



PR FOR PLANET EARTH™

A REPORT ADVOCATING
FOR SOCIALLY RESPONSIBLE
SUSTAINABLE DEVELOPMENT

INVERTER AIR CONDITIONER CUTS ENERGY USE IN ATLANTA HIGHRISE

ENEREF INSTITUTE EXAMINES THE BENEFITS OF VRF
AIR CONDITIONERS IN MULTI-FAMILY HOMES.

A building in Midtown Atlanta is among the first of its kind to incorporate an innovative technology that could be used to reduce carbon emissions in high-rise buildings throughout the United States.

Carbon emissions from air conditioning are a major factor in increasing global climate change.

The vertical packaged VRF (variable-refrigerant flow) units provided the building residents with more

IT WAS THE THERMAL COMFORT, THE HUMIDITY CONTROL, AND THE HIGHER ENERGY EFFICIENCY.

AMIR SAFAIE | CEO, *Safaie Landry*

consistent cooling comfort while significantly reducing energy use compared to conventional single-stage air conditioners. Single-stage units constantly turn on and off, causing considerable swings in temperature and humidity.

The Atlanta high-rise on the corner of Juniper Street and 10th Street is a home for low-income seniors and people with disabilities and includes studios and one-bedroom apartments. In 2017 the building was renovated as part of an Atlanta Housing Authority mandate from HUD.

For Columbia Residential, the real estate development and management company that led the renovation, energy efficiency was a driving factor in their selection of variable-refrigerant inverter-driven air conditioners. The installation of 154 Friedrich vertical packaged VRF units reduced the energy load enough that it resulted in \$500 savings per unit per year on the tenants' energy bills.

FRESH AIR CAPABILITIES

Beyond running more efficiently, the packaged VRF units installed in the Atlanta high-rise have the unique capability to condition and filter outside air to introduce make-up air into the room. According to the project's architect, Tom Little, this feature eliminated the need to duct fresh air into each apartment — an additional cost and space savings.

"The remarkable thing about this system is that it combines fresh air within the unit itself," explains Little, a Senior Associate and Director of Historic Preservation at Surber Barber Choate + Hertlein Architects.

HUMIDITY MANAGEMENT

The packaged VRF units have a high efficiency rating of 20.0 SEER. Unlike the more common EER rating, SEER accounts for seasonal climate variances. The inverter automatically adjusts to meet precise cooling conditions as the indoor temperature fluctuates. The high SEER rating proves that VRF performs

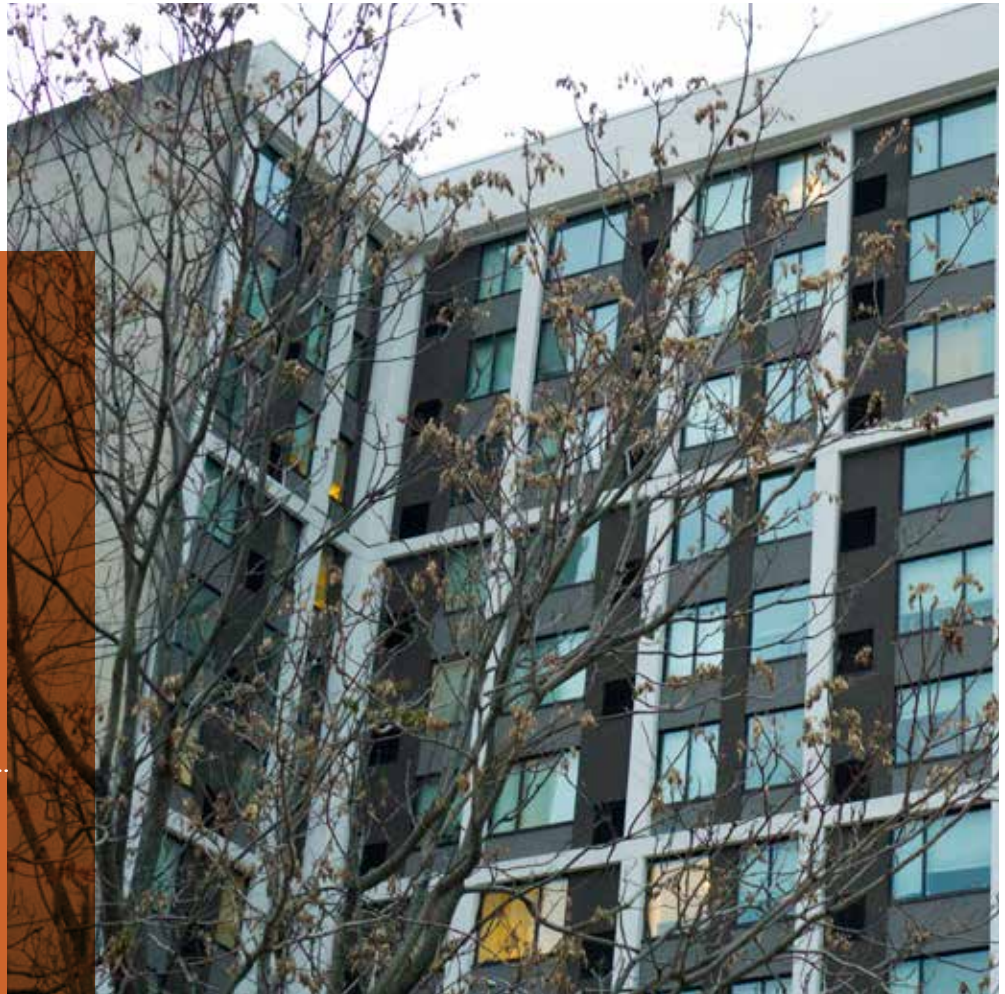
better in real-world conditions compared to traditional single-stage systems.

Heat index accounts for air temperature as well as relative humidity to determine our perceived temperature — how hot it feels to us. For example, at 70°F (21°C), a humidity level of 60% will have no influence on perceived temperature. On the other hand, a temperature of 90°F (32°C) and a 60% humidity level will feel like 100°F (38°C). In fact, according to the EPA, indoor relative humidity (RH) should be kept between 30 and 50% to prevent mold growth. Uncomfortably high humidity levels in areas such as Atlanta — which has an average summer humidity of 74.8% — are better managed with an inverter-driven VRF system.

"You can have the most efficient system, but if it doesn't do the job correctly, what good does it do?" asks Amir Safaie. "This particular project was very efficient, but it also benefited from both better humidity control and better temperature control." Amir Safaie is the CEO of Safaie Landry, the engineering firm that oversaw the HVAC renovation of the Atlanta high-rise.

RESIDENTS IN CONTROL OF COMFORT LEVEL

The units provide both heating and cooling for individual



YEARLONG RENOVATION

During the yearlong renovation, the tenants were moved to a different location.

rooms. They are vertically shaped (whereas a typical PTAC is horizontal) and installed inside a utility closet. Although the units are hidden from view, tenants are able to maintain their comfort with at-hand heating and cooling controls.

“In multifamily apartment buildings, we give tenants as much control over the system as they want,” says Peter Iodaci, Friedrich’s Director of Technical Management. “Tenants are paying the bills, so they should have absolute control.”

Inverter-driven systems are

more common on commercial rooftops, and the Friedrich units installed in the individual apartments of the Atlanta high-rise are among the first of their kind designed for multifamily residential buildings. And because they are individual air conditioning units, they are serviceable on a room-by-room basis. A few spare units were even stored on site in case a unit needs to be replaced in the future, which can be done without specialized training or certification.

SELECTING THE RIGHT SYSTEM

While the first cost for inverter-driven systems tends to be higher than traditional single-stage units, the lifecycle cost — which accounts for energy use over the life of the system — allows for a quick return on investment. With an annual energy savings of \$500 per apartment per year, the return on investment in the Atlanta high-rise was amortized in as little as two and a half years. And the cost of the 154 individual units was about one-third less per ton of air conditioning than a typical



JUNIPER AND 10TH STREET

The building envelope exterior, interior, HVAC, plumbing and electrical were upgraded.

chilled water rooftop system.

According to Raymond Kuniansky Jr, Chief Development Officer of Columbia Residential, their team considered several factors during the renovation: who would benefit, how the chosen HVAC system would affect the rent and building operation costs, whether the system's efficiency would be consistent with the necessary green program certifications, and whether there was a more affordable choice.

"We talk a lot about the need to be more aggressive in the pursuit of energy efficiency, but in a capitalist society, it's all

about investment returns," says Kuniansky. "But we also think about society's well-being in broader terms."

A VALUABLE DESIGN

J.M. Wilkerson was hired as the general contractor to construct the building in accordance with the design produced by Surber Barber Choate + Hertlein Architects, who, along with engineering firm Safaie Landry, specified the VRF air conditioning units that were ultimately installed.

Architect Tom Little explains, "We discussed it with Columbia Residential and our engineers and made the decision to install the VRF unit fairly early in the design."

Engineer Amir Safaie concurs: "Columbia understood the value they were getting. We didn't have to convince them. It was the thermal comfort, the humidity control, and the higher energy efficiency."

The system was sold by John Mobley, VP of Sales and Marketing at Mobley Sales. "You have to have an owner that is aware that their first cost is an eye-opening bid," explains Mobley. "But at 20 SEER, the efficiency of the unit is hard to deny."

THE NEED FOR CONDITIONED OUTSIDE AIR

According to Amir Safaie, the Friedrich VRP (VRF-Package) was also chosen because of how it brings fresh air into the building and controls for humidity. The unit is designed so that it blows the fresh outdoor air across the primary evaporator coil and through MERV 8 filters. The VRP can be an alternative to hard ducting outside air into the individual rooms. And because it effectively conditions outside air, it can help comply with ASHRAE 62.1-2013 standards for indoor air quality.

"Our primary purpose was not just energy, it was the resident's comfort. However, this obviously is going to give the best energy efficiency for that system and that type of building," says Safaie. "We could have gone with a standard VTAC, but with this system we had better humidity control."

A standard VTAC (Vertical PTAC) can introduce humid outside air into the space, which could potentially lead to mold and mildew growth — especially with fixed-speed systems that are optimized for efficiency at the expense of humidity control. The inverter system installed in the high-rise uses a system of temperature and humidity sensors to constantly monitor the space conditions.

INVERTER AIR CONDITIONERS ARE A FAST OPTION FOR UPGRADING COMMONLY INSTALLED SYSTEMS.

IN THE UNITED STATES ALONE, OVER 30 MILLION METRIC TONS OF CARBON DIOXIDE ARE UNNECESSARILY EXPELLED INTO THE ATMOSPHERE EACH YEAR DUE TO INEFFICIENT COOLING SYSTEMS.

NO DUCTWORK REQUIRED

Beyond solving the technical challenges of heating and cooling, architect Tom Little chose a vertical design because there was no ceiling clearance for ductwork.

“When we brought the unit to everybody’s attention, everybody thought, ‘Wow, this looks like a great unit.’ I think everybody knew that it combined everything we needed into one. It was a premium unit,” Little says.

Engineer Safaie coincides: “There are other manufacturers that do have similar systems to this, but they don’t have the variable refrigeration. And this unit has the ability to control fresh air coming in.”

EFFICIENCY PROGRAM CERTIFICATIONS

As part of an Atlanta Housing Authority’s program — which is regulated by Housing and Urban Development (HUD) — the building has a rent restriction that is fixed for 30 years. The state of Georgia has been pushing for greener buildings through their tax credit program for two decades. Every year, as

the program becomes stronger and with the community’s feedback, the requirements change. Columbia Residential worked with third-party consultants on the building design to obtain any efficiency program certifications.

RESIDENTS AT THE FOREFRONT OF SUSTAINABLE DESIGN

During the yearlong renovation, the tenants were moved to a different location. The building envelope exterior, the building interior, and the HVAC, plumbing and electricity systems were all upgraded. For the tenants, returning to a more efficiently remodeled home was worth the move.

“Since everyone came back home, life has just become much more comfortable for us,” says resident Corey Sanders. “The new air conditioner is quicker, quieter and saves us money.”

Columbia Residential’s Raymond Kuniansky comments, “We’re providing homes for people on low and fixed incomes, so every dollar makes a difference. We tried to make sure that what we were doing improved the wellbeing of the residents and contributed to lowering their cost to live in the units.”

And architect Tom Little notes, “What’s amazing about the building is that it provides an affordable option for a mostly senior population in the center of Midtown Atlanta, a great resource that doesn’t exist elsewhere in Midtown.”

The high-rise was built in the early seventies, long before Midtown Atlanta flourished. The variable-refrigerant flow (VRF) air conditioners provided the building residents with more consistent cooling comfort and were a wise energy-reducing investment for the Atlanta Housing Authority.

RESEARCH COMPILED AND PROVIDED BY ENEREF INSTITUTE.

Additional information generously provided by Raymond Kuniansky Jr, Chief Development Officer of Columbia Residential; Peter Iodaci, Director of Technical Management of Friedrich Air Conditioning; Amir Safaie, CEO of Safie Landry Partnership; Michael Travis, Vice President of J.M. Wilkerson Construction; John Mobley, Vice President of Sales and Marketing at Mobley Sales, Ltd.; and Tom Little, Senior Associate and Director of Historic Preservation at Surber Barber Choate + Hertlein Architects.



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action. Eneref Campaigns bring about that positive tipping point by creating the dynamic of common knowledge and the perceived social pressure to act responsibly. We'll ignite a movement so that you can lead others.

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A hand is shown holding a stalk of wheat against a sunset background. The hand is positioned in the center, with the fingers gently grasping the wheat. The background is a warm, golden light from the setting sun, creating a soft glow. The wheat stalks are in the foreground, some in focus and some blurred. The overall mood is peaceful and natural.

PR FOR PLANET EARTH™

*Every organization
must harness their capacity to
improve our planet and society.*

Right now, we need to make unprecedented changes to ensure a sustainable and equitable society. Limiting global warming requires rapid and far-reaching transitions in land, energy, industry, buildings, transport and cities. Every extra bit of warming matters to reduce irreversible harm to our ecosystems.

We encourage organizations to grow sustainably and act responsibly by raising awareness for clear, specific solutions that offer an efficient use of natural resources, demonstrate social responsibility and foster a peaceful, earth-friendly economy.

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