

Retrocommissioning: Frequently Asked Questions

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WHAT IS RETROCOMMISSIONING?

Retrocommissioning, also called building re-tuning, is a one-time building “tune-up” that does not require capital upgrades. It seeks to improve a building’s operations and maintenance procedures to enhance overall performance without any capital improvements.

People tune up their cars every year, but they typically never tune up their buildings. That’s where retrocommissioning comes in. It can often resolve problems that occurred during design or construction, or correct issues that have developed during the building’s life, such as fans that run backwards or lighting that never turns off.

In retrocommissioning, the existing base building systems—including the heating, ventilation and air conditioning (HVAC) systems, electrical and lighting systems, and building envelope—are thoroughly evaluated and optimized to ensure that they are running properly. The retrocommissioning professional also performs minor repairs, checks that equipment manuals are on site, and trains operators in the use of the building’s equipment.

WHY IS RETROCOMMISSIONING IMPORTANT?

Buildings waste 10–20 percent of the energy they consume because they’re not properly tuned, and thus owners overspend on utility bills. Retrocommissioning can fix these problems at low cost, often on the spot.

Over time, all buildings undergo changes that strain their mechanical, electrical, and controls systems and hinder performance. Furthermore, because systems in buildings can be highly interactive, small problems can have big effects on overall performance.

No matter how well building operators maintain equipment, energy waste and reliability problems can occur without regular tune-ups.

HOW IS RETROCOMMISSIONING DIFFERENT FROM OTHER TYPES OF COMMISSIONING?

New building commissioning, as its name suggests, ensures that the systems in a new building work as they were intended to. Ongoing or continuous commissioning is a process that relies on collecting and analyzing energy data via an existing building automation system or standalone metering equipment, and then making the necessary operational changes so that the systems in the building work optimally.

Retrocommissioning also looks at the systems of existing buildings, but it is a one-time event rather than an ongoing process.

HOW IS RETROCOMMISSIONING DIFFERENT FROM AN AUDIT?

Retrocommissioning focuses on optimizing existing equipment, while an energy and water audit focuses on identifying potential capital improvements. Therefore, retrocommissioning differs from an audit in two critical areas: 1) The scope of retrocommissioning is generally limited to non-capital intensive adjustments, corrections, and repairs of existing systems; and 2) during an audit potential improvements are simply documented, while during retrocommissioning improvements are actually implemented and their results verified. To obtain the most comprehensive assessment of a building's energy performance and its opportunities for improvement, while also ensuring that all no-cost or low-cost operational improvements are completed, both retrocommissioning and an audit are needed.

IS RETROCOMMISSIONING APPROPRIATE FOR EVERY BUILDING?

Almost every building can benefit from a tune-up. No matter how efficient it is, there's always room for improvement. However, there may be mitigating circumstances that would make retrocommissioning inappropriate for specific buildings. Re-tuning of existing systems may not be relevant for recently constructed buildings or buildings facing imminent demolition or major renovation. Similarly, buildings that have older and pneumatically controlled systems are often more difficult to re-tune and are likely to experience smaller savings. Finally, smaller buildings often do not have central HVAC systems, and thus lack many of the controls and distribution systems that typically stand to gain the most from retrocommissioning. As a result, even in cities where some level of retrocommissioning is mandated through a policy, the square footage threshold for buildings covered by retrocommissioning requirements typically excludes small buildings.

WILL RETROCOMMISSIONING BE INCONVENIENT FOR MY TENANTS AND STAFF?

Retrocommissioning doesn't inconvenience tenants because it rarely goes into tenant spaces, focusing on base building systems instead. Building staff will need to have hands-on involvement in the process. But this is to their own benefit, as well as the owner's as staff will become better trained in the building's systems, and their knowledge will lead to better operations, representing an additional payback for the owner.

WHAT IS THE COST OF RETROCOMMISSIONING?

Retrocommissioning costs about 30 cents per square foot and usually pays for itself in just over a year. It also continues to pay back annually, for years thereafter.

A 2009 Lawrence Berkeley National Laboratory analysis of 561 existing commercial buildings that underwent retrocommissioning found the median cost was \$0.30 per square foot. This resulted in a median whole-building energy savings of 16 percent, with a median payback time of 1.1 years. This means that the cost of retrocommissioning is recuperated in 1.1 years, with the benefits in cost savings from the building tune-up lasting several years longer.

WHAT ARE THE BENEFITS?

For building owners:

Cost savings. Building owners and managers can save significant amounts of money by retrocommissioning, because the process ensures that a building's energy systems are running properly. This means that building owners and managers are not only saving money through lower utility bills, but also by reducing maintenance costs and extending the life of equipment.

Increased property value. By optimizing their existing equipment, building owners are investing in their buildings in ways that the market recognizes. As companies increasingly adopt sustainability goals and seek lower operational costs, buildings that perform efficiently will command higher value in the marketplace.

Better working environment. Living and working in an energy-efficient building is more comfortable—the thermostats turn off and on at the appropriate times, the lighting contributes to a productive work environment, and the indoor air quality is better for people's health. All these factors make energy-efficient buildings more appealing for prospective buyers and tenants, while also increasing property value.

For building staff:

Professional development. Staff will get hands-on training on the building's equipment during retrocommissioning. They can improve their skills and further their careers.

For the whole city:

Reducing carbon pollution. Large buildings are responsible for a disproportionate amount of the carbon pollution in major cities. After retrocommissioning, these buildings use less energy, which means they are responsible for less carbon pollution and are doing their part to stave off the worst effects of climate change.

Building an energy services economy. Encouraging widespread retrocommissioning of all large buildings can help bring this practice to scale, enlarging the pool of practitioners, improving methods, and reducing cost.

Access to better information. If, as an element of a citywide program, some of the information on building systems and improvements made is also reported to a city agency, retrocommissioning can allow the city to capture a more complete understanding of how local buildings use energy.

Increasing resilience to extreme weather and air quality problems. Energy waste is a serious threat: it leads to increased emissions of climate-altering greenhouse gases. This leads to more frequent extreme weather events such as floods, storms, and droughts. Improving building energy efficiency is a cost-effective way to help prevent many of these problems, while putting money into the pockets of building owners.

HOW LONG WILL THE BENEFITS LAST?

Retrocommissioning is a one-time event, but the unfortunate reality is that building performance often deteriorates steadily over time, as repairs are neglected, system set points are misadjusted, or control sequences no longer match the changing use and occupancy patterns of the building. Therefore, to maximize the benefits, retrocommissioning is a process that should be repeated every 5–10 years to maintain optimal performance.

Some studies have shown that the inevitable deterioration in performance may be reduced or even eliminated if retrocommissioning is viewed not as a one-off event, but as an opportunity to fundamentally change the way a building is operated. For example, if retrocommissioning includes training and the installation of permanent metering and feedback systems, these improvements will “live on” long after the retrocommissioning team leaves the site and can help to maintain or even help deepen long-term savings.

HOW CAN OWNERS ENCOURAGE TENANTS TO BE MORE ENERGY EFFICIENT?

Since retrocommissioning only addresses the parts of a building accessible to the building owner, is there anything else that owners can do to encourage tenants to be more energy efficient? One reason that tenants may use excessive amounts of energy is that they often don't pay for the actual amount of energy they use. The owner can help incentivize tenants to reduce their consumption by sub-metering each tenant, and then billing them according to consumption. Since sub-metering an entire building can take time, a building owner or manager can work with their tenants to help them reduce their consumption in the interim by sharing information about best practices. Additionally, building owners can ensure that both they and their tenants are incentivized to be efficient by signing energy-aligned leases with their tenants.

ABOUT CITY ENERGY PROJECT

The City Energy Project (CEP) is a groundbreaking national initiative to improve the energy efficiency of existing buildings in 20 major American cities. The partnership between the CEP and the participating cities will support bold solutions that can be replicated by other municipalities nationwide and around the world to advance economic development and reduce pollution. The CEP is a joint project of the Natural Resources Defense Council and the Institute for Market Transformation.

For more information about the City Energy Project visit us at www.cityenergyproject.org.

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