The Challenges of Energy Efficiency on Campus: Three Expert Viewpoints

Whether in an academic setting or in a large-scale commercial/industrial project with a large energy footprint, the challenges of convincing decision-makers with spending responsibility of the value of investing in energy efficiency strategies can be a daunting task. Though all roads lead back to cost, the pathway to developing a continuous energy efficiency mindset has been hastened over time by a variety of factors including a convincing business case; as well as policy mandates that are both intra-institutional and also spurred by progressive legislation that reaches to the federal level; and economic incentives such as Savings By Design.

We spoke with three professionals who spearhead energy efficiency initiatives in the construction programs at three such settings: Nathaniel Wilson, Campus Architect at California State University, Northridge; Todd Lynch, Principal Project Planner, UCLA Capital Planning and Finance; and Carey Mcleod, Principal and Director of A. C. Martin's A/E Studio who is attached to the massive downtown Los Angeles Wilshire Grand project. Each respondent has been engaged in his respective career for twenty years or more.

The respondents were each asked a range of questions related to the challenge of implementing large-scale energy efficiency programs. Their answers are noted below.

To the question of how to overcome the major challenges of securing buy-in from leadership to achieve energy efficiency goals, Mcleod stated that understanding leaders' concerns about expenditures from first cost is critical. "It is a matter of convincing them that promoting energy efficiency is the right thing to do. We typically explain the steps involved to do what's right. Now many people are also aware of the need to reduce carbon."

At UCLA, which has an institutional energy efficiency mandate consistent with statewide UC policies, Todd Lynch offered a view of how to coordinate working with multiple stakeholders. While the university's overall size presents significant challenges based on the scale of energy use, there are also opportunities to make the business case. "Individual projects can seed energy efficiency strategies and help them to develop campus-wide," he noted.

"UCLA has the scale of a small city and it is a unique lab. There are all kinds of building types. It is a great scene of innovation that places sustainability in a broader context. The greatest challenge is advocating for the best use of available funds to get the best value. We have to find the best balance between the cost of construction and the integration of the highest performance measures available," stated Lynch.

"There is also the issue of collaboration. Pushing the team to realize solutions is important. From a mechanical standpoint, we try to emphasize passive solutions as a preferred approach whenever possible," Lynch noted.

Over at CSUN, Nathaniel Wilson feels fortunate to work in an environment that is very supportive of energy efficiency. "CSUN has a long history dating back to the energy crisis. Energy efficiency goals that exceed Title 24 have been stressed since that time.

Early on, there was a disconnect, then people became aware, and now there is a refreshing spirit of collaboration," said Wilson.

The key to convincing leadership and colleagues of the benefits of energy efficiency is to design the building first and then demonstrate the lowered operating costs. CSUN's Student Recreation Center has basketball courts and rock climbing space that meet daylighting requirements. Wilson cited the installation of large amounts of glazing as an important facet of the building's increased life cycle potential.

At UCLA, Lynch cited system-wide support for initiatives beginning at the Governor's office. But the most important support occurs at the project level. "The team determines the best uses of resources, how to stay under budget, and meet progress goals. Having a co-generation plant on campus is also a great asset," he noted.

The Bruin campus is continually growing with more people concentrated in the same amount of land, he said. "The upside is the reduction in transportation but the energy demands continue to increase with state of the art labs and new buildings. Our structures need to be very energy efficient and improve space utilization," Lynch said.

Mcleod said the keys to leadership buy-in at Wilshire Grand is his team emphasizing the long-term cost benefit of energy efficiency, and the advantages of participating in programs that offer sizable incentives and rebates. In the private sector, there is the expectation of a three-five year return on investment, whereas the expectation of a fifteen-year payback is prevalent in public projects.

Tenant incentives are also a good selling strategy. "If you can convince people that your building is more efficient that the building next door, then you have an advantage."

The climate of acceptance has generally changed. "People have become much more aware of the increasing cost of energy and the diminishing availability to water. At Wilshire Grand, we also emphasize the need to look far ahead and take the long view," he noted.

At CSUN, students' attitudes have influenced acceptance. "They are so aware of the issues associated with climate change. Non-sustainability classes in industry-related fields are typically under-enrolled. Cutting edge speakers are brought to campus to discuss the issues and students get hands-on training in real time work through campus academic departments, noted Wilson."

At UCLA, the pressure to stay competitive is intense. "The push to go beyond minimum efficiency standards is getting stronger all of the time. As Title 24 becomes more stringent, the team is pushed even further. Our campus energy benchmarks raise the bar each year at a graduated rate: in 2016, our projects need to use at least 35% less energy per square foot than the 1999 baseline. By 2021, it goes to 50% less," according to Lynch. "Some of our projects are already hitting that 50% mark." Benchmarks, measurement and verification, and energy optimization are all part of the language that surrounds projects.

And how do projects operate with common goals in mind? At CSUN, Wilson noted the collaboration of the engineering team on a solar hot water system using photovoltaics.

"Glumac and Gensler were hired because of they can provide an "Integrated Design", a process where engineers and architects collaborate on the design to meet the owner's program requirements for energy efficiency and sustainable design. The CSU process requires an outside consultant Mechanical Peer Reviewer to be part of this process," according to Wilson.

Mcleod feels that incentives offer the opportunity to look at the total project, including energy modeling, building siting and even the percentage of wind available. "All of that is now part of the process. Savings By Design offers goals," he noted. "The scoring creates the financial incentives. The harder you push, the more that is achieved."

Lynch feels that the UCLA team's goals are in close alignment on Title 24 and ASHRAE modeling for LEED specifications. "Enhanced commissioning and digital metering built out through Savings By Design offer better feedback to end users. The financial incentives help support tools such as measurement and verification equipment which provide a better picture of actual building performance beyond first cost predictions," he noted.

Mcleod sees code compliance and certification mandates as important facets. "LEED certification is an 'attaboy'. It tells the world that you have met certain standards. But it doesn't bring the money. Savings By Design is something real. To get the incentives, you have to exceed the standards. Energy efficiency is an iterative process. It is a series of approximations; reaching out to hit a target, move forward and hit the next. But sometimes in a cost model you have to retract."

Lynch feels that it is important to apply energy efficiency to passive measures before getting to systems. Go for the low-hanging fruit such as a good building envelope, high performance glass, and well insulated walls. Arrange a building to take full advantage of available resources. On the westside for example, there is ample sunshine and cooler breezes much of the time.

"Within a system, focus on efficiency. New lighting makes a huge difference within the electrical profile. Water has a high capacity to absorb heat, which makes it better than air for heating and cooling. Pumping water long distances takes far less energy and space than what is required of fans for the same temperature change." he stated.

"Meeting the requirements of the California building code regarding energy efficiency demonstrates minimum competency," Wilson stated. "LEED Platinum and Net Zero Energy use projects are what we need to be designing. If we had an infinite source of renewables, energy efficiency wouldn't be an issue."

On the question of aligning design performance with building performance, Lynch cited the ability to track building use and make improvements in base measurement and monitoring. "People occupying buildings on campus are a source of direct feedback, and help us to be able to respond expeditiously if problems arise.

"During the design phase, a lot of review occurs. Facilities and maintenance staff are in the conversation–early in the process, which allows them the opportunity to offer feedback. They then have a greater stake in both design and performance." LEED is a

very helpful tool for Lynch's team. "LEED mandates help guide maintenance, use, and operating parameters," he noted.

Many of Lynch's projects are renovations. Facets such as plumbing and the location of utility controls are already known. Lynch's team also works closely with the campus department that is occupying the building regarding furniture and other key logistics.

Mcleod sees the tie between design performance and building performance as an opportunity to make an assessment of initial goals and to validate the accuracy of design projections.

Wilson feels that "Commissioning (Cx) is essential. High performance buildings need a comprehensive Cx process that begins with the owner's program requirements and proceeds through the design and construction. New Smart buildings will have commissioning analytic software that provides for continuous self-testing and self-tuning, to assure energy conservation continues through the 60-100 years of projected operation."

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