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Lessons Learned from Continuous Commissioning® of a LEED® Gold Building in Texas

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EXECUTIVE SUMMARY

The subject building is a relatively new building with 120,000 square feet located in Texas and was the first LEED® Gold building in the area. To earn the title of a green building, the designers of this high performance building included many conservation and energy related design features and construction practices. The energy related design features of the building include a roof mounted photovoltaic system, a green roof design, and connection to a district cooling system which utilizes thermal storage. Many of the operations and mechanical issues identified during the course of commissioning the subject building are items common to many commercial buildings, green or conventional. The potential cost savings from implementing the measures is 21% of the annual energy consumption with a simple payback of less than one year.

The findings at the subject building suggest that:

- High performance buildings have many of the same problems as conventional buildings since none of the issues and opportunities identified would generally be considered unique to high performance buildings
- The potential for savings from commissioning the systems in high performance buildings is similar to that of conventional buildings and is as economically attractive.

DISCLAIMER

ACKNOWLEDGEMENTS

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Lessons Learned from Continuous Commissioning®[1] of a LEED®[2] Gold Building in Texas

The subject building is a relatively new building with 120,000 square feet of primarily office space located in Texas. The subject building is a multi-function building that serves as a meeting place and houses many officials and managers, a media center, and legal offices. The Building Automation System (BAS) is a state-of-the art Honeywell control system. In keeping with the overall policy of the owner to promote energy efficiency, water conservation, and renewable energy in all buildings larger than 5,000 ft^2, the subject building is a green building which earned the first LEED® Gold certification in the area. Chilled water is provided to the building by a district plant located nearby and heating is provided by an on site natural gas fired boiler.

To earn the title of a green building, the designers of the subject building included many conservation and energy related design features and construction practices. The conservation efforts focused on the use of recycled materials, recycling of construction waste, utilization of condensation from the HVAC system as a water source for a fountain, using what would be waste water from a natural onsite water source in the basement level for irrigation, native plants for landscaping to limit irrigation requirements, use of local materials such as pecan wood for doors, and bike storage with showers to encourage the us of alternate forms of transportation. The energy related design features of the building include a roof mounted photovoltaic system with a peak capacity of 9kW, a green roof design, and connection to a district cooling system which utilizes thermal storage to make ice at night and provide chilled water during the daytime.

Many of the operations and mechanical issues identified during the course of commissioning the subject building are items common to many commercial buildings, green or conventional. The primary maintenance issue identified was the need for calibration or replacement of numerous sensors including temperature, humidity, carbon dioxide, and static pressure sensors. The operations issues identified include suboptimal pumping operation, air handler scheduling, economizer operation, terminal box operation, and static pressure setpoints. Other opportunities include tuning of control loops to prevent hunting and balancing of systems to prevent comfort problems. None of the issues and opportunities described above would generally be considered unique to high performance buildings. The findings at the subject building suggest that the primary lesson from this building is simply that high performance buildings have many of the same problems as conventional buildings.

The estimated cost savings from implementing the measures above is 21% of the annual energy consumption is similar to energy savings estimates for conventional buildings. Given that the measures for the subject building are similar to those commonly proposed

[1] Continuous Commissioning is a registered trademark of the Texas Engineering Experiment Station of the Texas A&M University System.
[2] LEED is a registered trademark of the U.S. Green Building Council.

for conventional buildings, it is perhaps reasonable to expect savings of a similar magnitude. The payback for commissioning is estimated to be less than on year which is also comparable to a typical payback from commissioning a conventional building. Another possible lesson from the subject building is that the potential for savings from the conventional systems in high performance buildings is similar to that of conventional buildings and is as economically attractive.