

Columbia Association: Dual Fuel Heat Pump Rooftop Units

Columbia Association (CA) is a nonprofit community services corporation that manages 500,000 square feet across 50 public and community facilities in Columbia, Maryland. They are a long-time partner of the Better Buildings Initiative and participated in the original [Advanced RTU Campaign](#), which focused on high efficiency packaged rooftop units (RTUs), as well as the [Low Carbon Pilot](#).


When considering pathways to meet their decarbonization goals, Columbia Association looked to incorporate electric heat pump technologies for space and water heating applications. However, to satisfy the climate and heating needs for full electrification of their buildings they turned to dual fuel heat pumps, which combine an efficient electric heat pump RTU with natural gas backup heating.

Project Overview

There are many factors that played a role in the decision to replace gas heat RTUs with dual fuel heat pump RTUs.

1. Columbia Association's buildings are located in Maryland, which is a mild climate, but can require significant heating in the colder months.
2. Many of the buildings in Columbia Association's portfolio require heating loads above what is currently available on the market for package heat pumps.
3. Electric resistance auxiliary heat was to be avoided.

To address these factors, they decided to use dual fuel heat pumps. Dual fuel heat pumps operate by utilizing a heat pump in moderately cold temperatures (usually above 30 °F), and automatically switching to gas auxiliary heating in colder temperatures. This allows for significant decarbonization benefits without compromising on comfort in the colder months. With less electricity demand than traditional heat pumps with resistance auxiliary heat, dual fuel heat pumps allow Columbia Association to preserve the electrical panel capacity for other decarbonization efforts such as heat pump water heaters.

	
IMPACTS OF HEAT PUMP ROOFTOP UPGRADES	
▶ Organization Name, Location	Columbia Association, Columbia Maryland
▶ Building Type, Number, Size	500,000 square feet of public and community building space including fitness clubs, community centers, indoor swimming pools, golf clubs, etc.
▶ Project Description	Dual Fuel Heat Pump RTUs to reduce emissions
▶ Emissions Savings	Reduce emissions by 18 metric tons/year
▶ Energy Performance and Savings	Avoid 3,500 therms/year in gas consumption
▶ Financial, Comfort, Maintenance, and Other Benefits	The benefits of dual fuel units include comparable cost and facility comfort, minimal retrofits, and ease of maintenance

COMMERCIAL BUILDING HEAT PUMP CAMPAIGN

The Commercial Building Heat Pump Campaign aims to help small-to-medium commercial building owners and operators reduce greenhouse gas emissions and operating costs by increasing the adoption of both existing and emerging heat pump technologies.

UPGRADING FUEL-FIRED RTUS TO HEAT PUMP RTUS

▶ Original Equipment	Standard RTU with Gas Heating 8.9 EER DX cooling 80% eff. gas heat
▶ Heat Pump RTU Upgrade	Dual-Fuel Heat Pump RTU 12 EER DX cooling 3.4/2.2 COP heat pump 81% eff gas aux. heat

Demonstrating Performance

Since beginning the switch to dual fuel RTUs CA has decreased their emissions while maintaining performance.

Performance

The dual fuel RTUs have performed comparatively to the gas pack units.

Emissions Savings

The new heat pump rooftop units are expected to **reduce heating system emissions by 18 metric tons** compared to gas heat.

Utility Savings

Columbia Association estimates that **natural gas use will be reduced by 70% relative** to the original all gas package units.

Lifecycle Costs

The lifecycle costs of each dual fuel unit are projected to be comparable to the lifecycle cost of the original heating units.

Overcoming Barriers

The key challenges Columbia Association faced when considering heat pumps were related to the local climate and building space volume. These units can operate as heat pumps for most of the year and rely on gas heating in the coldest months,

providing significant emissions savings without the increased cost and electrical capacity of going all-electric. The dual fuel units were able to integrate with the existing utility and mechanical structures without upgrades or retrofits which allowed for quick deployment. Additionally, natural gas prices had recently increased so the team saw a strong economic case for decreasing natural gas consumption. As this trend continues, dual fuel heat pump package units will be an important tool for organizations in cold climates to cost-effectively achieve meaningful reductions in natural gas consumption.

Next Steps

The Columbia Association plans to continue the use of dual fuel heat pump RTUs as the standard for their buildings moving forward and reassess the heat pump options as the market expands.

If your organization is located in a cold climate, dual fuel heat pump RTUs may also be a viable solution to meet your sustainability goals.

Learn More

Visit the [Commercial Building Heat Pump Campaign website](#) for more information and sign up forms.

