

Energy Management and Conservation in Industrial and Commercial Environments

A Live Seminar on Essential Fundamentals and Best Practices in Energy Management and Conservation

Credit: 7.5 PDH's (1-Day); 0.75 CEU's

Lead Instructor: Professor Bobby Rauf, PE, CEM, MBA

Course description

This course caters to Engineers, Technicians, Facilities Managers, Energy Professionals, Architects and other professionals who are interested in enhancing their understanding of the concept of energy and utilities, and would like to learn about methods, best practices and strategies for reducing energy demand, energy consumption and energy costs in an industrial or commercial setting. The importance and pertinence of three faceted energy outlook is explained and discussed. This course addresses usage, cost and conservation of energy in its more common forms such as electrical, compressed air, natural gas, steam and heat, etc. This course will familiarize attendees with various ways for reducing energy cost through well planned, specific and results oriented projects. The instructor - with years of experience in energy project implementation and energy program/process development – shows how substantial energy cost reduction can be achieved with little or no capital investment. Some of such projects can be pursued in collaboration with and through sponsorship of local utility companies. Some of the myths associated with electricity and gas contracts will be exposed. Energy audits and tools needed to perform audits will be discussed. Practical examples of energy monitoring systems will be presented. The attendees will also be, briefly, introduced to some of the more proven renewable energy alternatives.

Learning Objectives - Upon successful completion of this course, participants will be able to:

- Apply principles and concepts associated with common forms of energy (electric, hydrocarbon, compressed air, steam, stack heat, etc.) in an industrial or commercial environment to assess the energy intensity and energy productivity differences between alternative manufacturing and process systems, with a clear understanding of the physics and engineering fundamentals of energy in its various forms.
- Apply energy engineering metrics - associated with different forms of energy, i.e. electrical, hydrocarbon fuel energy, heat energy, pressure energy, etc. - to quantify **how much** energy is being consumed and **how efficiently** energy is being utilized in operations and facilities of various types. Examples of energy

metrics include MMBtus, MMBtus/ton or product, kWh, kWh/ton of product, Joules, etc.

- **Identify, evaluate and implement** high value energy conservation opportunities based on energy facts, energy engineering principles, application of SCADA, Supervisory Controls and Data Acquisition, type Energy Management Systems (EMS). Develop architecture and design of EMS systems for specific energy measurement, real-time monitoring – and in some cases – energy conservation related control applications.
- Apply proven energy engineering and equipment sustainability best practices that can minimize overall energy intensity and enhance equipment durability in industrial and commercial facilities.
- Apply a three-faceted approach in the development of corporate or facility level energy management plan. This three-faceted approach includes: (1) Focus on Energy **Productivity** Improvement, (2) Focus on Energy **Cost** Minimization and (3) Focus on Energy **Supply/Source**.
- Apply Power Factor and Load Factor improvement engineering principles and methods to enhances electrical power quality, electrical energy productivity and electrical equipment sustainability. Calculation of power factor and load factor will be illustrated in addition to quantification of the benefits realized through these efforts.
- Distinguish between high efficacy and low efficacy lighting systems on the basis of watts/lumen or watts/foot-candle and apply coefficient of utilization approach in the design and specification of facility illumination systems – all, ultimately precipitating in lower overall energy intensity.
- Apply proven best practices in the HVAC realm to achieve optimal HVAC system operation and higher energy productivity.
- Apply proven best practices in the operation and maintenance of compressed air systems to maximize their utilization and to minimize energy intensity associated with compressed air generation, distribution and consumption.

Class Schedule:

Morning:

- Energy Basics and its Various Forms. Energy Facts and Statistics
- Electricity Basics and Electrical Rate Schedules
- EMS/BMS, Energy Monitoring and Building Monitoring Systems
 - *Morning Break 15 minutes*
- Power Factor Correction

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- Energy Conservation in Lighting

Afternoon:

- Cogeneration
- Energy Conservation in HVAC Systems, Steam Systems and Compressed Air Systems
- Energy Audits
- *Afternoon Break 15 minutes*
- Energy Conservation Tips; “The Low Hanging Fruit”
- Financial Justification and Implementation of Energy Projects

Why you shouldn't miss this seminar – How this seminar can benefit your organizations, what is unique about this course:

- Are you responsible for **reducing the energy intensity, or increasing the energy productivity**, in your operations or those of your clients', and you feel inadequately prepared to lead the effort; or perhaps you don't know where to begin? Then, this seminar is a must.
- Do you, as an engineer or energy manager, **feel that your knowledge and understanding of larger energy cost reduction opportunities** needs enhancement? Then you must not miss this proven and frequently updated seminar.
- **Do you feel that financial justification of energy conservation projects is an “uphill battle” in your organization?** Then, this seminar will give you the opportunity to air you challenges and frustrations. You will learn about some **proven approaches – both technical and financial – for successful energy project funding and implementation.**
- How often do you get a chance to attend a course or a seminar that is presented by the author of the books on the subject matter - in person? In this seminar, you will have the opportunity to interact and learn from **Bobby Rauf, the author of the texts, titled: (1) Thermodynamics Made Simple for Energy Engineers, and (2) Finance and Accounting for Energy Engineers.** (Copies of these books are available at additional cost).
- As an engineer, energy professional, **do you find the concept of power factor, the application and benefits of VFDs (Variable Frequency Drives), application of EMS (Energy Management Systems) – as energy conservation measures – elusive?** Then, this seminar will present an excellent opportunity to remedy that.
- So, as a plant engineer, facilities manager or energy professional, you know that the **compressed air is a costly resource from energy point of view, yet, you are**

not sure where to begin short of performing audits and hiring “experts” to curb the cost associated with the operation of large air compressors and minimization of compressed air wastage. This seminar will show you practical, common sense and proven best practices to make a measurable difference, with the least amount of cost.

- Some seminars and courses end up being monotonous monologues from the presenter to the audience. Not this one. In this seminar, you will get an opportunity to air questions, share your success stories in the energy arena, learn how to avoid costly mistakes, **through discussions with the instructor and other members of the audience.**

Who should attend:

- **Licensed Professional Engineers**, who need to meet the annual or biennial license renewal PDH (Professional Development Hour) or CEU (Continuing Education Unit) requirements. This energy seminar **couples engineering concepts and knowledge** with energy conservation concepts and best practices.
- **Facility Managers, Engineering Managers, Energy Professionals, Architects, Project Managers and other executives** who feel a need to enhance their energy engineering knowledge, to make informed decisions on energy projects or programs.
- **Professionals**, who are not experienced in the energy realm, including **energy project proposal development staff, energy project financial analysts and technical writers.**
- **Procurement/purchasing professionals** who are responsible for obtaining energy project proposals.
- **Construction managers** who manage energy project installations.
- Energy professionals preparing for the **CEM, Certified Energy Manager, exam.**
- **Other professionals** whose annual **PLP, Performance and Learning Program,** include energy engineering courses, training, or seminars.

Instructor Bio:

Professor S. Bobby Rauf, P.E, C.E.M, MBA; Member, ASEE, American Society of Engineering Education.

Professor Bobby Rauf is the President, Chief Consultant and a Senior Instructor at Sem-Train, LLC. Bobby has over 25 years of experience in teaching undergraduate and post graduate Engineering, Science, Math, Business Administration and MBA courses,

seminars and workshops. Prof. Rauf is registered (PE) **Professional Engineer**, in the State of North Carolina, a **Certified Energy Manager** and a **certified ergonomist**.

Prof. Rauf was inducted as “**Legend in Energy**” by AEE, in 2014. He is a published author of multiple engineering and energy books, and professional development courses. He holds a patent in process controls technology.

Prof. Rauf develops and instructs PDH (Professional Development Hour) and, continuing education, engineering skill building courses. He conducts these course in form of webinars, live on-site presentations, workshops, pre-recorded audio and self-study texts. Some his major clients include **Texas A&M University, Saudi Aramco – KSA, University of North Carolina at Charlotte, McNeese University, Lamar University, Clemson University, Association of Energy Engineers, EPIC College - Canada; US Bureau of Reclamation, BHP Billiton, PDHengineer, CED, Y-F Asia, and PDH Source.**

Prof. Rauf’s last full-time engineering employment, in the corporate world, was at PPG Industries, Inc. where he served as a **Senior Staff Engineer**. He brings to this program more than 25 years of hands-on experience in a broad spectrum of areas within large industrial plant engineering and plant maintenance departments, including electrical, controls, energy and mechanical projects. Professor Rauf has served as **Adjunct Professor at Gardner-Webb University** since 1989, where he has instructed classes in both the B.A. and M.B.A. programs.

Professor Rauf’s publications include (Available through AEE, Amazon.com, and Barnes and Noble):

- 1) Text book titled “**Thermodynamics Made Simple for Energy Engineers,**” Published in 2012 through Fairmont Press and CRC Press – Worldwide distribution.
- 2) Text book titled “**Finance and Accounting for Energy Engineers,**” Published in 2011 through Fairmont Press and CRC Press – Worldwide distribution.
- 3) Text book titled “**Electrical Engineering for Non-Electrical Engineering,**” The Second Edition of this book was published in 2016 through Fairmont Press and CRC Press – Worldwide distribution.

Lead Instructor’s Phone: (704) 477-9166

“SemTrain, LLC, is an approved sponsor and course provider with NY, NYSED, Maryland, NCBELS, North Carolina Board of Examiners for Engineers, New Jersey, and FBPE, Florida Board of Professional Engineers, for the provision of CPC, Continuing Professional Competency, courses.”

“SemTrain, LLC, is approved for US Federal Government Contract Work, and is SAM and CAGE registered.

Important Notes for Participants:

- In order to enhance the learning experience, the class size is limited – register early.
 - Seminars are subject to cancellation if the minimum registration threshold is not met. Registration fees will be refunded in entirety if a seminar is cancelled.
 - Name on the attendance certificate will be as it appears on the registration documents. Please Note: If an admin associate registers you, have them enter YOUR name on the registration/payment form.
 - Verify exact location of venue before the seminar date. *
 - Bring valid ID and copy of registration information. *
 - Light refreshments will be served. *
 - Certificates of attendance will be provided.
 - The handouts for the course will be provided via “Drop Box.”
 - Seminar Hours – Each Day: 8:00 am - 5:00 pm. One hour for lunch. *
 - Venue Wi-Fi where available. *
- * This information applies to in-person, face to face, seminars only.

List of Past and Current Clients:

Mr. Rauf of Sem-Train has provided training and/or consulting services to over 5000 engineers and non-engineers through some of the following organizations, over the last fifteen years:

1. **BHP Billiton**
2. **Saudi Aramco (Dammam, Kingdom of Saudi Arabia)**
3. **US Bureau of Reclamation (Hoover Dam)**
4. **US Dept. of State (SemTrain, LLC, is SAM/CAGE approved for Federal Contracts).**
5. **CED**
6. **Balfour Beatty**
7. **Shaw Group**
8. **McNeese University**
9. **North Carolina State University**
10. **University of North Carolina, Charlotte**
11. **Texas A&M University,**
12. **Clemson University,**
13. **PPG Industries, Inc.,**
14. **NEG, Nippon Electric Glass**
15. **PDHengineer,**
16. **PPI, Professional Publications**
17. **University of Maryland Baltimore County,**
18. **EPIC (Canada)**
19. **Y-F Asia – Singapore**

20. Duke Energy

Testimonials from clients:

- 1) Kimberly T.: Bobby, I would like to say that even though I am not an engineer, I am really glad that I took this. You have helped me to dissect and visualize some of the terms and concepts that were not tangible to me prior to this class.

- 2) Jim L. S. PE, CMRP, Manager Engineering: “....Bobby is an outstanding instructor and the material was very well presented.....We will want to do this again next year...

- 3) Gregory (Greg) V. D., P.E.: “Hi Bobby, I've enjoyed both of your pdhengineer.com webinars that I've attended.....I don't know how you get through a full 8 hours at such a high energy level!”

- 4) See other testimonials at our website.

Lead Instructor’s Phone: (704) 477-9166. *Note: Interested potential attendees are encouraged to call the instructor, directly, with technical seminar content related questions.*

Cancellation Policy: Full refund granted if registration is cancelled **30 days** or more prior to the scheduled date of the seminar; otherwise, registrant can apply the course credit toward attendance at another, scheduled, equivalent event, in the region, at a later date.

Sem-Train, LLC, reserves the right to cancel the seminar when minimum registration threshold is not met. In such case, Sem-Train, LLC, will issue full refund to the registrant. Registrants, in some cases, may be given the option to attend the on-line, live, webinar, version of the seminar.

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