Facility Energy Review
February, 2018

David Villines
Johnson Controls, Inc.
9850 Legler Rd.
Lenexa, KS. 66219
david.villines@jci.com
DICKINSON COUNTY KS FACILITY REVIEW

Johnson Controls Inc. (JCI) has conducted a brief facility walkthrough to gain a "very high level" overview of the current needs within the approximately 40,000 sq. ft. 60+ year old Courthouse/Jail Facility. Please Note, the staff has done a fantastic job of maintaining the facilities and equipment, but as you know all of their great effort cannot overcome aging infrastructure. The following are some of the cost saving opportunities that were identified.

Cost Saving Opportunities

LIGHTING - The lighting throughout the facilities has a mixture of T-12 and T-8 fluorescent fixtures with a few incandescent lamps. There are many exterior wall packs and parking lot lighting that are dated. LED lighting has become the new standard for both interior and exterior fixtures. Along with the current lighting being extremely energy inefficient, the existing lighting for the most part will not meet current lumen recommendations for an office environment. Halls and stairwells are likewise under illuminated creating the possibility for an unsafe environment under certain conditions. There are significant electrical and operational saving opportunities with this improvement measure and JCI's designated grant team will investigate any grants, rebates or alternative funding that may be available for this improvement.

WEATHERIZATION – Throughout the facility you will find many areas of heat loss/heat gain throughout the building envelope. These are generally door and window seals, pipe penetrations, cracks, tuck-pointing, etcetera that at first glance, and individually seem insignificant. But in reality when added cumulatively make a significant impact on comfort and energy consumption. These can also be major contributing factors in regard to pest management and moisture penetration/damage.

Gap's in weather stripping (daylight) in both main entry doorways. Seals and Sweeps.
**ROOF** — The Courthouse has a TPO (membrane) roof that is approximately 10 years old. This roof appears to be in good condition. Roofs, as with any other County asset, require routine annual inspections and maintenance. The roof needs to be cleared of any debris annually to prevent ponding of water and/or holes being rubbed or punched in the roofing membrane. (These conditions can also void any membrane warranty) There are areas around flashings and penetrations that need to be inspected and maintained before a problem should arise which will allow moisture to accumulate under the membrane causing damage the structural roof deck.

**HVAC CONTROL SYSTEMS** — The existing HVAC control system throughout the facilities is virtually non-existent. Some areas are not operating at all and there is no energy management system. We would recommend an upgraded common control system with energy monitoring capabilities. Controlling and setting of temperatures and run times could be maintained via secure site on the web thus saving energy and maintenance cost.
HVAC - Primary Space Heat: 2MBTU Dunkirk Sectional Hot Water Boiler. This boiler is old (original?) technology with inefficient atmospheric burners. The controls, pumps and everything associated with the boiler system are well past their life expectancy. New boilers today can be up to 50%+ more energy efficient. The Hot Water is distributed through a 2 pipe system. Primary Space Cooling: Is from an old self-contained 80 Ton Heatcraft Chiller. This is the primary comfort system for the Courthouse areas and uses radiators and fan coil units to distribute the air. In regards to this system the 2 pipe water system is original and shows signs of leakage and deterioration in several areas. There have been numerous problems with the boiler and it is being limped along due to its age. The repair parts are becoming increasingly harder to find. There is the same basic issue with the Chiller. The Chiller is currently operating at half capacity with one compressor out. The antiquated 2 Pipe system also requires that the building be manually switched from heating to cooling season to season which inevitably leads to major comfort issues in both spring and fall. The fan coils their selves are failing along with the pumps and entire water distribution system. There were at one time 4 separate zone temperature controls. Those have been eliminated and the entire heating system is simply either on or off causing major comfort issues throughout the building. It would be my recommendation to look at alternative building wide HVAC re-design to either a 4 pipe system or eliminate this type of system altogether. The new VRF Systems may be a viable and efficient alternative here.
There are numerous other Split Systems, Roof Top Units and Mini-Splits scattered throughout the building as auxiliary systems. Some of these units are also dated and in need of commissioning, repair or replacement.

Various Split Systems

“Newer” RTU’s over Jail area  Mini-Splits added for additional cooling

DOMESTIC HOT WATER: There are great energy saving opportunities in regards to the Domestic Hot Water system as well. The existing systems are base efficiency, aging and nearing the end of their useful life.
**WINDOWS** – The windows are Single Pane Aluminum frame units that are original to the building. These windows are extremely inefficient, drafty and in need of replacement. Although when looking at energy savings alone, windows do not have the best ROI. But when combining energy savings with comfort, safety, moisture penetration, and aesthetics there are more than enough reasons to replace these window units. Also the installation of efficient windows will result in a reduced load for the redesigned heating and cooling systems; thus saving money on the new equipment. Both S and W glass entry ways are in need of upgrades as well. New Impact/Intruder resistant glass or film could/should be used on all ground floor windows and entries.
ELECTRICAL – There are (2) electrical systems into the building. One 1000 Amp service (Trumbull) is original and one 800 Amp service (Siemens) appears to have been added with jail addition. The original system is comprised of Main Switchgear and Breaker Panels manufactured by Trumbull. Parts for these systems (breakers and switchgear) are no longer available other than remanufactured parts that may be found somewhere online. If in the event there was a catastrophic failure in the switchgear it is quite conceivable it could be weeks before a new system (new switchgear) could be ordered, built and adapted into place. Again no spare parts would be available for the existing system.

JAIL – I did not go in to any of the cell areas in the detention section. I did go into the entry and peaked into some areas. Talking with staff there are numerous issues from mechanical, plumbing, cell doors, overcrowding, safe access (inmates have to be transported through areas that are common to citizens and employees). “Renovating” an occupied space such as this will not only be extremely expensive due to its nature but could also lead to significant safety concerns for the public and occupants of the facility. My “suggestion” would be to use the old jail until a new one is constructed somewhere in close proximity.
OTHER- Another area of notice was the Fire/Security/IT/Public Address/Phone/Dispatch Systems. They appear to be dated and possibly insufficient in some areas. There are many solutions available but there are also options available that have significant cost, operational and even energy savings. JCI has a dedicated Building Wide Systems Integration (BWSI) design team that looks at all of these items as an integrated unit to provide the most safe, efficient, cost effective and many times self-funding solutions for this critical environment.

OTHER- Entryways into the courthouse from the south and from the west are single pane glass and aluminum frame with little obstruction. I would recommend at some point adding "decorative" safety bollards to help deter any possible vehicle access.

OTHER — Elevator which is only source of ADA access, is dated and parts are hard to find. My understanding it malfunctions on a regular basis. This can lead to compliant and ADA/OCR violations.
SUMMARY

The facility for the most part is 60+ years old. A majority of the mechanical systems are the same age. Average useful life of a Boiler or Chiller is 30 years. The average useful life of the associated piping is 50 years if well maintained and treated and the Air Handlers are 20 years. Electrical Systems 40 years, Windows 30 years, Elevators 20 years, Lighting 15 years and so on. Deferred maintenance and facility upgrades have unfortunately caught up with Dickinson County. Structurally the facility seems to be very sound and solid. With the proper upgrades and refresh it can be modernized and a very useful facility for the next generation.

The utility spend for last year was just under $80K. Total square footage is approximately 40K sq ft. That is a utility cost of around $2/sq ft. The jail area certainly plays into this high cost but even so, similar renovated buildings operate closer to $1/sq ft. So knowing this we obviously see significant room for improvement and cost reduction. This does not take into account the additional annual operational dollars that are being spent to repair and maintain these outdated systems.

Those “lost” excess utility/operational dollars that are already in your budget and being sent to the utility companies and spent on repairs can be used to leverage existing capital budgeted for renovation. IE: get up to two dollars of work accomplished for every dollar of new capital invested in the project.