



Building Diagnostics
& Property Science



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BUILDING COMMISSIONING

Many new buildings perform poorly during their first years of occupancy. Problematic buildings are typically those with complex HVAC systems and/or convoluted building envelopes and located in rainy and hot/humid climates. **Performance problems include excessive energy use, occupant comfort problems, and even degraded indoor air quality.** Building system failures can result in moisture intrusion problems that require very expensive repairs and litigation.

HOW COST EFFECTIVE IS IT?

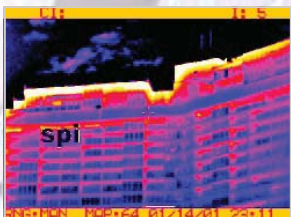
The benefits of commissioning sound like a building owner's dream come true: fewer change orders during construction; fewer call-backs after construction; lower energy bills; avoided premature equipment replacement costs; proper training of the building's operational staff; safer and healthier indoor environment; long-term tenant satisfaction and improved profit margin.

Although it is becoming increasingly common, many building owners still don't fully understand what commissioning involves, or are skeptical of the cost-effectiveness claims made by energy-management and commissioning professionals.

An important new study by Lawrence Berkeley National Laboratory (LBNL), funded by the U.S. Department of Energy, may go a long way toward changing the minds of decision makers who are sitting on the fence when it comes to commissioning. **In fact, the study concluded that commissioning is one of the most cost-effective means of improving energy efficiency in commercial buildings.**

WHAT DOES IT REALLY COST?

The researchers found that for new construction, median commissioning costs were \$1.00 per square foot, representing 0.6% of total construction costs. The energy-savings alone yielded a median payback time on the commissioning cost of 4.8 years. For existing buildings, the researchers found median commissioning costs range of \$0.30 to \$0.50 per square foot, with whole-building energy savings of 15% and a payback time of 0.7 years.



COMMISSIONING SERVICES

THE PLAN	DESIGN	CONSTRUCTION	ACCEPTANCE	POST OCCUPANCY
<p>Successful commissioning starts with a plan to identify the owner's requirements and a strategy to integrate commissioning throughout the project.</p> <ul style="list-style-type: none"> Assist Owner in developing design requirements from an operational perspective (design Intent Document) Perform assessment to quantify existing conditions Educate team on commissioning goals Prepare the construction checklist Maintain a record of progress 	<p>With the program set, the design is validated for its ability to meet the client's goals.</p> <ul style="list-style-type: none"> Review Design Intent Document for focus on the Owner's needs Prepare commissioning specifications for the contractor DD and CD design review from an operational perspective Identify, describe and assign each commissioning task for the project, including owner and specialist subcontractor responsibilities 	<p>Monitoring and validating that commissioning milestones are met during construction minimizes mistakes, oversights and delays.</p> <ul style="list-style-type: none"> Integrate commissioning milestones into the Master Schedule Verify completion of required submittals, tests and records Verify installation as it occurs and witness the tests Verify completion of contractor start-up documentation Verify the quality and accuracy of Test, Adjust and Balance process Verify DDC controls 	<p>Before you use your building, we shake it down to see if it's ready.</p> <ul style="list-style-type: none"> Verify accuracy, relevant and user-friendly owner training and manuals Perform assessments to verify all systems are ready for operation, complete, tested and clean Prove full integration of HVAC systems Conduct functional acceptance testing Conduct full operational training for facilities operators by using practical cause and effect drills 	<p>Supporting your operations through the learning curve of new facility.</p> <ul style="list-style-type: none"> Opposite seasonal testing under live load conditions Review with facility operators trend logs, alarms and failures Assist in tuning control loops to meet actual and not design conditions Provide system manual for re-commissioning Provide a report to verify that owner requirements were met Operations review prior to the end of the project



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◦ Commissioning ◦ Retro-Commissioning ◦ Envelope Diagnostics ◦ Energy Economics ◦ Indoor Air Quality