From the Ground Up

How to Design High Energy Performance Hospitals

Last year, the American Hospital Association reported that the number of hospitals in the United States had declined by 900 since 1980. While the supply of hospitals has declined, the demand for healthcare services has risen dramatically, primarily by aging baby boomers. This demand, combined with a deteriorating infrastructure, hospital consolidation, and advances in medical technology are fueling one of the hottest construction and renovation markets in decades. Healthcare construction is estimated to be a $15 billion market today and some believe it will double by 2010.

Money Isn't All You're Saving

As hospitals expand their size, add advanced medical technology, and compete for patients by increasing amenities such as family zones with Internet connections, energy use is expected to climb to new heights. Electricity use alone is projected to nearly double by 2015, according to the EPRI Journal (September 2000). Your hospital can control the magnitude of energy use in new construction (and subsequent future operational costs) by focusing on energy performance during the design phase. Since cost savings will go directly to your bottom line, such foresight will strengthen your hospital's financial performance and increase the asset value of the new facility.

How do you integrate energy performance into new construction? At Energy Star®, we have found successful design teams set a target for energy performance comparable to top performing facilities, develop a comprehensive plan for meeting the target, and compare estimated energy consumption to the target as the design develops. In other words, an energy performance goal must be institutionalized throughout the design process. We recommend you lay out a framework to guide your efforts along each step of the way.

Start Right – Set Goals

Setting definitive, measurable and achievable energy performance goals is the first step in designing high performing buildings. Energy Star's Target Finder (available at www.energystar.gov) can help you set goals and measure progress towards their achievement. Target Finder uses EPA's 1-to-100 energy performance rating scale to compare your new facility design to similar hospitals nationwide. Energy Star recommends setting a target of 90 or better, thereby putting your new facility* in the top 10% in terms of energy performance.

Assemble Design Team

Assembling a multi-disciplinary team to work together from goal setting to building operation is crucial. Your team should investigate energy performance design strategies and determine how these strategies can be integrated in new building design. Buy-in, experience, and early involvement are required for the team to establish and achieve design and energy performance goals.

Pre-Design Phase

The conventional design process usually introduces energy efficiency features, such as double-glazing or variable speed fan drives, during design development. However, one of the greatest opportunities for achieving superior energy performance is at the pre-design stage. Pre-design activities (e.g. building orientation) should help the team integrate energy

performance design concepts that, together, can have a tremendous impact on future energy use.

Schematic Design Phase

If your team developed an energy performance approach during pre-design, implementing those strategies during Schematic Design will be straightforward. Prepare to develop concepts more thoroughly and allow for multi-disciplinary team participation as the design is analyzed and refined to improve energy performance. Compare your simulated energy design to top performing buildings at this stage to chart progress toward achieving building design with optimal energy performance.

Design Development Phase

Use design development to refine, solidify, and document features introduced during schematic design. Energy performance design strategies should be well defined and integrated at this stage. Energy performance design decisions made during design development will be less effective than those made earlier in the process. Confirm that design is approaching or meeting aggressive performance targets compared to the top 10 percent of facilities (90 or better in Target Finder).

Construction and Bid Documents

Even the best-designed energy performance features can be compromised during the construction document phase. To avoid this, owners should ensure that energy performance strategies are clearly stated, understood and implemented in the field. The Statement of Design Intent, generated from Target Finder, identifies the intended energy performance outcome of the design and should be included in documentation and reviewed with all parties to ensure that they understand the performance outcomes. Building owners may want to provide incentives to the project team if operating costs are reduced as a result of better energy performance.

Commissioning

Commissioning is the process through which design intent is communicated to the building management team. It usually occurs as your new building is turned over for occupancy and can include tests to determine proper system function. In practice, commissioning is funded out of the design fee and must compete with design activities that often strain the budget. As a result, it is seldom pursued properly. It is critical that the team that will be responsible for keeping performance high understand your building's energy performance enhancing systems and characteristics, if the building is to ultimately earn EPA's Energy Star label for superior energy performance.

Tracking, Measurement, and Verification

Tracking energy performance has become standard practice for energy management systems in commercial buildings. In order to maximize the value of a design's energy performance, its actual performance should be tracked over time and compared to expectations. Tracking will also provide data to benchmark your hospital's performance against the Energy Star performance target for similar facilities. There are a variety of options for tracking and verifying energy savings, including EPA's national energy performance rating system.

Apply for the Energy Star label

New hospitals created with an emphasis on energy performance will be strong candidates to meet their energy target and qualify to receive EPA's Energy Star label. Once the facility generates one year of utility data, its actual energy performance can be compared to an industry benchmark of similar hospitals. Facilities that achieve a score of 75 or higher qualify as candidates for the label. This entire process can be completed at the EPA's Energy Star Web site (www.energystar.gov/benchmark).

We are in a unique moment in the healthcare industry. Never before have we seen growth trends like the present. Never have there been more opportunities to build hospitals from the ground up that reflect the best thinking in sustainable design and energy performance. Leading with a commitment to excellence in energy performance in the design phase now will help protect the environment and your bottom line for years to come. ASHE

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*** Only acute care hospital ratings are available at this time.*