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CONFERENCE
March 13-15, 2014 / Denver, CO

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NABCEP Continuing Education CONFERENCE

March 13-15, 2014 / Denver, CO

On behalf of the NABCEP Board of Directors, I welcome you to the Third Annual NABCEP Continuing Education Conference: "Where the Best Get Better." With over 80% of conference attendees holding NABCEP PV Installation and/or Technical Sales Professional Certification, you are clearly among the best at what you do. But you are not standing still, and neither is the solar industry. The best can only stay the best by getting better, and that is what this conference is designed to help you do.

Staying the best in this industry means keeping up with a complex and rapidly evolving technological and regulatory environment, and finding better ways to do things. This year's conference offers 35 distinct trainings and workshops from a total of 49 instructors, industry experts, manufacturer trainers, and guest speakers. You will find 28 manufacturers and service providers from all facets of the solar industry on hand to give you the opportunity to learn more about what they do and how they can help you succeed. You will learn about the latest technologies, techniques, and tools of the trade from these companies' best trainers during the educational sessions. And we've allotted plenty of networking time to speak with them one on one at their exhibit booths during lunches and receptions. I'm sure you will find something for just about any situation you'll encounter in selecting, designing and installing PV systems.

There are many ways to benefit from this conference. If you look around the room at one of the refreshment breaks or receptions, you're likely to find someone like yourself who is facing the same kind of challenges in his or her business.

NABCEP is proud to be able to bring you all together, and we know that the conversations you have in-between sessions and "after hours" will be some of the most relevant and interesting that you will have all year (until the next NABCEP CE Conference).

Of course, a conference of this caliber wouldn't be possible without the generous support of our sponsors. Please join me in thanking the companies that have stepped up to support this event! NABCEP relies on the financial contributions of these industry leaders who, by doing so, join NABCEP in our mission to promote quality and raise standards within the solar industry. Your recognition of their support, through saying "thanks" to their staff (and by using their products and services throughout the year), will go a long way to ensuring the success of NABCEP… and our ability to coordinate conferences like this one again and again. We are particularly grateful to SMA, who has once again taken on the lead sponsorship level. I hope you were able to sign up for one of the tours of their manufacturing facility before they filled up. I know I am excited about seeing how it all comes together in this great city of Denver.

Thanks again for joining us. Please stop by the NABCEP booth and say "hi."

Sincerely,

Richard Lawrence, *Executive Director*

SMA America is honored to welcome our fellow solar professionals to Denver for NABCEP's third annual Continuing Education Conference. We know that this year's dynamic event will provide you with the tools you need to be successful for years to come.

This conference is an example of SMA and NABCEP's shared belief that industry growth is achieved through education. Our common goal is to offer ways for solar professionals to improve their knowledge and skills through training and certification, resulting in the most qualified workforce in the energy sector. Educational opportunities such as this conference ensure that we maintain a continuous dialogue on the latest technology and best practices, as well as how we can work together to make solar power the energy of choice.

In the constantly changing solar landscape, industry professionals must understand the importance of safety, certification, quality installations and consumer confidence. Your presence here demonstrates your willingness to increase your knowledge and seek further education, confirming your commitment to becoming an elite professional in our field. Aside from the career advancement implications, this dedication helps raise industry standards as a whole.

We would like to sincerely thank NABCEP for allowing us to partner with them once again as the lead sponsor of the conference, hosted in the progressive city where SMA's U.S. manufacturing efforts are based. As part of the conference, we will open the doors to our production facility here and we are excited to give you a glimpse into how SMA's industry-leading photovoltaic technology is realized.

It is our sincere hope that this conference will provide a higher level of professional development, exceptional networking opportunities and a greater commitment to elevating the solar industry as the premier energy provider.

Henry Dziuba
President, SMA America

"We've selected Mitsubishi Electric solar modules for our commercial and residential installations because we want to offer our customers top quality, value, and peace of mind. The outstanding technical support, marketing resources, and leads we receive from Mitsubishi Electric's experienced pros makes us feel they're an extension of our own team."

– Sevan Varteressian, Managing Director, Sun Integration
Mitsubishi Electric customer since 2005

317kW installation: Mazda R&D Center, Irvine, California.

Visit the Mitsubishi Electric booth and plan to attend our session, ***"What makes a solar module bankable?"***

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Thursday – March 13, 2014

The O&M Strategies

Kris Sutton & Joe Villacci, Solar Energy International

Thursday, March 13
9:00am – 12:15pm
Crystal I
3 CEU credits

Operations and Maintenance (O&M) is one of the fastest growing segments of the PV industry, and for good reasons: preventive maintenance helps lower costs, averts potential breakdowns, maintains equipment warranties and improves system efficiency. O&M strategies and procedures will be covered, along with remote data analysis, and tools and techniques for troubleshooting. The goal is ensuring predictable ROI, PV system longevity, and peak productivity.

Off–Grid & Grid-Tied with Battery Backup (New and Retrofit)

Brad Berwald, Morningstar Corporation

Thursday, March 13
9:00am – 12:15pm
Conference Room 927
3 CEU credits

Using 600v charge controllers and key BOS technology solutions to design and deliver several key application scenarios: 1) Off-Grid PV Systems, 2) New Grid-tied PV systems with Battery Back-up, 3) Retrofitting string PV inverter systems to include battery backup without changing the PV array's configuration.

What Makes a PV Module Bankable?

Joel Jacobs, Gian-Paolo ("GP") Caminiti, & Jim Kadakia, Mitsubishi Electric

Thursday, March 13
9:00am – 12:15pm
Colorado I
3 CEU credits

Despite dramatic price reductions over the past several years, PV modules still represent the most significant part of overall solar electric system investment. They are the only energy producing component of the system, with other components serving as transfer media. PV Modules also face the greatest expectations for performance and durability among a system's components, with all modules required to carry a 25-year performance warranty. How can you identify modules that are up to the task? In this interactive seminar you'll learn how to evaluate two performance dimensions for determining PV module bankability. The seminar will cover the most common points of technical failure in a PV module and the product design strategies being adopted to address these vulnerabilities. It will include break-out sessions, Q&A, and hands-on examples to reinforce learning from the presentation material.

Solar Roofing Best Practices

Jeff Spies, Quick Mount PV

Thursday, March 13
9:00am – 12:15pm
Colorado II
3 CEU credits

Roof penetrations can be a tremendous potential liability for solar installers. Learn how to "respect the roof" by following roofing best practices when installing PV systems on all roof types. This technical training will guide solar professionals on how to follow code, maintain the roof warranty, and reduce installer liability.

Power-One Solar Inverter Product Training

Cameron Stewart, Power-One

Thursday, March 13
9:00am – 12:15pm
Colorado III
3 CEU credits

The objective of this course is to inform solar installers, designers, and engineers about features and benefits of solar inverters that could affect a solar design. The course will give technicians a better understanding of connection, configuration, installation, monitoring and troubleshooting techniques for micro, single-phase and three-phase inverters. Additionally, instructors will explain string-sizing, grounding methods, dual MPPT functionality and differences in transformerless inverters.

Rolls Battery Systems: Battery Sizing and Care for Off-Grid and Grid-Connected Systems

Steve Higgins, Rolls Battery

Thursday, March 13
9:00am – 12:15pm
Conference Room 827
3 CEU credits

How batteries work, proper battery bank commissioning, battery sizing for off-grid and grid-connected systems, required battery maintenance, charger parameters and the troubleshooting of battery banks.

2014 NEC Requirements for PV Systems (Part 1 of 2)

Ryan Mayfield, Renewable Energy Associates

Thursday, March 13
9:00am – 12:15pm and 1:45pm-5:00pm
Crystal II & III
6 CEU credits

Designed specifically for PV professionals, this course will cover the major Code articles 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.

Decentralized commercial PV with the Sunny Tripower: See how using the world's most popular inverter can benefit your next project.

Mike Mahon, SMA

Thursday, March 13
1:45pm – 5:00pm
Crystal I
3 CEU credits

Use the right tool for the job. The flexibility of a commercial-scale string inverter means more opportunities for installers and more options for their customers. The SMA Sunny Tripower line of three-phase, transformerless string inverters will scale from a 24kW application all the way to multi-megawatt designs. Megawatt-sized systems using the Sunny Tripower have sprouted up all across the continent since its release, opening the door for installers to grow their business. This seminar will cover the important aspects of using string inverters for commercial PV applications and will compare and contrast the traditional central inverter approach, including: When does it make sense to use a decentralized design? Why should I use the Sunny Tripower for my designs? How easy is it to design, install and monitor a Sunny Tripower? Why are grid management features important for a Smart grid? Rounding out the seminar will be an explanation of the Cluster Controller monitoring device and SMA's unrivaled Performance Package, its free support service that ensures peak operation of your plant.

Power Rail – Code Related Concepts (Class I)

Power Peak/Ground Mounts (Class II)

Tom Young & Larry Phillips, DPW Solar

Thursday, March 13
1:45pm – 5:00pm
Conference Room 927
3 CEU credits

Power Rail – Code Related Concepts (Class I): Installation and permitting, choosing the right product and information related to codes and permitting.

Power Peak/Ground Mounts (Class II): Concepts related to utility-scale ground mounts.

Thursday – March 13, 2014

Latest Advancements in Off-Grid Technology

Sandra Herrera, Schneider Electric

Thursday, March 13
1:45pm – 5:00pm
Colorado I
3 CEU credits

The Schneider Electric and Square D names have always been known for their innovative product features that not only save you time and money, but provide the most efficient, reliable solar system for your customers. Join us to learn how to size an off-grid system based on common customer variables (Need to run a well pump? Family of 5? etc.) then learn about incorporating system monitoring, the most advanced off-grid technology available in the market, and the types of reliability testing (like salt-fog testing) every product should pass.

Introduction and Installation of the SolarEdge System

Jeff Laughy, SolarEdge Technologies

Thursday, March 13
1:45pm – 5:00pm
Colorado II
3 CEU credits

The introduction and installation of the SolarEdge System course includes the following subjects: system overview, product line review, safety features, monitoring server review, installation training, basic system debugging, NEC compliance, and service and diagnostic tools review.

Offgrid Systems

Don Warfield, Ameresco Solar

Thursday, March 13
1:45pm – 5:00pm
Colorado III
3 CEU credits

A review of systems design fundamentals for offgrid systems.

Roofing for the Non-Roofer

Tony Diaz, Century Solar

Thursday, March 13
1:45pm – 5:00pm
Conference Room 827
3 CEU credits

This course addresses the historical issues and challenges of adding solar equipment to both flat and slope roof platforms. It will share the best practices known with the most recent advancements in mounting equipment combined with the proven techniques and workmanship delivered every day by Tony Diaz and Century Roof and Solar.

2014 NEC Requirements for PV Systems (Continued)

Ryan Mayfield, Renewable Energy Associates

Thursday, March 13
9:00am – 12:15pm and 1:45pm-5:00pm
Crystal II & III
6 CEU credits

Continues from the morning session: Designed specifically for PV professionals, this course will cover the major Code articles 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.

Conference Schedule

Wednesday - March 12, 2014

4:00 - 9:00 PM - REGISTRATION, HOTEL LOBBY

Thursday - March 13, 2014

6:30 AM - 6:00 PM - REGISTRATION, CRYSTAL BALLROOM FOYER

8:00 AM - 8:00 PM - EXHIBIT HALL, GRAND BALLROOM (Exhibit Hall is closed during all training sessions)

7:00 AM - 8:30 AM **TOUR OF SMA** — SHUTTLE DEPARTS FROM BANQUET AREA (pre-registration required) - SOLD OUT

8:00 AM - 9:00 AM CONTINENTIAL BREAKFAST, GRAND BALLROOM FOYER

CLASSROOMS	Crystal I	Conf. 927	Colorado I	Colorado II	Colorado III	Conf. 827	Crystal II & III
9:00 AM - 12:15 PM	O&M Strategies **Solar Energy International**	Off-Grid & Grid-Tied Systems With Battery Backup (New and Retrofit) **Morningstar Corporation**	What Makes a PV Module Bankable? **Mitsubishi Electric**	Solar Roofing Best Practices **Quick Mount PV**	Power-One Solar Inverter Product Training **Power-One**	Rolls Systems: Battery Sizing and Care for Off-Grid and Grid-Connected Systems **Rolls Battery**	2014 NEC Requirements for PV Systems **Ryan Mayfield**
10:30 - 10:45 AM	MORNING BREAK, GRAND BALLROOM FOYER, SPONSORED BY **RENOVA SOLAR**						
12:30 - 1:45 PM	LUNCH, GRAND BALLROOM, SPONSORED BY **RENOVA SOLAR**						
1:45 - 5:00 PM	Decentralized Commercial PV with the Sunny Tripower: Using the world's most popular inverter **SMA**	Power Rail – Code Related Concepts (Class I) Power Peak/ Ground Mounts (Class II) **DPW Solar**	Latest Advancements in Off-Grid Technology **Schneider Electric**	Introduction & Installation of the SolarEdge System **SolarEdge**	Off-Grid Systems **Ameresco**	Roofing for the Non-Roofer **Tony Diaz**	2014 NEC Requirements for PV Systems (Continued) **Ryan Mayfield**
3:15 - 3:30 PM	AFTERNOON BREAK, GRAND BALLROOM FOYER, SPONSORED BY **RENOVA SOLAR**						

5:15 - 8:00 PM WELCOME RECEPTION, GRAND BALLROOM, SPONSORED BY **MITSUBISHI ELECTRIC**

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Conference Schedule

Friday - March 14, 2014

7:00 AM - 6:00 PM - REGISTRATION, CRYSTAL BALLROOM FOYER

7:00 AM - 8:30 AM **TOUR OF SMA** — SHUTTLE DEPARTS FROM BANQUET AREA (pre-registration required) - SOLD OUT

8:00 AM - 7:00 PM - EXHIBIT HALL, GRAND BALLROOM (Exhibit Hall is closed during all training sessions)

8:00 AM - 9:00 AM CONTINENTIAL BREAKFAST, GRAND BALLROOM FOYER

CLASSROOMS	Crystal I	Crystal III	Colorado I	Colorado II	Colorado III	Conf. 827	Crystal II
9:00 AM - 10:30 AM	"Kid" 30-amp MPPT Charge Contoller **MidNite Solar**	Medium Voltage PV Systems **Solectria Renewables**	Installing Apollo II PV Shingles **CertainTeed**	PV and Building Energy Monitoring with eGauge **eGauge**	IronRidge (Roof Mount) RM-102-I **IronRidge**	Evaluating Commercial Buildings for PV Installation **ISA Corp.**	Economics of Solar: *Making the Financial Case for Commercial & Residential PV* **Andy Black**
10:45 AM - 12:15 PM	MidNite Solar's Arc Fault Combiners and Disconnects **MidNite Solar**	New Innovations that Reduce Soft Costs of PV Installation Panel sponsored by **Clean Power Finance**	Installing Apollo II PV Shingles **CertainTeed**	PV and Building Energy Monitoring with eGauge **eGauge**	IronRidge (Roof Mount) RM-102-D **IronRidge**	Evaluating Commercial Buildings for PV Installation **ISA Corp.**	
10:30 - 10:45 AM	MORNING BREAK, GRAND BALLROOM FOYER						
12:15 - 1:45 PM	LUNCH, GRAND BALLROOM, SPONSORED BY **SCHNEIDER ELECTRIC**						
1:45 - 5:00 PM	SMA's Sunny Boy TL-US with Secure Power Supply: A Seriously Smart Home Energy Solution **SMA**	Arc Faults and Ground Faults: Potential Firemakers **Bill Brooks sponsored by Solectria**	Latest Advancements in Off-Grid Technology **Schneider Electric**	Solar Roofing Best Practices **Quick Mount PV**	Designing, Installing and Commissioning Commercial Enphase Systems **Enphase Energy**	Off-grid Products: New Features and Remotes **Magnum Energy**	Economics of Solar (Continued) **Andy Black**
3:15 - 3:30 PM	AFTERNOON BREAK, GRAND BALLROOM FOYER						

6:00 - 7:00 PM RECEPTION, GRAND BALLROOM, SPONSORED BY **QUICK MOUNT PV**

7:00 - 11:00 PM DINNER, CRYSTAL BALLROOM, SPONSORED BY **SMA**

Guest Presenters

BROOKS ENGINEERING

Century ROOF & SOLAR "Think Green! Go Solar"

OnGrid SOLAR

RENEWABLE Energy Associates

SOLAR ENERGY INTERNATIONAL renewable energy education for a sustainable future

Conference Schedule

Saturday - March 15, 2014

7:00 AM - 4:30 PM	REGISTRATION, CRYSTAL BALLROOM FOYER						
7:30 AM - 1:45 PM	EXHIBIT HALL, GRAND BALLROOM (Exhibit Hall is closed during all training sessions)						
7:30 AM - 8:30 AM	CONTINENTIAL BREAKFAST, GRAND BALLROOM FOYER						
CLASSROOMS	Crystal I	Conf. 927	Colorado I	Colorado II	Colorado III	Conf. 827	Crystal II & III
8:30 AM - 11:45 AM	Beating Mother Nature at Her Own Game: The SMA Sunny Island **SMA**	Code Issues: Fire Code (IFC2012) & UL2703 **Panels**	What Makes a PV Module Bankable? **Mitsubishi Electric**	Commercial and Utility-Scale PV Design Considerations **Solectria Renewables**	Networking and Advance Communication with Enphase **Enphase Energy**	Rolls Systems: Battery Sizing and Care for Off-Grid and Grid-Connected Systems **Rolls Battery**	2014 NEC Requirements for PV Systems **Ryan Mayfield sponsored by Power One**
10:00 - 10:15 AM	MORNING BREAK, GRAND BALLROOM FOYER, SPONSORED BY **INTERSOLAR**						
11:45 - 1:15 PM	LUNCH, GRAND BALLROOM, SPONSORED BY **INTERSOLAR**						
1:15 - 4:30 PM	AE 3TL Inverter Training **Advanced Energy**	Bonding and Grounding: Theory, Practice and Wiley Solutions **SEI and BURNDY LLC**	AC Coupling for Backup Power Applications **Outback Power**	Introduction & Installation of the SolarEdge System **SolarEdge**	Power-One Solar Inverter Product Training **Power-One**	Magnum Energy RE Applications: New Product Intro **Magnum Energy**	2014 NEC Requirements for PV Systems (Continued) **Ryan Mayfield**
2:45 - 3:00 PM	AFTERNOON BREAK, GRAND BALLROOM FOYER, SPONSORED BY **INTERSOLAR**						
4:30 PM	CONFERENCE ADJOURNS						

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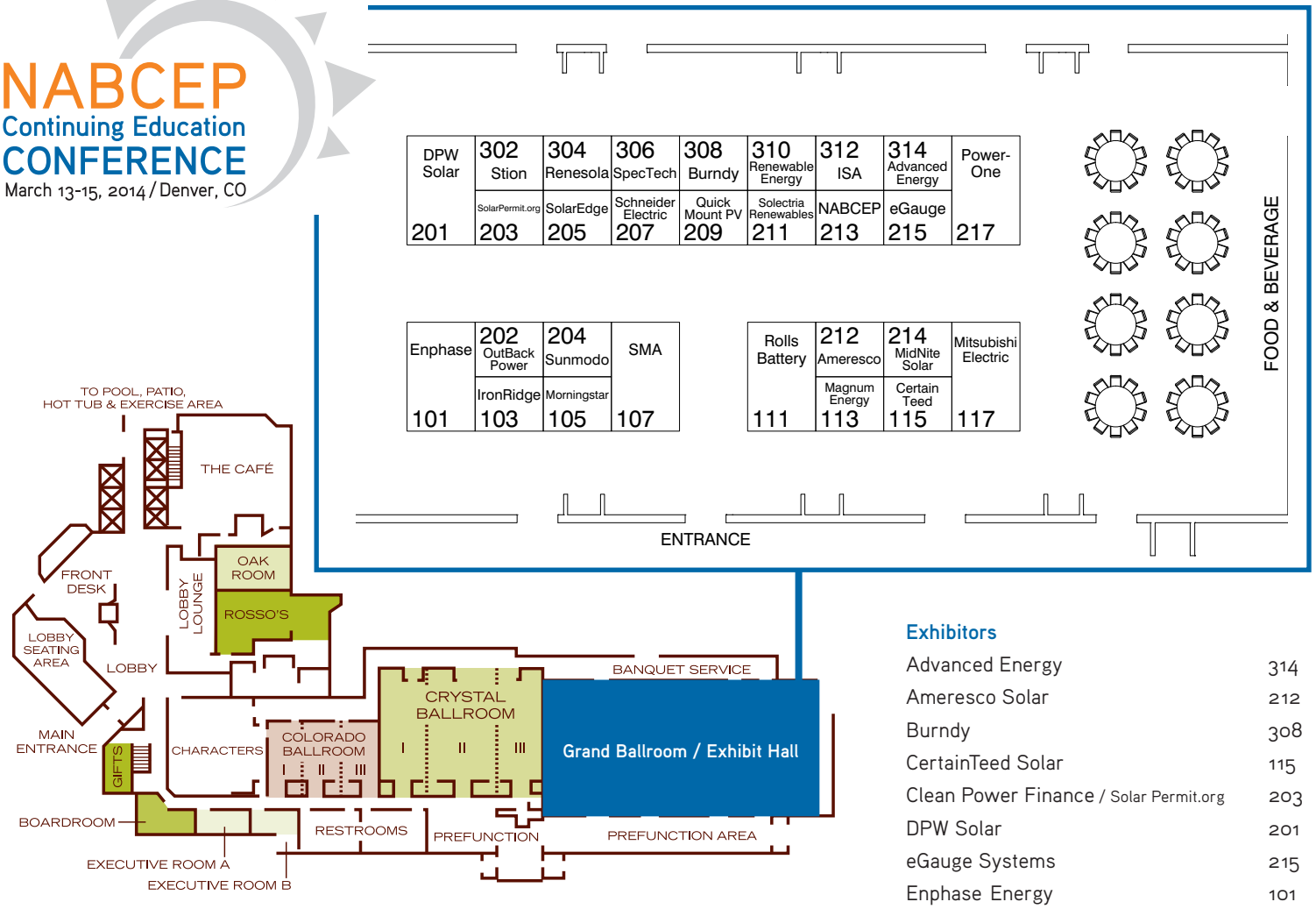
Denver, Colorado



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Friday – March 14, 2014

The Midnite Solar "Kid" 30amp MPPT Charge Controller

Robin Gudgel, Midnite Solar

Friday, March 14
9:00am – 10:30am
Crystal I
1.5 CEU credits

Introducing our newest controller, the Kid, which is the first 30amp MPPT controller for solar, wind, and hydro.

Medium Voltage PV Systems

Jon Fiorelli, Solectria Renewables

Friday, March 14
9:00am – 10:30am
Crystal III
1.5 CEU credits

What is a medium voltage PV system? Why would you choose a skid versus a stand-alone system? Do you need protective relays? What type of transformer is needed for MV systems? When should you use an MV system versus transformer-based? Get answers to these and other questions you might have about medium voltage solar systems.

Installing Apollo II PV Shingles

Katy Collardson & Sean Burr, CertainTeed Solar

Friday, March 14
9:00am – 10:30am
Colorado I
1.5 CEU credits

An overview of the installation of CertainTeed Apollo II shingles, best practices, and design considerations.

PV & Building Energy Monitoring with eGauge

Charlie Olness & Aaron Venezia, eGauge Systems

Friday, March 14
9:00am – 10:30am
Colorado II
1.5 CEU credits

This workshop will provide an overview of eGauge monitoring systems for PV and building loads. Installers can learn how to provide more services to their customer with building demand monitoring combined with a PV install. Installation and configuration will be covered, along with photos and examples.

IronRidge (Roof Mount) RM-102-I

Dan Felix, IronRidge Inc.

Friday, March 14
9:00am – 10:30am
Colorado III
1.5 CEU credits

Tech training on the IronRidge Roof Mount for installers. Step-by-Step best practices and installation of the IR Rail system.

Commercial Building Evaluation for Solar Installation

Tony Zante, ISA Corporation

Friday, March 14
9:00am – 10:30am
Conference Room 827
1.5 CEU credits

This course provides the tools for evaluating a commercial building to determine its suitability for the proposed solar array, including building review and structural capacity. It includes procedures, check lists and decision trees to assist in determining cost effective mounting alternatives for the project.

Economics of Solar: Making the Financial Case for Commercial & Residential PV (Part 1 of 2)

Andy Black, OnGrid Solar

Friday, March 14
9:00am – 12:15pm and 1:45pm – 5:00pm
Crystal II
6 CEU credits

A detailed study of Commercial and Residential PV Economic Analysis including system costs, incentives and electric rate structures variables as inputs to five financial analysis methods, including Simple Payback, Total Lifecycle Payback, ROI, Internal Rate of Return (IRR), Modified IRR, and Appraisal Resale Value.

Midnite Solar's Arc Fault Combiners and Emergency Disconnects

Robin Grudgel, Midnite Solar

Friday, March 14
10:45am – 12:15pm
Crystal I
1.5 CEU credits

This course reviews and explains Midnite Solar's family of Arc fault combiners' various applications and introduces its "bird house" emergency disconnect switch.

New Innovations that Reduce Soft Costs of PV Installation

Panelists: Matt Brown, Simuwatt/Concept3D; James Tong, Clean Power Finance; and Paul Grana, Folsom Labs
Moderator: Sarah Truitt, NREL
Sponsored by Clean Power Finance

Friday, March 14
10:45am – 12:15pm
Crystal III
1.5 CEU credits

This panel will feature a discussion on developing new tools that help reduce soft costs in the areas of customer acquisition and PV system sales, design and permitting. Demonstrations of software tools will be presented by the representatives of three companies on the cutting edge of reducing PV soft costs.

Installing Apollo II PV Shingles

Katy Collardson & Sean Burr, CertainTeed Solar

Friday, March 14
10:45am – 12:15pm
Colorado I
1.5 CEU credits

An overview of the installation of CertainTeed Apollo II shingles, best practices, and design considerations.

PV & Building Energy Monitoring with eGauge

Charlie Olness & Aaron Venezia, eGauge Systems

Friday, March 14
10:45am – 12:15pm
Colorado II
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This workshop will provide an overview of eGauge monitoring systems for PV and building loads. Installers can learn how to provide more services to their customer with building demand monitoring combined with a PV install. Installation and configuration will be covered, along with photos and examples.

IronRidge (Roof Mount) RM-102-D

Dan Felix, IronRidge Inc.

Friday, March 14
10:45am – 12:15pm
Colorado III
1.5 CEU credits

This IronRidge training for Roof Mount designers will review, in detail, the items designers should be checking in designing an IronRidge rail roof mounted racking system.

Commercial Building Evaluation for Solar Installation

Tony Zante, ISA Corporation

Friday, March 14
10:45am – 12:15pm
Conference Room 827
1.5 CEU credits

This course provides the tools for evaluating a commercial building to determine its suitability for the proposed solar array, including building review and structural capacity. It includes procedures, check lists, and decision trees to assist in determining cost effective mounting alternatives for the project.

SMA's Sunny Boy TL-US with Secure Power Supply: A Seriously Smart Home Energy Solution

Greg Smith, SMA

Friday, March 14
1:45pm – 5:00pm
Crystal I
3 CEU credits

Rarely does technology make such leaps forward like the TL-US series has. This groundbreaking device offers the industry's first Secure Power Supply, allowing it to produce power when the grid goes down without the use of batteries! After this introductory class, you will have a greater understanding of: Secure Power Supply benefits and capabilities, installation best practices for a worry-free site, simple array design allowing for different orientations, tilt and partial shading, and easy plug-and-play communication and monitoring with our new Webconnect module.

Arc Faults and Ground Faults: Potential Firemakers

Bill Brooks, Brooks Engineering
Sponsored by Solectria

Friday, March 14
1:45pm – 5:00pm
Crystal III
3 CEU credits

Over the past several years, fires have occurred in PV systems. The cause of these fires are now well understood. This session will provide a brief overview of the research on the subject, cover the field techniques that can identify potential problems, and discuss design and equipment methods that can prevent fires from occurring in PV systems.

Latest Advancements in Off-Grid Technology

Sandra Herrera, Schneider Electric

Friday, March 14
1:45pm – 5:00pm
Colorado I
3 CEU credits

The Schneider Electric and Square D names have always been known for their innovative product features that not only save you time and money, but provide the most efficient, reliable solar system for your customers. Join us to learn how to size an off-grid system based on common customer variables (Need to run a well pump? Family of 5? etc.), then learn about incorporating system monitoring, the most advanced off-grid technology available in the market, and the types of reliability testing (like salt-fog testing) every product should pass.

Solar Roofing Best Practices

Johan Alfsen, Quick Mount PV

Friday, March 14
1:45pm – 5:00pm
Colorado II
3 CEU credits

Roof penetrations can be a tremendous potential liability for solar installers. Learn how to "respect the roof" by following roofing best practices when installing PV systems on all roof types. This technical training will guide solar professionals on how to follow code, maintain the roof warranty, and reduce installer liability.

Designing, Installing, and Commissioning Commercial Enphase Systems

Peter Lum, Enphase Energy

Friday, March 14
1:45pm – 5:00pm
Colorado III
3 CEU credits

This session is for professionals to understand core design, installation, and commissioning principles for commercial Enphase products. The latest in microinverter and monitoring technologies will be covered.

Magnum Energy Offgrid Products – New Features /Remotes

Alan Stantos-Buch, Magnum Energy

Friday, March 14
1:45pm – 5:00pm
Conference Room 827
3 CEU credits

This offgrid/stand-alone product overview will cover new features, upgrades, and remote control programming.

Economics of Solar (Continued)

Andy Black, OnGrid Solar

Friday, March 14
9:00am – 12:15pm and 1:45pm – 5:00pm
Crystal II
6 CEU credits

Continues from the morning session: A detailed study of Commercial & Residential PV Economic Analysis including system costs, incentives, and electric rate structures variables as inputs to five financial analysis methods, including Simple Payback, Total Lifecycle Payback, ROI, Internal Rate of Return (IRR), Modified IRR, and Appraisal Resale Value.

Beating Mother Nature at Her Own Game: The SMA Sunny Island

Greg Smith, SMA

Saturday, March 15
8:30am – 11:45am
Crystal I
3 CEU credits

Don't let a hurricane or polar vortex get your customers down. Stand-alone and battery backup systems using the industry-leading Sunny Island off-grid inverter are ideal for locations prone to power outages or customers who want more independence from the grid. On the fence about adding AC-coupled systems to your business portfolio or have questions about using this unique product? The class will cover the following: system design ideas to get you started; generator tips to ensure proper operation in a Sunny Island system; backup power with or without PV; simple commissioning and commonly used parameter settings for worry-free operation; using Sunny Islands in a cluster for maximum flexibility, surge and application, and TLC for batteries: the Sunny Island's #1 priority! Learn about the BMS and how to ensure long battery life.

Code Issues: IFC2012 and UL2703

Saturday, March 15
8:30am – 11:45am
Conference Room 927
3 CEU credits

Prepare for the new fire code and UL racking standards: Learn the impact on your system designs/installations. The first half of this session will be devoted to exploring the new UL2703 standard for racking and grounding of rooftop PV systems: how it works, and what impact will it have on your PV designs and your solar business. The second half of the session will be devoted to exploring the new roofing setback and labeling requirements mandated by the new 2012 International Fire Code.

Moderator for both sessions

- Jeff Spies, Quick Mount PV, UL2703 Grounding/Bonding and Corrosion Subcommittee Leader

UL2703 panelists

- Daniel Sherwood, SunLink, UL2703 Revision Committee Chair
- Mark Gies, Panelclaw, UL2703 Structural, Grounding/Bonding and Corrosion Committee
- Wolfgang Fritz, Schletter, UL2703 Structural Loading Committee
- Harley Haney, Burndy LLC, UL2703 Structural, Grounding/Bonding and Corrosion Committee
- Chris Fleuckiger, Renewable Energy Engineer at Underwriters Laboratory

2012 fire code panelists

- Dan Fink, Buckville Energy Consulting, Masonville, CO
- Dave Lowrey, Boulder Fire Rescue, City of Boulder, CO

What Makes a PV Module Bankable?

Joel Jacobs, Gian-Paolo ("GP") Caminiti, & Jim Kadakia, Mitsubishi Electric

Saturday, March 15
8:30am – 11:45am
Colorado I
3 CEU credits

Despite dramatic price reductions over the past several years, PV modules still represent the most significant part of overall solar electric system investment. They are the only energy producing component of the system, with other components serving as transfer media. PV Modules also face the greatest expectations for performance and durability among a system's components, with all modules required to carry a 25-year performance warranty. How can you identify modules that are up to the task? In this interactive seminar you'll learn how to evaluate two performance dimensions for determining PV module bankability. The seminar will cover the most common points of technical failure in a PV module and the product design strategies being adopted to address these vulnerabilities. It will include break-out sessions, Q&A, and hands-on examples to reinforce learning from the presentation material.

Commercial and Utility-Scale PV Design Considerations

Jon Fiorelli, Solectria Renewables

Saturday, March 15
8:30am – 11:45am
Colorado II
3 CEU credits

This customized training includes installation details and various design considerations for commercial and utility-scale applications. It will include information on DC breakers versus fuses versus no inputs, DC/AC oversizing, string sizing best practices, AC/DC connections, wiring needs, string combiners, data monitoring and temperature/voltage considerations. This training also gives you firsthand working knowledge from the experts on the simplicity and ease of installation for Solectria Renewables' commercial/utility-scale inverters ranging in size from 10kW – 2MW. The inverters Solectria will discuss include its PVI 14-20 TL (3 Ph transformless inverters), PVI 50-100 KW, SGI 225-500PE and SGI 500XT (external transformer inverter).

Networking and Advanced Communication with Enphase

Jarett Skeffington, Enphase Energy

Saturday, March 15
8:30am – 11:45am
Colorado III
3 CEU credits

This session is for experiencd Enphase installers and is intended to help students develop a deeper working knowledge of networking and communications related to Enphase systems. This will be lecture and lab format.

Rolls Battery Systems: Battery Sizing and Care for Off-Grid and Grid-Connected Systems

Steve Higgins, Rolls Battery

Saturday, March 15
8:30am – 11:45am
Conference Room 827
3 CEU credits

How batteries work, proper battery bank commissioning, battery sizing for off-grid and grid-connected systems, required battery maintenance, charger parameters and the troubleshooting of battery banks.

2014 NEC Requirements for PV Systems (Part 1 of 2)

Ryan Mayfield, Renewable Energy Associates
Sponsored by Power-One

Saturday, March 15
8:30am – 11:45am and 1:15pm – 4:30pm
Crystal II & III
6 CEU credits

Designed specifically for PV professionals, this course will cover the major Code articles 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.

AE 3TL Inverter Training

Chris Lomibao, Advanced Energy

Saturday, March 15
1:15pm – 4:30pm
Crystal I
3 CEU credits

The intent of this product training course is to teach NABCEP installers what the Advanced Energy 3TL inverter is, what types of applications they will most likely see with them, how they are installed, functionality, best installation practices, start-up procedures, monitoring applications and troubleshooting.

Bonding and Grounding: Theory, Practice, and Wiley Solutions, SEI and BURNDY

Harley Haney, Burndy LLC & Brian Mehalic, Solar Energy International

Saturday, March 15
1:15pm – 4:30pm
Conference Room 927
3 CEU credits

Review of NEC UL codes as they pertain to best practices for installing BOS (balance of systems). Safe, efficient, time saving methods for bonding, grounding, wire management will be covered.

AC Coupling for Backup Power Applications

Matt James, Outback Power

Saturday, March 15
1:15pm – 4:30pm
Colorado I
3 CEU credits

The objective of this training is to discuss the AC Coupling Solution for backup power applications using battery based inverter/chargers and methods for regulating PV charging including an option that provides battery and generator protection components. You will learn to land your grid-tie inverter field connections and an optional two-wire generator start to the system for adding battery back-up to grid tied solar solutions.

Introduction and Installation of the SolarEdge System

Jeff Laughy, SolarEdge Technologies

Saturday, March 15
1:15pm – 4:30pm
Colorado II
3 CEU credits

The introduction and installation of the SolarEdge System course includes the following subjects: system overview, product line review, safety features, monitoring server review, installation training, basic system debugging, NEC compliance, and service and diagnostic tools review.

Power-One Solar Inverter Product Training

Josh Rogers, Power-One

Saturday, March 15
1:15pm – 4:30pm
Colorado III
3 CEU credits

The objective of this course is to inform solar installers, designers, and engineers about features and benefits of solar inverters that could affect a solar design. The course will give technicians a better understanding of connection, configuration, installation, monitoring and troubleshooting techniques for micro, single-phase and three-phase inverters. Additionally, instructors will explain string-sizing, grounding methods, dual MPPT functionality and differences in transformerless inverters.

Magnum Energy RE Applications – New Product Intro

Alan Santos-Buch, Magnum Energy

Saturday, March 15
1:15pm – 4:30pm
Conference Room 827
3 CEU credits

A stand alone and backup power application discussion, introducing new products, including the PT100 charge controller and ACLD-40 for AC coupling applications.

2014 NEC Requirements for PV Systems (Continued)

Ryan Mayfield, Renewable Energy Associates

Saturday, March 15
8:30am – 11:45am and 1:15pm – 4:30pm
Crystal II & III
6 CEU credits

Continued from the Morning Session: Designed specifically for PV professionals, this course will cover the major Code articles 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.

Conference Presenters

Johan Alfsen is Director of Training at Quick-Mount PV. He has been in the solar industry since 2004, starting as an installer in the San Francisco Bay area. In his roles as speaker, trainer and author of various articles on roof penetrations and code compliance for residential solar installations, Johan is known industry-wide for his passionate advocacy of solar roofing best practices. He sits on the Board of Directors for Roof Integrated Solar Energy (RISE) as well as the PV Installation Professional Resource Guide Committee for NABCEP. He was recently certified by the Tile Roofing Institute (TRI).

Brad Berwald brings more than 11 years of technical sales experience in the PV and semi-conductor industries to Morningstar Corporation. Brad joined Morningstar in 2002 as a Sales Engineer. His expertise in Managing Global Accounts, Technical Marketing and Training, IT and Networking, Database Management and Product Development has enabled him to take on many new challenges at Morningstar. In his current role, Brad is helping Morningstar grow its international business and evolve its product portfolio to meet the evolving needs of the renewable solar energy market. Brad holds a BSEE and a Marketing-focused MBA from Alfred University.

Andy Black is CEO of OnGrid Solar. OnGrid provides financial analysis and sales software to solar installers to help them close more sales (www.ongrid.net/payback). Andy specializes in the financial payback of solar electricity systems. He holds a Masters in Electrical Engineering and a Certificate in Marketing. He is a NABCEP Certified PV Installation Professional emeritus and a member of the NABCEP PV Technical Sales Professional Resource Guide and Technical Committees. Andy is a recent Director of CalSEIA, the NorCal Solar Energy Association, and the American Solar Energy Society.

Bill Brooks has designed, installed and evaluated grid-connected PV systems for more than 25 years. He is a consultant to the PV industry on a variety of performance, troubleshooting, and training topics. Over the past 15 years, his training workshops have helped more than 5,000 local inspectors and 5,000 electricians and installers understand PV systems and how to properly install and inspect them. Mr. Brooks has written several important technical manuals for the industry, including IREC Field Inspection Guidelines for PV Systems and the NABCEP PV Installation Professional Resource Guide (coauthor). His experience includes work on Code Making Panel 4 for the National Electrical Code, Article 690, and IEEE utility interconnection standards for PV systems. He is also an active participant in Standards Technical Panels (STP) for UL1741 (Inverters), and UL1703 (PV Modules) and serves as task group lead for Fire Ratings and Grounding in UL 1703 STP.

Matt Brown joined concept3D in 2007 after working at Google on the Google Earth 3D buildings development team. After launching concept3D's Atlas map management software, Matt joined the simuwatt team as Director of Product Management overseeing both Solar and Energy Auditor products. Matt left Michigan to study Architecture at the University of Colorado at Boulder and has no plans to move back.

Sean Burr is Sales Manager, CertainTeed Solar. A PV business development professional, Sean has worked in the solar industry since 2002 as an installer, designer and sales manager. He has a B.A. in Environmental Education from Prescott College.

Gian-Paolo ("GP") Caminiti has led business development and regional sales for Mitsubishi Electric in the eastern US and Caribbean since 2009. Prior to working with Mitsubishi Electric, GP headed his own renewable energy systems company, including low-pressure hydrogen storage through fuel-cell integration. He moved the company from Germany to the US in 2001. GP has worked extensively in international business development, specializing in sales force development, executive coaching, and strategic business development.

Katy Collardson is Technical Supervisor, CertainTeed Solar. A NABCEP Certified PV Installation Professional, Katy has worked in the solar industry since 2006 as an installer, designer, project manager and trainer. She has a B.A. in German from Colorado College and an MBA, with a Certificate in Sustainable Technology, from ASU.

Tony Diaz has more than 27 years of experience in the roofing industry and has been building PV systems since 2001. Tony is both a roofing contractor and an electrical contractor with the State of California and operates Century Roof and Solar out of the San Francisco Bay area. He is also a contract instructor for Solar Energy International. Recognized for his expertise in the roof tile, built-up, solar and composition shingle sector, Tony is factory-certified on many roof systems and is qualified to assemble and build composition, tile, shake, shingle, single ply PVC and PV solar-integrated roof tiles. Tony is a NABCEP Certified PV Installation Professional and a RISE Certified Solar Roofing Professional.

Jim Egan has more than 25-years of experience in the commercial and residential industry as an electrical contractor. He holds three national certifications as an electrical inspector with the International Association of Electrical Inspectors (IAEI) and National Fire Protection Association (NFPA). He is also an electrical section voting member of the NFPA for the National Electrical Code. Since 1996, he has been involved in the renewable energy industry. Jim teaches credited courses, workshops and seminars at colleges and industry venues. He joined Power-One in 2011 and leads the company's training program and customer support group.

Dan Felix is a Training Manager with IronRidge, where he develops training classes and programs, develops best use practices of the IR product lines, and works with IR Product Development for new products. As Western US Project Manager for Nation Wide Solar Integrator, Dan built and managed large commercial and utility scale solar projects in the western US. Prior to that, Dan managed and operated Erickson Construction Electrical Division, overseeing large commercial solar projects in Northern CA.

Dan Fink has been designing, installing and servicing renewable energy systems since 1994. He has served as a firefighter with the Rist Canyon Volunteer Fire Department, Larimer County, Colorado since 1998. Dan began training both firefighters and RE installation professionals in fire safety practices in 2008, and his classes on the topic are accredited as Continuing Education by both IREC and NABCEP.

Jon Fiorelli is an Applications Engineer who has worked in the PV industry for more than five years. He has been involved in all phases of commercial PV design, installation, commissioning, and O&M. Prior to joining Solectria Renewables, Jon was an Application Engineer for Satcon Technology. His experience and training as a NABCEP Certified PV Installation Professional has helped him to excel in the field of solar. Jon joined the Solectria team in March of 2013.

Christopher Flueckiger is the global Principal Engineer for Renewable Energy at Underwriters Laboratories. Chris joined UL in 2000 working in the Power Distribution, Medical, and ITE groups. His current PDE responsibilities include Solar Energy Systems, Photovoltaics, Solar Thermal, and Solar Balance of System Devices with close collaboration and lead reviewer responsibilities for Inverters, Wind Turbines, and other Renewable Energy Systems.

Wolfgang Fritz, Vice President of Engineering, leads the engineering department for Schletter Inc.'s North American operations. After receiving his Ph.D. from the University of Arizona, and prior to joining Schletter, Dr. Fritz worked for six years as an engineering consultant, mainly on infrastructure development projects. He coordinates the implementation of all the engineering design features of the solar mounting systems Schletter manufactures—ranging from small residential systems to large commercial roof mounted and utility-scale ground mounted power plants.

Mark Gies, Vice President of Reliability and Compliance at PanelClaw, has more than 20 years of engineering and engineering management experience. He currently is a member of the Standards Technical Panel for UL's solar PV mounting systems subject, UL2703, as well as an associate member of SEAOC's solar committee. Prior to joining PanelClaw, Mark founded and served as

continued on pg. 18

Conference Presenters continued

COO/CFO of Inventor's Workshop. Mark holds an MBA from F.E. Olin School of Business at Babson College, and an ME and AB in mechanical engineering from Dartmouth College.

Paul Grana is the co-founder and head of sales and marketing for Folsom Labs, a leading design and performance modeling software provider. Previously, he was the Director of Product Management and Technical Marketing for Tigo Energy, and has also worked for Abound Solar. Paul holds a BS in Mathematics from the University of Chicago and an MBA from Harvard Business School. He also holds a patent on combiner box design.

Robin Gudgel is a mechanical engineer who has 25 years experience in the solar industry. He was the chief mechanical engineer and an owner of Trace Engineering for 10 years, founder and president of OutBack Power and MidNite Solar. There is scarcely an off-grid system in North America that doesn't have at least one piece of equipment that Robin didn't have a hand in designing — some good and some not as good. Experience helps in this industry.

Harley Haney is the Solar Segment Sales Manager at Burndy and has more than 20 years' experience in product safety and regulatory compliance. His responsibilities include engineering applications, product design, project management and business development in the PV arena. His goal is to drive the growth of the Wiley product line through design innovations that add value for ease of installation and saving time at the job site. Harley has technical expertise in Codes and Standards and is an active member on two of UL's Standards' Technical Panels: UL 1703 for PV Modules and UL 2703 for PV Racking Systems focusing on bonding and grounding requirements.

Sandra Herrera enjoys assisting customers every day to overcome technical solar challenges. With her expertise and experience in single- and three-phase solar systems, she has helped countless customers in her two years of working for Schneider Electric. Sandra has been happy in the dynamic renewable energy industry for the past nine years, and sees great potential for solar applications in developing nations.

Steve Higgins, Technical Services Manager for Rolls Battery Engineering, has spent the last two decades helping with the design, sales and troubleshooting of battery-based systems all over the world. During this time, Steve has also been working to educate installers and integrators on inverter repair, proper system sizing and the design, operation, maintenance and troubleshooting of battery-battery based renewable energy systems.

Joel Jacobs leads business development and regional sales for Mitsubishi Electric in the western US. He has strong insight into PV module quality, having represented several module manufacturers over the past eight years. Prior to joining the solar industry, Joel built and implemented the largest family-centered consumer expo in California, which ran for more than 10 years. Joel's specialties include new business development, channel development and management, strategic planning, building loyal partnerships, account management, and creative exploration and problem solving.

Matt James has 11 years of experience in the battery based inverter industry, seven of them at OutBack Power Technologies. He currently manages the application engineering team who support Outback's customers with product training and troubleshooting. He lives an uninterrupted and battery-backed-up life in the foothills of the Cascade mountain range in Granite Falls, WA with his family and his off-grid wood shop.

Jim Kadakia is a Senior Engineering Manager in the Photovoltaic Division of Mitsubishi Electric US, Inc. He is responsible for technical aspects of the US photovoltaic module business, including warranty-related matters, code compliance, and engineering system design and development for residential and commercial applications, including complete AC/DC solutions. Jim has a Masters degree in Electrical Engineering and is a professional engineer (Electrical – State of California). For more than 30 years he has led technical teams in product development and project management as related to inverters, electrical systems, motor controllers, UPS, power electronics, refinery electrical systems, turbines, battery back-up for traffic intersections and cell towers, and PV system design.

Jeff Laughy has been working in renewable energy power electronics for more than 16 years. He has held a variety of design and engineering positions at Kenetech Windpower, Trace Technologies, Xantrex, CiscoSystems, SMA America, Enphase Energy, and SolarEdge Technologies. His experience includes inverter design for wind and hybrid power generation technologies and application engineering, ranging from micro-up to mega-Watt grid-tie PV systems.

Chris Lomibao is a field applications engineer with Advanced Energy Industries. Chris's background includes electrical design of large commercial and utility-scale photovoltaic systems. He also has experience in designing fixed-tilt shade canopies and single-axis and dual-axis tracker PV systems. He has additional experience in PV system utility witness testing, commissioning, operations, and maintenance-manual creation, as well as system performance estimating. His most recent projects include a 35 megawatt peak (MWac) utility-scale PV system in Gila Bend, AZ, where he led the PV electrical direct current (DC) design.

David Lowrey serves as Chief Fire Marshal with the City of Boulder Fire Rescue in Boulder, Colorado, where he has worked for 17 years. Prior to his appointment as Fire Marshal, he served eight years as the department's Fire Protection Engineer. He oversees the Life Safety Division, including code enforcement, building and construction, fire and life safety education and fire investigations. David has extensive experience in plan review as well as the inspecting and acceptance testing of fire protection systems. He is a principal member and current chair of the NFPA 72 technical committee for notification appliances, as well as a principal member of the NFPA 13 technical committee for installation and the NFPA 13 correlating committee. He serves as an alternate on technical committees NFPA 3 and 4, on the commissioning and integrated testing of fire protection and life safety systems.

Peter Lum is a technical training professional with more than 20 years of experience in hi-tech and renewable energy. Peter is the senior trainer at Enphase Energy and has also managed and delivered technical training at Fat Spaniel Technologies. He is an Assistant Professor in the California college system where he teaches Solar Technology, Design, and Sales.

Mike Mahon is a technical training specialist with the SMA Solar Academy, delivering in-person training and webinars covering SMA products and the basics of photovoltaics. Prior to joining SMA in 2011, Mike taught NABCEP Entry Level Exam preparation and PV installation and design classes for private firms and non-profit organizations. Mike holds a PhD in chemical engineering and a master's degree in electrical engineering, and has worked in the energy industry since 1998.

Ryan Mayfield has been working in the renewable energy field since 1999 and is the President of Renewable Energy Associates, a Corvallis, Oregon, consulting firm providing design, support and educational services for electrical contractors, architectural and engineering firms, manufacturers and government agencies. Ryan serves as Photovoltaic Systems Technical Editor for SolarPro magazine, regularly writes feature articles in SolarPro and Home Power magazines and wrote PV Design and Installation for Dummies. Ryan was also a contributor and video team member for Mike Holt's Understanding the NEC Requirements for Solar Photovoltaic Systems.

Brian Mehalic is a NABCEP Certified PV Installation Professional and ISPQ-certified PV instructor with more than a decade of experience designing, installing, servicing, and inspecting all types and sizes of PV systems. He is a curriculum developer and instructor for Solar Energy International and North Carolina State University, a frequent contributor to SolarPro and Home Power, and an independent consultant.

Charlie Olness is one of the original founders of eGauge Systems and has been the technical sales director since 2009. Before eGauge, Charlie worked as a PV installer and PV sales person for Simple Solar and SRE in the Boulder area. Before utility rebates hit Colorado, Charlie worked as a support technician for Real Goods in the Renewable Energy catalog division and as a research associate for the DOE focused on environmental carbon cycling. Charlie graduated is with a BS from UC Berkeley.

continued on pg. 20

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Conference Presenters continued

Larry Phillips worked in the Spec Home building industry for many years and has always been interested in renewable energy. After attaining an associate's degree in the Renewable Energy field, Larry started at DPW Solar in 2012 as a Product Support Specialist. Avid NM Lobo Fan, Larry takes pride in working with customers to get them the right solution for the right project.

Joshua Rogers, Power-One Technical Training Specialist, has ten years of experience working with power equipment and training operations. He joined the Power-One team more than a year ago. Prior to joining Power-One, Rogers was in the US Navy for just under nine years, where he served as a nuclear operator on CVN 73, a nuclear aircraft carrier. He went on to be an instructor at the Navy's Nuclear Power Training Unit, where he taught prospective operators on theory, operation and incident response. Since joining Power-One he has developed an extensive training program to educate individuals on Power-One products features, installation, and troubleshooting from Residential to Utility PV.

Alan Santos-Buch is the Director of Renewable Energy at Magnum Energy. He provides technical sales, training and support for dealers, distributors and installers in the Americas. Previously, as a managing partner at Solar Power Fit, LLC (SPF), Alan developed Power Purchase Agreements (PPAs) with commercial building owners who agreed to host their PV systems. He passed the NABCEP PV Entry Level Exam in 2007.

Daniel Sherwood is a professional electrical engineer with more than a decade of experience in the solar industry. He is SunLink's director of electrical products and regulatory compliance and is also the chair of the UL2703 standards technical panel task group.

Jarett Skeffington is a Training Professional at Enphase Energy. Jarett has been involved in the hi-tech field for more than a 14 years, holding a variety of technical positions at companies ranging from start-ups to multi-national public companies. At Enphase, Jarett runs in-person training, in addition to online webinars, for the company's entire installer customer base, as well as end users. Jarett is responsible for ongoing training development for the complete line of Enphase products. Prior to Enphase, Jarett was a senior software engineer at Tellabs, where he was responsible for training the global engineering staff.

Greg Smith is a technical training specialist for the SMA Solar Academy, where he develops curriculum and performs on-site seminars and webinars about SMA products, code compliance and installation best practices. Smith, who holds a master's degree from Central Michigan University, spent 20 years in the U.S. Navy, most recently as a submarine sonar technician and master training specialist.

Jeff Spies is the Senior Director of Business Development at Quick Mount PV, serves as NABCEP Secretary and leads two committees for the UL2703 standards test panel. He has been on the forefront of solar training since his entry into the PV industry in 2007. Thousands of contractors and installers have attended his popular online and live trainings. He is a regular speaker at major industry trade shows and has authored several technical articles for major trade publications. Jeff holds a B.S. in Mechanical Engineering, and he worked in sales, marketing, and technical training in the industrial automation field prior to moving into solar.

Cameron Stewart is a PV Academy Technical Trainer at Power-One and has nine years of experience in the photovoltaic industry. Prior to joining Power-One, Cameron was a Field Service Engineer at a local module manufacturer and EPC group, where he serviced and diagnosed problems with utility-scale systems. Prior to that, he worked on the roof tops installing PV systems. He worked his way up through the ranks to become a team leader and ultimately the operations manager of Arizona's largest residential installers. Due to his diverse background in the PV industry, he is quickly becoming a notable and key resource for all PV Professionals.

Kris Sutton, a NABCEP Certified PV Installation Professional, instructor and staff member at Solar Energy International, has actively worked in the photovoltaic industry since 1999. Trained as an electrician, Kris has worked as a PV installer, project manager and system designer, before coming on full-time at SEI. Kris has trained thousands of people in the U.S. and around the world. He has also served as a member of the board of CoSEIA and on NABCEP test committees.

James Tong is Senior Director of Strategic Initiatives and Government Affairs at Clean Power Finance. In 2011 and 2012, James researched and designed three projects to address the soft costs of solar and was awarded a total of $4.5MM from the Department of Energy SunShot Initiative. His work includes the development of solarpermit.org: the free, online, open-source database that consolidates information on permitting requirements throughout the nation. Additionally, he is collaborating with NREL as one of the principal investigators on a $2.3MM project to study the drivers of consumer adoption of solar systems.

Sarah Truitt is the Solar Technology Deployment Manager at the National Renewable Energy Laboratory (NREL). She manages a portfolio of projects pertaining to Balance of Systems "soft costs", which includes working with companies to develop software tools to reduce soft costs. Prior to joining NREL, Sarah served as an active member of the U.S. Department of Energy's Solar Market Transformation team in Washington, D.C. Sarah's career in solar energy began in the Bay Area where she sold PV and Solar Thermal Systems for Sun Light and Power and participated in the formation of the California Solar Initiative through The Utility Reform Network (TURN).

Aaron Venezia is a senior support specialist at eGauge Systems. He is responsible for overseeing technical support staff operations and works closely with engineers to assist in the hardware and software troubleshooting of the eGauge product line.

Joe Villacci specializes in system design, installation methods, and performance verification of solar electric systems. He works as a technical trainer and curriculum developer for Solar Energy International. Joe also provides design review, commissioning, and troubleshooting services through his company, OnSight Solar Electric Services. He is an IREC Certified Master Trainer/PV and NABCEP Certified PV Installation Professional.

Don Warfield has been working in the photovoltaics business for the past 35 years. Starting in product development and aerospace manufacturing, Don has spent the past two decades involved in module product development and the applications engineering of PV modules and their associated BOS components, ranging through initial design, certifications, manufacturing, installation and customer training. He currently works for Ameresco Solar. Don serves on the STP for UL1703 and UL1741, and working groups 2, 3 & 6 (modules, BOS and systems) of the IEC's technical committee 82. He is currently the Chairperson of the NABCEP Board of Directors.

Tom Young's original interest and exposure to renewable energy stems from his involvement in wind power generation and storage research in Oklahoma as a joint project between the University of Tulsa and RIT. Working on the technical challenges of that project, it became obvious to him that the ultimate feasibility of such projects depended on making them economical. Since then, Tom has focused his efforts on improving the economics of solar as a senior product engineer, designing innovative and cost-effective PV systems and structures at DPW Solar, in Albuquerque. DPW's products and services span the solar market — from small residential to utility-scale.

Tony Zante is President and CEO of ISA Corporation, a manufacturing and distribution firm specializing in solar mounting equipment for roof and ground applications. Mr. Zante has developed and is currently manufacturing specialized solar mounting products for commercial buildings. Mr. Zante also provides engineering services to help contractors with their solar installations, including structural analysis and support, solar thermal engineering designs, and engineered solutions for ground mounts and carports. Mr. Zante has developed and co-patented a number of solar products including single axis trackers and tiltable ground mounts. Mr. Zante holds patents and pending patents for solar clamping systems, tiltable racking systems, trellis racking systems and tiltable ground mount systems.

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- Easy way for potential customers to locate and contact certificants through NABCEP's online directory
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- Conext XW Inverter/Charger
- MPPT Solar Charge Controllers with Fast Sweep Technology
- Power Distribution Panel
- Automatic Generator Start Module
- System Control Panel

Your system, your way.

The Conext XW Inverter/Charger features unparalleled application flexibility. It is ideal for off-grid or battery backup systems. It can also be paired with an existing grid-tie inverter.

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