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# Case Study – 7th Street Public Market

EDUCATION / HEALTHCARE / LODGING / GOVERNMENT / OFFICE BUILDING / RETAIL / SPECIAL



## Variable Refrigerant Flow Air Handling Unit Solution Provides Flexibility and Comfort for Open Marketplace

### OBJECTIVES:

The owners of the 7th Street Public Market needed to address an inefficient, decades-old, single-zone heating, ventilating and air-conditioning (HVAC) system originally designed for the previous tenants, a local privately-owned grocery store and café. Located in Uptown Charlotte, NC, this multi-vendor open marketplace also required a highly flexible system with precise control to meet the changing comfort demands of new tenants moving into the space. The solution would need to be adaptable, energy efficient, deliver lower operating costs and — due to limited outdoor installation space — occupy a small equipment footprint.

### SOLUTION:

To meet the unique HVAC challenges, the owners of the market selected Carrier, who initially proposed three multi-zone system options: 1) install a new system consisting of a single air-handling unit (AHU) with variable air volume (VAV) capability, 2) install a new variable refrigerant flow (VRF) system, with one AHU unit per zone and 3) install a new standard DX system, with one AHU per zone. Carrier's Hourly Analysis Program (HAP) software was utilized to execute load calculations for the systems.

The market owners selected the VRF system because of its high-efficiency, lowest operating costs over the life of the system, high degree of flexibility and the smallest footprint for the outdoor units. To execute this unique design/build project, Carrier specified two Toshiba Carrier variable refrigerant flow (VRF) heat pumps and six vertical AHUs.

On behalf of the market's owners, Carrier submitted information to Duke Energy's Smart Saver Custom Incentive program, which qualified it for a \$24,381.00 rebate.

**Variable Refrigerant Flow System Delivers Precise Comfort and Efficiency**

**Energy Incentive = \$24,381.00.**



*Along with precise comfort and the lowest operating costs over the life of the system, the 7th Street Public Market project qualified for Duke Energy's Smart Saver Custom Incentive of \$24,381.00.*



# Case Study – 7th Street Public Market



*“The VRF system allows us to easily control each zone throughout the entire Market.”*

Chris Clouden, Executive Director  
7th Street Public Market

## SYNOPSIS:

Since the late 1800s, the geographic location of Uptown Charlotte, NC has been a center where people gathered, socialized and traded their goods. So it's not a coincidence that this is now the area where the multi-vendor 7th Street Public Market is housed and, as its mission statement asserts, 'celebrate the food culture of the Carolinas and promote local and regional farmers, food artisans, and entrepreneurs.'

The 11,700 square-foot building was originally designed for a privately-owned grocery store and café which had an inefficient, 20 year-old, single-zone heating, ventilating and air-conditioning (HVAC) system. So along with upgrading outdated physical building attributes, the owners of the 7th Street Public Market needed to address the unique comfort challenges posed by multiple vendors operating within an open marketplace. This would require a flexible HVAC system with precise control to meet the changing comfort demands of new tenants to the space. Additionally, the retrofit of the new system would need to be accomplished while the market would be in full operation.

To meet the unique HVAC challenges, the market owners selected Carrier, who initially proposed three multi-zone solutions. Carrier's Hourly Analysis Program (HAP) software was utilized to execute load calculations for the systems. To meet all the operational and fiscal needs of the market's space, a variable refrigerant flow (VRF) system with one vertical air-handling unit (AHU) per zone was selected. To execute this unique design/build project, Carrier specified two Toshiba Carrier VRF heat pumps and six vertical AHUs.

Greg Heckle, Carrier's Project Manager for the market project said, "We worked closely with the market's owners to design the installation and determine the equipment selection. The final solution is highly efficient, provides precise temperature control with variable speed compressors, zoned comfort and heat recovery." Additionally, VRF systems deliver the lowest operating costs over the life of the system, are quiet, reliable, flexible in design and simple to install with 'plug-and-play' controls, .

To maintain comfort during installation, Carrier Rental Systems supplied a 75 kW electric heater to supply preconditioned air into the outside air intake. This provided the market with the heat they needed to remain in operation during colder months without impacting floor space.

Chris Clouden, Executive Director of the 7th Street Public Market said, "Ours is a one-of-a-kind atmosphere, so it's critical to make sure that all who work and visit the market are comfortable year-round. The Carrier system allows us to easily control each zone throughout the entire market. Although the available space for the outdoor units was very small, the VRF heat pumps fit perfectly. It was a very professional installation with good communication throughout the entire process."

On behalf of the market's owners, Carrier submitted information to Duke Energy's Smart Saver Custom Incentive program, which qualified it for a \$24,381.00 rebate.

## Project Summary

**Location:** Charlotte, NC

**Project Type:** Retrofit

**Building Size:** 11,700ft<sup>2</sup>

**Built:** 1981

**Facility Usage:** Multi-vendor marketplace for restaurants and retail entrepreneurs

**Objectives:** Replace outdated and inefficient single-zone heating, ventilating and air-conditioning

(HVAC) system with a more efficient and versatile multi-zone system

**Equipment:** Two Toshiba Carrier variable refrigerant flow (VRF) heat pumps, six vertical AHUs

**Total Cooling Tons:** 56

**Major Decision Drivers:** High degree of flexibility, high efficiency, reduced operating costs and smaller footprint for outdoor VRF units

**Unique Features:** New system allows comfort control adaptability for rotating vendors in an open market and restaurant environment

**Installation Date:** 2018