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Understanding Energy Economics of Automated Continuous Commissioning

http://www.scientificconservation.com/blog/entry/when_roi_is_a_bad_thing/

Customers often ask what kind of ROI they can expect from automated continuous commissioning (ACC). The simple answer is, that if done properly, there is no ROI. Knowledgeable professionals in the industry often say the most sustainable energy is the energy never used. Similarly, the best ROI is the one that never happened. Understandably, this can puzzle customers accustomed to traditional ROI metrics when trying to wrap their heads around the old adage of “an ounce of prevention is worth a pound of cure”.

The simple truth is, in the arena of automated continuous commissioning, ROI is a bad thing. It means that something went wrong and you corrected it too late. So how does one decide whether automated continuous commissioning is a good investment?

Texas A&M's Energy Systems Lab research (<http://esl.eslwin.tamu.edu/continuous-commissioning-.html>) points out that for buildings with *manual* continuous commissioning “the average measured utility savings are about 20%, with simple paybacks typically occurring in less than two years.” This is the most basic, traditional measure of ROI. As such, it doesn't factor in other critical considerations. A few examples cited below will shed light on this.

That said, the importance of commissioning is without dispute. For its highly sought after LEED certification, U.S. Green Building thinks so strongly about commissioning that they have made it a requirement for anyone desiring any level of certification (with additional value given for continuous commissioning). If looked at from that light, one can say that the average risk of not doing continuous commissioning is a 20% increase in energy cost. But that is only a small part of the story.

The key question is how often should one re-commission their facility? LEED says no less than every two years. Is two years the magic number? Fact is, something really wrong can happen as soon as the commissioning agent packs up. This is the case since commissioning agents don't access data once the logging part of the commissioning process is complete. Consequently, problems may go unsolved until that agent comes back, someone in the building notices the issue, or worse, never

does get resolved. Take the recent case of a high-end department store. The house domestic water pumps were on the same schedule as the air conditioning systems. Since the air conditioning systems came on a few hours before the store opened, the domestic water pumps were put on a separate schedule. This cancelled the chiller schedule. While this problem was discovered and the issue was quickly resolved via ACC, it raises the salient question: how long would this have gone un-noticed at a cost of \$90.00 per day? Four months? Three days? Who knows? It's entirely possible the issue wouldn't have been addressed until the next time a commissioning agent went to the site two years later.

There is another major benefit of continuous commissioning that is not accounted for in traditional energy savings ROI models. A customer with two 450-ton chillers allowed one of the chillers to run at a very low part load. This resulted in periodic surging of one of the units that would inevitably have caused the bearings to fail since the centrifugal compressor was operating at a lower part load than what was specified in the system design. By catching this problem early, a failure costing thousands of dollars along with days of downtime and angry hot customers was avoided.

Proactively avoiding the cost of catastrophic failure and unscheduled downtime is a compelling and intuitive value of continuous monitoring. But how should ACC's ability to mitigate risk be included in the economic model? Like vibration analysis and thermography before it, ACC breaks new barriers in the financial model. Any major air conditioning manufacturer can give you excellent statistics of the average life of equipment. Those statistics cannot be aligned to what would have happened if all that equipment was continuously monitored. One thing is certain: the small cost of automated continuous commissioning pales in comparison to the benefits.

This is not to suggest that ROI is unimportant in determining certain energy projects under consideration. However, to avoid some of those ROI's in the first place, automated continuous commissioning is essential.

It is clear that energy professionals have relied upon traditional ROI metrics to gauge the value of energy efficiency solutions. If we ignore the value of *sustaining* energy efficiency while not taking advantage of the benefits from continuous monitoring, we risk not only overvaluing efficiency gains, but continue to miss the opportunity to minimize the true cost of operations of buildings and their systems.