MAKING GREEN AND SUSTAINABLE DESIGN REALLY WORK

How Engineers Can Work Better with the Architect So they Can Design and Build a More Energy Efficient Building and Better Serve the Client

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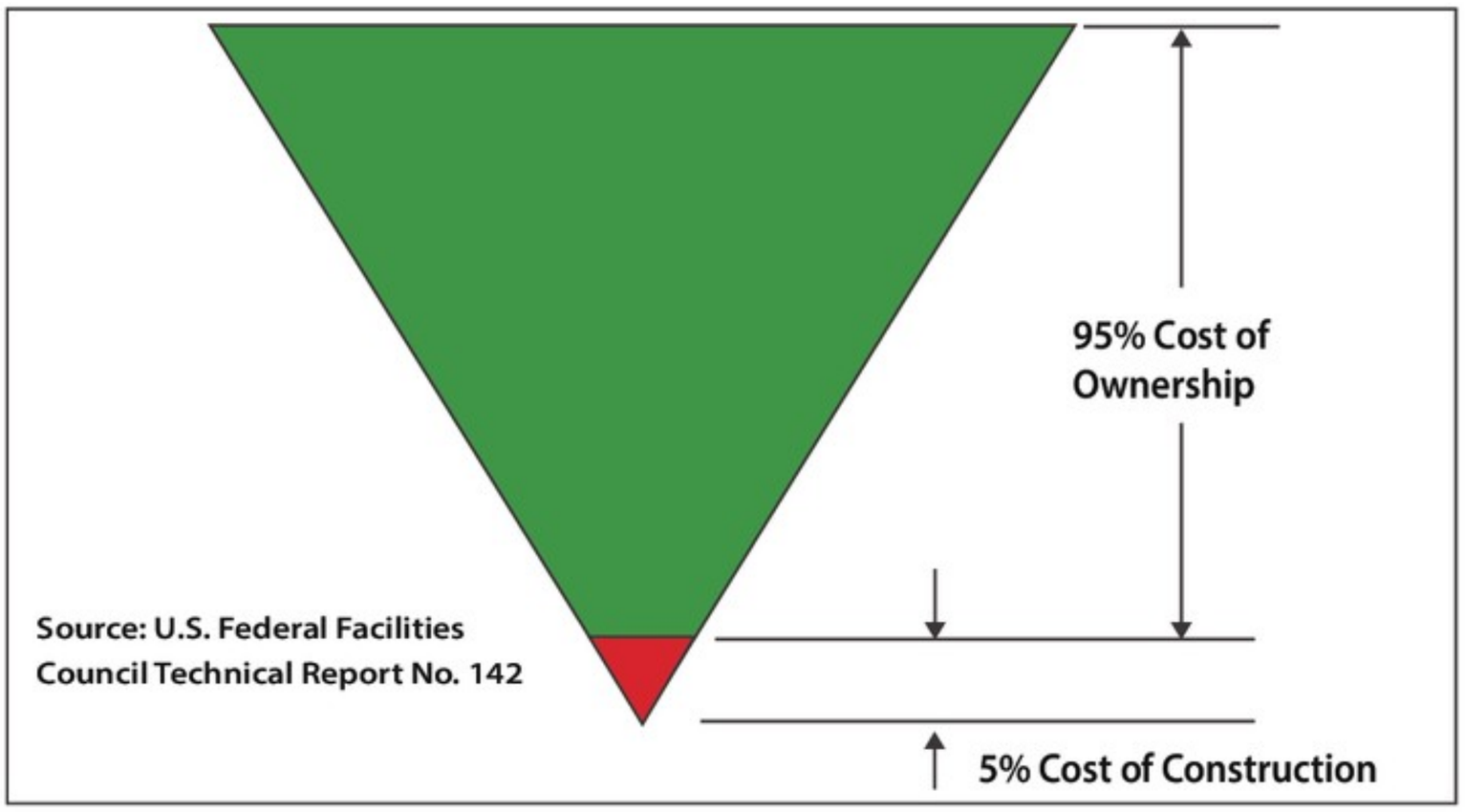
Energy efficiency has been the buzzword among building engineers, and many architects, for some time now. But if a new building is being constructed, added on to or renovated, energy efficiency may not be top-of-mind to the developer. Here's why it should be, and some tips on how to incorporate energy efficiency measures that make everyone – especially the client – happy.

One of the best things you can do is start thinking about energy early on. The earlier the better. Why? Creating an energy efficient building that is also functional and aesthetically pleasing takes time. Whether or not you're building for LEED® certification (Leadership in Energy and Environmental Design), you can design and build using USGBC's guidelines for energy efficiency. Help your client understand that there are no "cookie-cutter" answers here. Each project is unique and requires its own unique solutions. It may cost a little more up front, but it will save the client money throughout the life of the building.

The additional cost can vary from as little as two percent to more than ten percent depending on the differences between the original design and the revised design, but it is more than worth it over the life of the building. Often the building owner will see the savings in the utility costs in the first few years, especially if proper commissioning is performed prior to occupancy.

Traditional vs. Integrated Design

Most building owners/developers want an attractive building. Until recently, attractive mostly meant eye-catching on the outside, functional on the inside, with great curb appeal. With the growing popularity of mandated energy attractive is taking on a whole new meaning. Today's market wants a better building all around:



- Aesthetically pleasing
- Functional
- Energy efficient
- Good indoor air quality
- Quiet (Usually. This can be a function of who is in the building and what their ages are!)
- Comfortable to be in

What's in it for the client? Buildings with these qualities tend to have higher occupancy rates, higher productivity ratings, higher occupant satisfaction - and they command higher rents and higher resale value. For cost-effectiveness, start early. The architect, engineers (mechanical and electrical) and the general contractor must be on the same side — the side of the client. We call this Integrated Design – when everything from the building envelope through HVAC, lighting and plumbing have both an attractive design that works for the building occupants, and a practical, energy efficiency component.

Some architects are not accustomed to working with engineers so early on. Often they still have the engineers come in later to design the heating/cooling/electrical and plumbing systems and figure out how to make them work around the architect's drawings. Integrated Design is a better way.

Begin with "Green and Sustainable" in Mind

Even if LEED® certification is not the goal,

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a properly designed and operated energy efficient building will save money on energy as soon as the building is built and occupied. With proper predictive and preventive maintenance these savings will last for as many years as the building will be there.

One of the key tenets of LEED is ASHRAE Energy Standard 90.1. We always recommend – no, make that insist - that the architects with whom we work have a copy of their own. Equally important, and much more useful, is the Energy Standard 90.1 User Manual, which explains and gives examples of various aspects of the building, including the building envelope:

- Fenestration
- Insulation
- Roof, Walls, Windows
- Air barriers
- Daylight and views
- Glare from windows

We recently completed a second project with a manufacturer that was building an addition to the LEED Gold Certified building that we had worked on previously. The company knew they wanted the addition to be LEED certified but the architect for the new project was not familiar with LEED, so we came in early on and helped guide him on various choices. For example, we recommended the most cost-effective R-values for the building envelope right up front so they could benefit from it immediately and would not have to add additional insulation later.

Energy efficiency is not just about using the most efficient equipment (mechanical, electrical, HVAC, etc.). It's as much about eliminating various energy-using equipment completely if possible (as in a Net Zero building) or at least minimizing their size and the size of their ancillary equipment. For the HVAC

systems, this includes the size of piping, electrical wiring, starters, etc., not just the mechanical equipment itself. All this equipment needs space, so using smaller equipment if possible, due to energy efficiency planning up front, can mean more public space for the architect to design.

Here are just a few ways the architect's choices can be influential in improving energy efficiency:

1. Proper siting helps by increasing daylight. This can have two main benefits: Reducing the lighting load; and decreasing exterior heating and cooling loads on the building.
2. Entrances should accommodate vestibules or at least revolving doors. This helps maintain a proper, steady indoor air temperature.
3. Duct work has to be properly sized - large enough so as not to create additional resistance that requires larger motors on HVAC systems and also to minimize noise problems.
4. And while an all-glass building is beautiful, the new energy code recommends no more than 40 percent of the building should be covered in glass.

These small architectural design changes can mean a smaller HVAC systems will suffice, freeing up usable space, saving money on the building and on the ongoing costs of running it. These are some of the positive results from working with engineers in advance that should make both the architect and the building developer happy.

To find out how Newman Consulting Group can help your Integrated Design Project contact www.newmanconsultinggroup.us (248) 626-4910.

About the Author: *Jim Newman, one of the country's most experienced energy efficiency and green building experts, is owner and managing partner of Newman Consulting Group, LLC, headquartered in Farmington Hills. Known as the "Dean of Green," Newman regularly speaks to professionals, student groups and the media about sustainability and green technology. He conducts seminars and webinars internationally on energy efficiency and sustainable operations and maintenance practices, and also writes articles in professional publications on saving money through energy efficiency and improved maintenance in commercial, industrial and institutional buildings. Newman has been involved in this industry long enough to be both a seasoned expert and a pioneer.*