GUEST SPEAKER

Green: Under promise and over deliver

Avoid unhappy clients and potential lawsuits by following some simple steps.

As design and construction teams work to achieve increasingly higher LEED ratings, they are pushing the envelope of energy efficiency with new uses for recycled and renewable materials within the building. Unfortunately, many projects have fallen short of the team's original intentions.

The most significant concern for a finished building is the difference between the modeled and the actual energy consumption. Energy modelers are pressured by the design and construction teams to demonstrate significant energy savings over a code baseline building; these large energy savings will help earn a higher LEED rating for the finished project. However, when owners see that first year energy consumption costs are substantially higher than the model predicted, they can claim they have been misled into making inappropriate investments that did not result in the payback they expected.

Unfortunately, this is a simple mix-up that can be avoided very easily. Here are some tips to minimize the potential for unhappy clients or litigations for not delivering the energy goals that were promised:

Discuss model requirements— The U.S. Green Building Council and the American Society of Heating, Refrigerating and Air-Conditioning Engineers have specific requirements for modeling buildings to determine the energy efficiency of the proposed design. These guidelines are meant to provide an even playing field between different projects, even though some may have more specific requirements.

Steve Straus

ASHRAE requires plug loads be modeled based on an operating schedule that mimics a traditional work day, typically 7 a.m. to 6 p.m. for an office building. In reality, tenants who work late or leave their computers running all night create additional energy costs that fall outside of the schedule. Clients should be informed that if numerous electronics are left on after everyone has gone home, they can anticipate higher energy consumption than the energy model predicted.

To avoid this, **Glumac** recommends providing at least four energy model results for the owner: a baseline and a building model for the project designed to meet USGBC or ASHRAE 90.1 requirements, as well as separate models that use an operating schedule that you and owner both agree upon. Perhaps it is decided that some equipment will be left on at night, or that a small percentage of employees will sneak space heaters into their offices. Make sure everyone is on the same page as to what the hours of operation are.

Historical energy database— Provide your client with a historical database of operating costs of similar projects. You can identify many comparable projects from the U.S. Environmental Protection Agency's web site on ENERGY STAR buildings at *www.energystar.gov/index.cfm?c=green_buildings.green_buildings_index*. By showing your client a comparison of code-conforming buildings and the actual data of energy efficient buildings, you can begin to establish the groundwork for what the "real numbers" will be for the project.

Accurate plug loads— Plug loads vary by occupancy, due to the number of computers within the work space. While most office tenants have a plug load of 0.75-1.0 watts per square foot, the industry is beginning to see much higher loads of 2-3 watts per square foot, especially in the software engineering market. Owners are attempting to reduce real estate costs by increasing the occupancy density by almost 50%, trying to fit many more people into a space than they did just five years ago. I recommend measuring the energy consumption per workstation, multiplied by the number of workstations in the space. Rules of thumb used to calculate the number of watts per square foot don't account for increased density, creating an underestimation that can really drive up energy costs.

Don't be overly optimistic— Energy specialists may be quick to believe manufacturers' results and promises on the purported energy savings of a particular product. This data might be based on a "best case scenario" with occupancy schedules and density that differ greatly from your building project. It is important to measure the actual efficiencies from previous installations, and to provide realistic assumptions in the analysis.

Document the assumptions— It's very important to document the assumptions used to create your baseline energy models, and review them with the owner and design team to make sure the assumptions are reasonable. When differences occur between the requirements of various agencies, make sure these discrepancies are brought to the teams' attention so that everyone can move forward from the same point.

Since Glumac began commissioning projects, we've seen a trend where actual operating costs are 50- to 100% higher than those predicted by the energy specialist. The baseline energy models should project similar increased operating costs, which would accelerate the payback for these energy saving measures.

At Glumac, we track many of our clients' projects for several years after they have been completed. If the building's actual energy consumption doesn't match the theoretical, we identify what might have created these differences.

More often than not, a change in occupancy hours or building use is the cause. We recently evaluated a new college building where the actual energy usage was much higher than we initially estimated. We discovered that although our baseline model was created for 12 hours of operation, the university was operating the building 24 hours due to its increased popularity with the students.

STEVEN STRAUS is president of **Glumac** (San Francisco, CA). Contact him at *sstraus@glumac.com*. LOUISA GAYLORD, communications director, is co-author.