Energy Assessment Training Course

The National Renewable Energy Laboratory (NREL) provides training for governments and organizations worldwide to assist with energy efficiency and renewable energy project planning and development. Trainings can be adapted to an organization's particular interest and geographic location or country, and may be targeted to specific audiences, including policy makers, energy planners, and engineers.

Training Course Overview

The Energy Independence and Security Act (EISA) of 2007 states that energy managers shall complete a comprehensive energy and water assessment for each calendar year for approximately 25% of the [covered] facilities in a manner that ensures that an evaluation of each such facility is completed at least once every four years. As a result of this Federal legislation, NREL developed an energy assessment training course in partnership with the Department of Energy's (DOE) Federal Energy Management Program (FEMP).

The objective of the training course is to teach trainees state of the art assessment techniques using standardized analysis and assessment tools. Through completion of the course, trainees will have the knowledge and resources needed to conduct comprehensive energy assessments. Targeted trainees include energy managers, facility managers, resource efficiency managers (REMs), building engineers, HVAC technicians, electricians and programmatic energy staff.

The week long training course includes interactive presentations each morning followed by hands-on walk through assessments each afternoon. The trainees are taught to use on-site assessment tools, fill out data collection forms, use analytical tools created by NREL, and generate a comprehensive energy assessment report. Trainees will receive a workbook that includes copies of the presentations and data collection sheets. The workbook is meant to serve as an energy auditing field book with topic-specific assessment procedures, performance specifications and cost guidelines. Attendees will also receive a CD with the analytical tools, presentations, report template and key publications for each topical area. NREL is continuously working on developing new material and adding state of the art energy efficiency and renewable energy technology information to the course to ensure that each trainee will be equipped to analyze the latest, state of the art technologies.

Trainees are asked to bring a laptop, a calculator and a notebook. Attendees are asked to have Microsoft Excel, Word, and eQuest, (a free energy modeling software program) loaded onto their laptop. (http://www.doe2.com/equest/).

Elements of the Training Program
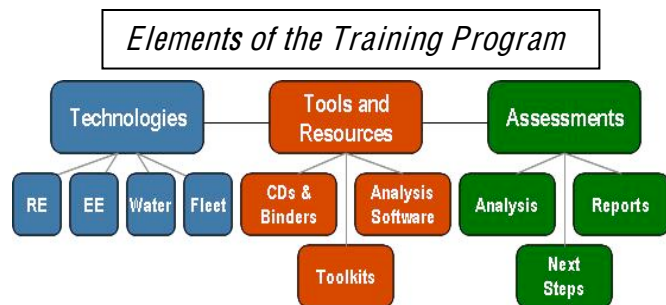
Topics covered during the training:

Section 1: Introduction
1. Purpose of the Training and Overview
2. Energy Awareness
3. Energy Usage Data
4. Safety
5. O&M Metering
6. Fleet

Section 2: Lighting
1. Office/ Residential Lighting
2. High Bay Lighting

Section 3: Water Conservation

Section 4: Plug Loads

Section 5: Building Envelope

Section 6: Renewable Energy
1. Photovoltaic
2. Solar Hot Water
3. Solar Ventilation Pre-heat
4. Wind
5. Biomass
6. Ground Source Heat Pumps
7. Ocean

Section 7: HVAC
1. Human Physiology
2. HVAC Systems
3. Cooling Systems
4. Control Systems
5. HVAC System ECMs
6. Heating System ECMs
7. Domestic Hot Water
8. Cooling System ECMs
9. Control System ECM's
10. Retro-Commissioning and O&M
11. Motors

Section 8: eQUEST Energy Modeling

Section 9: Implementation
1. Financing
2. Measurement and Verification
3. Emerging Technologies
4. Incentives
5. NREL Capabilities

Energy Efficiency and Renewable Energy Assessment Tools

As part of the training course, NREL created a suite of analytical tools to develop energy efficient design strategies for buildings and electric power systems. The tools are automated, Excel-based calculation tools that use Visual Basic programming. Each individual calculation module is designed to operate transparently. The user is not required to be proficient in the engineering analyses procedures that are automatically generated by the tool. The user is only responsible for entering data that is easily collected during an energy assessment. Each individual energy conservation measure (ECM), water conservation measure (WCM) or renewable energy opportunity has its own worksheet. Each worksheet has a set of automated user forms that guide the user through the technological specifications that should be met for each measure and provides cost guidelines that should be used when scoping out a project. Once the user enters data into a worksheet and clicks on a control button, all of the ECM data automatically populates an output file. The tools also incorporate building life-cycle costing equations and will calculate simple payback, discounted payback, net present value, and savings-to-investment ratio for each ECM. The tools are currently set up to analyze low bay lighting ECMs, high bay lighting ECMs, water conservation opportunities, plug load ECMs, and renewable energy opportunities.

Through completion of the course, trainees will also be taught how to use eQUEST to evaluate their individual buildings. eQUEST is a commercially-available, free software tool that is used to simulate the hourly energy performance of buildings, and evaluate the energy and cost savings of various energy efficiency retrofit opportunities. eQUEST facilitates defining building geometry, space characteristics, schedules, and HVAC systems, as well as running parametric analyses to study design options.

For more information about the Energy Assessment Training Course, contact: Jesse Dean at jesse.dean@nrel.gov or 303-384-7539