

# BUILDING COMMISSIONING OPTIMIZES BUILDING PERFORMANCE

From minimizing risks to reducing expenses, building commissioning provides the most effective way to ensure optimum performance throughout the life of a building — from construction to operation to recertification.

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Every building, new or old, comes with inherent short- and long-term risks. New buildings can be poorly designed from the beginning or without an eye towards the long-term operation. During construction, projects may deviate from an original design, incurring change orders that exceed the budget. Defects may arise that impact original intent and long-term success.

Over time, existing buildings often perform inefficiently and beyond their intended design, incurring excessive operating costs, wasting energy, and contributing to occupant and maintenance staff frustration.

If these risks aren't managed, they can result in a number of negative outcomes, such as reduced building performance, inevitably creating higher capital and operating expenses. When the risks are well managed, the outcomes range from optimized systems to comfortable building environments and lower operating costs. **The most powerful way to ensure ideal outcomes is through the process of building commissioning.**

**Building commissioning is one of the most cost-effective ways to lower risk, increase performance and save money.** It is a quality-assurance and risk-reduction solution in the life of a building that enhances the long-term value for its owner. Executed by technical professionals with extensive engineering and operations experience, commissioning assures the owner receives the quality for which it contracted. It identifies and corrects issues in the design, construction, and operations lifecycle before they become expensive problems.



On average, the operating costs of a commissioned building are **8% to 20%** below that of a non-commissioned building.

— [Portland Energy Conservation](#)

**THE GOALS OF BUILDING  
COMMISSIONING ARE MULTIFOLD:  
IT ENSURES THAT BUILDING CONSTRUCTION  
IS EXECUTED AS CONTRACTED, NEW OR  
EXISTING BUILDINGS ARE OPERATING AS  
INTENDED, AND BUILDINGS ARE MEETING  
THE COMFORT AND USABILITY NEEDS OF  
THE OWNERS AND OCCUPANTS.**

# 3 TYPES OF BUILDING COMMISSIONING

The type of building commissioning deployed at a facility is defined by the lifecycle of the building.



## TYPE 1 New Building Commissioning

**New building commissioning** involves verification that the facility's construction aligns with the designed intent so owners get what they contracted for and potential problems are detected and resolved early. It invariably avoids excessive capital costs during the design and construction phase, and reduces operating energy and operating costs after turnover.



## TYPE 2 Retro- Commissioning

**Retro-commissioning** involves review and recalibration of existing building systems so they achieve optimum performance. An example includes improving building performance and reducing energy consumption by identifying and correcting operational issues. Retro-commissioning provides a safe and healthy facility, improves energy performance, minimizes energy consumption, improves maintenance reliability, reduces operating costs and maintains more comfortable building environments. It is the fastest and most cost-effective means to correct issues in an existing building.



## TYPE 3 Re- Commissioning

**Re-commissioning** involves the recertification of an already commissioned facility to ensure it maintains or quickly returns to peak performance. The goal is to identify building system deficiencies and correct them for optimum energy use.

## Positive Outcomes from Building Commissioning

Building commissioning allows building owners to:

- Decrease utility costs (energy savings)
- Improve building system function
- Improve building operation and maintenance
- Extend the equipment lifecycle
- Improve building documentation
- Avoid construction costs

### Additional benefits include:

- Achieve building goals
- Reduce risks
- Gain an advocate
- Ensure optimal building comfort

# **BUILDING** COMMISSIONING **BENEFITS IN ACTION**

Examples of building commissioning across various environments abound. Discover how Aramark's team of engineering professionals have delivered improved ROI, increased savings and operational efficiencies for clients throughout the country.



## **Penn State Health**

**SAVED NEARLY \$100K IN COSTS  
AND \$30K ANNUALLY**

The scope of commissioning for the Milton S. Hershey Medical Center Support Services building included the design review, verification of installed systems, dynamic performance testing, and operations training of maintenance personnel. Thanks to the oversight, 109 commissioning deficiencies were documented, resulting in \$98,000 in contractor corrective costs. Further, the campus gained an annual operating savings of \$30,000.



## **Baylor University**

**REALIZED COMMISSIONING ROI OF 45%**

Through building commissioning, more than 150 issues were resolved in nine buildings across 1.3 million gross square feet (GSF). The university gained over \$1 million in capital cost avoidance, an annual operating savings of \$65,000 per year and a 22 percent energy consumption reduction.



## **Albert Einstein College of Medicine**

**AVOIDED \$1.8M IN COSTS**

Building commissioning identified 936 issues during the design, inspection and functional testing stages of the buildings at the Price Center for Genetic and Translational Medicine at Albert Einstein College of Medicine. The result was a savings of nearly \$1.8 million in cost avoidance and contractor corrective costs.



## **University of Pittsburgh Medical Center**

**AVOIDED OVER \$100K IN COSTS**

Through building commissioning, the UPMC Altoona campus identified 1,000 building deficiencies and avoided more than \$100,000 in costs from potential collateral damages, including potential mold growth. Further, the campus gained an annual energy savings of over \$50,000.



# Building Commissioning Study on Payback and Risk Prevention

The costs of building commissioning are fractional relative to the capital cost for construction and the annual expense for operations. At the very least, commissioning pays for itself. In expert hands, building commissioning results in significant cost savings, exceeding the commissioning costs many times over because of discoveries that reduce risk and optimize performance.

To quantify the results of building commissioning, the [Lawrence Berkley National Laboratory](#) evaluated 643 buildings and 99 million gross square feet. These are the key findings:

	Existing Buildings	New Construction
<b>Median commissioning costs</b>	\$0.30 per square foot  (and 0.4% of total construction costs for new buildings)	\$1.16 per square foot
<b>Median whole-building energy savings</b>	16%	13%
<b>Median payback times</b>	1.1 years	4.2 years
<b>Median benefit-cost ratios</b>	4:5	1:1
<b>Cash-on-cash returns</b>	91%	23%

- Considerable reductions in greenhouse gas emissions were achieved, at a negative cost of -\$110 and -\$25/ton CO<sub>2</sub>-equivalent.
- Projects employing a comprehensive approach to commissioning attained nearly two times the overall median level of savings, and five times the savings of projects with a constrained approach.
- Non-energy benefits are extensive and often offset part or all of the commissioning investment.
- Limited multi-year post-commissioning data indicate that savings are often persistent for a period of at least five years.



# WHO COMMISSIONS?

One common misconception surrounding commissioning is that this process falls under the responsibility of the architect, engineer or contractor. In fact, it is the responsibility of the building owner, typically the VP of operations, chief financial officer or chief facilities officer.

Employing an architect, engineer or contractor to execute the commissioning inevitably creates an inherent conflict of interest. Furthermore, these professionals lack continuous experience with operating facilities long-term or training the operating staff of the building systems.

The expertise needed to commission new or existing building spans a broad spectrum of technical capacity, ranging from engineering, systems, operations, Computerized Maintenance Management System, energy management, and training, among many more. This requires the guidance and knowledge from an experienced Commissioning Agent (CxA) to ensure investment success on behalf of the building owners.

# **GAIN** A COMMISSIONING PARTNER WITH **DEEP EXPERIENCE**

While constructing and maintaining a building at optimal performance can be a challenge, finding a building commissioning partner does not have to be. Aramark has more than 40 years of building commissioning experience and has saved hundreds of clients more than **\$75 million** on nearly **900 projects** (\$80 million+GSF) by avoiding problems and optimizing building performance.

Aramark's commissioning services include skilled Engineering Solutions (ES) and Building Management Systems (BMS) teams. The teams comprise more than 100 technical professionals with broad expertise credentials, including Professional Engineers (P.E.), Certified Commissioning Professionals (C.C.P.), Certified Building Commissioning Professionals (C.B.C.P.), LEED-Accredited Professionals (L.E.E.D.), Project Management Professionals (P.M.P.) and Certified Energy Managers (C.E.M.). The teams' deep building commissioning and technical expertise includes HVAC, building envelope, architecture, boilers, chilled water systems, plumbing, mechanical, electrical, standby power and controls.





# THE ARAMARK DIFFERENCE

Aramark's commissioning capabilities include solutions that align with a building owner's vision for new construction and renovations projects that optimize existing building systems including:

- Providing an unbiased, objective view of the building systems installation, operation and performance
- Cooperating and coordinating all commissioning activities with the project manager, design professionals, the construction manager and contractors
- Providing on-site representation to focus and coordinate the commissioning efforts
- Coordinating and integrating teams of professionals to support corrective actions
- Establishing parameters and testing requirements for system acceptance versus component acceptance
- Exercising the systems throughout operating ranges, verifying safety and emergency conditions

Aramark's industry-leading, web-based software promotes full accountability through real-time deficiency reporting throughout the entire commissioning process.



If you're ready to see how building commissioning can improve ROI, increase savings and enhance efficiencies, [contact Aramark today.](#)