

Optimizing HVAC control to improve building comfort and energy performance

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Within the last 20 years, more and more studies have demonstrated the benefits of improving building design and operation. Researchers have also developed a number of new technologies to improve existing building energy and comfort performance. As a result, the Continuous Commissioning (CC ♦) has been developed.

CC ♦ has been helping building owners achieve energy savings and thermal comfort improvement by retrofitting out-of-date facilities, detecting declined efficiency equipments, replacing malfunctioned components and updating incorrect operating sequences, and optimizing the system control sequences. Old buildings with no advanced equipment and control strategies definitely have energy savings potential. For example, one CC ♦ effort successfully saved \$9,932/yr for a 34,173 square feet school building by converting a constant air handler to variable air volume, adding economizers, dampers and actuators, and replacing three-way valves with two-way valves. The utility cost was reduced for a 123,000 ft² laboratory-office building up to \$369,000/yr by simply detecting and fixing a leaking pneumatic line on the cooling coil control valves and implementing a supply air temperature reset schedule.

It is generally believed that a well-designed new building with state-of-the-art technologies has little or no potential of reducing energy by retrofit or commissioning. It has been demonstrated, through the CC ♦ process, the potential energy savings and performance improvement is great, even in buildings with the state-of-the-art technologies.