Energy Auditing Series

Fundamentals of Energy Auditing

August 8–12, 2011
April 2–6, 2012
Madison, Wisconsin

Your opportunity to:

- Learn how to measure and improve building performance
- Save time and money in developing your energy auditing program

Revised and expanded to let you practice what you learn!

Enroll today to succeed tomorrow!
Why This Course?
Take the first step to greater occupant comfort and cost savings by learning how to conduct a careful building energy analysis. A well-conducted energy audit is the key management tool in that process. The basic functions of management (planning, organizing, decision making and controlling) depend on information. The energy audit:
- Supplies information necessary to manage energy use
- Determines where and how energy is being used
- Identifies measures to improve efficiency
- Provides a benchmark against which future building performance can be compared

THE COURSE for Energy Auditors!
Fundamentals of Energy Auditing is the key course for developing efficient energy auditing techniques. By attending, you’ll gain from our 30 years of experience and save time and money in developing your energy auditing program for small commercial and institutional buildings.

What You Will Learn
Fundamentals of Energy Auditing teaches you how building energy systems operate and gives you the skills necessary to measure performance. You will review basic systems, including HVAC, boilers, plumbing, electrical, and building envelope, as they apply to commercial buildings. You will learn how to do energy audits properly, by studying:
- Procedures to use
- Useful instrumentation
- Energy estimates and savings calculations
- Energy end-use profiles
This course will help you establish an energy audit program for your facility. We provide proper training in conducting energy audits and supplement utility energy auditor training programs.

Who Should Attend
Most of the 2500 students who have already attended our auditing courses are:
- Plant and facility engineers
- Utility engineers
- Energy auditors or corporate energy managers
- Energy management personnel from state/federal government and the military
- Vocational school, community college or university educators working in energy conservation programs
You should have some background in building energy systems and/or construction to benefit the most.

Past Participants Say…
"EXCELLENT, KNOWLEDGEABLE PRESENTERS."
"THE FIELD WORK WAS EXCELLENT!"
"THERE WILL BE IMMEDIATE APPLICATION TO MY JOB."
"THE HANDBOUTS WERE FANTASTIC!"
"LOTS OF GOOD INFORMATION PRESENTED IN EASY-TO-UNDERSTAND LANGUAGE."

Valuable Take-Home References
You will receive a revised notebook of materials prepared especially for this course. The materials will provide practical information derived from our 30 years of experience in performing and teaching energy audit techniques. Copies of technical handbooks, engineering reports and publications, and selected manufacturers’ literature will also be available for your use and consultation.

Fieldwork/Workshop Experience
Gain basic theoretical knowledge and practical experience from our mix of classroom lectures and on-site fieldwork. This fresh approach to fieldwork will help you understand the basic energy systems found in smaller commercial buildings. You will:
- Study the types of energy systems installed in such buildings
- Analyze those systems to improve energy efficiency
- Participate in an organized approach to recommending energy-efficient improvements
Working in teams, you will
- Discuss each topic with other energy auditors, energy managers and consultants
- Identify systems, analyze equipment performance and recommend improvements and savings
- Prepare and present energy audit reports, guided by our experienced instructors
Please bring a pocket calculator and be prepared to take notes and do team homework on several evenings in preparation for Friday’s audit report.

Fieldwork note: This course will offer a variety of fieldwork, including boiler rooms, mechanical equipment rooms, and rooftops. You should bring along both indoor and outdoor field clothing.

Limited Class Size
To maximize your learning opportunities, we limit the class size to 24 students.
## Fundamentals of Energy Auditing

**August 8–12, 2011 in Madison, Wisconsin**

**April 2–6, 2012 in Madison, Wisconsin**

### Course Outline

#### Monday

**8:00 Registration and Refreshments**
The Lowell Center  
610 Langdon Street  
Madison, Wisconsin

**Energy Analysis**

**8:30** What Is an Audit?  
- Types of energy audits  
- Audit process  
- Developing end-use profiles  
- Case studies and examples

**10:30** Fieldwork/Workshop: Building Energy Data Collection

**1:00** How Buildings Use Energy  
- Determining balance point temperatures  
- Energy analysis procedures  
- Energy reduction potential

**3:00** Workshop: Energy Estimating Basics and Utility Bill Analysis  
- Modified degree day  
- Variable base degree day  
- Bin analysis

#### Tuesday

**Lighting**

**8:00** Problem Review and Coffee

**8:30** Lighting System Design and Analysis  
- Properties of light  
- Lumens/footcandles/candlepower  
- Types of energy-efficient lighting

**11:30** Auditing Lighting Systems  
- Conducting an audit  
- Effective retrofit solutions  
- Lighting economics

**2:00** Maintaining Lighting Systems  
- Cleaning and relamping  
- Reliability of ballasts

**3:00** Fieldwork/Workshop: Analyzing Lighting Systems and Preparing Audit Results

#### Wednesday

**Heating/Ventilation**

**8:00** Problem Review and Coffee

**8:30** HVAC Systems  
- Types of systems  
- Rooftop and packaged equipment  
- Typical equipment and components  
- Heat recovery and energy savings

**10:30** Boiler, Hot Water and Steam Systems  
- Types of boilers  
- Water and steam distribution  
- Hot water reset  
- Steam trap surveys

**1:00** Automatic Temperature Control  
- Control fundamentals  
- HVAC modifications  
- Variable speed drives

**2:00** Audit Instruments and Measurements  
- Temperature, air flow and combustion analyzers  
- Use of continuous readout equipment for improved analysis

**3:00** Fieldwork/Workshop: HVAC System Survey

#### Thursday

**Cooling**

**8:00** Problem Review and Coffee

**8:30** Cooling Systems  
- Chillers  
- Cooling towers  
- Rooftop and packaged equipment  
- Distribution, motors, fans and pumps  
- CFC issues

**11:00** Fieldwork/Workshop: Cooling Systems Survey

**1:00** Energy Conservation Opportunities: Heating and Cooling  
- Energy load estimating  
- Fan law calculations  
- Psychrometrics  
- Sample problems/solutions

**3:00** Fieldwork/Workshop: Building Audit Summary Report Preparation

#### Friday

**Energy Reporting**

**8:00** Problem Review and Preparation of Audit Reports

**9:30** Presentation of Audit Report to Course Staff and Participants; Critical Analysis

**1:00** Energy Accounting, Benchmarking and Tracking

**3:00** Final Adjournment

### Course Speakers

**Brian Basken**  
Senior Project Engineer  
Pearson Engineering  
Madison, Wisconsin

**William C. Dries**  
Mechanical Engineer  
Dries Associates  
Middleton, Wisconsin

**Larry Falk**  
Maintenance Engineer  
The Lowell Center  
University of Wisconsin–Madison

**John L. Fetters**  
Senior Engineer  
Effective Lighting Solutions, Inc.  
Columbus, Ohio

**Keith J. Kempski**  
Energy Adviser  
CESA 10  
Madison, Wisconsin

**Richard J. Pearson**  
Principal  
Pearson Engineering  
Madison, Wisconsin

**Don Schramm**  
Program Director  
Engineering Professional Development  
University of Wisconsin–Madison

**Philip Van Styn**  
Senior Engineer  
Pearson Engineering  
Madison, Wisconsin

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**ENROLL ONLINE TODAY! Or visit our Web site**
Four Easy Ways to Enroll

Internet: http://epd.engr.wisc.edu/

Phone: 800-462-0876 or 608-262-1299 (TDD 265-2370)

Mail to: Engineering Registration
The Pyle Center, Dept. 108
702 Langdon Street
Madison, Wisconsin 53706

Fax: 800-442-4214 or 608-265-3448

Course Information

Please enroll me in Fundamentals of Energy Auditing

☐ Course #M454 August 8–12, 2011 in Madison, WI Fee: $1995
☐ Course #M693 April 2–6, 2012 in Madison, WI Fee: $1995
☐ I cannot attend at this time. Please send me brochures on future courses.

Enrollment limit is 24. Enroll today!

Personal Information (Please print clearly.)

Name __________________________
Title __________________________
Company ________________________
Address _________________________
City/State/Zip ____________________
Phone (______) ______ Fax (______) ______
E-mail __________________________

Additional Enrollees

Name __________________________
Title __________________________
E-mail __________________________

Billing Information

☐ Bill my company  ☐ P.O. or check enclosed (Payable in U.S. funds to UW – Madison)

Cantholder's Name __________________________
Card No. __________________________
Expire __________________________

UW# __________________________

Bring UW–Madison Expertise to Your Organization!

On-site training can equip your employees in skill areas critical to your success. We can:

• Assess training needs and design learning programs tailored to your situation
• Deliver course content, customized for your needs, in person or online
• Empower your employees to quickly translate practical knowledge into productive work

UW–Madison can help you meet your training goals! Contact Corporate Education Director Carl Vieth (608-263-7424 or vieth@wisc.edu) to discuss your opportunities. Or see http://epd.engr.wisc.edu/onsite

General Information

Fee Covers Notebook, course materials, break refreshments, lunches, and certificate.

Cancellation If you cannot attend, please notify us at least 7 days prior to the start of the course, and we will refund your fee. Cancellations received after that date and no-shows are subject to a $150 administrative fee. You may enroll a substitute at any time before the course starts.

Location Both offerings of this course will be at The Lowell Center, 610 Langdon Street, Madison, Wisconsin. If you must be contacted during the course, phone messages may be left for you at 608-256-2621.

Accommodations

Your enrollment confirmation will include local hotel/motel information and lodging information for The Lowell Center. We have reserved a block of rooms at a reduced rate at The Lowell Center for participants in either course. Make your reservations at least four weeks in advance by calling toll free 866-301-1753. Please mention this course when you contact The Lowell Center.

Continuing Education Credits

Earn 4.0 Continuing Education Units (CEU), 40 Professional Development Hours (PDH), 40 AIA Learning Units (LU) or 40 GBCI CE hours when you attend this course.

The University of Wisconsin–Madison, Department of Engineering Professional Development, is an approved education provider of the U.S. Green Building Council Education Provider Program.

Need to Know More?

Call toll free 800-462-0876 and ask for
Program Director: Don Schramm
Program Associate: Debbie Benell
Or e-mail custserv@epd.engr.wisc.edu

Limited Class Size

To maximize your learning opportunities, we limit the class size to 24 students. You will benefit from individualized attention, workshop situations, and personalized problem solving.

Daily Schedule

Sessions will run from 8:00 a.m. to 5:00 p.m. Monday through Thursday and from 8:00 a.m. to 3:00 p.m. on Friday. There will be midmorning and midafternoon refreshment breaks and noon lunch each day.

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