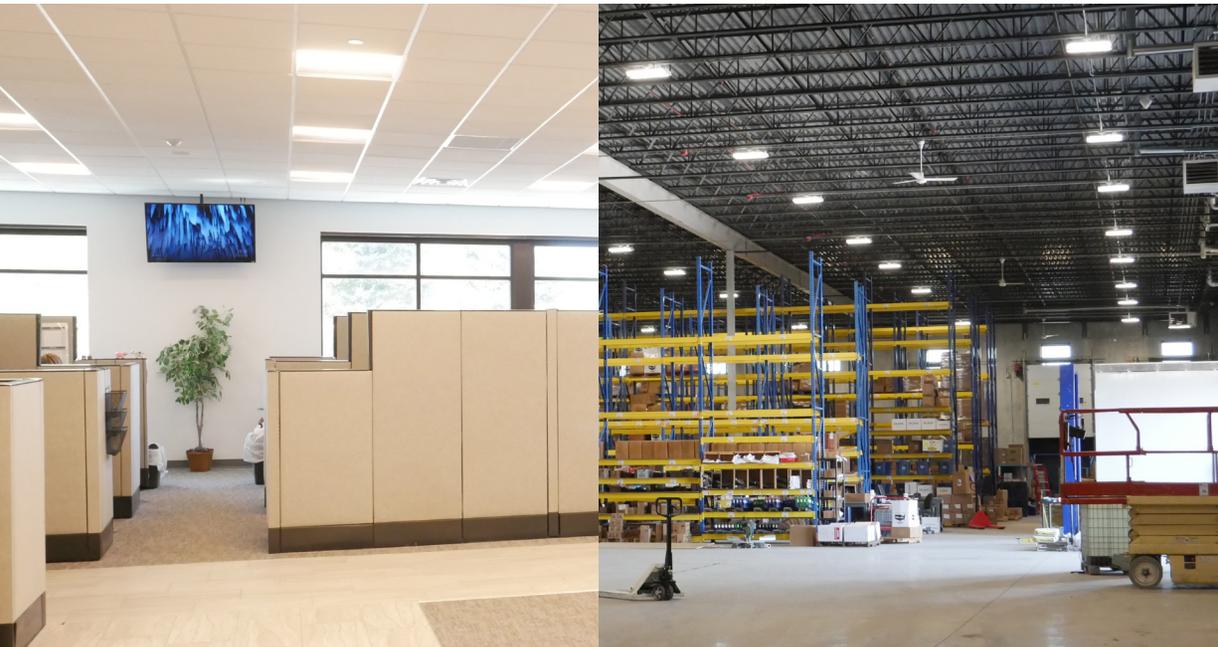


THREE SQUARE MARKET CASE STUDY

Bringing insight and automation from office to warehouse.



The sky is the limit. If you can dream it,
75F can do it – and I mean that sincerely.

-Todd W. | CEO of Three Square Market
and TurnKey Corrections



THE CHALLENGE

As the first US company to implant microchips in employees, Three Square Market is leading the adoption of advanced automation technology to improve operations. 75F is helping deploy smart building systems to support their vision. When Three Square Market designed their new corporate headquarters – consolidating three separate buildings into one in their new Wisconsin location – owner Todd W. sought out the most advanced web-based building control system. He was surprised at the cost of traditional systems, especially given their lack of desired features.

Three Square Market's headquarters consists of a two-story building with 50,000 square feet of office space, including 40 private offices served by six rooftop units (RTUs), plus a 65,000 square foot warehouse with four RTUs and eight large unit heaters. It was important to Todd that each private office had its own individual temperature control zone. A large IT office in the center of the second floor made for a unique temperature balancing challenge.

AT A GLANCE

Location	River Falls, Wisconsin
75F® Solutions	Dynamic Airflow Balancing™ Outside Air Optimization™ Smart VAV with Reheat™ Hydronic Controls™ In-Floor Hydronic Heat™ Unit Heater Controls™
Square Footage	115,000
Rooftop Units	10
RTU Sizes	7.5-20 tons
Previous System	New construction
Zones	66

THE 75F SOLUTION

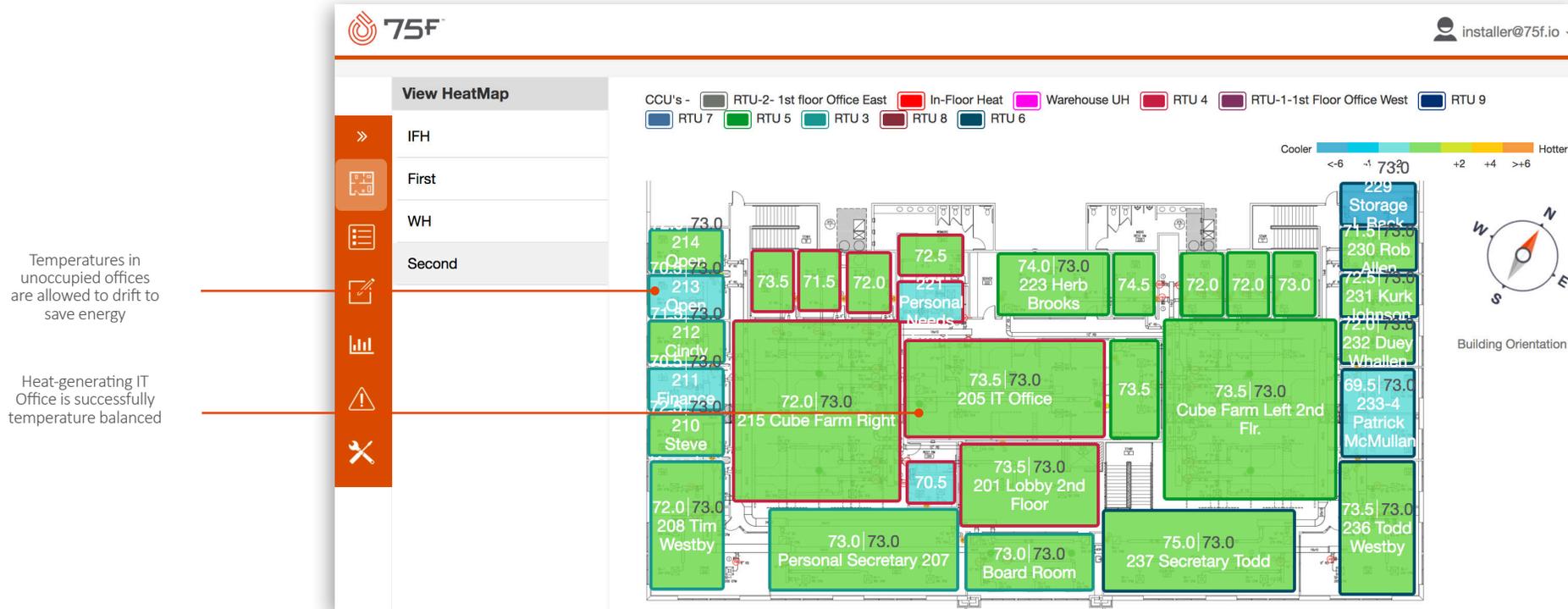
75F installed a variety of automation controls at Three Square Market to best suit their layout and needs. The solutions include 75F® Dynamic Airflow Balancing™, Smart VAV with Reheat™, Outside Air Optimization™, Hydronic Controls™, In-Floor Hydronic Heat™ and Unit Heater Controls™. The 75F Facilisight™ suite of web and mobile apps is the central control hub, common to all 75F solutions installed at Three Square Market, bringing cloud based control solutions with remote monitoring, deep analytics and smart automation for optimal control of comfort and efficiency. 75F's solutions collect 650 data points every minute and transmit the data to the wireless Central Control Unit™ (CCU), where it is sent to the cloud for processing. 75F proprietary algorithms determine the optimum settings for the next day's strategy, factoring in everything from the local weather to Three Square Market's geographical orientation to determine the best control strategy.

DYNAMIC AIRFLOW BALANCING - Three Square Market wanted individual temperature controls for the private offices on the second floor. 75F Dynamic Airflow Balancing (DAB) outfitted rooftop units with sensors and controls to efficiently condition all office spaces. DAB builds a vast data model of Three Square Market's building envelope by reading sensor data each minute and sending instructions to move 75F® Smart Dampers™ a few degrees at a time, creating desired zone temperatures throughout the building. DAB was a great

fit for a new building, as its performance matches or exceeds a traditional VAV system with greater efficiency and lower installed cost. 75F worked directly with the building design engineer to implement the DAB solution for four rooftop units, which serve 32 zones on the second floor of the building. The result was much greater comfort for the private offices, with individual control and remote management.

Thanks to its ability to fine-tune zones, the DAB solution solves problems which would otherwise require expensive renovations. Three Square Market's IT office, located in the core of the building, soon became an unexpected hub of activity. A large number of employees combined with dozens of computers and monitors meant that the room quickly heated up. 75F balanced the temperature and solved the problem without adding duct-work, simply by tuning the surrounding zones to provide more airflow.

OUTSIDE AIR OPTIMIZATION - The 75F Outside Air Optimization (OAO) solution is tied in with all six of the office rooftop units, plus four additional RTUs in the warehouse. With OAO, Three Square Market benefits from "free cooling days" using outside air when conditions are right, which can save up to 40% of the utility operation costs.



Live heatmap showing Dynamic Airflow Balancing operating on the second floor of Three Square Market.

SMART VAV WITH REHEAT & OAO IN ACTION

With web monitoring, weather feeds, outside temperature sensors, plus unique algorithms to determine the economizer actions, 75F's OAO system delivers more than 200% of the free cooling days of comparative systems and offers a new level of system insights and diagnostic capabilities. OAO also measures and delivers Three Square Market's targeted Indoor Air Quality (IAQ) levels by monitoring CO₂ in the building and controlling fresh air to allow for optimum safety, comfort and productivity for employees.

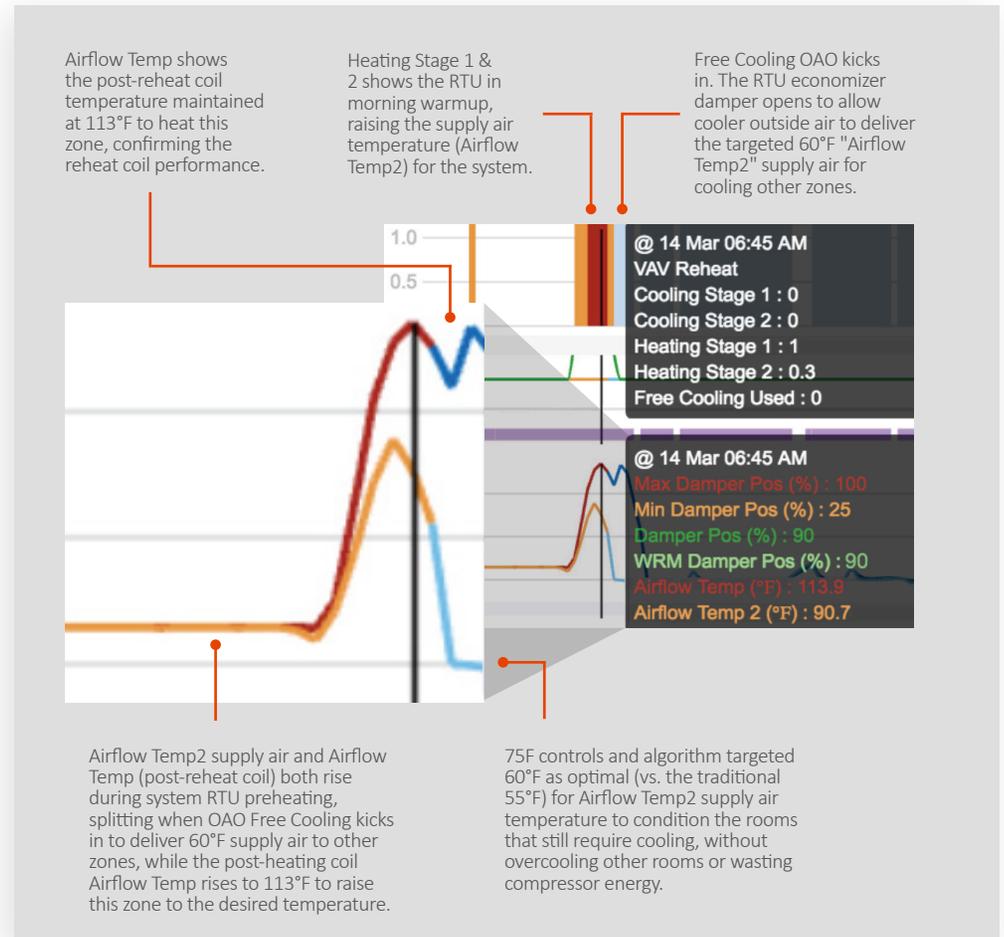
SMART VAV WITH REHEAT - The first-floor offices incorporate a VAV with Reheat system, with two large rooftop units serving 22 VAV zones. The architecture of the first floor, including open designs with large square footage and diverse loads, yet only two air shafts, required a different approach than the DAB solution used on the second floor.

A key component of the Smart VAV with Reheat solution is the 75F® Smart Node™ controller. This versatile device operates off 24V and wirelessly communicates with our Central Control Unit (CCU). Combined with 75F sensors, the Smart Node modulates the damper position and reheat coil valve, while sensing airflow temperatures both upstream and downstream of the reheat coil. 75F's Smart VAV with Reheat solution interacts with OAO to achieve variable supply air temperatures based on the projected loads in the building; this eliminates large amounts of energy waste associated with the standardized 55-degree air-flow temperature targeted in traditional VAV with Reheat systems.

HYDRONIC CONTROLS - 75F introduced wireless inlet and outlet temperature sensors to monitor the supply and return water temperature of the boiler at Three Square Market. Monitoring and tracking the temperature difference between the supply and return water temperature is an important data point which can be used to monitor and diagnose boiler health and the systems connected to it. 75F monitors the supply water temps to assure the boiler outdoor temperature reset is functioning properly. The system can alert users if the boiler deviates from the optimum set point, based on weather.



75F Hydronic Controls system installed at Three Square Market.

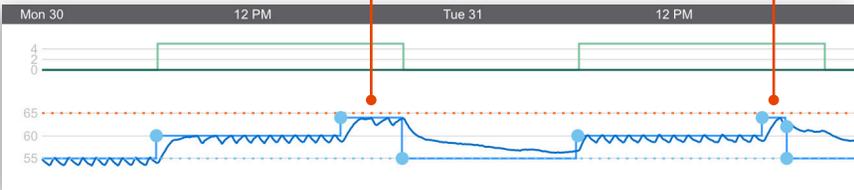


IN-FLOOR HYDRONIC HEAT - Three Square Market uses water-based in-floor heating installed around the perimeter of the first floor of the building (to account for cold Wisconsin winters), as well as in locker rooms and restrooms on the first floor where local building code prevents air diffusers. 75F installed In-Floor Hydronic Heat controls for the 3-way valve mixing water produced by the boiler; this continuously modulates the water temperatures to 150°F for the VAV with Reheat coils and 110°F for the in-floor radiant system.

Wireless controls for the 3-way mixing valve receive inputs from the wireless temperature sensors in the floor slabs in seven controlled zones and ensure optimal temperatures are maintained. This also eliminates the need for running control wires throughout the building.

UNIT HEATER CONTROLS - In the 65,000 square foot warehouse, eight large unit heaters and four rooftop units provide heating and cooling throughout the year. We installed the Unit Heater Controls solution, which provides fan control and intelligent scheduling capabilities to the unit heaters. Each unit heater is equipped with 75F sensors and ground controls which wirelessly connect to the rest of the system. Building managers can set schedules for individual unit heaters, or group them together. Using Facilisight, unit heaters run according to the schedule, respond to sensors to accommodate desired temperature set points during occupied hours and are allowed to drift to a specified set point during off-hours to save energy. Three Square Market was able to schedule the temperature increase from 60°F to 64°F in the warehouse for company volleyball games on select days of the week.

Time	Mon	Tue	Wed	Thu	Fri	Sat	Sun
12:00 am							
04:00 am							
08:00 am							
12:00 pm	60	60	60	60	60		
04:00 pm							
08:00 pm	64	64		64			



Three Square Market was able to schedule the temperature increase from 60°F to 64°F in the warehouse for company volleyball games on select days of the week.



Employees at Three Square Market enjoying greater comfort and productivity (and recreation) throughout the office and warehouse areas. (Photo credit: Three Square Market).

THE RESULT

Three Square Market had great expectations for their new state-of-the-art headquarters office, which incorporated a mix of heating and air conditioning systems. 75F delivered unified web access and control with enhanced functionality at a fraction of the cost of traditional HVAC control systems. The 75F solutions spanned the combined 66 office and warehouse zones – a total of 115,000 square feet served by ten RTUs, eight unit heaters and one boiler. Three Square Market benefited from an extremely fast installation, implementing 75F devices using out of the box connections and wireless pairing. Facility managers at Three Square Market can see real-time data for each system, making diagnostics as easy as grabbing a mobile phone or a laptop (instead of a ladder). Finally, the employees at Three Square Market now enjoy comfortable offices and the ability to control their individual spaces for greater health, comfort and productivity, all while the company is saving energy.

The technology that 75F offers is above and beyond what everybody else does.

-Todd W. | CEO of Three Square Market and TurnKey Corrections

