

SECOND RUN IN **ASIA!**

UTILITY & COMMUNITY SCALE ENERGY STORAGE (U&CES) SYSTEMS

Reviewing a Nascent Industry

SGD 3379 for
2
Participants
or More

17 - 19 JANUARY 2018, PUTRAJAYA, MALAYSIA

LEARN FROM THE BEST

IREC Certified Clean Energy Instructor/Master
Trainer of the Year 2016
Christopher LaForge, CEO Great Northern Solar

TOPICS COVERED

Define & explain how Utility and Community Scale Energy Storage (U&CES) operates and the benefits of these systems

*Identify the best application and limitations of each system type
U&CES range of applications*

Calculate U&CES system costs

Identify and describe different U&CES system types and Manufacturers, their storage capabilities and the systems

Data collection and analysis, connection scheme, control algorithm and power system study for U&CES

Safety issues with U&CES systems

Define commissioning, operation and maintenance procedures for U&CES systems

Explain various policy, methodologies and utility-sided business model for implementation of U&CES systems

Expert Course Faculty Leader



Christopher LaForge

IREC Certified Master Trainer
- Photovoltaic Technologies

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About This Training Course

This course will provide a detailed analysis of Utility and Community Scale Energy Storage (U&CES) Systems. Beginning with an overview of the current available technologies the course will present the elements of U&CES with a focus on the benefits to Utilities as well as the advantages of energy storage for Commercial and Industrial energy users.

Issues to be covered include: Storage system design, battery applications, component specification and installation, integration of storage with Renewable Energy (RE) systems, multiple presentations of specific manufacturers of storage systems, O&M issues, available industry resources for ongoing education and the development of individual projects.

Key Learnings

This course will allow participants to gain practical and theoretical knowledge about U&CES systems with a focus on real-world applications and current working examples of the various technologies.

Participants in this course will upon completion of this course, be able to:

- Define & explain how Utility and Community Scale Energy Storage (U&CES) operates and the benefits of these systems.
- Describe and identify components and specifications of a U&CES system
- Identify the best application and limitations of each system type
- Calculate U&CES system costs
- Describe financial benefits of U&CES systems
- Correctly size a U&CES system
- Recommend a U&CES system type to meet a Utility administrator's or business owner's goals
- Identify and describe different U&CES system types, their storage capabilities and the systems
- Explain data analysis, connection scheme, control algorithm and power system study for U&CES
- Explain and safety issues with U&CES system
- Define commissioning, operation and maintenance procedures for U&CES systems
- Demonstrate proper safety procedures when installing a U&CES systems
- Explain various policy, methodologies and utility-sided business model for implementation of U&CES systems

Who Will Benefit

- Project developers and administrators
- Investors
- EPCs
- Project managers
- Installers
- Designers
- Government policy makers

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Course Outline

DAY 1

Introductions

Background and History of Utility and Community Scale Energy Storage

Section I

- Define & explain how Utility and Community Scale Energy Storage (U&CES) operates and the benefits of these systems.

Defining Storage types:

Flywheel

Compressed Air

Batteries:

Lead-Acid, Lithium-Ion

Flow batteries

– Vanadium Redox Vs: Zink Bromide

Sodium-sulfur batteries

Ni-Cd

Capacitors

Superconducting Magnetic Energy Storage (SMES)

Section II

- Describe and identify components and specifications of a Battery based U&CES system:

Batteries by type

Inverters

Transformers/Phase converters

Points of interconnection

Client

Utility

Section III

- Identify the best application and limitations of each system type

U&CES range of applications:

Energy time shift

Load following

Frequency regulation

Renewable capacity continuity

Transmission congestions relief

Energy tariff cost management

- Application services and blending

Section IV

- Calculate U&CES system costs

Beginning analysis of determining cost in general

Equipment Cost parameters

Site preparation cost

Logistic costs

Section IV

- Describe financial benefits of U&CES systems – introduction System services – defining and stacking for optimal benefits

DAY 2

Review of Sections I – IV w/ Q&A

Continue financial benefits of U&CES systems

Optimizing and Stacking system services

Section V

- Correctly size a U&CES system
 - Defining client goals
 - Analyzing loads
 - Choosing capacity
 - Inverter capacity
 - Battery Capacity

Section VI

- Recommend a U&CES system type to meet a Utility administrator's or business owner's goals

Section VII

- Identify and describe different U&CES system types and Manufacturers, their storage capabilities and the systems

Section VII continued –

How to review Manufacturer's Presentations

Manufacturers' battery presentations

Section VIII

- Data collection and analysis, connection scheme, control algorithm and power system study for U&CES
 - Data monitoring systems
 - Connection issues
 - Supervisory control and data acquisition (SCADA) interfacing
 - Controlling, managing and maintaining U&CES systems
 - Security

Section IX

- Safety issues with U&CES systems
 - Installation safety issues
 - O&M safety issues
 - Security of operations and interfaces

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DAY 3

Review of Sections V-VIII w/ Q&A

Continue Section IX

- Safety issues with U&CES systems
Complete the discussion of Section IX with Q&A

Section X

- Define commissioning, operation and maintenance procedures for U&CES systems
 - Commissioning protocols
 - O&M options and Planning

Section XI

- Define and Demonstrate proper safety procedures when installing U&CES systems
- Safety issues –
- Site Preparation
 - Equipment deployment
 - Integrating and Wiring
 - Commissioning
 - O&M safety issues

Section XII

- Explain various policy, methodologies and utility-sided business model for implementation of U&CES systems
 - Governmental Policy issues
 - Utility policy issues
 - For utility owned systems
 - For privately owned systems
 - Modeling implementation

Final Review, Q&A and Open discussion

Your Expert Course Faculty

CHRISTOPHER LAFORGE

Christopher LaForge is the CEO of Great Northern Solar and is a NABCEP certified Photovoltaic Installation Professional. He has been an instructor with the Midwest Renewable Energy Institute since 1993 Teaching advanced Photovoltaic (PV) design and installation and is an IREC Certified Master Trainer (TM) in Photovoltaic Technologies. Christopher was the primary curriculum developer for the MREI Photovoltaic courses at the Institutes inception.

A strong advocate for clean energy production Christopher volunteers with the Midwest Renewable Energy Association, the North American Board of Certified Energy Practitioners (board of directors member 2004-2014, Chair of the Nominations Committee-current) and with the Northern Futures Foundation.

Christopher LaForge has been designing, specifying, installing and operating Battery based Solar Electric systems (PV) for over 30 years. LaForge has lived “off-Grid” for over 26 years where he runs his business Great Northern Solar.

LaForge has been training contractors, administrators and officials in the operation of PV systems including those employing storage for over 26 years. In the last 5 years LaForge has been investigating and developing trainings for the application of energy storage in commercial and other large applications.

With the development of Lithium Ion and other advanced battery technologies LaForge has begun to consult and present trainings in battery design and deployment for the commercial market.

In 2016 LaForge developed a hands-on seminar for retrofitting a LiOn storage and energy arbitrage system for a commercial building in Duluth Minnesota. The Hartley Solar Storage Retrofit Seminar walked participants through the design and implementation of the advanced storage system to provide for building resiliency and peak demand load shaving as well and potential other ancillary services for the Hartley Nature Center and Minnesota Power – the site Utility.

This small prototype is beta-testing Energy Arbitrage software that allows the client to choose several operational modes for cost reduction and resiliency.

Most recently LaForge presented “Energy Storage into Renewable Energy Systems” for the North Central Electrical League in the Minneapolis/Saint Paul area of Minnesota.

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| | PER PARTICIPANT | 2 PARTICIPANTS OR MORE | IN-HOUSE TRAINING |
|-----------------|---------------------------|---------------------------|---|
| 3 Day Programme | SGD 3,579 Per Participant | SGD 3,379 Per Participant | Guaranteed Minimum 40% Off Normal Price |

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