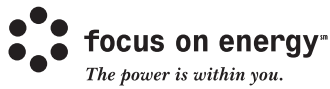


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# Understanding and managing electrical power quality

Presenting faculty: Greg Stark, P.E.

Electrical power quality is critical to every facility's operation. Learn about common power quality disturbances and problems and how to improve power quality supply, immunize the equipment, control the disturbance and more.

This full-day training will provide a solid understanding of electrical power quality. Participants will learn what constitutes power quality and why it is important, common disturbance types and sources, effects on different types of equipment and the various types of solutions to power quality problems.

**AS A RESULT OF THIS TRAINING YOU WILL BE ABLE TO:**

- Describe what constitutes power quality problems
- Identify various types of power quality disturbances
- Explain the effects of power quality disturbances on different types of electric equipment
- Describe where power quality problems originate (e.g. customer, utility and/or both)
- Identify the advantages and disadvantages of various power quality solutions

**BENEFITS OF ATTENDING:**

- Gain a solid understanding of electrical power quality and how it influences your facility
- Discover how to improve power quality supply
- Learn about power quality disturbances and problems
- Understand how power quality effects your equipment

**WHO SHOULD ATTEND?**

Electricians, engineers, operations employees, facility managers, account managers and representatives, electrical service planners, new construction workers and anyone involved in operating or managing electrical equipment and systems where electrical power quality is a concern.

**WHEN/WHERE**

January 26, 2010  
Radisson Hotel La Crosse  
200 Harborview Plaza, La Crosse, WI 54601

January 27, 2010  
Holiday Inn Campus Area  
2703 Craig Road, Eau Claire, WI 54701

January 28, 2010  
Sheraton Milwaukee Brookfield Hotel  
375 South Moorland Road, Brookfield, WI 53005

**AGENDA**

7:30 am—Registration and continental breakfast  
8:00 am—3:30 pm—Program (lunch, breaks provided)

**COURSE AGENDA**

**Power Quality—Why Problems Now?**

- Power quality definitions
- End-use equipment has changed (electronic vs. electric)
- Customer expectations
- Historically, voltage was the key
- How much is too much?

**Common Power Quality Disturbances**

- Transients, sags and swells, over-and-under voltages, interruptions, electrical noise and interference, harmonic distortion, voltage unbalance and frequency fluctuations

**Power Quality Effects on Equipment**

- Power distribution equipment, motors, lighting systems and controls (electro-mechanical and electronic)

**Common Sources of Power Quality Problems**

- Internal customer wiring/equipment, neighboring customer wiring/equipment, electrical distribution system and grounding

**Power Quality Solutions**

- Improve the supply
- Immunize the equipment
- Control the disturbance

**CONTINUING EDUCATION UNITS**

The Energy Center of Wisconsin is an Authorized Provider for the International Association for Continuing Education and Training (IACET) and is committed to developing quality learning activities. You will receive .65 Continuing Education Units for attending this training. AFE (Association of Facilities Engineering) members will receive .65 CEUs for attending this full day seminar.

**COST**

The registration fee for attending this training is \$169, which includes continental breakfast, lunch and program materials.

**CANCELLATIONS AND REFUNDS**

All cancellations are subject to a \$25 administrative fee. We will refund 50% of the registration fee for cancellations received within two weeks of the training. Cancellations made within three business days of the training are non-refundable. If this program is not held for any reason, the Energy Center of Wisconsin's liability is limited to the refund of the program fee.

**QUESTIONS?**

If you need more information, want to cancel or make a substitution, or you have not received a confirmation and it is one week before the event, please contact Kristi Kaiser at 608.238.8276 x135 or [kkaiser@ecw.org](mailto:kkaiser@ecw.org).

## REGISTRATION FORM—Understanding and managing electrical power quality

**PLEASE REGISTER ME FOR**

Understanding and managing electrical power quality—\$169

- January 26, 2010—La Crosse, WI
- January 27, 2010—Eau Claire, WI
- January 28, 2010—Brookfield, WI

**REGISTRATION DEADLINE**

All registrations must be made in advance.

**PAYMENT**

Only credit card (Visa, MasterCard or American Express) payments are accepted online.

**ONE FORM PER ATTENDEE**

First name \_\_\_\_\_  
(as you would like it to appear on your name badge)

Last name \_\_\_\_\_

Title \_\_\_\_\_

Organization \_\_\_\_\_

Mailing Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Phone \_\_\_\_\_

Email \_\_\_\_\_

If you have dietary/accessibility needs, please specify:

\_\_\_\_\_  
\_\_\_\_\_

**PAYMENT INFORMATION**

Check enclosed (please make check payable to Energy Center of Wisconsin)

Visa       Mastercard       American Express

Credit card # \_\_\_\_\_

Expiration date \_\_\_\_ / \_\_\_\_      Security code \_\_\_\_\_  
(3-digit number on card back)

Name on card \_\_\_\_\_

Signature \_\_\_\_\_

**METHOD OF REGISTRATION**

(payment by credit card or check must accompany registration)

1. **Online:** [www.ecw.org/university](http://www.ecw.org/university)
2. **Phone:** 608.238.8276 x135
3. **Fax to:** 608.238.0523
4. **Mail to:** Energy Center of Wisconsin  
Electrical power quality  
455 Science Drive, Suite 200, Madison, WI 53711

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## About the presenter...

Greg Stark, P.E.

Biological & Agricultural Engineering Department, Texas A&M University

Greg Stark is a lecturer at Texas A&M University in the Biological & Agricultural Engineering Department and has 20 years of experience providing assistance to electric power suppliers and their customers. His private consulting practice specializes in electrical industry structure, electrical energy systems and energy management, power quality, stray voltage in livestock facilities and irrigation safety. Greg has experience in load profiling and load forecasting, technical training and standards, energy management, and power quality with such industry leaders as TXU, Reliant and Xcel Energy. From 1988 to 2002, he served as Executive Director of the Texas Agri-Business Electric Council—a liaison between the electric utility companies in Texas and Texas A&M University providing specialized training courses and technical assistance to the member companies.

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INNOVATIVE PROGRAMS  
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