



apogee**renovation**
enhancing looks | improving value | saving energy

Energy-saving retrofit
with interior accessory windows

195 CHURCH

New Haven, Connecticut





Connecticut's 195 CHURCH offices' window retrofit increases energy efficiency, occupant comfort and savings

Located on the New Haven Green, 195 CHURCH has completed a \$6 million energy-efficient window and lighting retrofit. Implementing recommendations from Globelé Energy and Apogee Renovation, the property's tenants have more comfortable workspaces, and the building owner, 195 Church Street Associates, LLC, also has gained both occupants and annual energy savings. The project earned an estimated \$589,000 rebate from utility provider United Illuminating through the EnergizeCT initiative.

"There has not been a capital improvement of this magnitude to a building in New Haven in many years," observed Christopher

Vigilante, chief operating officer of Northside Development Co., the property management company for 195 CHURCH where Northside Development Company also is a tenant. Currently, the 244,000 square foot, 18-story, Class A office building is 75% occupied with 28 tenants and 340 occupants.

Data

- **Employees/occupants:** 340
- **Occupancy:** 75%
- **Square Footage:** 244,000
- **Floors:** 18
- **Construction year:** 1974
- **Renovation year:** 2018



Improving on history for a better future

Built in 1974 and largely constructed of concrete, 195 CHURCH reflected the materials and style of the era. The original windows remain functional, but were manufactured at a time before low-e insulated glass and improved thermal breaks in the aluminum framing were available.

In addition to the aging windows, the property's all-electric baseboard heating and variable-air-volume system with electric reheat contributed to large utility bills. Seeking to improve the building's energy efficiency, Northside worked with Globelé Energy, LLC, to review the property per the U.S. Department of Energy's benchmarking program and by performing a Level 1 ASHRAE energy audit.

As a regional electric distribution company, United Illuminating (UI) provides energy efficiency programs through the EnergizeCT initiative. This initiative is designed to advance the efficient use of energy, reduce air pollution and negative environmental impacts, and promote economic development and energy security.

"UI's energy engineer Gary Pattavina was instrumental in guiding us through the plan and offered very helpful advice and guidance through a very intricate process," said Vigilante. "The goal was to make this building as efficient as possible thus doing the right thing for the environment and also producing a very good return on our investment."

Pattavina noted, "Electrically heated buildings are a great candidate for energy efficiency measures and these types of projects are exactly what we look for at UI. We recognize new energy-efficient windows are a costly investment and the incentives available to our customers help bring that up front cost down significantly. We were very excited to work with the customer and their design team to help them achieve the energy savings on this window replacement project."

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Gary Pattavina, United Illuminating's energy engineer

Modeled for savings

To achieve the owner's energy reduction goals, Globelé outlined a multi-phased plan. Phase I recommended replacing the old fluorescent lights with new LEDs and updating the 43-year-old windows. Helping Northside's team select the optimal window system, Apogee Renovation provided an annual energy savings forecast showing the potential savings offered with Wausau Window and Wall Systems' 1297 Series S.E.A.L. interior accessory windows.

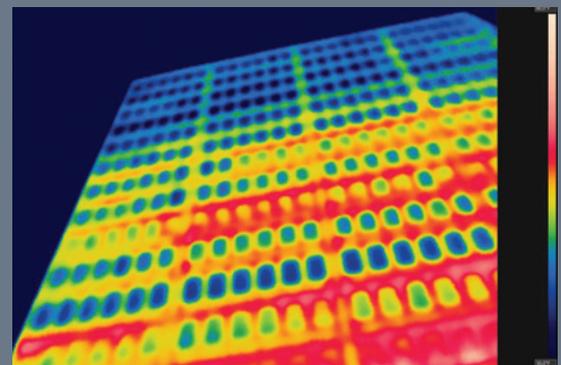
Interior accessory windows were installed from the building's interior over the existing windows, which were sealed closed to prevent air infiltration. For 195 CHURCH, Wausau's S.E.A.L. units featured Viracon's RoomSide™ low-e glass and aluminum framing members finished by Linetec in Dark Bronze anodize.

Using the eQUEST energy modeling physics-based software tool to simulate the performance of a building on an annual basis, Apogee Renovation forecasted the level of energy savings that could be achieved by adding an interior accessory window with low-e glass to the existing glazing. From this data, performance predictions were provided on annual energy, peak demand and daylight energy use.

After a full year of occupancy, Apogee Renovation's energy team leader, Mike Sheppy, PE, CEM, reviewed actual use and savings. Sheppy explained, "Our analysis of the raw energy data showed a 15.7% measured whole-building savings when adjusted for colder than predicted winter weather and increased occupancy."

"Today's energy-efficient windows can dramatically lower the heating and cooling costs associated with windows, while increasing occupant comfort," said Sheppy. "Optimizing natural light also can contribute to a building's energy efficiency and tenants' wellbeing."

The original windows, installed in 1974, remain functional, but were manufactured at a time before low-e insulated glass and improved thermal breaks in the aluminum framing were available.



Thermal imaging of the north façade shows the building with a temperature scale of 30 to 50 Fahrenheit. Cooler temperatures are shown in blue, while warmer temperatures are shown in red. From the blue on floors 4, 8, 9 and 14-18, it is apparent that these floors have completed their window retrofit. The new units offer improved thermal performance, which contribute to energy savings and occupants' comfort.



Increased daylighting and comfort

Viracon's RoomSide low-e glass also improves light-to-solar gain (LSG) ratio by 21%. Sheppy elaborated, "This improved LSG ratio increases the number of hours in the year that natural daylighting can be used without tenants having to draw their blinds. In addition, electrical lighting can be dimmed or turned off with daylighting controls."

He continued, "Furthermore, according to the World Green Building Council, natural daylighting can save up to \$2,000 per employee in office costs by increasing occupant comfort, leading to higher productivity. Adding an interior accessory window with low-e glass to the existing glazing significantly improves occupant comfort because surface temperatures are much closer to room temperature."

In Connecticut's cold months, Sheppy said, "The new glazing keeps the occupants seated in the perimeter spaces of this building more comfortable by significantly reducing radiant heat transfer. These improvements allow occupants to sit closer to the windows, increasing the usable floor space of the building."

Comparing the window bays before and after the retrofit, thermal imaging showed window surface temperature differences of nearly 20 degrees Fahrenheit. Sheppy

described, "The new windows stand out in sharp contrast against the old windows. This indicates that the new windows are keeping out the cold 34 degree Fahrenheit outside conditions, while keeping in the warm 72 degree Fahrenheit inside conditions."

Window of opportunity

Energy-efficiency upgrades and renovations on 195 CHURCH began in March 2017. Milestone Construction Services, LLC substantially completed the window retrofit by Sept. 2017. To minimize disruption to the tenants, Milestone waited for a more convenient time in early 2018 to complete the building retrofit on the last two floors.

Northside's Vigilante complimented the efforts, "Milestone did an incredible job on the installation. Of course, vacant offices are a piece of cake, but when you get into occupied offices, which need to be completed on nights and weekends, it's a completely different story. The efficiency of their crews was amazing."

"All offices that had windows in them had to have blinds removed, windows cleaned (existing and new), furniture moved, electronics disabled and reinstalled...oh and then you had to install the new insert windows and caulk them. Milestone took pictures of every office before anything was touched and they made sure it was put back perfectly. They did an amazing job

with no added stress in my life.” He added, “There were a lot of pieces to this puzzle and Milestone made this the easiest construction job that I have ever been involved with.”

Now completed, Milestone updated 1,400 window units totaling 42,336 square feet. More than 1,200 of these interior accessory windows units were 4 by 8 feet. The rest were narrow 1.5 by 8 feet, installed on the South elevation. Wausau also provided the field measurements to ensure the best possible fit.

“It’s a top-notch team at Wausau,” praised Vigilante. “From the sales department to the modeling department to the delivery of truckloads of windows – the process was nearly flawless. They build a great product and deserve a lot of recognition for their team’s products and processes.”

Making the goal

Vigilante also was quick to recognize Globelé’s important role, saying, “Elena Cahill and her staff guided me through the world of energy purchasing, as well as introducing me to the UI’s energy incentive programs. We are all proud of the fact that we were

one of the first approved buildings in the UI territory to be able to receive incentives for the installation of window inserts, something that would not have happened were it not for the team that Globelé brought to the project.”

Throughout the energy-efficiency updates, Northside collaborated with Kenneth Boroson Architects, LLC. “KBA is our architectural firm for the entire building,” noted Vigilante. “They designed the office fit-ups, lobby renovations, conference suite design, upcoming fitness center and lounge additions, etc. They are involved in almost every aspect of design for this building.”

Demonstrating the owner’s commitment to design, performance and comfort, Vigilante summarized, “From purchase in December of 2015, we have replaced the exterior sidewalks, remodeled the lobby, added a state-of-the-art 4th Floor Conference Suite, installed 9,000 LED lamps, installed 1,400 new energy-efficient window inserts and have re-positioned the building in the market adding new tech companies as tenants. ...We have added life and vibrancy to a landmark building in New Haven.”

195 CHURCH St.: New Haven, CT 06510

- **Owner:** 195 Church St. Associates, LLC; New Haven, Connecticut
- **Property management:** Northside Development Co.; New Haven, Connecticut; <http://northsidedct.com>
- **Architect – lobby and conference room renovations:** Kenneth Boroson Architects, LLC; New Haven, Connecticut; <https://www.kbarch.com>
- **Utility company:** United Illuminating Company; New Haven, Connecticut; EnergizeCT initiative, <https://www.energizect.com>
- **Energy consultant:** Globelé Energy, LLC; New Haven, Connecticut; <http://globeleenergy.com>
- **Window contractor:** Milestone Construction Services, Inc.; East Haven, Connecticut; <http://milestonecsllc.com>
- **Window renovation strategists:** Apogee Renovation, a façade improvement initiative of Apogee Enterprises, Inc.; Minneapolis; <https://www.apogeerenovation.com>
- **Window systems – manufacturer:** Wausau Window and Wall Systems, a company of Apogee Enterprises, Inc.; Wausau, Wisconsin; <http://www.wausauwindow.com>
- **Window systems – glass fabricator:** Viracon, Inc., a company of Apogee Enterprises, Inc.; Owatonna, Minnesota; <http://www.viracon.com>
- **Window systems – finisher:** Linetec, a company of Apogee Enterprises, Inc.; Wausau, Wisconsin; <http://www.linetec.com>
- **Photos by:** Woodruff/Brown Architectural Photography

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resources

architectural glass

Viracon | The leading North American fabricator of high-performance, custom-coated architectural glass for global markets

architectural framing systems

Alumicor | A Canadian-based supplier of architectural aluminum building envelope products

EFCO | A leading manufacturer of architectural aluminum window, curtainwall, storefront and entrance systems

Linetec | A leading architectural finishing company, offering high-performance paint and anodize finishes for aluminum

Sotawall | A full-service designer, manufacturer and installer of proprietary high-performance unitized curtainwall systems

Tubelite | A leader in eco-efficient aluminum storefront, curtainwall and entrance systems

Wausau Window and Wall Systems | A leading designer and manufacturer of energy-efficient, custom aluminum window and curtainwall systems

architectural services

Harmon | One of the largest U.S. full-service building glass and curtainwall installation companies

services

building survey

Determine conditions, perform thermographic inspection, recommend upgrades

energy modeling tool

Utility-grade, whole-building energy modeling

specification assistance

Review performance requirements

detail assistance

Architectural drawings of window and curtainwall products

budgeting

Provide installed options

network of installers

Recommend quality, authorized installers across North America

renderings

Visual representation of retrofit

INTERESTED IN LEARNING MORE?

Apogee Renovation provides high-performance glass, aluminum framing and window system solutions to optimize energy efficiency and enhance aesthetics of commercial properties.

With these solutions, building owners and developers can reduce energy costs, increase tenant satisfaction and improve overall value of their buildings.

To learn more, please contact Kevin Robbins, Director of Apogee Renovation, at krobbins@apog.com or 715-409-0821 or visit www.apogee renovation.com.



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