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Modernizing Historic Buildings

Historic renovations can be daunting – and costly. But officials in Elmore County found a solution that brings the historic courthouse into the 21st century and helps offset costs with energy savings from a large, municipality-wide capital reinvestment project.

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Modernizing Historic Buildings Presents Challenges — and Opportunities

Officials in Elmore County, Alabama felt like victims of history. For years, they had been struggling to address a growing list of deferred maintenance issues compounded by a local landmark, the ornate and historic courthouse. Although the pride of the community, the older structure suffered from drafty windows, an outdated HVAC system, antique lighting and minimal information technology infrastructure. Officials knew renovating historic buildings could be difficult and costly, but they were committed to modernizing all their municipal facilities, while protecting the architectural appeal of the courthouse.

How could they do both?

The answer came when Schneider Electric, an expert in modernizing historic buildings, partnered with the county on an energy savings performance contract that will transform many of the county's critical buildings with modern energy conservation technologies — and reduce annual utility budgets by 38 percent, a savings of more than $4.4 million over the life of the project. Those savings are being reinvested in renovating Elmore's facilities, allowing the county to give the stately courthouse the energy efficiency makeover it deserves.

"Our partnership with Schneider Electric will allow Elmore Country to address key facility issues that had been on our deferred maintenance list for many years," said Richie Beyer, county engineer. "In the end it's a win for citizens and the county commission because they don't have to come up with additional revenue to make these improvements."

But while Elmore County looks to the future, many other entities with historic building stock find themselves stuck in the past. Though they're a community asset, historic buildings are also a drain on resources due to outdated equipment and decades-old construction practices that rarely meet modern building codes.

Often, municipal staffs simply don't have the expertise needed to modernize these facilities, while maintaining their historic nature. As a result, deferred maintenance issues mount to the point that some simply get shut down — or torn down — rather than renovated properly.

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Project Overview

Elmore County Commission had been struggling to address a growing list of deferred maintenance issues in its facilities including outdated HVAC systems, poor lighting and drafty windows.

Solutions highlights:
- Advanced LED lighting reduces energy consumption and improves safety and security
- County-wide building automation system provides centralized control and reduces energy use
- Major mechanical renovations replace failing equipment and improve occupant comfort
- Comprehensive water fixture replacement reduces consumption
- Building envelope improvements boost occupant comfort

Results:
The project will transform many of the county's critical buildings with modern energy conservation technologies that will reduce its annual utility budget by 38 percent, saving more than $4.4 million in energy costs over the life of the project.

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Three Reasons Historic Buildings Are Difficult to Address

As valuable as it is, historic building stock represents a particular challenge that many municipalities aren't prepared to address. Here are three reasons why:

1.

Maintenance costs mount more quickly for historic buildings.

A $10 million building requires a $40 million budget to pay for the cost of maintenance and utilities over its lifecycle. Those costs rise significantly as buildings reach historic status — and the older buildings get, the worse problems become.

That dynamic is compounding as many municipalities face mounting infrastructure needs that far surpass existing budgets. Buildings are starved of necessary maintenance, which in turn makes them much more costly to operate, and ultimately may lead to their demise.

2.

Old buildings are rarely energy efficient (or up to modern building codes).

Historic buildings often compound budget shortfalls because of their outdated infrastructure. Antique lighting, single pane windows and a lack of modern HVAC systems lead to unnecessarily high utility bills, which further strain operating budgets.

Building codes change to adapt to new technology and reflect the best safety information of the day, leaving many historic buildings out of date and not up to code within years of their dedication. At the Elmore County courthouse, open-flame natural gas heaters warmed common areas. But modern builders know that this technology (although once cutting-edge) presents fire and health hazards if collecting dust ignites or CO_2 is released into unventilated areas.

3.

Modernizing historic buildings and aging infrastructure can be cost prohibitive.

The modernization process is similar regardless of how old a building might be. But historic buildings often involve a different set of decision makers in the planning process including government officials, historical societies, concerned citizens and even national preservationists. Additionally, historic buildings often have significant infrastructure issues, which make modernization projects complex — and costly.

Improvements must balance the demands of building codes, functionality, efficiency and architectural aesthetics. Those variables can create a lot of competing priorities and confusion about the best way forward.

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Real-world Examples of Modernizing Historic Buildings

The historic City Hall in Holland, MI as it looked when it was dedicated in 1911.

Historic buildings such as city halls and county courthouses are community landmarks. For citizens, they represent nostalgic touchstones. For visitors — and potential new citizens — they serve as a calling card to the community's character. In Elmore County, the courthouse was featured in Hollywood films and preserving its architectural appeal was the top concern.

"These buildings mean something to the community. There's history and memories associated with them," says Todd Smith, Schneider Electric senior account manager. "Our approach to historic renovation is to be very cognizant of how the building is used by the community and to balance modernization with the aesthetic appeal that means so much to local residents."

"Details are everything when it comes to protecting the curb appeal of a historic building," says Chris Smith, Schneider Electric construction manager. "There are always going to be surprises in renovating an older building, so we have to be flexible and prepared to adjust our plan along the way."

"In the end, it's a **win for citizens** and the commission because they don't have to come up with additional revenue to make these improvements, and the employees that occupy these buildings and spaces should see **better working conditions** in addition to the public that interacts there everyday."

- Richie Beyer,
  Elmore County Engineer

Working with the Historical Society

Historic buildings sometimes carry the special designation of being listed on the National Register of Historic Places, but that doesn't mean that they can't also be modern and energy efficiency facilities. In Holland, MI, Schneider Electric's engineering team worked closely with the local Historical Society to create a comprehensive plan to update Holland City Hall while maintaining the historic grandeur of the building.

Window retrofits were an important aspect of the efficiency plan and a highly visible architectural element. The Historical Society provided archive photos to help the team design a historically accurate solution. The color, trim, weatherproofing, tint and mullions were all carefully considered before fabricating the custom window solution. These efforts will restore the historic character of the front façade, which lost its original windows in an earlier renovation, thus improving the overall aesthetic of the building.

Through a partnership with Schneider Electric, Holland will complete a comprehensive energy efficiency project expected to generate over $2.9 million in savings and modernize the historic City Hall at the same time.

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But protecting that curb appeal isn't always easy. For example, it can be difficult to replace equipment in the space allowed when removing old equipment because modern equipment can be so different. And in some cases, replacement isn't an option.

Still, solutions can be found that maintain the integrity of historic buildings while fitting them with 21st-century efficiencies. Here are four examples of how Schneider Electric accomplished this feat at Elmore County's historic courthouse:

HVAC systems

An older building may not have been built with an HVAC system, so adding one can be a challenge from both an engineering and aesthetics standpoint. It's vitally important to protect the integrity of historic buildings. So when it came to addressing a building without a centralized HVAC system, Schneider Electric removed the air conditioning window units and replaced them with a whole-building variable refrigerant flow (VRF) system that was placed on the roof. That way, the system can't be seen from the road and the building maintains its historic integrity.

Results: The VRF system dramatically improved occupant comfort because each room could now control temperature independently. In addition, the new system brought the building up to modern codes, which requires bringing in outdoor air, thereby improving indoor air quality. New duct work was hidden inside custom soffit solutions to minimize visibility and preserve the historic character.

Windows

Some things just can't be replaced on historic buildings, such as windows. Specifically, Elmore officials wanted to preserve the existing window frames and glass. But, as with so many historic buildings, these old, drafty windows also reduced energy efficiency. So Schneider Electric teams got creative.

Results: Magnetic acrylic window inserts and solar film were installed to make the historic windows as efficient as possible. In addition, the newly installed VRF HVAC system allowed the Schneider Electric team to remove bulky window air conditioning units. The building has regained its historic integrity and received an energy efficiency upgrade that helped significantly reduce annual utility costs.

Lighting

The community was particularly attached to its grand chandeliers. But these once shining stars had succumbed to age. They were breaking and their retrofitted compact fluorescent lights (CFL) weren't a good solution. Schneider Electric solved both problems with an LED retrofit that brought these beauties back to life.

Results: A hallmark of the county was given new life and the retrofit substantially reduced annual energy costs. Maintenance on these delicate lights is also dramatically reduced, since LED bulbs last much longer than CFLs. Additionally, the color temperature of the LEDs and their size are more in keeping with the original chandelier's character than the CFLs, further protecting the building's historic character.

Building Controls

Older buildings often aren't easily retrofitted for modern solutions. Such systems typically require extensive cable and wiring in situations where space doesn't allow it. Schneider Electric mapped the full plan for the building controls, then found aesthetically appealing solutions to blend new and old infrastructure together.

Results: The project will create centralized automation and HVAC control throughout, along with a system of networked thermostats. Using this centralized system, teams can quickly troubleshoot most HVAC issues and resolve them as they arise to better preserve occupant comfort. The system also includes new power meters, which provide real time data for key facility consumption points. These meters will help determine where the facility is using the most power and assist in trouble shooting power reliability issues.

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The Long-term Benefits of Modernization

Letting historic buildings molder doesn't just waste energy, it also wastes opportunity. That's because municipal buildings play an important role in a city's infrastructure. As such, they need to be functional spaces to perform work, welcome visitors and run the municipality. They also serve as the "face" of the community since they're often the first thing people see during interactions with municipal government.

It's no wonder that U.S. mayors believe they're judged by constituents on the quality of local infrastructure, suggesting infrastructure is as much of a political issue as an economic and quality of life concern. In fact, U.S. mayors cited facilities and city buildings as a top five priority in the 2015 Menino Survey of Mayors.

Elmore County is a great example of the benefits these types of modernizations can bring to municipalities — and how the costs can be offset through the energy savings they yield. The partnership with Schneider Electric will bring energy efficiency measures to five buildings across the county: the historic courthouse, judicial center, jail, highway department and extension office.

The buildings will offer increased functionality and comfort to those who visit and work there thanks to better indoor air quality and improved lighting both indoors and out. The project will also transform many of the county's critical buildings with modern technologies and energy conservation measures.

In addition to dramatically improving the energy efficiency of Elmore's facilities, the project will have a substantial environmental impact, removing 15,525 metric tons of CO_2 from the atmosphere, the equivalent to removing 3,279 cars from the road or planting 14,696 acres of trees.

"It can be expensive to modernize historic buildings and aging infrastructure," says Todd Smith. "But implementing energy efficiency improvements at multiple facilities creates a unique opportunity for municipalities to leverage energy savings to help cover the costs. In many cases, utility and operational savings mean modernization of historic buildings can be achieved without raising taxes or fees on local residents."

In the end, no one can put a price on the value of preserving historic buildings. But the best part of this story may be the fact that Elmore County didn't have to. Through a partnership with Schneider Electric, county officials tackled a large, municipality-wide capital reinvestment project ultimately saving energy costs and preserving the rich history of the historic courthouse at the same time.

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Elmore County's commitment to modernizing facilities has an environmental impact equivalent to:

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Meet the Operational Demands of Today While Making Advances for Tomorrow

Providing an excellent quality of life for your citizens is your main focus. Your vision is to create a safe, comfortable environment that drives economic success and community engagement. You know that modern infrastructure and technology help promote community growth and attract new businesses and residents. But the cost of success is increasing along with your operating costs. At every turn, you are competing for the funding you need to support your strategic goals.

A solution is here

Schneider Electric can help you prepare your community for the future with innovative solutions and creative funding leveraged through a comprehensive capital recovery and reinvestment program. Our experts will help you reinvest in your city or county, in order to strengthen your municipality's brand, modernize facilities and technology, generate revenue, engage citizens, and ultimately drive your community further.

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