

EXECUTIVE SUMMARY

Felix Hotel is a twelve story hotel with a total square footage of 85,700SF located in the heart of downtown Chicago. A total of 225 guest rooms are located from floors two through twelve with office, conference, fitness center, and a bar located in the first two floors to be used as a conference area.

There was a recent renovation in 2009 with sustainability and energy efficiency in mind to become the first LEED Silver certified Hotel. Thus, the mechanical system was designed very well to comply with many of the ASHRAE standards 62.1-2007 and 90.1-2007. An adequate quantity of outside air is introduced into the space while individual heat pump provides guests with personal control over their thermostat.

In previous technical assignments, the overall construction of the building, energy consumption and annual building utility costs, and existing mechanical equipment were investigated and analyzed. With that data, several other available mechanical systems were looked at to see if additional energy savings could be achieved. The goal of this report is to lower the annual utility cost and lower the carbon footprint of the building. Greywater Heat Recovery and Combined Heat and Power have been analyzed as alternative systems.

Greywater heat recovery system uses the waste heat that would otherwise be thrown out into the sanitary sewer to preheat cold water entering the boiler. The installation of nine greywater heat recovery system provided an energy savings of 6,177 therms per year. After considering labor of installing additional copper pipes and the heat exchangers itself, the payback period was a reasonable 6.5 years.

A micro turbine was picked as the prime mover for a combined heat and power system. Trane TRACE was mainly used to calculate the daily energy load in order to size a 30kW micro turbine that would run near max capacity all the time. The electricity load profile was never met but it would have the ability to save all thermal loads in the summer time. The payback period was 9.44 years.

Overall, the greywater heating system showed the great energy cost savings and was recommended for installation for Hotel Felix.