

WORKFORCE

# Help wanted: Tech-savvy talent to lead smart buildings into the future

Integrated systems hold promise if workforce participation can meet the demand.

BY BETSY CONROY

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**C**ommercial facilities have access to a breadth of smart building technologies that can improve operations, save energy, reduce carbon footprints, and enhance occupancy comfort. Interconnected building automation systems (BAS) and data analytics are increasingly vital for building owners and operators to achieve these goals and to comply with performance ordinances rolling out across the country. For these efforts to have a chance to succeed, a skilled workforce must be available that can install, program, integrate, operate, maintain, and oversee these advanced systems.

The smart building industry offers thousands of high-paying job opportunities in commercial construction, building operations and facility management, and architecture and engineering. Yet, individuals skilled and knowledgeable in smart buildings are in short supply. Owners and operators, service providers, and system vendors are struggling to fill roles, particularly for entry- to midlevel positions in facilities. Several industry stakeholders and educators are now collaborating to change that.

## **Rising opportunities and pay**

The exploding number of opportunities in the commercial smart building industry crosses all skill levels, titles, and disciplines. Architecture and engineering firms are posting openings such as energy inspector, sustainability specialist, building performance diagnostician, master systems integrator, and building scientist. Construction entities are seeking installers, technicians, forepersons, and managers with expertise in energy efficiency, indoor air quality, sustainability, and smart building codes and standards. Facilities and operations is an area that Gregory King, managing director of Cambridge, Mass.–based TSK Energy Solutions sees plenty of openings, from entry-level building

maintenance workers and technicians to mid-level building operators and BAS technicians and to advanced roles like building engineers, facilities operation managers, energy managers, and senior operations managers.

"As organizations realize that energy is the biggest cost over the lifetime of the building, and expanding regulations require them to meet energy efficiency goals or risk being penalized, they are looking to build their staff," King says. "Demand is especially huge in the mid-level building automation technician realm—those that operate and maintain building systems and understand their associated hardware and software."

According to research by the Association of Controls Professionals commissioned by King, the average number of postings for building automation technicians posted across four platforms—Indeed, ZipRecruiter, Glassdoor, and LinkedIn—exceeds 12,000, though duplicate postings likely inflate that number.

"The opportunity to work directly for building owners and operators is highest among universities and health care and life sciences companies, followed by traditional large commercial office building owners," King says. Career

opportunities also abound with the growing number of companies focused on clean energy, sustainable real estate, and sustainable city planning, as well as with control companies, like Siemens, Honeywell, and Johnson Controls, that have enhanced their service offerings in the smart building space. As hiring onsite staff becomes more difficult for owners, many are turning to outside services to help maintain and operate their digitally sophisticated buildings.



Siemens director of connected real estate innovation Marty Skolnick sees this gap as an opportunity for recruiting talent

that previously may have entered traditional IT technology and software development roles. "While technicians and engineers in the past may have focused on a singular system, we now need well-rounded individuals and a different skill set," he says. "In the entry and mid-level range, there is demand for building commissioning agents that can look at a smart building as its own intelligent system and commission everything to work in harmony. We also need data analysts that can understand and translate all the building data."

The opportunities vary in salary, depending on experience level and location. According to ZipRecruiter, annual salaries of commissioning agents and data analysts range from \$60,000 to \$125,000. Average salaries for chief engineers, facility operators, and energy managers top \$100,000, with the highest 10% exceeding \$150,000. BAS technician salaries are also on the rise. "Most students can start a building automation technician apprenticeship in high school making \$20 per hour and then quickly ramp up to \$40 per hour, which is more than \$80,000 a year," says Melanie Danuser, director of education and training at the Northwest Energy Efficiency Council (NEEC) Smart Buildings Center, in Seattle.

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Siemens vice president of digital enterprise Ben Dwyer sees the digitization of buildings supporting more remote work, which subsequently leads to more opportunities and potential to garner better pay. "Offering remote positions is a huge differentiator for us," he says. "As we continue to have a deep focus on the ability to deliver many of our services remotely, many more of our core competencies can be achieved from a remote digital standpoint, and that helps us attract the talent we need."

## **Honing smart building skills**

Data acquisition and analysis and systems operations and maintenance (O&M), integration, testing and evaluation, design and performance modeling are among the top technical skills essential for running smart buildings, according to a 2020 research report by the American Council for an Energy-Efficient Economy (ACEEE). The report also notes a disconnect between these skills and industry professionals and academics due to a lack of educational programs to teach these skills.

King couldn't agree more. "Even if a building is designed and engineered to be efficient, building owners and operators don't always have the skilled staff to maintain it," he says.

"It's an issue of the career not maintaining parity with the pace of innovation." A decade ago, technicians weren't trained in building automation or programming. Because modern building design evolves, he continues, "we need a workforce that can support integration, create sequences of operation, and perform the programming needed to ensure that systems and devices are operating as intended."

To develop the skill set for smart buildings, educators and training providers are beefing up curriculum within their credentialing, certification, and continuing education programs. In the federal space, facility personnel must meet core competencies per the Federal Buildings Personnel Training Act (FBPTA), which includes gathering, calculating, and analyzing quantitative and qualitative data needed for measuring building performance. GSA's Facilities Management Institute connects federal agencies with FBPTA-aligned training, such as the Professional Facility Management Institute's ProFM credential.

The Urban Green Council's Green Professional (GPRO) certificate program popping up at community colleges and continuing education providers nationwide is teaching college students and facilities staff building O&M strategies that reduce energy use and improve tenant comfort and health.



The Smart Buildings Academy's technician, programmer, designer, integrator, and master technician certifications all include courses on information technology, communication protocols, and programming fundamentals, which are also available a la carte for current facilities professionals to hone their skills. The Building Operator Certification (BOC) program, NEEC's flagship competency-based training and certification program administered nationwide through its partner network, has also been upgraded to address the required skill set for today's highperformance buildings.



"Our training now focuses on integrated controls," Danuser says, "and we have entire classes dedicated to building

electrification, data collection and analysis, and smart building sensor technologies. We are also addressing the need for today's workforce to understand energy benchmarking—you need a baseline to determine where you need to get to and what data you need."

Higher ed institutions are also introducing smart building programs. In 2020, Roxbury Community College (RCC), in Massachusetts, unveiled its Center for Smart Building Technology with the help of an advisory board comprising representatives from building automation industry associations, utilities, corporations, architecture firms, and government entities. The center offers prep courses programs for several certifications, including BOC, LEED accreditation, and GPRO, and a two-year smart building technology engineering degree program. Both the certification and degree courses teach students how to set up and program intelligent controllers for HVAC, lighting, security, fire alarm, and other building systems.

Other institutions offer the ProFM credential as a certificate program for federal facilities staff and as part of more comprehensive smart building programs like Pennsylvania State University Facilities Engineering Institute's Smart Buildings Operation Training program. South Seattle College

now offers a Bachelor of Applied Science degree in sustainable building science technology. And the list goes on.

Solution vendors involved in the smart building space are also partnering with educational institutions to train students for real-world jobs. Siemens, for example, has programs to support workforce development with Santa Fe Community College to help develop the Building Energy Automation and Microgrid Training Center, which transforms campus buildings into living laboratories. In turn, the company widens its own talent pipeline. "By engaging students and faculty through capstones, fellowships, and research opportunities," says Siemens solutions director David Weaver, "we are then able to mentor and work with students with the goal of inspiring them and hiring them."

## **Tackling misperceptions and financial obstacles**

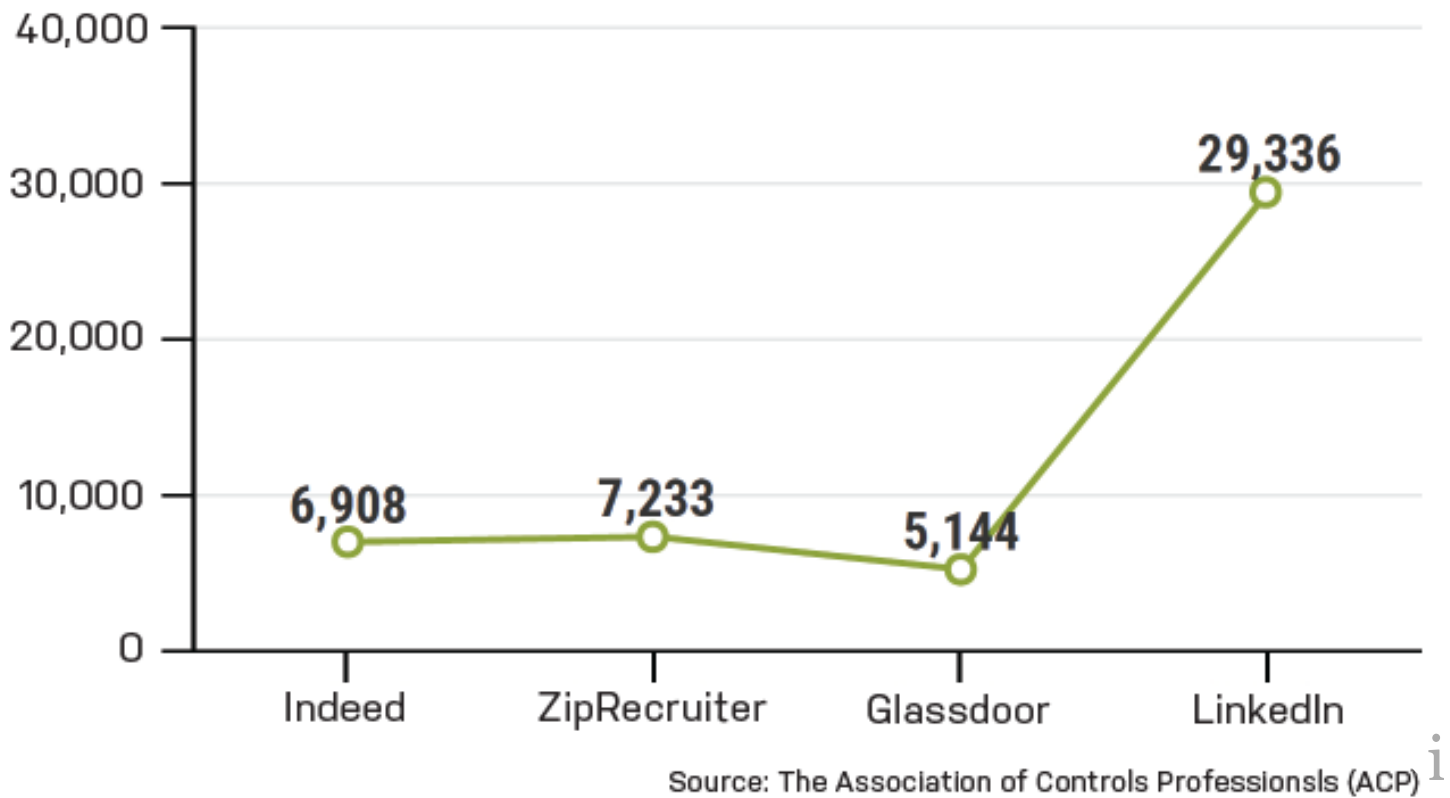
Another reason the smart building sector is having difficulties finding skilled workers is that facilities and building operations professionals are retiring at a pace quicker than new workers are entering the industry. Lack of awareness about these jobs among youth only exacerbates the problem. "The

misperception that these jobs are blue-collar is something that we're addressing in community college outreach efforts," King says. "When young people are exposed, we see them get excited when they realize it's a technology profession. They are tech savvy, and [they can] become the next generation of experts that operate and maintain our evolving buildings."

To help address the shortage, the NEEC added the beginner course series "Fundamentals of Energy Efficient Building Operations" to its BOC Level I and Level II programs. To get the word out to more students about smart building careers, the NEEC is also collaborating with vocational high schools, community colleges, and workforce development associations. Danuser says, "We're doing a lot of work on career mapping and changing the conversation from blue-collar to green-collar. With the shift to clean energy, many jobs will no longer exist, and we can retrain these individuals. The industry is also an ideal space for veterans who come out of the service with applicable soft skills, like teamwork and discipline, and often with technical skills, like computer programming and engineering systems."

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## MEAN DAILY BUILDING AUTOMATION TECHNICIANS JOB POSTINGS



Younger generations are passionate about reducing our environmental impact and achieving carbon neutrality, which Siemens' Weaver believes will help shift perceptions and interest levels once students understand what smart buildings are about. "We just need more time in front of them to open their eyes and encourage them take a long, hard look at the smart building industry as an exciting space to do that," he says. "It's no longer about a thermostat and screw-turning. It's about apps, software, and leveraging sensor data to meet key performance indicators for energy reduction and sustainability."

Attracting millennials and zoomers also requires changing the delivery of educational content. "We need to keep a relevant and updated curriculum, but part of our strategic planning is also curriculum design," Danuser says. "We're looking at breaking modules down into bite-sized, more digestible segments and doing virtual building walkthroughs where we can plant problems and have our students complete hands-on energy savings programs."

The rising cost of tuition and living expenses is yet another barrier to enrolling in smart building educational programs. Though certification programs and two-year degrees are significantly cheaper than four-year degree programs, many students—particularly those from low-income and underserved communities—still require financial assistance. Community colleges offer a variety of scholarships and financial aid; RCC, for example, offers scholarships specifically for students interested in STEM and green energy programs. For working professionals, employers might cover certification and continuing education costs.

Given the skills gap, industry stakeholders are newly addressing funding, such as utilities and energy efficiency program administrators, Danuser notes. "We also arrange for discounts and scholarships with associations, like the

International Facility Management Association." Some organizations can use grant funding from various sources, she adds, and some utility-supported strategic energy management programs will help cover tuition for customers. The NEEC is also working to build scholarship programs for incumbent and incoming workers from disadvantaged communities and backgrounds.

## **Weathering the market and the economy**

Given the uncertain economic conditions, the uptick in smart building industry jobs might likewise seem tenuous, but Skolnick believes inflation and fear of recession are actually advantageous. "When the economy is good and construction is up, we're busy developing new properties," he says. "But when it is down, building owners focus on doing more with less and improving operational efficiencies. That makes these jobs recession-proof."

High volumes of vacant commercial space due to the pandemic and increase in remote work can also raise questions on job security. Regardless of building vacancy, owners and operators still need to comply with energy

efficiency regulations—while maintaining revenue. "Clearly, there is a shift in real estate development away from office space," King says, "but building owners are simply reconfiguring and retrofitting their space for subleasing and to comply with ordinances, which will continue to create jobs."

SKILLS CATEGORY	PROFICIENCIES
Operations and maintenance	Use cost-benefit analysis to refine efficiency decisions
	Optimize building systems
	Perform diagnostics and corrective procedures
	Equipment, controls, and building automation systems O&M
Systems integration	Ensure cybersecurity
	Integrate and manage smart technology and controls
	Program controls
	Select and install advanced equipment
	Select and install building automation systems
Systems testing and evaluation	Perform retrocommissioning
	Perform commissioning
	Do energy audits
	Set benchmarks
Data acquisition and analysis	Interpret and use data analyses
	Analyze data
	Monitor and measure system performance



	Install sensors and meters
Systems design and performance modeling	Use modeling and simulation software
	Understand advanced building systems
	Be familiar with codes and regulations
	Know advanced system assemblies

With a record \$70 billion in private and public investments last year, according to a report by the American Investment Council, the life sciences industry and universities are moving in. More than 20% of lab spaces being developed are conversions from office space. These energy-intensive users need to meet sustainability goals and regulations while updating ventilation, lighting, and other building systems to suit their needs.

Vacant spaces will also drive the development of mixed-use properties, with building owners eyeing prime office locations for multifamily residences, Danuser adds. "I don't see a future where buildings are vacant," she says. "Considering the housing crisis, we're likely going to see the repurposing of many commercial properties into housing."

Siemens' Weaver points out that efforts to develop smart cities will only increase opportunities in the building market. "Smart urban development will expand resources and hiring needs," he says. "Convergence doesn't need to just be in a building—it will eventually be about how we connect with smart streetlights, smart parking, and the other many spaces we touch."

A skilled, smart building workforce enables a building to achieve energy targets, ESG requirements, and other corporate or organizational strategic initiatives. The 2020 ACEEE report documents this correlation, noting that specific skill deficiencies can actually increase building energy use and compromise overall operations and performance.

A skilled workforce and building performance are fundamentally related, Skolnick affirms: "If you don't have people who can properly deploy and commission systems or collect, analyze, and leverage the data, you end up with a building that was perhaps smart when it was designed—but doesn't stay smart or become smarter over time."

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