



ENERGY STORAGE SYSTEMS

Join our global industry expert & instructor:
Sean White, Independent Solar and Energy Storage
Speaker, Consultant and Author.



16 hours of virtual learning experience

04 - 07 December 2023

11:00 - 15:00 Atlantic Standard Time (AST)
16:00 - 20:00 Central Africa Time (CAT)
18:00 - 22:00 East Africa Time (EAT)

www.biiworld.com

Course Overview:

As intermittent renewable energy becomes more prevalent, there is a need to have energy storage. Energy storage can not only store energy for long periods of time but can also react to grid events and keep the grid stable. At times energy storage is only needed for seconds or minutes to support voltage or frequency. With the use of lithium-ion batteries, hydrogen fuel cells, flow batteries and other storage technologies, we can have a grid that is more efficient, less energy is wasted, power plants can be smaller, and our grid can be smarter and saving money.

This 4 Day Online course will cover all the aspects of modernizing the grid from an energy storage point of view, from the individual household to the large utility scale infrastructure. We will cover the technical and business aspects of energy storage systems, including bidirectional electric vehicle technology and virtual power plants (VPPs).

Learning Objectives:

- Identify the main Energy Storage System (ESS) technologies.
- Understand many ways how ESSs help the grid.
- Key lithium-ion battery cathode and anode chemistries.
- Lifecycles of ESSs and recycling.
- Operational and maintenance of ESS components.
- Integration of ESS into the utility grid and other assets, such as solar and wind.
- Build and design ESSs from different components, including inverters, dc-to-dc converters, transformers, and energy management systems.



TARGET AUDIENCE (Who should attend):

Job Titles :

- Project developers
- Consultants
- EPC contractors
- Project Managers
- Electrical Engineers
- Lenders
- Insurers
- Policymakers
- Utilities
- Designers
- Operation and Management Specialists
- Educators
- ESS Product Manufacturers

AUDIENCE (Who should attend):

Industries :

- Energy
- Transmission
- Renewables
- Solar
- Wind
- Oil and Gas
- Utility Transmission and Distribution





Instructor:

Dr. Sean White

... your **EXPERT TRAINER** for this Course.

Dr. Sean White is an Award Winning IREC Certified PV Master Trainer. Sean was on the NABCEP PV Installer Exam Committee and helped author the NABCEP PV Installation Professional Task Analysis, which is the "gold standard" of PV certifications. Sean was also on the energy storage committee of the Solar ABCs PV Industry Stakeholder Group.

Sean has authored 9 books including "Energy Storage Basics" and is working on other books for Routledge Publishing. Sean is a California Licensed Electrician and a California Licensed Solar Contractor.

He has been teaching at many different schools and has taught tens of thousands of students in the USA, the Philippines, Australia, Malaysia, UAE, Canada, China, Africa, Mongolia and the Middle East. Sean has also workshops at many of the large conferences, such as RE+, SPI (Solar Power International) and ASES National Solar Conference, Intersolar and SNEC. Sean was the recipient of the SNEC (Shanghai) online trainer of the Decade Award in 2020.



PRESENTATIONS:

Day 1

11:00 - Pre-Course Intro – Delegate Expectation Briefing

Session 1: Introduction

- Meet the class and instructor.
- ESS facts and figures.
- Overview of ESS uses.
- Energy storage with Solar and Wind
- Power and Energy Basics

Session 2: ESS Configurations

- AC-Coupling
- DC-Coupling
- Standalone ESS

Break

Day 2

11:00 - Review of Day 1

Session 5: Review and more

- Chemistries
- Coupling
- Chemistries

Session 6: Lithium-Ion Chemistries Detailed

- Mining
- The Cobalt Problem
- Lithium Iron Phosphate (LFP) Solution
- Nickel, Lithium, Manganese, and more.

Break

Session 3: ESS Uses

- Ancillary Services
- Frequency Regulation
- Inertia/Spinning Reserves
- Time Shifting
- Ramp Rate Control
- Grid Forming and Grid Following Inverters

Session 4: Lithium-Ion Batteries

- Lithium-Ion vs. Other Technologies
- Lithium-Ion Charging
- Lithium-Ion Chemistries: LFP, NMC & NCA

Case Study – 1: World’s largest ESS – Moss Landing California

Post-Session Q&A

15:00 – End of Day 1

Session 7: Types of Batteries

- Cylindrical
- Prismatic
- Pouch
- Cells, Modules and Packs

Session 8: Lithium-Ion Battery Charging

- Charging for Longevity
- Full Charging and Discharging
- Fast and Slow Charging
- Battery Management Systems

Case Study – 2: Hornsdale Power Reserve (Tesla South Australia)



Course Outline:

Day 3

11:00 – Review of Day 2

Session 9: Review Plus

- ESS Safety
- Lithium-Ion Battery Thermal Runaway
- Safety Systems
- Safety Procedures

Session 10: Comparing Different Types of ESSs

- Pumped Hydro
- Flow Batteries
- Flywheels
- Compressed Air
- Gravity Storage
- Sodium Sulfur Batteries
- Thermal Storage

Break

Session 11: Hydrogen Energy Storage

- Long term storage

Day 4

11:00 – Review of Day 2

Session 14: Charging strategy

- Making a battery last longer
- Understanding manufacturer's settings
- Warranties

Session 15: Datasheets and Installation Manuals

- Looking at Specific ESS components
- LG, Tesla, BYD, SMA, Solis, Huawei, and more.
- Comparing pluses and minuses

Break

Session 16: ESSs with Wheels

- Round-Trip Efficiency Problem
- Electrolysis
- Fuel Cells
- Green and not green hydrogen
- Solid Oxide Fuel Cells

Session 12: Codes and Standards

- International Electrotechnical Commission (IEC)
- National Electrical Code (NEC)
- Underwriters Laboratories (UL)

Session 13: Utility Interconnections

- Residential
- Commercial
- Utility-Scale

Case Study 3: APS ESS Fire

Post-Session Q & A

15:00 – End of Day 3

- How Most Batteries are in EVs and will be Used for the Grid
- How EV Battery Economies of Scale Translate to Stationary ESSs
- Virtual Power Plants (VPP) with EVs

Session 17: Coordinating the Grid

- Virtual Power Plants
- Distributed Generation
- Grid of the Future
- Utility-Scale

Case Study 4: Virtual Power Plant

Post-Session Q&A (Day 1 – 4)

15:00 – End of Day 4 & Course



High Voltage Electrical Maintenance

Facilitator : **John Robin**

Date : **10 – 13 October, 2023**

Timings : **09:00 – 13:00 Atlantic Standard Time (AST)**
13:00 – 17:00 Greenwich Mean Time (GMT)



Today, electricians moving into the High Voltage work world need more preparation than ever. Once you cross the 750 Volt threshold, new techniques are required to guarantee your personal safety, and the workers entering this environment.

Electricians must recognize all the different parts of high voltage equipment, know the functions of the components, and how to interpret the data on the gauges and relays. Electricians must also be cognisant of safe work regulations covered in CSA Z462 and NFPA 70E.

This 4 Day Online High Voltage Electrical Maintenance Course will provide attendees with a comprehensive understanding and the details covered in this course are covered in NFPA 70B, Maintenance Standards. Understanding how to create a safe work environment, and to maintain High Voltage Electrical Equipment will fulfil requirements set out in Occupational Health and Safety Standards.

John Robin, Power Systems Electrician – Electrical Safety and Maintenance Instructor. For the past 25 years, have instructed more than 500 courses to a variety of industrial, commercial, and institutional companies across North America. Our expert has extensive Electrical Safety and Maintenance experience (40 years) working in the Pulp and Paper industry - starting as an operator in pulp production for 10 years, and then apprenticing as an Electrician.

[CLICK HERE](#)

To access this course agenda.

Does BII Online Virtual Training have the same value as traditional classroom training?

Yes, BII Online Virtual Training offers participants; same training system as in-person, i.e face-to-face engagement with instructors, course material, interactive participation of all delegates, and personal support that they would expect to find in a traditional classroom.

What are main features of your online courses? Are they on-demand? Is it different content from the in-person offering?

The content of the virtual training is similar to the in-person sessions and customized presentation makes it a richer online learning experience. As always, we will share presentation materials with attendees for later reference.

The online courses are not on-demand and recordings cannot be purchased. They are set on scheduled dates, live with an instructor and co-host via webinar software. While the day is shorter than an in-person session (4hrs vs 8hrs), timing are adjusted to accommodate attendees in different time zones and allow more time for one-on-one conversations via the Q & A.

What are the technical requirements for participation in a virtual course?

All you need to participate in virtual training are:

- Desktop or Laptop or Tablet Computer, and Internet connection
- Webcam
- Headset with built-in microphone

Can I attend an online training session if I have a Macintosh computer?

Yes, Our Online training systems does allow Macintosh computers, PCs, and computers running Linux to easily enter any of our online training sessions.

What type and version of browser will I need for online classes?

It is recommended that you use the latest version of Firefox, Chrome or Internet Explorer for Windows and Firefox or Safari for Mac. Each of these is available for free download and also suggested you have the PDF Reader

How do I have access to the trainer for questions?

As in the classroom, you will see the trainer in front of you and have the opportunity to ask questions at any time - all via audio and video transmission.

Is there a mute option within an online training session to minimize background noise from my audio connection?

Yes, the Mute button will display to the right of your name as you hover your mouse over your name shown in the Participants panel on the top, right side of the Web conferencing screen.

What if I miss few sessions of the online training program?

The training will be simultaneously recorded which will be provided to you as per request & requirement

Do I get a Certificate at the end?

Yes, you will get a PDF version of your certificate of completion



Please complete this form and send it back to:
E-mail to: zack.miller@biiworld.com

Event Code: OL TE 73

Delegate Details

- Name: Mr/Mrs/ Ms
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Job Title:
Email:
- Name: Mr/Mrs/ Ms
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Job Title:
Email:
- Name: Mr/Mrs/ Ms
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Job Title:
Email:

Payment Details

METHOD: CREDIT CARD OR WIRE TRANSFER

Please debit my

Visa Eurocard /Mastercard Amex Diners club

Card Billing Address:.....

Street:City:.....

Zip/Postal:

Card Holders Name:

Email Address:

Card Holders Signature:

Card Number

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Credit Card CVV2/ CVC / CID Number:

Visa / Mastercard (3-digit code on the back) Amex (4-digit code on the front)

Valid from: / Expiry Date: /

I agree to BII debiting my card

Company/Organisation Detail

Name:

Person to Contact:.....

Email:

Address:

.....

City:

Country:

Contact No:

Type of Business:

Website:

Authorization and Acceptance of Sales Contract & Terms & Conditions

I hereby declare I am authorised to sign this contract and terms & conditions in the name of the company/organisation:

Name:.....

Date:.....

Signature:.....

- 1-2 Delegates Fee** **USD 1199 per delegate**
- 3 & Above Delegates Fee** **USD 1099 per delegate**

20 USD administration charge and any applicable withholding or any other tax or fee will be applied

TERMS & CONDITIONS:

- Payment terms:** BII World LTD requires the full payment of the invoiced amount within 7 working days from the issue date of the invoice. BII World LTD reserves the right to refuse entry to any client who does not pay the invoice in full and on time. The registration fee includes: Training documentation and admission to all training sessions.
- Cancellation by client:** The client has the right to cancel his/her participation in the event. Cancellation must be received by BII World LTD in writing either by mail or fax. If the client cancels the event, he/she will get two options:
 - A. CREDIT NOTE:** Choose 2-year credit note, BII World LTD will send all the schedule training event details throughout the year. Delegate has the right to choose and attend any of the training programs (valid 2 years).
 - B. NOMINATION:** In this option delegate can nominate/refer someone from his/her group/company to attend the particular training program on behalf of the actual delegate.
- Cancellation by BII World LTD :** While every reasonable effort is made to adhere to the advertised program, circumstances can arise which may cause changes in the program, including but not limited to changes in the content, date(s), or special features of the planned event. Such circumstances include but are not limited to acts of terrorism, war, extreme weather conditions, compliance with government requests, orders and legal requirements, failure of third-party suppliers to timely deliver, and failure to register the minimum target number of attendees for a given event. BII World LTD reserves the right to change the content, date(s), and/ or special features of an event, to merge the event with another event, or to postpone it or cancel it entirely as appropriate under the circumstances. Client agrees that BII World LTD shall not be liable for any cost, damage or expense which may be incurred by client as a consequence of the event being so changed, merged, postponed or cancelled and client agrees to hold BII World LTD harmless and to indemnify BII World LTD in case of liability caused by any such changes, mergers, postponements or cancellations.
- Cancellation of the event:** In case BII World LTD cancels an event, then client can choose any of the below mentioned options:
 - (a) BII World LTD will refund full payment to the client within 15 business days.
 - (b) Client can choose the credit option for 2 years, for more details please read term no-2 part (a)

- Postponement of the event :** In case BII World Ltd postpones the event to a new date, then client can choose any of the below mentioned options.
 - (a) The client can attend the course on the postponed dates.
 - (b) Client can choose the credit option for 2 years, for more details please read term no-2 part (a)
- Client's identification information.** By signing of this sales contract and these terms and conditions the client gives full right to BII World LTD to share the client's identification information, i.e. client's name, address, email addresses, phone numbers and names of representatives and website with other clients who participated in the same event. The client has the right to opt out of this clause by written notice to BII World LTD.
- Governing law:** This contract shall be governed by and construed in accordance with the laws of the Province of Alberta, Canada. Any disputes arising under or in connection with this registration form shall be settled before the competent court in Canada.
- Indemnification:** To the fullest extent permitted by the law, you agree to protect, indemnify, defend and hold harmless BII World LTD, its owners, managers, partners, subsidiaries, affiliates, officers, directors, employees and agents, from and against any and all claims, losses or damages to persons or property, governmental charges or fines, penalties, and costs (including reasonable attorney's fees) (collectively "the Claims"), in any way arising out of or relating to the event that is the subject of this contract, and regardless of negligence, included but not limited to, Claims arising out of the negligence, gross negligence or intentional misconduct of BII World LTD employees, agents, contractors, and attendees; provided, however, that nothing in this indemnification shall require you to indemnify BII World LTD Indemnified parties for that portion of any Claim arising out of the sole negligence, gross negligence or intentional misconduct of the BII World LTD parties.
- Other currencies.** In case that client requests payment in other than official currency (USD), BII World LTD reserves the right to apply 5% currency risk surcharge to the actual exchange rate.
- Other Conditions:** Any terms or conditions contained in the client's acceptance which contradict or are different from the terms and conditions of this registration document shall not become part of the contract unless individually negotiated with BII World LTD and expressly accepted by BII World LTD.