



**ADVANCED ENERGY MODELING FOR LEED
ONLINE TRAINING COURSE**

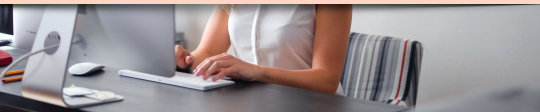
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**SIMULATION SOFTWARE AND KEY
OUTPUT REPORT
FOR ENERGY PROFESSIONALS**

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WHAT SHOULD YOU LEARN



The summary output reports contain information on energy use by end use, energy cost, and unmet load hours for both the baseline and the design case energy models.





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The following is supporting documentation for the LEED EA Credit 1 template including a list of modelled energy efficiency initiatives and the BOPU reports from eQUEST for the proposed and Appendix G baseline models.

The modelled energy efficiency initiatives for the Jumeira Mosque project are as follows:

Building Envelope

- Use of energy efficient lighting systems
- Use of solar hot water systems in preference to electric storage heating
- Use of a photovoltaic lighting system.



TITLE 24 OUTPUT REPORTS

The current state-approved energy compliance software programs for use with California Title 24-2005, EnergyPro and eQuest Compliance Module, are both DOE-2-based software. These programs can generate DOE-2 reports and Title 24 report forms summarizing the modeling inputs and outputs.

The PERF-1, UTIL-1, and ECON-1 reports are the major forms required as backup documentation for EA Credit 1. DOE-2 outputs may be used to complete the EA Credit 1 submittal template and provide additional backup documentation.

- ✓ PERF-1 report. Provides summaries of Title 24 TDV energy consumption by end use, lighting power density, envelope inputs, and HVAC inputs for both baseline and proposed cases.
- ✓ UTIL-1 report. Summarizes electricity and fossil fuel consumption per end use. When residential domestic water heating is modeled, the value from the UTIL-1 report must be used rather than the ECON-1 report for fuel consumption, and the virtual natural gas rate must be used to add the residential water heating costs to the values reported in ECON-1.
- ✓ ECON-1 report. Summarizes economic outputs, including energy use and energy cost information for both cases.

HAP OUTPUT REPORTS

For LEED projects, the most important output report in Carrier's Hourly Analysis Program (HAP) v4.5 is the EA Credit 1 summary. This report mimics the format and content of the LEED credit form. If the project preference is set to "LEED 2009," the report will be formatted according to the LEED 2009 EA Prerequisite 2 credit form. The report contains the following information:

- ✓ Energy use and peak demand by end-use component, and total energy use for the proposed building, all four baseline building orientations, and the baseline average;
- ✓ Energy cost for the proposed building, all four baseline buildings, and the baseline average;
- ✓ Unmet load hours for cooling and heating;
- ✓ Energy-use intensity (energy per unit floor area);
- ✓ Documentation of compliance with the 25% process energy cost requirement; and
- ✓ EA Credit 1 points earned.

In addition, the following HAP v4.5 reports provide useful information for documenting and troubleshooting LEED project results:

- ✓ Annual Cost Summary report. Lists the energy cost and energy cost per unit floor area by end use categories and as a total for the building.

HAP OUTPUT REPORTS +

- ✓ Energy Cost Budget by System Component report. Summarizes the energy use and energy use intensity (energy use per unit floor area) for end use categories and as a total for the building.

- ✓ Zone Temperature Report and Unmet Load Report (for air systems) and Unmet Load Report (for plants). Provide the raw data that are the basis for LEED unmet load hours reported on the EA Credit 1 summary report.

- ✓ Monthly Energy Use by Component report. Lists monthly energy use for end use categories on a building-wide basis (e.g., total indoor fan kWh by month). This information is helpful for understanding the relative energy consumption of major energy end uses.

- ✓ Monthly Air System Simulation Results and Monthly Plant Simulation Results reports. Provide monthly and annual energy use and load information for individual system and plant equipment components. This information is helpful for understanding the behavior of specific systems and plants in the building.