THE HIGH-PERFORMANCE BLUEPRINT FOR MODERN BUILDING OPERATIONS

Optimizing Building Systems to Drive Operational Excellence

BOMA International

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In a competitive market, tenants demand more than just space. They now expect seamless, healthy, resilient, tech-enabled environments.

THE NEW OPERATIONAL MANDATE

In today's data-rich commercial real estate (CRE) environment, the roles of real estate managers and building operators have undergone a fundamental evolution. Modern building teams have shifted from caretakers to strategic managers of complex, high-performance assets. Building engineering teams now operate on the front lines of many new and often unprecedented operational challenges, including:

Technological Disruption
The rise of smart buildings, **Internet of Things (IoT)** sensors, and AI-driven analytics has transformed nearly every piece of equipment into a continuous data stream. This technological shift requires new competencies in data interpretation, system integration, and real-time decision-making – prompting engineering leaders to adopt a culture of data-driven decision-making.

The Sustainability Imperative

Energy optimization, carbon reduction, water conservation, and waste diversion have become essential pillars of operational excellence – not optional initiatives. These functions now represent core operational and financial priorities, driven by investors, tenants, and increasingly stringent regulatory requirements.

While sustainability remains highly important to 75% of tenants, survey data suggests they may be "reprioritizing" their approach. For example, tenants reported that specific sustainability measures, including energy efficiency, recycling, renewable energy, and water efficiency, declined in importance between 2024 and 2025. The sharpest declines were in the perceived value of renewable energy initiatives – which fell by 6% in the West and 7% in the Midwest between 2024 and 2025.[1]

The "Flight to Quality"

In a competitive market, tenants demand more than just space. They now expect seamless, healthy, resilient, tech-enabled environments. Tenant surveys from leading CRE firms consistently rank building quality and operational performance as the top drivers of leasing decisions (second only to location).[2] Moreover, the 2025 Kingsley Index Report explicitly shows that building-related factors (such as HVAC, parking, and building quality) are catching up with management service delivery as drivers of overall tenant satisfaction.[3]

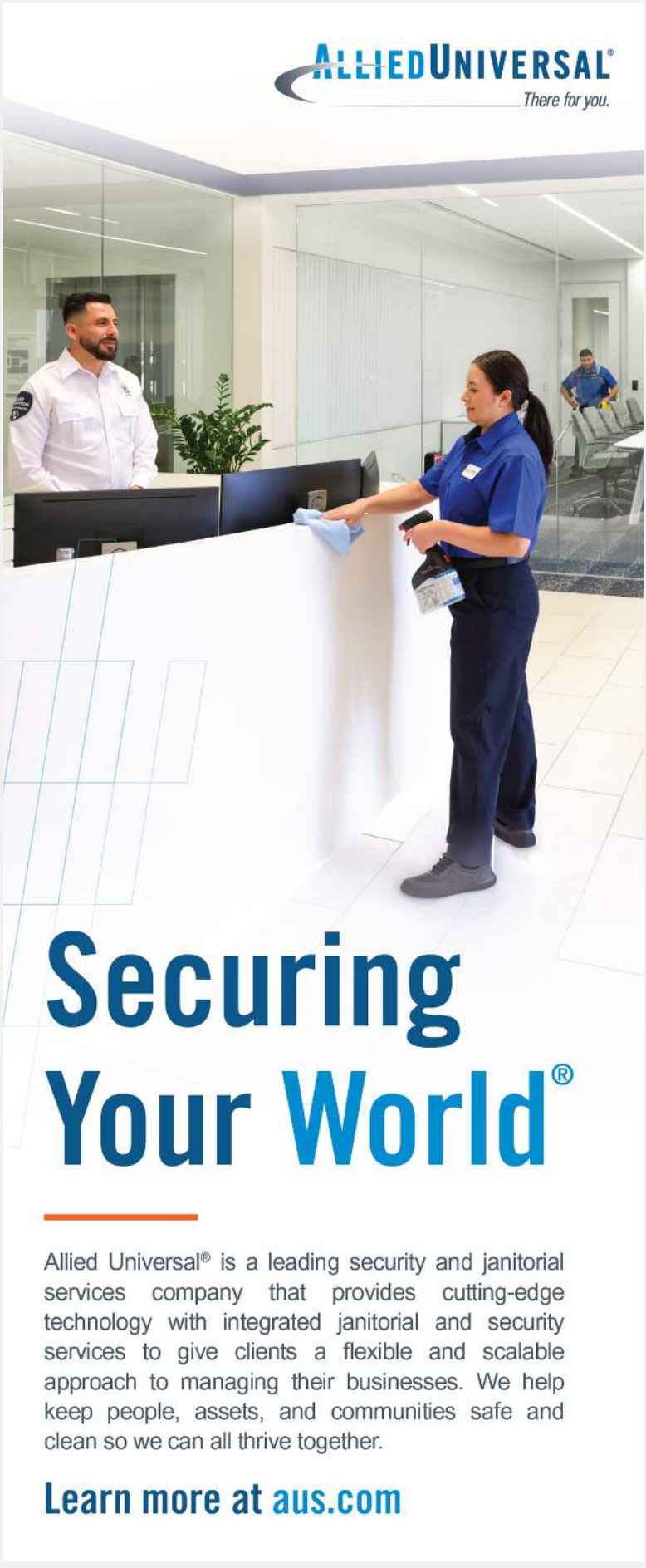
This “flight to quality” places new pressure on building systems to deliver integrated, reliable, and high-performing occupant experiences.

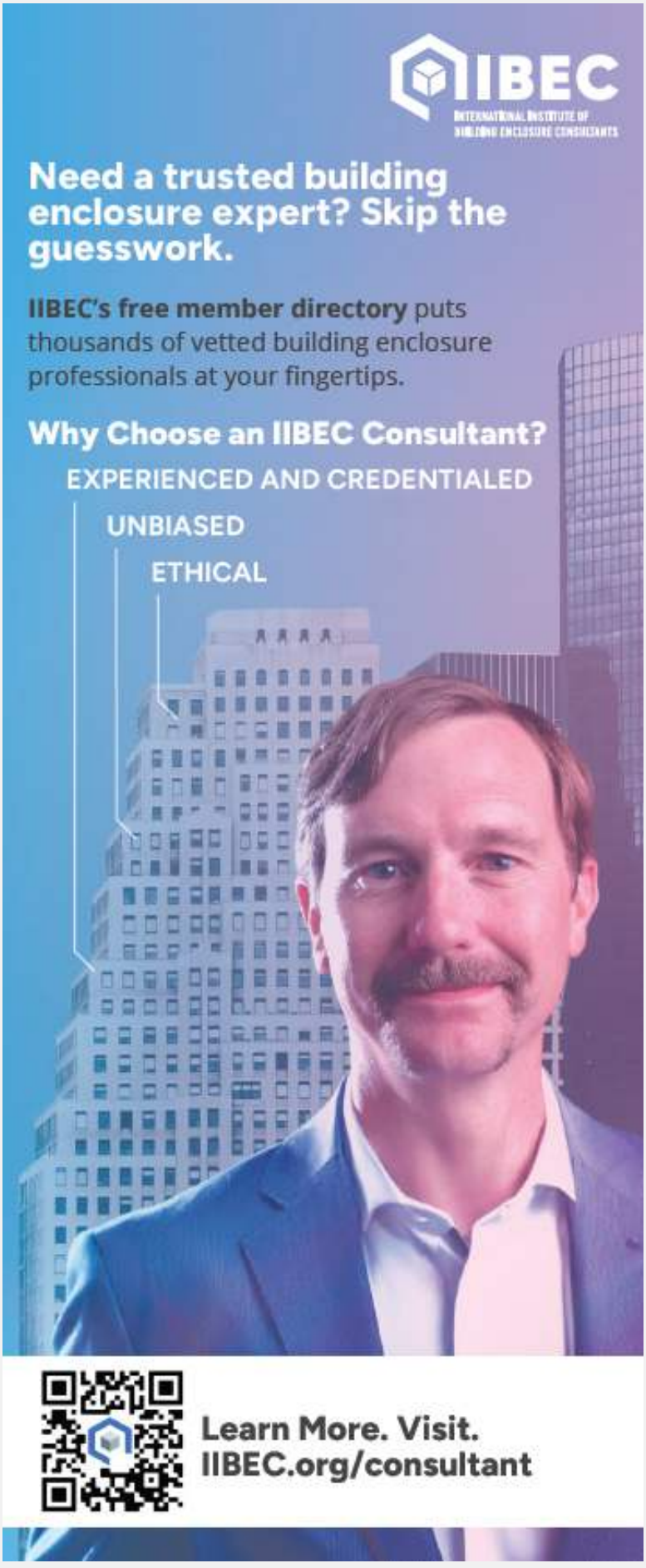
The Financial Link

Maintenance has shifted from a perceived cost center to a measurable driver of asset value and tenant retention. A well-maintained building is likely to command higher rents, retain tenants, and maintain a stronger market position. Conversely, significant deferred maintenance remains a direct threat to NOI, asset value, and long-term capital planning.

This new operational mandate requires a new playbook. A "preventive maintenance" program that might have been innovative a decade ago is no longer sufficient. Property teams need a comprehensive, forward-looking “proactive maintenance” strategy that integrates technology, sustainability, and financial planning.

1. 2025 Kingsley Index Report
2. JLL. *Global Tenant Sentiment Survey*. 2024
3. 2025 Kingsley Index Report





Proactive, Preventive, or Predictive?
Believe it or not, they are not the same thing.

- Proactive maintenance is an overarching strategy that aims to prevent equipment failures and maximize asset lifespan before a breakdown occurs. Both preventive maintenance (PM) and predictive maintenance (PdM) fall under this umbrella, but they differ significantly in their approach to timing and data usage.
- Preventive maintenance is a scheduled, time- or usage-based strategy. The goal is to reduce the probability of failure by performing routine tasks at fixed intervals, regardless of the equipment's actual condition.
- Predictive maintenance is a condition-based strategy that uses real-time data and analytics to forecast exactly when a component is likely to fail. This allows maintenance to be scheduled only when it's genuinely needed, closer to the point of failure.

THE "RUN-TO-FAILURE" FALLACY: A REALITY CHECK

Many building teams, often constrained by budget or an outdated mindset, still operate on a reactive, "run-to-failure" model. This approach, where equipment is repaired only after it breaks, is a high-stakes gamble disguised as short-term cost savings.

The reality is that this "strategy" is almost universally the most expensive way to operate a building. The true costs of reactive maintenance are staggering and create a vicious cycle that can cripple an asset.

Exponentially Higher Costs
The immediate financial impact alone is significant. According to the U.S. Department of Energy, a reactive "run-to-failure" program can cost three to five times more than a proactive program.[4] The additional cost includes factors such as premium rates for overtime labor (especially a vendor's overtime costs), rush shipping for parts, and the cascading damage that occurs when the failure of one component stresses an entire interconnected system.

4. U.S. Department of Energy. *Operations & Maintenance Best Practices: A Guide to Achieving Operational Efficiency*. 2023.

The Catastrophic Cost of Tenant Turnover

Unplanned failures also directly undermine the tenant experience. Unplanned downtime is the enemy of tenant retention. Importantly, tenants surveyed this year report that building upkeep and quality are increasingly factors in their renewal decisions, particularly for office and medical real estate occupants.[5] An unreliable HVAC system, a leaky roof, or persistent plumbing issues are not minor inconveniences; they are "push" factors that can be enough to convince tenants to relocate.

The resulting turnover cost can be substantial and is often unrecoverable. Industry estimates, including those from NAIOP, suggest that the combined cost of leasing commissions, new tenant improvement (TI) allowances, and lost rent from vacancy can equal 6 to 12 months – or more – of rent for that space.[6] That lost revenue is unrecoverable and directly assaults a property's net operating income (NOI).

The Financial "Death Spiral" of Premature Capital Replacement

Deferred and reactive maintenance shorten the predictable lifespan of major systems. For example, a roof designed for a 20-year lifespan may fail after 15 years if neglected, forcing early, unbudgeted capital expenditures. That new roof ties up cash that cannot be spent on value-add improvements (like a lobby refresh or added amenities) that will increase asset value. Instead, the owner has to divert this capital to respond to the system failure.

Operational Chaos & Hidden Risks

Reactive operations trap engineering teams in a constant cycle of crisis response. This "tyranny of the urgent" prevents long-term planning, training, and energy management. It burns out top talent, and the building continues to fall behind. Meanwhile, hidden risks – particularly in life safety, façade maintenance, and structural systems – continue to grow unnoticed. In some cases, these extend beyond being "just" maintenance problems; they can become massive, unquantified legal and financial liabilities. Operating without a modern, comprehensive maintenance plan is no longer a viable business model.

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5. 2025 Kingsley Index Report
6. NAIOP Research Foundation. *The True Cost of Tenant Turnover in Office Properties*. 2023.

THE PROACTIVE BLUEPRINT: STRATEGIES FOR PEAK PERFORMANCE

The definitive solution is a comprehensive "proactive blueprint" that directly addresses the challenges of the modern operational landscape. This strategy is a significant evolution, moving far beyond basic preventive maintenance to equip teams with the tools for true operational excellence.

High-performance teams are defined by their focus on these core strategies:

THE LEAP FROM PREVENTIVE TO PREDICTIVE (PDM) MAINTENANCE

The greatest strategic leap forward is the move from preventive maintenance (based on calendar-based schedules) to predictive maintenance strategies that leverage data analytics and smart building technologies to anticipate failures before they occur. The DOE estimates that a properly functioning predictive maintenance program can reduce maintenance costs by 25-30% and eliminate 70-75% of breakdowns.[7]

Predictive maintenance is built on:

- Smart Technology Integration: Using IoT sensors, AI-driven diagnostics, and real-time monitoring to track actual equipment health (vibration, temperature, output).
- Data-Driven Decisions: Moving from a "change filters every three months" (whether they are dirty or not) mindset to a "change filters when airflow impedance hits X" (at the exact time they are ready to be replaced) reality, saving labor and material costs.
- Innovative Tools: Practically applying tools like drones and robotics for safer, faster, and more accurate inspections of roofs, façades, and other hard-to-reach building systems.

THE CRITICAL ROLE OF COMMISSIONING (CX)

When systems deviate from their design intent (referred to as “drift”), energy waste, comfort issues, and higher costs result. Commissioning (Cx) is a critical quality assurance process that verifies and optimizes building system performance, particularly HVAC system performance. A high-performance plan includes:

- Initial Commissioning (Cx): Ensuring a new building and its systems operate at peak efficiency from the start by holding contractors accountable to design intent.
- Retro-Commissioning (RCx): An essential "tune-up" for existing buildings. Research from the Pacific Northwest National Laboratory (PNNL) indicates that retro-commissioning can often yield energy savings of 10-15% (with an average simple payback of just 1.1 years).[8] Retro-commissioning has also proven effective at resolving long-standing operational issues and tenant complaints.
- Continuous Commissioning (CCx): An ongoing process using technology to monitor system data, ensuring that equipment stays optimized and does not "drift" into inefficiency over time.

Ideally, building teams should conduct initial commissioning when the building or tenant space is delivered – and then implement continuous commissioning in perpetuity. Or, if the building was not commissioned or it has been several years since the initial commissioning, the team should conduct retro-commissioning and implement continuous commissioning.

7. U.S. Department of Energy. *Operations & Maintenance Best Practices: A Guide to Achieving Operational Efficiency*. 2023.
8. Pacific Northwest National Laboratory. *Building Re-tuning (BRT): A Low-Cost Path to Energy Savings*. 2023

Operating without a modern, comprehensive maintenance plan is no longer a viable business model.

CONNECTING MAINTENANCE TO THE BOTTOM LINE
Modern maintenance uniquely bridges the gap between the mechanical room and the asset manager's office. This is achieved by:

- **Strategic Financial Analysis:** Employing a "Repair, Upgrade, or Replace?" framework that moves beyond simple cost to analyze the Total Cost of Ownership (TCO).
- **Integrated Capital Planning:** Connecting daily maintenance (OpEx) directly to long-term capital planning (CapEx), helping managers forecast replacements and build data-driven budgets using tools like industry-standard "useful life" tables.
- **Right Sizing the Team:** Using a labor needs analysis to strategically determine the most effective staffing model (in-house, vendor, or hybrid) for a property's specific needs, balancing skills with cost.

SHIFTING THE FOCUS TO BUILDING OCCUPANTS
High-performing teams recognize that building performance is inseparable from occupant experience. A building's performance is now inextricably linked to the health, well-being, and productivity of the people inside it.
This human-centric approach to maintenance includes:

Managing Indoor Air Quality (IAQ)
Proactive IAQ management goes beyond just changing HVAC filters. It involves monitoring carbon dioxide (CO2) levels, managing ventilation for optimal air changes, and selecting low-VOC materials. The "CogFX" studies from Harvard's T.H. Chan School of Public Health have scientifically linked better IAQ to significantly higher cognitive performance scores among office workers.[9]

Water & Resource Conservation
Implementing sustainable practices, such as xeriscaping (using native, drought-tolerant plants) and smart irrigation systems, reduces water consumption. A robust waste management and recycling program diverts waste from landfills.

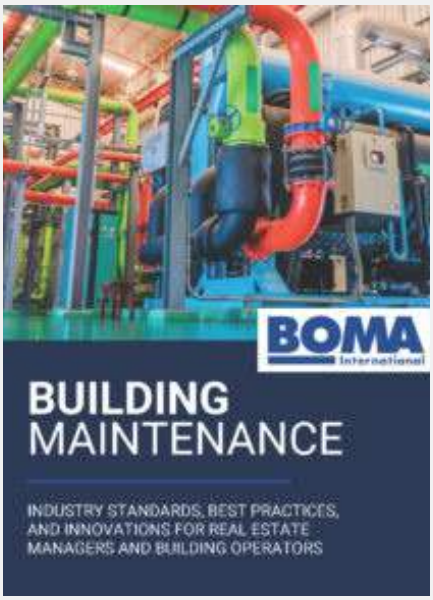
Prioritizing Health & Safety
Building teams should focus on health and safety programs to protect employees, vendors, tenants, and visitors. For property-level employees and certain vendors, this means rigorously adhering to occupational health and safety standards, including Lockout/Tagout (LOTO) and hazardous communications (HAZCOM) protocols, as well as other required safety practices and processes.

Aligning with Green Building Standards
Modern maintenance is the engine that powers green building certifications. Programs like LEED®, BOMA BEST®, BOMA 360©, ENERGY STAR®, and WELL are key market differentiators. It is not just about getting a certification to hang in the building's lobby. According to the U.S. Green Building Council (USGBC), LEED-certified buildings boast operating costs that are, on average,19% lower than those of their non-certified counterparts.[10]

9.Harvard T.H. Chan School of Public Health, 2021. *The CogFX Study: Cognitive Function in Green and Conventional Buildings*. 2021.
10. U.S. Green Building Council. *LEED by the Numbers: The Business Case for Green Building*. 2023.

YOUR GUIDE TO OPERATIONAL EXCELLENCE

To implement these sophisticated strategies, teams need a single, authoritative source of truth.



BOMA International's new ***Building Maintenance: Industry Standards, Best Practices, and Innovations*** is that guide. Authored by an industry veteran and extensively peer-reviewed by a committee of leading building operations professionals, this manual is the definitive playbook for modern building operations.

This comprehensive, 250+ page guidebook is organized for practical application:

- **Foundational Principles**: It establishes the "why" behind proactive maintenance, the core roles of the team, and the financial imperative for excellence.
- **Advanced Strategies**: It provides deep dives into complex, high-value concepts like commissioning, maintenance staffing models, energy management, and OpEx/CapEx planning.
- **Smart Tech & Sustainability**: It details the integration of smart building technologies (IoT, drones) and the implementation of green building & wellness practices.
- **System-by-System Deep Dives**: It features dedicated chapters for every major building system, including HVAC, electrical, fire/life safety, elevators, roofing, façades, and more.
- **The Complete Toolkit**: The manual concludes with an indispensable set of appendices, including comprehensive maintenance checklists for every system, detailed tool lists, a full glossary of terms, and extensively updated useful life tables for capital planning.

This manual provides the framework, tools, and advanced strategies necessary to reduce risk, drive efficiency, and enhance asset value.

To equip your team with the new standard of care visit boma.org/resources-publications

THE NEW STANDARD OF CARE

The commercial real estate industry is at a turning point. The most successful building teams will be proactive, data-driven, and strategic.

Kingsley's data confirms that building performance and upkeep are rapidly becoming key differentiators for tenant satisfaction and renewals – moving them from "background noise" to factors that "move the needle."[11]
Optimizing building systems is no longer optional – it is the very foundation of asset performance, tenant retention, and financial success.

11. 2025 Kingsley Index Report

ABOUT THE AUTHOR

This article and the Building Maintenance guidebook are authored by Marc Fischer, MBA, M.Ed., a BOMA Fellow with over 30 years of experience in commercial real estate. As the Principal of INSPIRE CRE, he specializes in operational process improvement and asset management strategies. He is a past president of BOMA Baltimore, a former member of BOMA International's Executive Committee, and holds multiple industry designations, including the RPA®, CPM®, and CCIM®. Marc is also a respected instructor and author of over a dozen industry textbooks, guides, and professional publications.

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GLOSSARY

Asset Value: The financial worth of a building or property. Strong operations and maintenance increase asset value by reducing costs and improving tenant retention.

BOMA 360®: A certification from BOMA International recognizing excellence across building operations, management, security, sustainability, and tenant experience.

BOMA BEST®: A green building certification program focused on environmental performance for existing buildings.
Building Performance Standards (BPS): Local laws requiring buildings to meet specific energy efficiency or emissions thresholds by certain deadlines.

Capital Expenditure (CapEx): Large, long-term investments in major building systems or improvements (e.g., replacing a roof or chiller).

Carbon Reduction: Efforts to reduce greenhouse gas emissions from building energy use.

Commissioning (Cx): A quality assurance process that verifies building systems operate as designed. Includes three variations:

- Initial Commissioning (Cx): Conducted when a new building or new systems are delivered.
- Retro-Commissioning (RCx): A tune-up for existing buildings to fix inefficiencies.
- Continuous Commissioning (CCx): Ongoing monitoring to ensure systems remain optimized.

Condition-Based Maintenance: Maintenance performed based on the equipment's actual condition, rather than a set schedule.

Deferred Maintenance: Maintenance that has been postponed, often leading to larger failures and higher costs.

Design Intent: The original performance expectations for building systems as specified by the engineers who designed them.

Department of Energy (DOE): The US federal agency providing research and guidelines related to energy use and maintenance best practices.

Façade: The outside face of a building (e.g., walls, cladding, windows). Often inspected for safety and weather-related deterioration.

Green Building Certifications: Programs that evaluate a building's environmental performance, including:

- LEED®
- WELL
- BOMA BEST®
- ENERGY STAR®

Hazard Communication (HAZCOM): An OSHA-required program ensuring workers know about hazardous chemicals used on site.

Heating, Ventilation & Air Conditioning (HVAC): The systems controlling temperature, humidity, and air flow in buildings.

Indoor Air Quality (IAQ): The quality of air inside a building, influenced by ventilation, CO_2 levels, pollutants, humidity, and filtration.

Internet of Things (IoT): A network of internet-connected devices – like sensors – used to collect real-time performance data from equipment.

Leadership in Energy & Environmental Design (LEED®): An internationally recognized system for rating environmentally responsible buildings.

Life Cycle/Useful Life: The expected number of years a system or component will last before needing replacement.

Lockout/Tagout (LOTO): Safety procedures ensuring equipment is powered off and cannot be restarted during maintenance.

NAIOP: A commercial real estate association providing research and industry data, including tenant improvement and leasing cost benchmarks.

Net Operating Income (NOI): A property's income after operating expenses but before debt service and taxes; a key valuation metric.

Operating Expenses (OpEx): Day-to-day costs required to operate a building (e.g., utilities, maintenance, cleaning).

Predictive Maintenance (PdM): A proactive approach using sensors, monitoring, and analytics to predict equipment failures before they happen.

Preventive Maintenance: Scheduled maintenance based on time intervals (e.g., quarterly servicing), regardless of equipment condition.

Pacific Northwest National Laboratory (PNNL): A research organization that published widely referenced studies on commissioning and energy savings.

Reactive Maintenance: Fixing equipment only after it fails – often the most expensive maintenance strategy.

Real-Time Monitoring: Live tracking of equipment operation using sensors and software.

Retro-Commissioning (RCx): A systematic process for diagnosing and correcting inefficiencies in existing buildings.

Smart Building: A building equipped with integrated systems and sensors that provide automated, data-driven control.

System Integration: The process of making different building systems (HVAC, lighting, access control, etc.) work together through a unified digital platform.

Total Cost of Ownership (TCO): A method of evaluating long-term costs of a system – including maintenance, energy, and replacement – not just upfront cost.

Value-Add Improvements: Enhancements (like lobby renovations or amenity upgrades) that increase a building's competitiveness and value.

Waste Diversion: Efforts to reduce landfill waste through recycling, composting, or re-use programs.

Xeriscaping: Landscaping using drought-tolerant plants to reduce water usage.