

A ROADMAP FOR TRANSFORMING EXISTING BUILDINGS INTO INTELLIGENT ASSETS

Executive Summary

Most commercial buildings operating today were built before cloud computing, IoT devices, artificial intelligence, and advanced analytics became mainstream. Yet these buildings still represent billions of square feet of valuable real estate and critical infrastructure.

The challenge facing owners is not whether these buildings can become smarter – it is determining how to modernize them in a practical and cost-effective way.

Modern technologies now allow existing facilities to achieve many of the same benefits as newly constructed smart buildings without requiring complete equipment replacement. Through strategic investments in building automation, system integration, analytics, optimization software, and artificial intelligence, aging facilities can improve energy efficiency, occupant comfort, operational reliability, and sustainability performance.

This paper presents a three-level Building Intelligence Maturity Model that provides facility owners with a practical roadmap for modernization.

The goal is simple: Transform existing buildings from reactive assets into intelligent, data-driven facilities.

Why Existing Buildings Represent the Greatest Opportunity

According to industry estimates, more than 80% of the buildings that will exist ten years from now have already been built.

Most organizations cannot justify replacing facilities simply to gain access to modern technology. However, many can justify investments that improve operational performance, reduce energy costs, and extend equipment life.

The good news is that technology evolves much faster than buildings.

A building constructed in 1985 may have outdated controls, but its HVAC equipment, electrical systems, and mechanical infrastructure often still possess significant value.

The commercial real estate landscape is also evolving in ways that further increase the importance of building modernization. Organizations are increasingly acquiring and repurposing existing facilities for uses that differ from their original design intent. Former office buildings are being converted into healthcare facilities, educational spaces, mixed-use developments, and specialized industrial environments. Warehouses are becoming data centers, manufacturing facilities are being transformed into distribution hubs, and aging commercial properties are being repositioned to meet changing market demands. In many cases, the building's structure remains sound, but the operational requirements have changed dramatically. Modern building technologies provide owners with the flexibility to adapt existing infrastructure to new uses while

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improving performance, reducing operating costs, and avoiding the substantial expense and timeline associated with new construction.

Today's technologies allow owners to unlock that value by adding intelligence to existing assets rather than replacing them outright.

The Building Intelligence Maturity Model

Every building exists somewhere on a journey from manual operation to intelligent optimization.

The five levels below provide a framework for understanding where the facility is today and what improvements should come next.

LEVEL 1: REACTIVE BUILDING

“Fix it When it Breaks”

In many older facilities, pneumatic control systems are still responsible for controlling critical HVAC equipment. While pneumatic systems were innovative and effective for their time, they inherently require ongoing maintenance and calibration. Air leaks, failed diaphragms, clogged restrictors, aging compressors, and drifting control signals can gradually degrade system performance without providing any indication to building operators. As these systems age, maintaining consistent comfort conditions becomes increasingly difficult and often depends on the experience and intuition of long-tenured maintenance personnel.

Many Reactive Buildings also rely heavily on institutional knowledge rather than documented processes or system visibility. It is not uncommon to find a facility where a single maintenance technician has spent decades learning the building's quirks, undocumented modifications, and workarounds. They know which air handler requires a manual adjustment every summer, which pneumatic thermostat is unreliable, or which valve must be exercised periodically to prevent it from sticking.

While this knowledge can keep a building operational, it also creates significant risk. When that individual retires, changes jobs, or is otherwise unavailable, years of operational knowledge often leave with them. The result can be increased service calls, longer troubleshooting times, reduced occupant comfort, and a building that suddenly becomes much more difficult to operate efficiently.

Without access to real-time system information, operators spend much of their time responding to problems instead of preventing them. This reactive approach often results in inconsistent building performance, excessive occupant comfort complaints, unexpected equipment failures, and increased maintenance demands.

Modernization helps transfer critical knowledge from individuals to systems by providing visibility, documentation, trending, alarming, and analytics that can be shared across the entire facilities team rather than residing with a single person.

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Common Characteristics:

- Legacy or aging control systems
- Limited or no historical trending
- Minimal alarming capabilities
- Little visibility into equipment performance
- Manual troubleshooting processes
- Heavy reliance on operator experience
- Isolated building systems with little to no integration
- Reactive maintenance practices

Common Challenges:

- Excessive occupant comfort complaints
- Unexpected equipment downtime
- Increased emergency service calls
- Lack of operational consistency
- Difficulty identifying energy waste
- Deferred maintenance issues
- Higher operating costs

While facilities at this level often appear functional on the surface, hidden operational costs can be substantial. Equipment frequently operates inefficiently, maintenance resources are consumed by emergency repairs, and energy consumption is often significantly higher than necessary.

As a result, many organizations adopt an “if it isn’t broke, don’t touch it” mentality. Unfortunately, this mindset often allows small inefficiencies to compound into larger operational and financial problems over time.

Reactive Buildings represent the starting point of the Building Intelligence journey. The first step toward modernization is gaining visibility into building operations through connected systems, centralized monitoring, and accessible performance data.

You can’t improve what you can’t measure.

LEVEL 2: CONNECTED BUILDINGS

“I Can Finally See What’s Happening”

A Connected Building represents the first major step in the journey from reactive operations to intelligent building management. At this stage, facility teams gain visibility into their systems through modern Building Automation Systems (BAS), centralized monitoring, and accessible operational data.

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Connected Buildings typically feature web-based user interfaces, historical trending, alarm management, and remote access capabilities that allow operators to monitor building performance from virtually anywhere. These systems provide a single source of truth for facility operations, reducing reliance on manual inspections and reactive troubleshooting.

Best-in-class Connected Buildings are built on open-protocol platforms that enable seamless integration between HVAC, lighting, power monitoring, metering, life safety, security, and other building systems. Rather than operating in isolation, these systems share information and provide operators with a comprehensive view of facility performance.

Modern dashboards and graphical user interfaces transform raw data into actionable insights by presenting key performance indicators, equipment status, energy consumption, and system alarms in an intuitive format. Building operators can quickly identify issues, respond to occupant concerns, and make informed operational decisions.

Common Characteristics:

- Modern Building Automation System
- Web-based user interface
- Centralized monitoring and control
- Historical trending and data storage
- Alarm management and notifications
- Open-protocol system integration
- Remote access capabilities
- Graphical dashboards and reporting

Benefits:

- Improved operational visibility
- Faster troubleshooting and issue resolution
- Reduced service response times
- Better occupant comfort and satisfaction
- Increased operator productivity
- Enhanced decision-making through data

For many organizations, reaching Level 2 delivers immediate operational improvements without requiring major mechanical equipment replacements. The ability to see, understand, and manage building performance creates a strong foundation for future modernization efforts.

Most importantly, the Connected Building establishes the platform upon which all higher levels of building intelligence are built. Without connectivity, data collection, analytics, optimization, and artificial intelligence cannot be effectively deployed.

You can't optimize what you can't see.

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LEVEL 3: INTELLIGENT BUILDINGS

“The Building Tells Me What’s Wrong”

As buildings progress into the Intelligent Building stage, technology begins to serve as a workforce multiplier for building owners, facility teams, and occupants. Leveraging the foundation established in the Connected Building, organizations can now transform operational data into actionable intelligence.

Rather than simply monitoring equipment and responding to alarms, Intelligent Buildings continuously analyze the system performance, identify abnormalities, and highlight opportunities for improvement. The building begins to move beyond reporting information and starts delivering meaningful insights that help operators make better decisions.

Through technologies such as Fault Detection & Diagnostics (FDD), Continuous Commissioning, Energy Analytics, Indoor Air Quality Monitoring, and Automated Reporting, the building becomes an active participant in facility operations. These tools continuously evaluate equipment performance and identify issues before they escalate into equipment failures, occupant complaints, or excessive energy consumption.

Instead of waiting for a tenant to report that a space is uncomfortable or discovering a problem during routine maintenance, operators are notified of issues as they emerge. This allows maintenance teams to address concerns proactively, often before occupants are even aware a problem exists.

Using advanced analytics, Intelligent Buildings can automatically detect and report many issues such as simultaneous heating and cooling, stuck or leaking control valves, improper equipment sequencing, sensor calibration drift, excessive after-hours operation, indoor air quality concerns, and equipment operating outside design parameters to name a few. ***Many of these issues can remain hidden for months or even years in traditional facilities, quietly impacting occupant comfort, energy consumption, and equipment reliability.***

Common Characteristics:

- Fault Detection & Diagnostics (FDD)
- Continuous Commissioning
- Energy Analytics Platforms
- Automated Performance Monitoring
- Indoor Air Quality Monitoring
- Automated Reporting and Dashboards

Benefits:

- Early detection of operational issues
- Reduced occupant comfort complaints
- Improved equipment reliability

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- Lower maintenance costs
- Reduced energy consumption
- Increased staff productivity

At this level, organizations begin to shift from reactive maintenance to proactive operations. Maintenance resources can be prioritized based on actual equipment conditions rather than fixed schedules or occupant complaints. Building operators spend less time searching for problems and more time solving them.

The result is a facility that operates more efficiently, consumes less energy, provides a better occupant experience, and enables facility teams to focus on strategic improvements rather than daily firefighting.

Intelligent Buildings don't simply collect data – they transform data into action.

The building tells you what's wrong before occupants do.

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The smartest building in a portfolio is not necessarily the newest building. It is the building that effectively uses technology to support operational decisions.

Today's owners have access to tools that can transform aging facilities into intelligent connected, and highly efficient assets without replacing the underlying infrastructure. The path forward is no longer defined by the age of the building. It is defined by the maturity of the technology supporting it. The future belongs to organizations that recognize that simple truth.

Modern technology has fundamentally changed what existing buildings can become.

Check out our website: <https://old-buildings-new-tricks.com/>

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