Building Commissioning Comes of Age

Measuring Property Performance Can Uncover Surprising Disparities

By Dees Stribling

The late management guru Peter Drucker probably wasn't talking about building commissioning when he said, "If you can't measure it, you can't manage it." But with a little twist of the phrase, he could have been. For building owners and their asset managers, it would be more fitting to say, "If you don't measure it, you can't manage it."

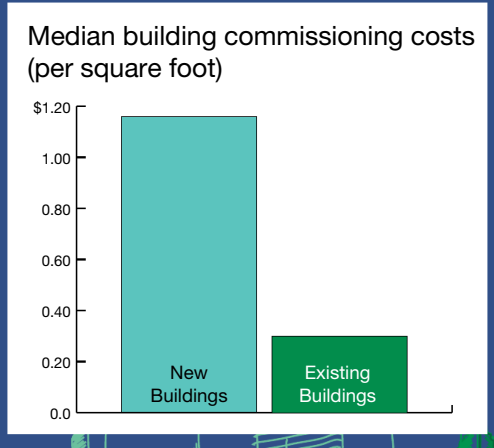
Building commissioning is the process of measuring exactly how a building's energy, ventilation, water and other systems are functioning and comparing that performance to how the building's systems are supposed to function to meet the owner's needs. Sometimes the gap between what a building does and what it is supposed to do is surprisingly wide, and without commissioning, ownership might not realize that a tolerably functioning building could be functioning much better—at a savings in operational costs.

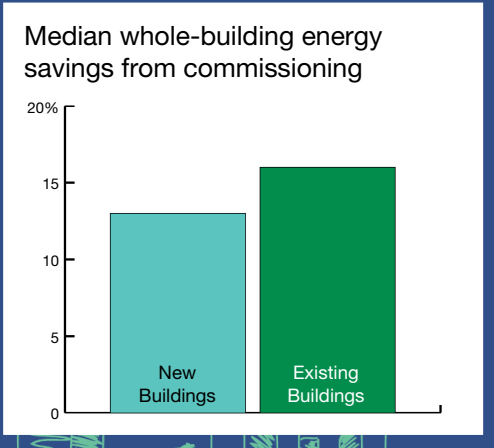
As a concept, commissioning is not new, but it has not always been applied to buildings. The U.S. Navy has long used forms of commissioning to test ships to make sure they perform as designed, and some manufacturers use a commissioning process as a kind of quality control for their products. Later, the process began to be applied to buildings, especially large and complex structures—hospitals, for example—whose owners needed a high level of operational precision.

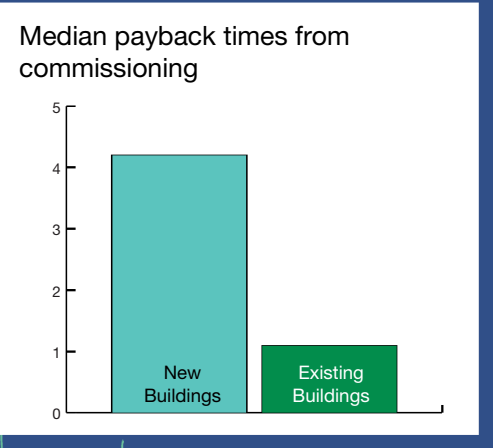
In more recent years, the push for sustainability in commercial real estate design has given commissioning a boost, since commissioning a new building helps ensure that it is really as green as planned. Commissioning has also been mandated or incentivized in certain places (such as California) for certain large new-construction buildings.

The American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE), which has formulated standards for commissioning—the 146-page "Technical Requirements for the Commissioning Process"—and which certifies specialists in commissioning process management, has also published a short definition of commissioning for buildings. "The process focuses upon veri-

Measure to Manage







Source: Lawrence Berkeley National Laboratory

fying and documenting that the facility and all of its systems and assemblies are planned, designed, installed, tested, operated and maintained to meet the owner's project requirements," the organization says.

Pithy, but when it comes to the nitty-gritty of building functions, that description covers a lot of ground. Among other things, commissioning involves pressuring a building and testing for air leaks; a thorough test of the HVAC system, including checking its control loops (dampers, valves, variable frequency drives and so on) for proper operation; verifying that the building's temperature control systems do what they are supposed to do; and ensuring that the building's fire, life and safety systems are up to snuff.

Commissioning vs. Retro-Commissioning

"At the heart of commissioning is the question, 'Does the building do what the owners want it to do?'" posited Jay Enck, principal of CxGS (Commissioning and Green Building Solutions). "Still, ownership's goals are going to be different, depending on a variety of factors. It's no surprise that, for example, schools, recreation facilities, courthouses and crime labs have different commissioning processes, considering their uses. But there also can be considerable differences in the commissioning process among more standard commercial properties."

Even so, in some ways commissioning a new property is a straightforward task, since the designer and all the documentation about the building and its systems are at hand. By contrast, commissioning an existing building, often referred to as "retro-commissioning," adds yet another layer of complexity to the task. Not only does a retro-commissioning team need to determine how building systems are functioning, they need to determine how they were designed to function, sometimes in the absence of original documentation. Yet as energy costs escalate and the movement toward building sustainability fully enters the mainstream of commercial real estate, retro-commissioning has found its legs.

"Retro-commissioning is gaining traction," said Jason Dinan, director of engineering at Colliers International's Washington, D.C., office. "For owners of older buildings, it's a starting point toward improved efficiency. Over the years, a lot of hands have made their mark on a building, and not always for the better. Retro-commissioning is a way of unspooling all that, and understanding where a building started."

Steven Ring, Northern California city leader with Cushman & Wakefield Inc., agrees with that assessment, adding that "the majority of existing buildings were never commissioned. In retro-commissioning, you can uncover the things that haven't been done right over the years with the mechanical, HVAC and lighting systems. A lot can happen to a building over time, and the initial tuning gets lost, just like a car whose owner's manual gets lost. Retro-commissioning brings a building back into tune."

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>
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Costs and Benefits

Naturally, both commissioning and retro-commissioning require spending some money. Is it worth it? Probably so, but with some caveats.

A 2009 report by Lawrence Berkeley National Lab, "Building Commissioning: A Golden Opportunity for Reducing Energy Costs and Greenhouse-gas Emissions," detailed the economic benefits of commissioning for both new and existing structures, analyzing data from 643 buildings representing about 99 million square feet and looking at the work of 37 commissioning providers. The takeaway was that commissioning "maximizes the quality and persistence of energy, cost and emissions reductions," the report explained.

Key findings of the report were that median whole-building energy savings for structures undergoing commissioning were between 13 and 16 percent, with a median payback time of 1.1 to 4.5 years. "Commissioning is arguably the single most cost-effective strategy for reducing energy costs and greenhouse-gas emissions in buildings today," the report asserted.

Median commissioning costs, the report found, were between 30 cents and $1.16 per square foot for existing buildings and new construction, respectively (and 0.4 percent of total construction costs for new buildings), which highlights an important point about the costs involved—namely, that they are quite variable.

"The costs can be all over the board," said Beth Machen, president of the Charlotte, N.C.-based Machen Advisory Group, which specializes in sustainable building consulting. "I've seen quotes vary by more than $10,000 for doing the same thing. The important thing is to work with someone you trust, someone with a track record of commissioning."

Machen points out that for existing buildings, retro-commissioning is much more valuable if the building's engineering staff is part of the process, even if only as observers. "As the third-party engineers do their work, I would have the building engineer follow them around, because the building engineer is the one who's ultimately running the system. A good engineer can make the building hum, but even the best engineer will learn things about a building during commissioning."

And the benefits of commissioning can vary somewhat according to the intentions of ownership, noted Ring. "For owners that plan to hold a building for a long time, commissioning makes a great deal of sense," he observed. "The savings can be quite substantial. The case is less clear-cut for owners who plan to sell after a few years, but that isn't quite as common as it used to be. As long-term ownership becomes more prevalent in commercial real estate, so will commissioning and retro-commissioning." CPE