

Fitchburg Update

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Making Good Buildings Even Better

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Everyone can tell that the City of Fitchburg has some impressive municipal buildings. The City Hall, Community Center and Library, as part of the City's municipal campus, were all built to last and the City keeps these buildings well maintained. However, even the best maintained buildings can have mechanical systems and controls issues that are not readily apparent resulting in wasted energy.

“Hidden issues” that can cause lower energy efficiency, are present in most buildings that have lighting systems, heating, ventilation and air conditioning (HVAC) equipment and building automation systems (BAS). As a result, many larger buildings can benefit from having their HVAC, BAS and lighting systems reviewed through a process called retro-commissioning (RCx). RCx was developed to find the deeper issues that go beyond what is covered in a typical energy audit.

RCx is a process where mechanical engineers work with building maintenance staff to review how much energy the building systems are using and then investigate how a building's mechanical systems are actually operating versus how they are supposed to operate. The RCx process not only looks at energy efficiency but also seeks to improve occupant comfort and enhance indoor air quality (IAQ).

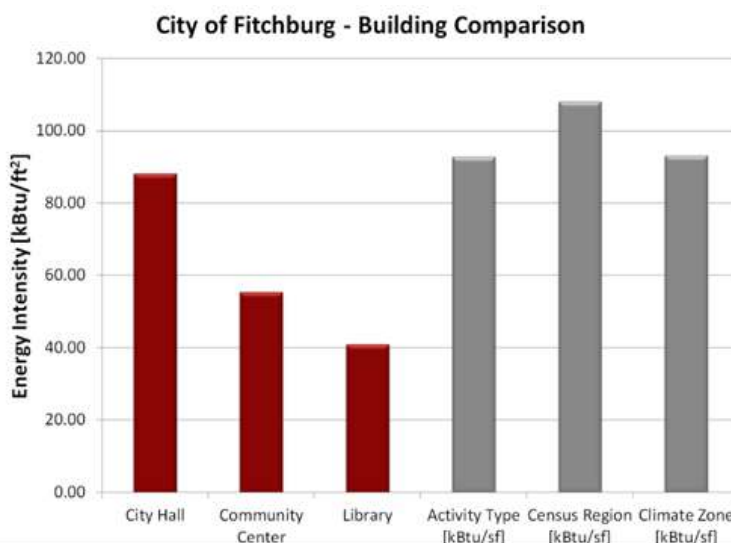
The Madison, WI office of SCS Engineers conducted RCx for the City of Fitchburg from April through August 2013 at three different municipal buildings, listed below:

City Hall - Built in 1999 (56,300 sq. ft)

Community Center - Built in 1988, with a major addition in 2012 (20,200 sq. ft)

Library - Built in 2010 as a LEED Gold building (56,400 sq. ft)

The energy use intensity (EUI) of the three buildings, before the RCx investigation, were all better than average with the highest EUI being for the City Hall building. The EUI metric normalizes energy consumption by building area, so that building energy consumptions can be compared; the higher the EUI, the more energy used per sq. ft. of building area during a year. The City Hall building had an EUI of 88,000 BTU/sq. ft. When compared to similar buildings, it is better than other buildings of a similar type, census region and climate zone (see comparisons in the chart at right). The Community Center had a lower EUI of 55,000 BTU/sq. ft, and the Library was even better, with an EUI of 41,000 BTU/sq. ft. The Library's low EUI is thanks to its geothermal heating and cooling system.



The RCx process involves many technical steps to thoroughly check out how a building's various HVAC, BAS and lighting systems are operating. The result of an RCx investigation is to make improvements to enhance occupant comfort, energy efficiency and IAQ. Some of the RCx steps include:

Energy Data - Obtain energy usage data for pre-RCx benchmarking.

Interviews - Interview staff who work in the building to find out comfort issues.

Trending - Collect and evaluate data (e.g., temperature, humidity and CO2).

Testing - Examine mechanical systems, sensors, controls, dampers, valves, terminal units, etc.

Recommendations - Create a list of facility improvement measures.

Implementation - Act on the recommendations to improve comfort, energy efficiency and IAQ.

Fitchburg's RCx evaluation resulted in 32 recommendations to improve energy efficiency in the City Hall, Community Center and Library buildings. The following is a summary of the energy saving projections from the 32 RCx energy saving recommendations (not including any improvements in comfort and indoor air quality):

City Hall: \$5,900/year (est. implementation cost of \$7,400)

Community Center: \$6,010/year (est. implementation cost of \$35,100)

Library: \$10,750/year (est. implementation cost of \$5,900)

TOTAL: \$22,660/year (est. implementation cost of \$48,400)

In summary, through methodical testing and analysis of a building's HVAC, BAS and lighting systems, RCx can result in making good, well-operated buildings perform even better. This is true for the three different City of Fitchburg buildings, which after implementation can look forward to being even more efficient. If you'd like more details regarding the specific recommendations and other aspects of the RCx project, please visit: www.fitchburgwi.gov/RCC.