



Community Office for Resource Efficiency

CCY Architects

Local firm tackles building efficiency
with an all-electric rooftop heat pump

Project Date: 2022-2024

Published: March 14, 2025

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Executive Summary

Building efficiency remains a top priority as the Roaring Fork Valley region continues to move towards cleaner energy. With the assistance of the Community Office for Resource Efficiency (CORE), building owners can make the necessary efficiency upgrades to reduce their environmental impact. CCY Architects is an architecture firm based in Basalt, Colorado, that designs residential and commercial spaces with the goal of “connecting people to the natural environment and building community with an evocative design reflective of contemporary life.” The firm’s commitment to preservation and sustainability prompted it to reach out to CORE to explore energy-efficient solutions for its office building, including the installation of an all-electric rooftop heat pump. The partnership between CCY and CORE highlights the process of pairing cutting-edge technology with smart decision-making to reduce the environmental impact of a building built in 1999. While the process was not without hiccups, the firm achieved its goal by bringing in trusted partners and remaining adaptable. This approach helped pave the way for a greener future in both the local architecture industry and the broader Colorado community.



The Opportunity

As a part of ongoing renovations to CCY Architects' primary office in Basalt, Colorado, the decision to install an all-electric heat pump to replace its gas heating system stemmed from the desire to convert the building (built in 1999) to all-electric. CCY embarked on this journey because it aligns with the firm's values, broader sustainability goals, and ongoing commitment to reducing its carbon footprint and promoting energy efficiency. This move positions CCY to eventually operate on 100% renewable energy, aligning with the Roaring Fork Valley's transition toward a greener grid.

"Environmental stewardship and wellness are central to our practice; our firm has implemented a Sustainable Action Plan and is committed to the AIA 2030 Challenge," – Alex Klumb, Partner, CCY Architects

With this forward-thinking approach to heating and cooling, CCY is setting an example for the region, both with other building owners and its clients. The firm is embracing being in the messy middle. CCY is bringing in emerging technology to meet its sustainability goals and to have the ability to share its findings with its

clients. CCY wants to contribute to the dialogue, test parameters, and build confidence throughout the region.

The firm's project was completed in June 2024, and it is now in the 'living lab' phase, where it's testing, adjusting, and learning. This phase is having a positive impact on CCY's clients and its projects as the firm 'gets the kinks out.' This process allows CCY to share its experiences and advocate for similar systems in the future.

Project Overview

Project

All-electric rooftop heat pump on a commercial building

Partners

- CCY Architects
- CORE
- Climate Control
- Radar Engineering
- R&H Mechanical
- Rutgers Construction

Total Project Cost: \$164,342

CORE Contribution: \$20,000 towards rooftop unit

Additional Funding: \$7,500 rebate from Holy Cross Energy

Total Savings: \$27,500



Building Specifics

Location: 228 Midland Avenue, Basalt, Colorado (Eagle County)

Building Type: Commercial Office Building (40 occupants)

Square Footage: 6,173 square feet

Year Built: 1999

Utility Provider: Holy Cross Energy

Heating Cooling System:

- Old system
 - Gas-powered Trane rooftop unit with electric cooling
 - Size/capacity: 7.5 tons
- New system
 - Heat pump rooftop unit with Variable Air Volume with controls
 - Size/capacity: 15 tons ($15 \times 12,000 = 180,000$ BTU/h) with 18 kW resistance backup

Domestic Hot Water System: 40-gallon electric hot water system

Electric Service Size:

- Needed an electrical upgrade to support the additional use of electricity after converting from gas
- Increased from 400 amp service to 800 amp service

Problem to be Solved

Beginning the process of upgrading a building built in 1999 is no small feat. The CCY office was built with a modest technical system. The push to upgrade began in 2022



when a discussion of an office remodel surfaced. The firm's motivation to upgrade its heating and cooling system stemmed from the need to increase both comfort and efficiency. As CCY dove into the project, the desire to go towards all-electric became a reality when the firm brought the right partners to the table.

“After partnering with CORE, the all-electric heat pump emerged as the best fit from both an environmental and financial perspective.”

– Sean O'Bryant, Architect, CCY Architects

Project Goals

- Help pull the building off of fossil fuels and clean up the energy it's using
- Enhance comfortability for staff occupying the building
- Meet internal sustainability goals
- Try new technology to share with clients

Process for Solving Problem

1. Commit to the project
2. Identify the right team
3. Trust that team
4. Make it happen



CCY Architects started its project by building a team. The firm was adamant about finding the right partners to help guide its process and turn ideas into reality. CCY was inspired by the Rocky Mountain Institute (RMI) and Aspen Ski Co. and brought CORE, Climate Control, Radar Engineering, R&H Mechanical, and Rutgers Construction together to advance the project. Once CCY built its team, it committed to the project and to trusting that team.

The team asked high-level questions to validate that they were going in the right direction. They worked through turning goals and aspirations into reality based on building specifics. After looking at the building as a whole and evaluating future goals, they determined what could and may not be. One of their pivots early on was shifting from solar to embracing more emerging technology. They also determined the need to upgrade the building's electrical service capacity to bear the additional electrical load of converting from gas heating to electric. To meet the goals of this project, CCY needed to upgrade from a 400 kW to a 600 kW service. In the end, given their long-term goals, the project team chose an 800 kW system to withhold battery storage and other electrical services they are trending towards.

CCY Architects believes partnering with CORE was a 'value-add' to the project. CORE was able to provide comparative analysis, help ensure that the system the firm was

designing and looking to install was the right system, and compile financial incentives to acquire that system (i.e., grants and rebates).

“Once we got in touch with CORE, [the process] was pretty streamlined. There were pieces for us to be educated on, and CORE filled in the gaps.”

– Sean O’Bryant, Architect, CCY Architects

Staff from CCY stated that having a project team that was responsive and accessible was invaluable. They noted that having an expert to validate and bring in new ideas was critical, and finding people who were approachable and willing to step into a world of uncertainty was key.

Result of Process

The results of this project caused a ripple effect, starting with the staff that occupy the building, the people that maintain the building, the clients that work with CCY, and the larger community.



This specific project impacted the more than 40 staff that occupied the building. CCY was searching for more stability in its heating and cooling system and needed to thread the needle between efficiency and comfort.

Post-project, overall feedback from staff has been positive. They are finding less variability in the mechanical system, which has been more consistent and

controllable. For example, the meeting room used to be called “The Icebox,” and it is now nicknamed the “Comfort Zone.”

This project also impacted the building's facility operations. Previously, fixing an issue with the heating and cooling required a phone call and a round-trip from Grand Junction. Now, fixing issues takes one email and the option to fix it remotely and quickly.

“We live in such a well-refined world that we deter if there's a little bit of discomfort along the way. Being a part of helping things advance and evolve – I want to get behind that.” – Alex Klumb, Partner, CCY Architects

Since installing the rooftop heat pump, CCY Architects has significantly reduced its reliance on natural gas, resulting in lower gas utility bills. While electricity use has increased as expected, this transition to an all-electric system aligns with CCY's commitment to sustainability and energy efficiency. As more data becomes available, we anticipate further insights into the long-term energy and cost savings of this retrofit.

CCY is comfortable being in the “living lab” phase as it works through the kinks of embracing new technology, allowing it to learn mechanics from installation to day-to-day operations. This experience ensures it is testing the system and “walking the walk.” By exploring and evaluating its experience with the heat pump, CCY can build client trust, position the firm as a green technology advocate, and provide the opportunity to share insights along the way.

This project also indirectly impacts the larger Roaring Fork Valley community by contributing to our health, safety, and well-being. CCY Architects is enhancing the health and human comfort of its staff and making strides to contribute to a healthier climate.

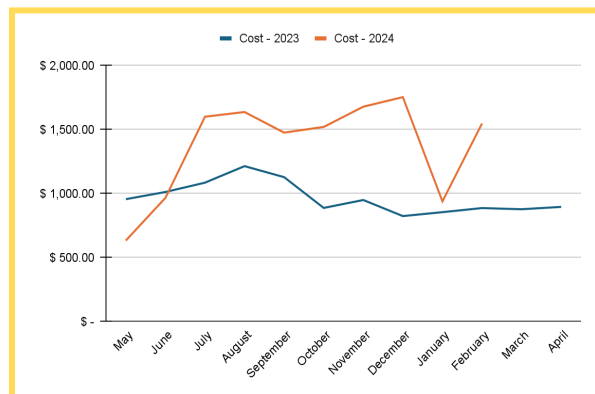
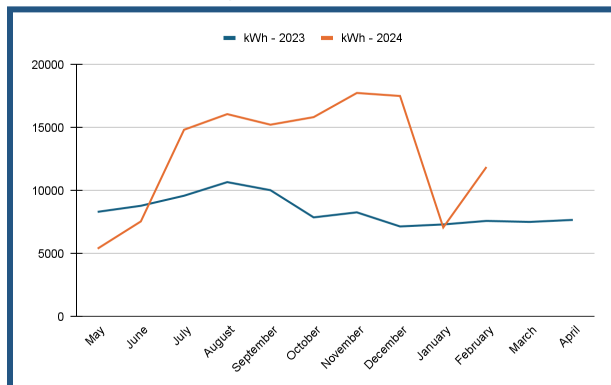
Pre- and Post-Project Building Data

		Utility Data	
Timeframe	Emission Reduction	Holy Cross Energy - Electric	Black Hills Energy - Gas
Month prior to the install		5,400 kWh	52 therms
1 month after install		14,840 kWh	1 therm
1 year after install (estimated)	15.92 MTCO ₂		
1 year after install (actual)	TBD	TBD	TBD
Lifetime Savings (estimated)	318.42 MTCO₂		

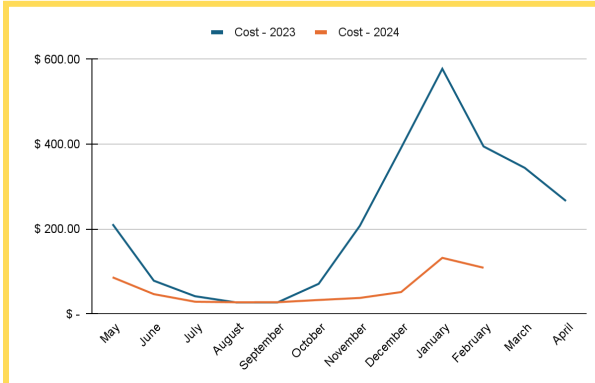
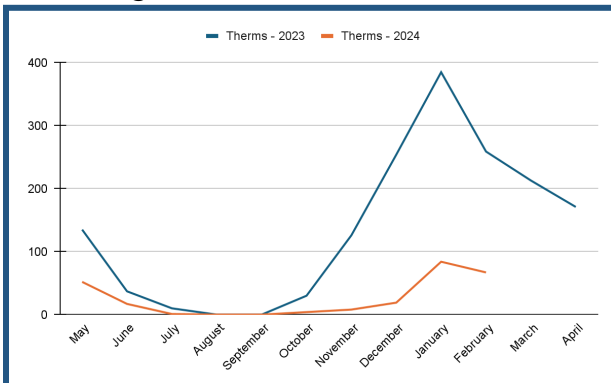
318.42 MTCO₂ = 66 average American home's energy use in one year

Utility Data	Utility Bill Cost
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Electricity Usage



Gas Usage



Lessons Learned

No project comes without lessons learned. Not only did the CCY project team need to pivot and alter expectations, but they also had to handle deadline extensions and continue operations during the project. CCY's advice is to be as organized as possible and try to think through various scenarios. The project took three weeks to complete, and the silver lining was that because COVID-19 taught them to be nimble, hybrid work situations were more easily implemented.

“Our design solutions, driven by site conditions, allow us to optimize a building’s overall design for its environmental conditions. We implement solutions that rely on both passive and active strategies to minimize our projects’ impacts on the environment.” – Alex Klumb, Partner, CCY Architects

Concluding Statements

CCY Architect's efforts are an example of innovation and stewardship. Its ability to find the right team, trust that team, and be willing to step into a process that holds some level of uncertainty shows its leadership and drive toward cleaner energy. CCY's tenacity and adaptability will cause ripple effects across the community for years to come.

Next Steps

CCY's plans include continuing to be curious in the “living lab” phase. The firm hopes to collect and analyze data, refine the systems operations, and share its findings with the larger community. The team at CCY wants to “look under the hood” and keep asking:

- What did we learn?
- How were we successful?
- What can we share to keep this momentum going in the community?

CCY plans to share this information with its clients and anyone interested in learning more.

As for additional building projects, CCY will move into an interior remodel scheduled to be completed in 2025. The firm is also exploring incorporating other systems, such as battery storage and rooftop solar.

CCY's recommendation to anyone else willing to take on a project like this:

Embrace emerging technology. Take the step.

Acknowledgments

Thank you to CCY Architects staff who were interviewed to develop this case study.

- Alex Klumb - Partner and Owner, CCY Architects
- Sean O'Bryant - Architect, CCY Architects
- Nicole Kinsler - Marketing and Communications Director, CCY Architects





 AspenCORE.org
 +1-970-925-9775

