies  
Nick Carter, Tesla Powerwall

Tuesday April 5, 2016  
1:00 pm - 3:00 pm  
Sunset IV, V  
2.0 CEU Credits

Next generation lithium-ion battery systems from companies like Sonnen and Tesla have



## TUESDAY, APRIL 5, 2016

dominated the solar news over the past year as utility rate changes focused considerable attention on new battery storage solutions for load shifting and shaving. Despite this enthusiasm, the vast majority of solar battery systems continue to use conventional lead-acid batteries. This panel will evaluate comparative strengths and weaknesses of emerging battery solutions to traditional lead-acid batteries and highlight the significance of new battery management systems on battery performance and life. We'll discuss software solutions for load shifting and shaving, and forecast the impact of the new storage options on existing battery market sectors.

### Effective Sales Techniques

*Moderator: Kevin Mulvey, Sullivan Solar Power*  
INVITED PANEL:

Ken Johnson, Mitsubishi Electric  
David Savarese, Sullivan Solar Power  
Michael Bishop, OnGrid Solar  
Kelly Smith, Ambassador Energy

Tuesday April 5, 2016  
3:30 pm - 5:30 pm  
Dockside Room  
2.0 CEU Credits

Join us for a discussion about how the sales process is or can be broken down, bottlenecks and solutions, the importance of product selection criteria, benefits of creating vendor relationships, creating long-term customers, driving referrals vs. just closing deals, working with financial modeling programs, and the most common reasons why contractors lose deals.

### Managing Worker Safety

*Moderator: John Schehl, RISE*  
INVITED PANEL:

Guy Snow, G&G Systems  
John Schehl, RISE  
John Kryes, Professional Contractor Supply

Tuesday April 5, 2016  
3:30 pm - 5:30 pm  
Mission Bay Room  
2.0 CEU Credits

Solar installation is a combination of two of the most dangerous professions in the world: electrical and roofing. Managing the safety of every worker, both on and off the job site, is the highest responsibility of any solar company. You know you have to do it, but are you doing it as well as you can? Learn how to develop and implement an effective safety management plan. It's about much more than compliance.

### Large Scale 1000V System Design

*Moderator: Ryan Mayfield, Renewable Energy Associates*  
INVITED PANEL:

Jim Kadakia, Mitsubishi Electric  
Michael Nieman, Yaskawa-Solectria Solar  
Coel Schumacher, Solar BOS  
Brian Mehalic, Solar Energy International

Tuesday April 5, 2016  
3:30 pm - 5:30 pm  
Sunset I, II & III  
2.0 CEU Credits

The jump from 600 VDC to 1,000 VDC impacts every stage of the PV system design and installation. Integrators need to be aware of multiple changes in their design and installation methods to provide safe and reliable installations. This panel will focus on the impacts of 1,000 VDC on the major components and how manufacturers are reacting to provide solutions to this market segment. Changes to system designs and installation practices, as well as safety issues for the installation crews and the host site will be covered.

### Rapid Shutdown Requirements and Solutions

Sponsored by: **ABB**

*Moderator: Ward Bower, ABB*  
INVITED PANEL:  
Jason Fisher, SolarCity

John Berdner, Enphase Energy  
Ryan Stankevitz, MidNite Solar, Inc.  
Cameron Stewart, SolarEdge  
Robert Lowe, ABB

Tuesday April 5, 2016  
3:30 pm - 5:30 pm  
Sunset IV, V  
2.0 CEU Credits

NEC 2014 introduced requirements for the rapid shutdown of PV systems, causing quite a stir in the solar industry. Installation requirements spell out physical boundaries while electrical requirements allow full array voltage within the array boundaries and specified voltages and volt-ampere limits outside the boundaries. Products, strategies and moderate confusion for meeting the new requirements continue to evolve as the code gets adopted in more regions and manufacturers have had additional time to develop and improve products. This session provides insights, clarifications and methodologies for rapid shutdown for the 2014 NEC.

## WEDNESDAY, APRIL 6, 2016

### Grid-tied Battery-based System Design & Installation

Kelly Larson, Solar Energy International  
Rebekah Hren, Solar Energy International

Wednesday, April 6, 2016  
8:00 am - 5:00 pm  
Dockside Room  
6 CEU Credits

Battery-based PV system design and installation is a complex task. This class focuses on systemsizing and selecting components for residential grid-tied (multimode) applications. Load analysis techniques, inverter and controller selection criteria, battery maintenance, and NEC 2014 requirements for battery-based systems will be presented.

### Economics of Solar

Michael Bishop, OnGrid Solar

Wednesday, April 6, 2016  
8:00 am - 5:00 pm  
Bay View Room  
6 CEU Credits

PV system economics are much more complicated than calculating a simple payback based on anticipated power production and avoided energy costs. This course will provide a detailed study of commercial and residential PV economic analysis methods that include system costs, tax incentives, utility rate structures, and finance rate variables as inputs into five different financial analysis methods. Go beyond simple payback and understand Total Lifecycle Payback, Return on Investment, Internal Rate of Return (IRR), Modified IRR, and Appraisal Resale Value, and Net Present Value.

### PV System Maintenance and Troubleshooting

Bill Hoffer, Solar Energy International  
Brian Mehalic, Solar Energy International

Wednesday, April 6, 2016  
8:00 am - 5:00 pm  
Sunset I, II  
6 CEU Credits

The goal of PV system operations and maintenance (O&M) is insuring predictable ROI, PV system longevity, and peak productivity. O&M is one of the fastest-growing segments of the PV industry, and for good reasons: preventive maintenance helps lower costs; averts potential system downtime; maintains equipment warranties; and improves system efficiency and energy output. O&M strategies and procedures will be covered, along with tools and techniques for troubleshooting.

### PV and the 2014 NEC

Ryan Mayfield, Renewable Energy Associates

Wednesday, April 6, 2016  
8:00 am - 5:00 pm  
Sunset III, IV, V  
6 CEU Credits

Designed specifically for experienced PV professionals, this course will cover the major code requirements affecting PV installations, focusing on the 2014 NEC. Upon successful completion of this course, participants will have the ability to recognize and implement new code requirements for PV systems. We will also briefly explore what changes to expect in 2017.



# MAKE SURE YOUR CE<sub>s</sub> ARE COUNTED!

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**NEW**

OutBack Power based its FLEXware platform on proven customer designs to provide a **factory-built, pre-configured, pre-wired and pre-tested alternative to designing individual projects from scratch**. FLEXpower quickly became a best seller in the demanding off-grid market.

Now **there are FLEXpower solutions for all renewable energy projects, including the NEW FLEXpower Radian**—based on OutBack's Grid/Hybrid Radian Series. All advanced Radian Series features, including GridZero energy blending, Advanced Battery Charging and dual AC inputs, are available in 4kW or 8kW systems designed to take the guesswork out of your installations.

OutBack's industry-leading FX-based FLEXpower systems are also **now available with the advanced FXR**, putting the latest Grid/Hybrid technology into OutBack's classic FX form factor.

**Your time is valuable**—with FLEXpower you can spend less time on balance-of-system, and more time adding value to all of your installations.



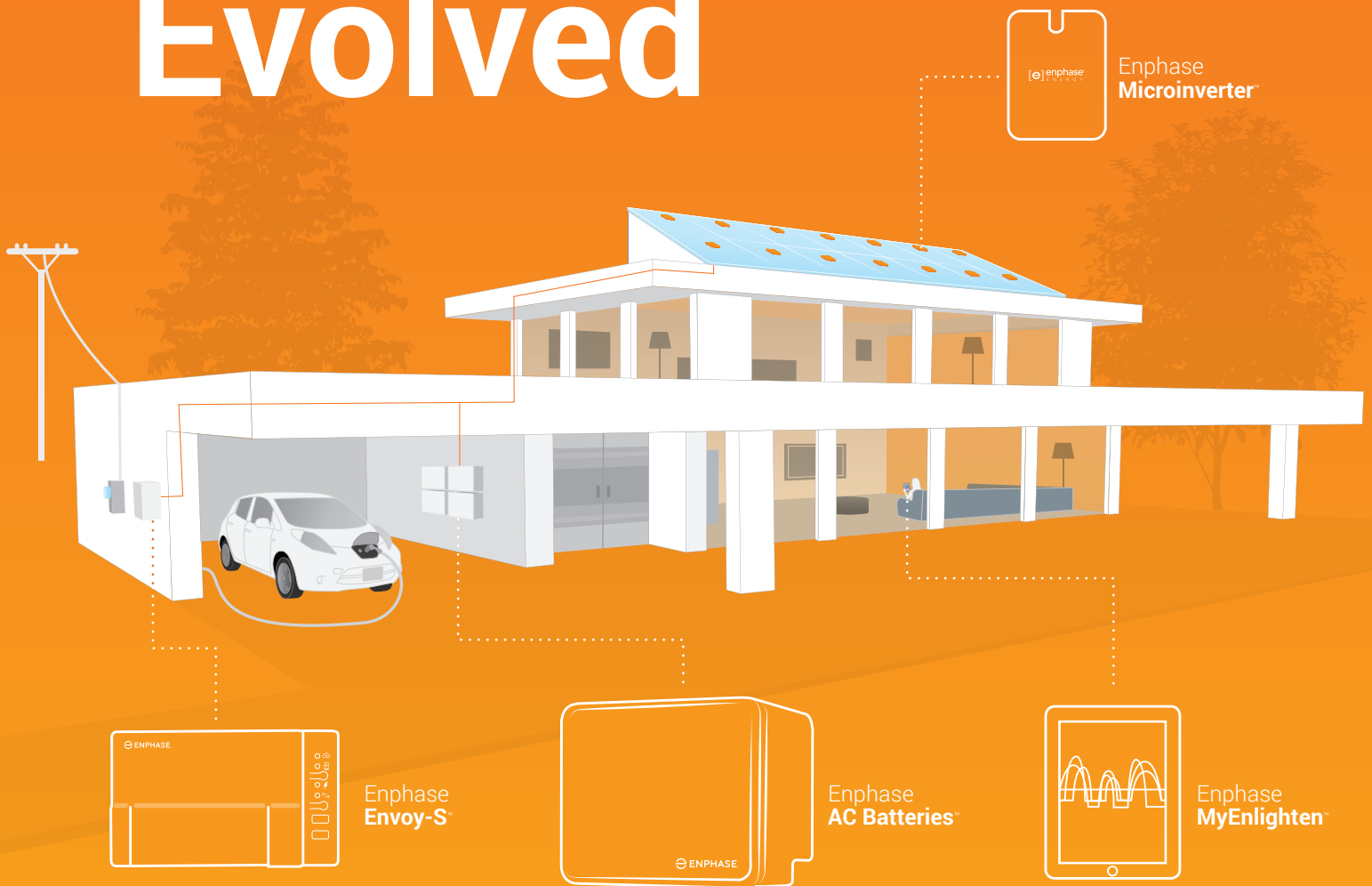
FLEXpower Radian with IBR-3  
and EnergyCell Nano-Carbon Batteries

### Store the Energy with OutBack Power—

Ideal for Partial State of Charge (PSoC) applications, EnergyCell Nano-Carbon batteries can deliver up to 44% more cycle life compared to traditional VRLA batteries.



# Energy Evolved™



Enphase is revolutionising clean energy on a global scale.

Integrated, efficient and extraordinarily reliable, the **Enphase Home Energy Solution** beautifully combines solar generation, storage and load management technologies into one solution that is a pleasure to install and use.

**That's smart energy. That's energy evolved.**