

# SEDAC CASE STUDY



## Rolling Meadows 3rd District Courthouse RCx



Photo credit: kmaschke

Cook County 3rd District Courthouse, Rolling Meadows

COOK COUNTY 3 <sup>RD</sup> DISTRICT COURTHOUSE	
Client:	Cook County
Energy Measures Implemented:	<ul style="list-style-type: none"><li>De-lamp light fixtures</li><li>Install radiant heat control timers to parking garage</li><li>Modify exhaust fan schedule</li><li>Adjust air handling unit schedule</li><li>Incorporate static pressure control of variable frequency drives</li></ul>
Project Cost:	\$20,645
Estimated Annual Energy Savings:	723,000 kWh
Estimated Annual Cost Savings:	\$40,900
Pay Back Period:	6 months
Building Size:	327,597 sf

### PROJECT SUMMARY

High energy costs, inefficient cooling and heating, and less than optimal lighting are a few concerns that motivated Rolling Meadows 3rd District Courthouse to contact the Smart Energy Design Assistance Center (SEDAC), a step that initiated a successful retro-commissioning project.

Rolling Meadows 3rd District Courthouse was built in 1987. The Courthouse is a large building, encompassing almost 328,000 square feet. With an HVAC system that was not operating optimally and an ineffective lighting system, the Courthouse was an ideal candidate for the Department of Commerce and Economic Opportunity (DCEO) Illinois Energy Now Program Public Sector Retro-Commissioning Program, which is managed by the Smart Energy Design Assistance Center.

Retro-commissioning (RCx) is a process of fine tuning a building's existing systems to better meet its current uses. SEDAC worked with Courthouse staff to identify low-cost measures that would significantly reduce energy consumption. In addition, SEDAC provided guidance throughout the process of implementing the measures. Sieben Energy Associates, an approved SEDAC retro-commissioning provider, performed the analysis, as well as measurement and verification after the project was completed.

### IMPLEMENTED MEASURES

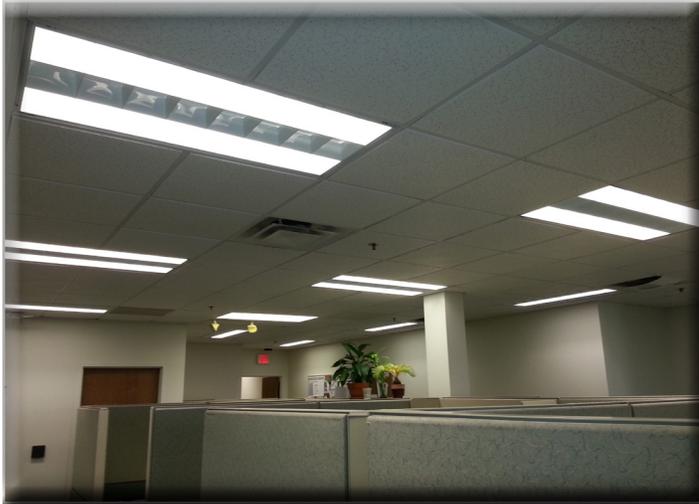
The Rolling Meadows Courthouse completed five low-cost energy saving measures that were identified in the report. The implemented measures include lighting improvements, but the primary focus was optimizing the building HVAC systems.

*Cook County is projected to **save more than \$40,000 annually** in electricity costs as a result of implementing five low-cost to no-cost energy efficiency measures identified in the SEDAC RCx study.*

### ADJUST LIGHTING

The Courthouse has approximately 1,400 lighting fixtures, each of which contains six lamps. This configuration produces more light than necessary for a building of this type.<sup>1</sup> An ensuing measure recommends de-lamping, or removal of a number of lamps from each fixture. For the Courthouse, reducing the number of lamps in each fixture from six to four yields estimated annual savings of 82,469 kWh, or \$5,400. At the time of verification, implementation was only 25% complete, so the maximum savings have not yet been achieved.

<sup>1</sup> Lighting power density should not exceed 1.9 watts per square foot in courtrooms. ANSI/ASHRAE/IESNA Standard 90.1-2007



*De-lamping from 6 to 4 lamps*

### **INSTALL CONTROL TIMERS ON RADIANT HEATERS IN PARKING GARAGE**

The parking garage had twenty-two electric radiant heaters that operated constantly during winter. These heaters provided much more heat than the space required. SEDAC recommended permanent disconnection of ten heaters. On the remaining twelve electric radiant heaters, push button timers were installed. The timer allows a unit to run for two minutes when activated by occupants. Implementing this measure resulted in an estimated annual energy savings of 204,140 kWh and cost savings of \$10,500 per year.

### **ALTER EXHAUST FAN SCHEDULE**

The Courthouse's building automation system (BAS) offers the capability to start and stop exhaust fans, but this feature must be enabled. Instead, fan settings had been programmed for manual control and set for continuous operation. The recommendation to switch the fan exhaust setting to automatic, and to incorporate a start/stop schedule into the BAS was implemented. This measure resulted in estimated energy savings of 19,541 kWh each year and annual cost savings of over \$1,000.

### **SCHEDULE AIR HANDLING UNITS**

Analysis revealed that some Courthouse air handling units (AHUs), equipment that produces and circulates conditioned air, were operating continuously. In addition, temperatures were controlled manually so there was little consistency between the units. This energy-saving measure recommended that AHUs be turned on/off automatically to prevent unnecessarily heating or cooling of the building when unoccupied. The energy savings from this measure are estimated at 190,318 kWh each year, yielding annual cost savings of \$9,800.

### **INCORPORATE STATIC PRESSURE CONTROL OF THE VARIABLE FREQUENCY DRIVES**

Before participating in this RCx Study, the variable frequency drives (VFDs) on all Courthouse AHUs were replaced with newer models. The static pressure control function was not activated, however. Consequently, the fans ran at full speed and thus, extra energy was being used to unnecessarily over-pressurize air ducts. Adjustments to the BAS were made and these changes allowed the VFDs to operate at more efficient levels, control the fan speeds, and eliminate over-pressurization of air ducts. These modifications yield an additional annual energy savings of 226,069 kWh, and annual cost savings of \$14,200.



### **SAVINGS TO DATE**

Implementing these five measures generated significant energy and cost savings. The projected energy savings total 722,537 kWh per year and over \$40,000 annually in cost savings.

### **ADDITIONAL MEASURES**

Two additional measures were identified, but have not been implemented. One measure repairs the electric baseboard heaters that continue to operate after the BAS has signaled shut down. The second adjusts the cleaning crew's schedule so that lights can be turned off earlier. Implementation of these measures is expected to yield additional energy savings of 415,564 kWh and cost savings of \$30,607 annually.

### **BOTTOM LINE**

Once all recommendations are implemented, the building is expected to reduce its annual energy use by 13.5%, which will save the Rolling Meadows 3rd District Courthouse \$71,500 each year.

#### **WHO WE ARE**

The Illinois Energy Now Program offers free retro-commissioning consultation services for public sector facilities in Illinois. These services, delivered by SEDAC and its team of private sector RCx service providers, offer guidance and analysis to improve the energy performance of your building. SEDAC is managed by the University of Illinois-Champaign, in partnership with 360 Energy Group, LLC.

**For more information about the SEDAC RCx Program, please visit [www.sedac.org](http://www.sedac.org).**

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