

LONG TERM LOAD FORECASTING

June 8 – 9, 2017

The Hotel Minneapolis, Autograph Collection
Minneapolis, MN



EUCI is authorized
by IACET to offer
1.0 CEUs for the
course

OVERVIEW

Load forecasting is a fundamental element in utility business operations and planning processes. During the past 120-plus years, load forecasting methodologies have evolved as the industry and related technologies advanced. Consequently, many classical methods are no longer suitable in addressing today's challenges in the utility industry.

This course offers a comprehensive and in-depth treatment to long-term load forecasting. The content includes:

- A review of the fundamental concepts and classical methods
- A statistical approach that leverages high resolution data and modern computing power
- Probabilistic forecasting that helps better quantify the uncertainties of the unpredictable future
- Several advanced and emerging challenges triggered by big data
- Renewable energy integration and demand side management programs

This course brings the long-term load forecasting methodologies to the most widely-used business forecasting tool, spreadsheets. It starts with an overview of various options available in the market, and then zooms into spreadsheet operations. We will demonstrate four different ways of doing forecasting in spreadsheets, and help the participants understand the limitations of each. The participants will gain hands-on experience with building models and generating load forecasts in spreadsheets, while competing and collaborating with others. Real-world examples and case studies are embedded throughout the course when introducing the theories and methodologies.

This will be a working session.
Each participant should bring a laptop with MS Excel 2007 (or newer versions) with add-ins of Solver and Data Analysis.

This is an intermediate course. Individuals not having experience in forecasting should consider attending the preceding program on Fundamentals.

LEARNING OUTCOMES

Attendees will cover materials and engage in discussions that will allow them to:

- Review the fundamental concepts of load forecasting
- Recognize the evolution of classical load forecasting methods
- Prepare and build regression models with hourly data
- Build and conduct ex post forecasting to analyze the source of errors
- Evaluate point and probabilistic load forecasts
- Apply and conduct what-if analysis
- Employ and conduct weather normalization
- Evaluate the distribution of forecast errors
- Manage how to perform data cleansing
- Discuss emerging topics and the applicable problem-solving principles

AGENDA

THURSDAY, JUNE 8, 2017

8:00 – 8:30 am	Registration and Continental Breakfast
8:30 – 10:15 am	Introduction to Long-Term Load Forecasting <ul style="list-style-type: none">• Utility applications<ul style="list-style-type: none">o Useso Users• How much is 1% error?• Principles of forecasting• Load forecasting terminologies• Exercise: calculating error measures
10:15 – 10:30 am	Morning Break
10:30 am – 12:00 pm	Evolution of Classical Methods <ul style="list-style-type: none">• The magic ruler• Regression models with monthly or daily data• S-curve and spatial load forecasting• End use studies
12:00 – 1:15 pm	Group Luncheon
1:15 – 3:00 pm	A Statistical Approach <ul style="list-style-type: none">• Golden insights from hourly data• Polynomials or piecewise functions?• A large but small model• Is it economists' fault?
3:00 – 3:30 pm	Networking Break
3:30 – 5:00 pm	Exercise: Load Forecasting with Hourly Data
5:00 pm	Course Adjourns for the Day



"I was very pleased with the information conveyed in this course. The multitude of data that can improve a load forecast and how to implement them was eye-opening."

Sr. Engineer-Delivery System Planning, Alliant Energy



"Dr. Hong's knowledge on the subject along with his ability to divulge and present the material in an understandable format makes the course invaluable to forecasters."

Manager of System Planning & Standards, PRECorp

AGENDA

FRIDAY, JUNE 9, 2017

- 8:00 – 8:30 am** **Continental Breakfast**
- 8:30 – 10:00 am** **Probabilistic Load Forecasting**
- Evaluation methods
 - Exercise: calculating pinball loss
 - Scenario analysis
 - Exercise: scenario-based probabilistic load forecasting
- 10:00 – 10:15 am** **Morning Break**
- 10:15 – 11:00 am** **Probabilistic Load Forecasting (Continued)**
- Load normalization against weather
 - Exercise: probabilistic load forecasting and normalization
- 11:00 – 11:45 am** **Challenges and Emerging Topics**
- Data, data, data
 - Distributed generation
 - Energy efficiency and demand response
 - Electric vehicles
 - Forecast override, override what, and how?
- 11:45 am** **Course Adjourns**

INSTRUCTOR



Tao Hong

**Director of BigDEAL (Big Data Energy Analytics Laboratory),
University of North Carolina at Charlotte**

Dr. Tao Hong is the Director of BigDEAL (Big Data Energy Analytics Laboratory) at University of North Carolina at Charlotte and Chief Data Scientist of Hong Analytics. He has been providing training and consulting services to more than 100 organizations in the energy industry worldwide. He is the Founding Chair of IEEE Working Group on Energy Forecasting, General Chair of Global Energy Forecasting Competition, lead author of the online book *Electric Load Forecasting: Fundamentals and Best Practices*, and author of the blog *Energy Forecasting*. Dr. Hong received his B.Eng. in Automation from Tsinghua University in Beijing and his PhD with co-majors in Operations Research and Electrical Engineering from North Carolina State University.



“Paving for the Future — long term energy load forecasting”

Senior Forecasting Specialist, Dairyland Power Coop

REQUIREMENTS FOR SUCCESSFUL COMPLETION OF PROGRAM

Participants must sign in/out each day and be in attendance for the entirety of the course to be eligible for continuing education credit.

INSTRUCTIONAL METHODS

PowerPoint presentations, case studies, and workshop exercises will be used in this program.

EVENT LOCATION

A room block has been reserved at the The Hotel Minneapolis, Autograph Collection, 215 S 4th St, Minneapolis, MN 55401, for the nights of June 4-8, 2017. Room rates are \$229, plus applicable tax. Call **1-612-340-2000** for reservations and mention the EUCI event to get the group rate. The cutoff date to receive the group rate is May 4, 2017 but as there are a limited number of rooms available at this rate, the room block may close sooner.

Please make your reservations early.

IACET CREDITS



EUCI has been accredited as an Authorized Provider by the International Association for Continuing Education and Training (IACET). In obtaining this accreditation, EUCI has demonstrated that it complies with the ANSI/IACET Standard which is recognized internationally as a standard of good practice. As a result of their Authorized Provider status, EUCI is authorized to offer IACET CEUs for its programs that qualify under the ANSI/IACET Standard.

EUCI is authorized by IACET to offer 1.0 CEUs for the course.

REGISTER 3, SEND THE 4TH FREE

Any organization wishing to send multiple attendees to this course may send 1 FREE for every 3 delegates registered. Please note that all registrations must be made at the same time to qualify.

REGISTRATION
to register [CLICK HERE](#) or

Call: 201 871 0474
fax: 253 663 7224
email: register@pmaconference.com
web: <http://pmaconference.com/>
Mail: POB 2303 Falls Church Va 22042

Please make checks payable to: "PMA"

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PLEASE REGISTER

BOTH ENERGY FORECASTING FUNDAMENTALS FOR UTILITY/POWER INDUSTRY PROFESSIONALS AND LONG TERM LOAD FORECASTING COURSES
 JUNE 6 – 9, 2017: MINNEAPOLIS, MN: US \$2495
 Early bird on or before May 19, 2017: US \$2295

LONG TERM LOAD FORECASTING COURSE
 JUNE 8 – 9, 2017: MINNEAPOLIS, MN: US \$1495
 Early bird on or before May 19, 2017: US \$1295

How did you hear about this event? (direct e-mail, colleague, speaker(s), etc.)

Print Name Job Title

Company

What name do you prefer on your name badge?

Address

City State/Province Zip/Postal Code Country

Phone Email

List any dietary or accessibility needs here

CREDIT CARD INFORMATION

Name on Card Account Number

Billing Address Billing City Billing State

Billing Zip Code/Postal Code Exp. Date Security Code (last 3 digits on the back of Visa and MC or 4 digits on front of AmEx)

OR Enclosed is a check for \$ _____ to cover _____ registrations.

Substitutions & Cancellations

Your registration may be transferred to a member of your organization up to 24 hours in advance of the event. Cancellations must be received on or before May 5, 2017 in order to be refunded and will be subject to a US \$195.00 processing fee per registrant. No refunds will be made after this date. Cancellations received after this date will create a credit of the tuition (less processing fee) good toward any other EUCI event. This credit will be good for six months from the cancellation date. In the event of non-attendance, all registration fees will be forfeited. In case of course cancellation, EUCI's liability is limited to refund of the event registration fee only. For more information regarding administrative policies, such as complaints and refunds, contact our offices at (201) 871-0474.