

HOW TO

BY DAVE THOMAS

Cut energy costs with new construction materials and ideas

With ever-increasing energy costs claiming larger shares of overhead and operations expenses, building owners benefit greatly from adopting new methods for conserving resources. Here are a few effective tools and techniques to help build additional savings.

Energy savings begin with assessing the options for a building's energy systems at the earliest conceptual design stage. It is during these first days that owners should ask the construction manager for recent construction cost data to develop a high-level energy model based on real parameters for the building. This approach provides valuable information early enough in the process to direct the project in a way that both satisfies building owner needs and saves the most on building energy costs and maintenance.

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In a typical building process, the design team creates a detailed energy model to assess possible energy savings *after* mechanical systems, envelope materials and structure have already been determined. At this late point the options available to make design changes that affect the energy model, like adding half an inch of insulation or changing the type of glazing, generate only nominal savings.

Alternatively, when the owner involves construction managers early on, we can look for building options that will add efficiency and create smarter buildings. When

we receive concept design information we evaluate three or four different mechanical systems, envelope options and structural options and then provide a menu of choices. Working with partners like engineering and energy consultants, the next step is to look strictly at utility energy costs, develop an energy model and identify opportunities to maximize savings. At the same time, we develop in-house cost estimates for every individual option and every combination of options for mechanical, structural and envelope systems.

The design team also benefits when a building owner receives early feedback on the kind of opportunities there are for their specific building needs and can make early decisions. The entire team gets a more efficient start by narrowing down the options for the final design, early on. Once systems are selected through this early assessment, the design team can also provide a useful, further detailed energy model and work with owners who are pursuing LEED certification or pursuing incentives or tax credits for energy efficiencies.

We have worked with various clients on cost-saving initiatives, but two examples come to mind.

At Bates College in Lewiston we looked at three mechanical systems, three structural systems and two envelope systems. We looked at every combination of those components and showed the college what each scenario would cost from a construction perspective and from a 25-year utility cost perspective. This data, presented visually, showed first cost, utility cost and return on investment over a 25-year period, which was invaluable in helping the college make informed decisions for the project.

At St. Joseph's Healthcare in Bangor, adopting this process for a 22,000-square-foot structure led to the introduction of insulated concrete-form construction, walls

made from a double layer of manufactured concrete sandwiched around foam insulation. The layered forms of polystyrene foam and concrete provide a tight seal against extreme temperatures. This envelope choice enabled the heating and cooling system to be downsized significantly compared to what would be needed on a traditional building of its size, saving the owner about \$70,000 in construction costs and \$10,000 annually in heating and cooling costs.

For commercial and institutional building owners, the increasing cost of fuel and electricity can decrease the resources available for new jobs or upgrades to facilities and technologies that help businesses stay competitive. Engaging in comprehensive, early assessments of building system options can change that.



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