

6 Trends Defining Next-Generation Buildings

Owners must design and build facilities that account for changing realities to ensure they run efficiently, safely and sustainably over time — or risk paying in the long run.

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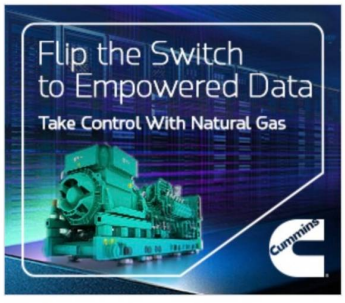
DESIGN & CONSTRUCTION

New construction has always been a numbers game, challenging building owners to juggle competing priorities — initial costs, speed to build, long-term performance and a dozen other variables that do not always line up neatly. That balancing act has only grown more complicated thanks to recent pressures from hybrid work, rising energy costs, climate risk and rapid advances in building technology, adding new levels of complexity to the early design phase process.





Many organizations spend nearly double the initial construction cost keeping a building running across its lifetime, often because they ignore the gap between the way buildings are designed and the way they actually function. When decisions made today influence a facility's operational performance for the next 30 to 40 years, it means construction and operations can no longer exist as separate conversations.

What might feel like a small, cost-saving decision on day one can easily become a multi-million-dollar problem down the road. Technology, occupancy patterns and environmental conditions are changing faster than traditional construction practices or codes can evolve, so owners must design facilities

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safely and sustainably over time — or risk paying for it in the long run.

Below are significant trends shaping new construction, as well as strategies owners can use to make sure their buildings are ready for the future.

Lifecycle costs outpace construction costs



Construction planning is shifting its emphasis from upfront construction costs to the full lifecycle cost of buildings, including long-term operation, maintenance and adaptability. Many buildings are still designed around the lowest pricing when realistically, long-term performance often rivals or exceeds construction budgets over time.

Serviceability, system access, system redundancy and long-term maintainability all matter just as much as structural design. Too often, buildings require costly service disruptions, such as cutting through finished walls or bringing in a crane to access a single piece of equipment through a roof — a scenario that could easily be avoided with better planning.

Redundancy is another area where early design decisions matter. Having three smaller chiller units rather than one large unit might cost slightly more, but this upfront cost will pay off when a building can continue to operate efficiently at partial load or when one component is offline without service disruption.

Advancements in modular mechanical, electrical and plumbing systems are giving owners a way to remove, service and replace components cleanly and quickly without destructive demolition.

For example, a manufacturing client pursuing long-term asset optimization discovered exactly how impactful lifecycle thinking can be. By implementing condition-based maintenance supported by real-time operational data, the organization reduced equipment wear, extended asset life and avoided several catastrophic failures — savings that stem not from capital expense but from design supporting long-term access and monitoring.

Energy efficiency as a strategy



institutional buildings. While LED retrofits and high-efficiency equipment are now standard, owners increasingly need buildings that are designed to use less energy and respond to occupancy patterns in real time.

Green and blue roofs are increasingly used to prolong roof life, manage stormwater, stabilize interior temperatures and reduce HVAC load. With a suitable design, a roof that would need replacement in 20 years might last 30 or 40 because of the added protection and thermal benefit.

But the bigger opportunity lies in the way systems respond to actual usage. Many offices today see their peak occupancy Tuesday through Thursday, prompting organizations to group employees onto fewer floors on those days. If HVAC systems cannot operate independently across different parts of the building, owners end up air conditioning far more space than necessary. Systems designed to serve specific areas rather than entire floors are becoming essential for long-term operating cost control.

One recent client's multi-campus program illustrates how powerful an intentional energy strategy can be. Through continuous analytics and real-time monitoring across nine buildings, the company reduced energy consumption by 9,724 MWh over four years, avoided 7,879 tons of carbon dioxide and saved roughly $200,000 per year. These gains came from a building infrastructure that supported intelligent, data-driven operations, not from costly new equipment.

Smart buildings and integrated data

Talk of smart buildings often conjures images of flashy dashboards or novel user experiences, but the real value of smart systems is far more practical and unifies two very different categories of information: equipment and space use intelligence.

Equipment intelligence involves real-time visibility into the way HVAC systems, chillers, boilers, compressors and even lighting systems perform. Automated fault detection and diagnostics, utility monitoring and predictive algorithms can reveal issues days or weeks before anyone feels the symptoms. Without them, owners and facility managers rely on scheduled maintenance that does not reflect actual system performance.

Space-use technology is just as important. Occupancy sensors, traffic counters, restroom monitors and air-quality tools show the way people actually use the building. This advantage allows operators to align ventilation schedules, cleaning programs, lighting and staffing with real demand instead of assumptions.

Bringing these two categories together requires a connected ecosystem where building information modeling (BIM) is proving invaluable. When built properly, a BIM model shows the way every system in the building connects and behaves under different conditions. Once sensors feed into that model, operators gain a real-time map of the building.

Many organizations delay this work until they are years into using the building, which makes the process more expensive and less accurate. There is no reason these models should not be incorporated directly into new

In the first client example, analytics caught subtle faults that did not appear in routine preventive maintenance. Correcting the issue during off-hours avoided a disruption that would have impacted one-half of the building. A similar alert flagged a breaker fault before it became a catastrophic chiller failure. That is the kind of operational intelligence owners are hoping for when they talk about smart buildings, and it only works when systems are integrated from day one.

Climate resilience design: Standard, not specialty

Floods, wildfires, extreme heat and rapid-onset storms have become more common than they were even a decade ago, and insurers have taken notice. Owners are responding with resilient design practices that reduce risk.

In flood-prone areas, owners have moved mechanical and electrical rooms off the ground floor and designed first floors with resilient finishes such as polished concrete instead of laminate, moisture-resistant wall systems, and thoughtfully planned drainage that can be cleaned, dried and brought back online quickly after an event. Wildfire regions are seeing increased use of metal roofs and non-combustible exterior cladding that typically last longer and substantially reduce insurance risk.

Even landscapes and hardscapes play key roles. The placement of hydrants, the selection of vegetation and site drainage strategies all influence a building's resilience. Codes do not always reflect this reality yet, so owners who build to the minimum standard might find themselves facing higher operating costs or recovery times later.

Future-proofing requires flexibility, long-term thinking

Buildings often outlive their original purpose. Decades later, an office tower might become a laboratory, a classroom wing might become a collaborative workspace, and a distribution hub might shift to robotics. Designing with flexibility ensures the building can adapt without reinventing the wheel every time needs change.

Future-ready buildings typically share several traits: durable, maintainable materials; accessible system layouts; infrastructure capable of supporting higher loads; and an assumption that environmental, technological and operational conditions will shift throughout the building's lifespan.

Predictive maintenance strengthens this adaptability and illustrates what long-term flexibility looks like in practice: a building that can adjust, respond and evolve without fighting its own design.

Operators must be involved early

Architects design buildings for aesthetics, code compliance and user experience. Contractors build to schedule and budget. But operators understand the daily realities: what wears out, what breaks, what never quite works the way it looks in the renderings.

People who design buildings focus on the way it looks and the amount it

selecting light-colored carpet in high-traffic areas or installing beautiful handwashing fixtures that create slip hazards might look appealing on paper, but they can create operational problems that persist for years.

These are avoidable problems but only if the people who understand daily operations have a voice in the design process. Bringing operators, including facility managers, into design discussions helps owners forecast operating budgets, refine materials and layouts and stress-test assumptions that do not always hold up in real environments to prevent long-term problems.

New construction should position facilities to operate effectively for decades amid shifting technology, occupancy patterns, environmental pressures and regulatory expectations. Owners who bridge the traditional divide between construction and operations will deliver facilities that perform as well in year 30 as they do on opening day. The future of construction is about building for everything owners and occupants cannot see yet and making the decisions today that will make those possibilities easier, safer and more sustainable tomorrow.

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