

## Virginia Department of Motor Vehicles – HQ Building Performance Contract

Project Size: \$6,909,086

**Guaranteed Annual Energy Savings: \$284,130**

Contract Date: August, 2012



Prior to entering into an Energy Performance Contract with Trane, DMV's Headquarters Building (310,000 sq. ft.) in Richmond, VA had two 36-year-old centrifugal chillers and constant-volume pumps. The chiller plant operated at low efficiency due to aged equipment, antiquated controls, constant-volume operation, and an overall system design of low temperature differentials (10°F on both the chilled water and condenser water loops).

Trane redesigned the chilled water system with an EarthWise™ approach, focusing on optimizing the efficiency of the chiller plant while addressing the comfort needs of the building. The chillers were replaced with new centrifugal chillers with variable frequency drives (VFDs). The chilled water loop was converted to variable-volume flow. The new plant design utilized higher temperature differentials (16°F on the chilled water loop, 13°F on the condenser water loop), which improved efficiency and had the added benefit of allowing direct expansion (DX) air handling units to be converted to chilled water without increasing pipe sizes. New direct-digital controls (DDC) were installed on all of the equipment served by the chiller plant. The controls were programmed to optimize both energy efficiency and equipment life spans.

The boiler plant was also upgraded from constant-volume flow to variable-volume flow. Trane installed small boiler circulator pumps to keep a constant flow through the boilers, installed VFDs on the larger distribution pumps, and reconfigured the piping and control valves to accommodate the upgrades.

Upgrades to the DMV building included replacing all interior and exterior lighting systems with highly efficient illumination; water retrofits to increase energy efficiency and conserve water; deduct meters which help reduce sewer fees for cooling tower water; and replacement of over 1,200 windows.

DMV leaders expect the improvements to reduce energy consumption by approximately 36 percent and save \$284,130 a year. The upgrades also have reduced the buildings' environmental impact while improving building comfort for employees and visitors and supporting increased productivity for staff.



*In October of 2014, the Virginia Department of Motor Vehicles was recognized by Governor McAuliffe for its commitment to energy efficiency and sustainability and was awarded the Energy Efficiency Leader Award.*

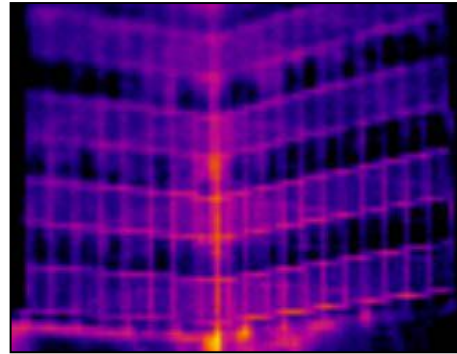
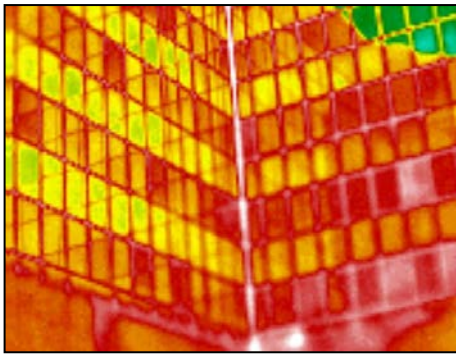
**BEFORE**



**AFTER**



*Windows in the before picture above look different from each other due to replacement one by one over the years. They are different colors/makes/models. There is dirt and/or moisture between the panes of glass on windows with failed seals.*



*Picture on the left, taken during the winter, shows thermographic imaging results prior to the execution of the Performance Contract. All the reds and yellows indicate infrared heat loss. The one on the right shows imaging results after execution of the Performance Contract.*



*Chillers shown on the left are quickly approaching the end of their useful life.*