

LEVELS OF ENERGY ASSESSMENTS

Portions of the descriptions for the following scopes of work are taken from the ASHRAE *Procedures for Commercial Building Energy Audits, 2nd Ed.*

LEVEL 1 ENERGY ASSESSMENT

Scope of Work for a Level 1 Energy Assessment

A Level 1 Energy Assessment will identify low-cost/no-cost measures for improving energy efficiency and provide a listing of potential capital improvements that merit further consideration. For example, replacing all 32 watt T8 lamps with 28 or 25 watt T8 lamps as the existing lamps fail, is a “no cost” measure since lamps are replaced at the time of routine maintenance.

The results of the Level 1 Energy Assessment may indicate the value of pursuing a Level 2 or 3 Energy Assessment if some a significant savings potential exists. If opportunities for more significant energy savings are noted during the Level 1, Entech will provide a rationale for more detailed analysis with a separate proposal for the work.

Refer to *Services Provided for Level 1 Energy Assessment* below for additional information.

Services Provided for a Level 1 Energy Assessment

- Present Preliminary Energy-Use Analysis (Requires building level utility information provided by the Client)
- Perform walk-through survey
- Identify low-cost/no-cost recommendations/Energy Conservation Measures and O&M related ECMs
- Identify possible capital improvements (capital intensive ECMs)
- Evaluate energy usage and compare EUI (Energy Usage Intensity) to similar sites
- Summarize utility data with estimated EUI based savings for utility rate changes (or fuel source changes)
- Prepare Executive Summary of findings and a brief report of the assessment

For each building receiving a Level 1 Energy Assessment, Entech will complete the indicated scope of work and provide an electronic (PDF) copy and three printed copies of a brief, pre-final report and, upon review and comment of the client, the final report.



LEVEL 2 ENERGY ASSESSMENT

Scope of Work for a Level 2 Energy Assessment

A Level 2 Energy Assessment involves a more detailed building survey, including energy consumption and peak demand analysis. A Level 2 will identify and provide the savings and cost estimates of all practical energy conservation measures (ECMs) that meet the owner/operator's constraints and economic criteria. Changes to operations and maintenance procedures and associated costs will be included in the analysis.

The detail and accuracy of cost and savings estimates will be limited by the scope of the Level 2 analysis, but are typically adequate for determining actionable recommendations for most buildings and measures. As with Level 1, if opportunities for more significant energy savings are noted during the Level 2, Entech will provide a rationale for a more detailed analysis with a separate proposal for the work.

Refer to *Services Provided for a Level 2 Energy Assessment* below for additional information.

Services Provided for a Level 2 Energy Assessment

- Present Preliminary Energy-Use Analysis (Completed – Results will be provided in report).
- Perform detailed survey.
- Identify low-cost/no-cost recommendations/Energy Conservation Measures and O&M related ECMs.
- Identify possible capital improvements (capital intensive ECMs).
- Review HVAC and Electrical designs, equipment condition, and O&M practices.
- Review water usage.
- Measure key parameters (light meters, space temperatures, etc.).
- Analyze capital measures (detailed estimated savings and cost of all proposed ECMs).
- Meet with owner/operators to review significant capital measures.
- Prepare report including the following:
 - Evaluate energy usage and compare EUI (Energy Usage Intensity) to similar sites
 - Summarize utility data with estimated EUI based savings for utility rate changes (or fuel source changes).
 - Detail complete building description and equipment inventory.
 - Estimate low cost/no cost savings.
 - Provide detailed end-use breakdown.
 - Estimate capital projects costs and savings.
 - Provide Summary Sheet for each ECM with existing deficiency, general description of work required, cost and savings estimate and financial analysis.
- Prepare Executive Summary of assessment including recommended projects and highlighted projects.

Entech will complete the indicated scope of work and provide three printed copies of a pre-final report and, upon review and comment of the client, three printed copies of the final report. In addition, an electronic (PDF) of the pre-final and final report will be provided.



LEVEL 3 ENERGY ASSESSMENT

Scope of Work for a Level 3 Energy Assessment

A Level 3 Energy Assessment involves all of the work of the Level 1 and Level 2 Energy Assessments with the following additional scope: more thorough field data collection assists in the creation of a detailed computer simulation of the building calibrated to the existing energy usage using 8,760 hour weather data for the specific location and year being calibrated. This calibrated model provides a baseline for energy consumption and can then be modified to determine energy savings for more complex ECMs.

A calibrated building simulation has the significant advantage of accounting for the interaction between different components of complex building systems such as boiler and chiller plants or HVAC and lighting systems. After completing the building model, viable system improvements to the building are simulated by adjusting the model to reflect the changes. Annual savings are determined by the decrease in energy from the calibrated baseline model.

After determining which system improvements provide economically significant savings, a detailed cost estimate is generated from a schematic level design narrative. Together, the savings and the cost estimate provide the foundation for an economic analysis of each of the projects. Net Present Value (NPV) and simple payback are used to provide a snapshot of the economic feasibility of each ECM.

Refer to *Services Provided for a Level 3 Energy Assessment* below for additional information.

Services Provided for a Level 3 Energy Assessment

- Present Preliminary Energy-Use Analysis (Completed – Results will be provided in report).
- Perform detailed on-site survey.
- Detail building description and inventory.
- Identify low-cost/no-cost recommendations/Energy Conservation Measures and O&M related ECMs.
- Identify possible capital improvements (capital intensive ECMs).
- Review HVAC and electrical designs, equipment condition, and O&M practices.
- Review water usage.
- Measure key parameters (light meters, space temperatures, etc.).
- Analyze capital measures (detailed estimated savings and cost of all proposed ECMs).
- Meet with owner/operators to review significant capital measures.
- Conduct additional testing, data collection and monitoring (large motor current draws, actual distribution temperatures, occupancy logger, etc.).
- Create and calibrate detailed computer simulation of the building and systems:
 - Model the building envelope, equipment, and annual operation with individual schedules for each space's lighting, plug loads, occupancy, and equipment operation.
 - Adjust model to match actual annual energy usage from utility bills.



- Model will then be adjusted for the proposed ECMs to simulate annual savings.
- Develop schematic level design narrative for recommended projects.
- Prepare report including the following:
 - Evaluate energy usage and compare EUI (Energy Usage Intensity) to similar sites.
 - Summarize utility data with estimated EUI based savings for utility rate changes (or fuel source changes).
 - Detail complete building description and equipment inventory.
 - Estimate low cost/no cost savings.
 - Provide detailed end use breakdown.
 - Provide detailed cost estimates for capital projects.
 - Provide Summary Sheet for each ECM with existing deficiency, detailed description of work required, cost and savings estimate and financial analysis.
 - Recommend measurement and verification procedures where applicable.
- Prepare Executive Summary of assessment including recommended projects and highlighted projects.

Entech will complete the indicated scope of work and provide three printed copies of a pre-final report and, upon review and comment of the client, three printed copies of the final report. In addition, an electronic (PDF) of the pre-final and final report will be provided.

