Garage DCV System Case Study: CityView Plaza, San Jose

NES FG-20 Digital System Achieves a 96.5% kWh and 96.5% Peak kW Demand Savings – Reduces the Property's Entire, Annual Energy Bill by 8.94%

The Property

CityView Plaza is a fully integrated office campus situated on 11-acres in downtown San Jose, CA. The mixed-use, Class A campus consists of high-rise and mid-rise office buildings, spanning a full city block.

The property possesses a large, commercial garage with the same, full city block footprint, portions of which extend down two (2) levels. Daily traffic and occupancy in the garage, which can accommodate up to 1,100 vehicles, is always at maximum levels.

The largest portion of the garage is at ground level, and it receives a fair amount of natural ventilation. However, there is a small, enclosed portion of the ground level of the garage and two (2) fully enclosed, below-grade levels requiring mechanical ventilation.

CityView Plaza, San Jose, CA

The Savings Opportunity

Each below-grade level measures 47,000 square feet, with two (2), 15-horsepower (HP) motors exhausting vehicle fumes on a 24/7 basis. The ground-level portion that is enclosed measures approximately 10,000 square feet, and it is ventilated on a 24/7 basis by a 10-HP exhaust fan motor.

Power (kW) measurements showed the combined HP and runtimes of the three (3) garage exhaust fan motors — 8,760 hours per year, per fan — resulted in 196,974 kWh being consumed annually, with a correlating peak-period demand of 22.48 kW. Based on the property's electric utility rate of $0.155/kWh, the pre-retrofit cost to ventilate the enclosed portions of the garage amounted to $30,036 annually.

The NES System Solution & Results

In the fall of 2014, NES installed our FG-20 digital, demand-control ventilation (DCV) system for commercial garages. The NES FG-20 is designed to serve as a "stand-alone" system, but it can be readily scaled to comport with building management systems with BACnet® and Modbus® communication protocols, delivering a high degree of functionality and value-added features, including Internet accessibility.

In this instance, property management selected the Modbus-communicating, web-enabled version of the FG-20 system, such that the chief engineer and his staff are able to set and manage the system's operational parameters from their desktops, with real-time views of system component performance, e.g., VFD and motor speeds, individual CO sensor readings, milliamp continuity, etc.

Consumption	Without NES Controls	With NES FG System	$ Savings	% Savings
Total kWh	**196,974**	**6,889**	**190,085**	**96.5%**
Total Cost @ $0.155/kWh	**$ 30,036**	**$ 1,050**	**$ 28,986**	**96.5%**
Total kW Demand	**22.50**	**0.80**	**21.70**	**96.5%**

At CityView Plaza, the FG-20 controller monitors carbon monoxide (CO) readings provided by 14 Modbus CO sensors NES installed in the enclosed portions of the garage and, based on CO concentrations, sends a control signal to variable frequency drives (VFDs) connected to the garage's exhaust fan motors. The VFDs, in turn, modulate fan-motor speeds/ventilation rates to prevent CO levels from rising above a predetermined set point.

Post-installation data logging of kW consumption showed the NES FG-20 garage DCV system reduced the garage fan motors' combined kWh consumption by more than 190,000 kWh a year – an 96.5% savings. Peak kW demand was reduced by nearly 22.0 kW, which equates to a 96.5% savings.

Prior to retrofit, the garage ventilation system accounted for 9.3% of Cityview Plaza's total, annual electricity bill. The energy consumed by the garage ventilation system now represents just 0.36% of the property's total, annual energy bill – an 8.94% decrease.

After receiving a $19,277 incentive/rebate from PG&E for the energy savings obtained, the retrofit paid for itself in just 14.7 months.

About Nagle Energy Solutions (NES)

Nagle Energy Solutions, LLC (www.nagle-energy.com) is a developer, manufacturer, distributor and installer of an innovative demand-control ventilation (DCV) system for commercial garages that reduces energy consumption by an average of 95% – with quantifiable savings as high as 97% achieved – all while leaving your garage-fan motors running.

Our sales and service capabilities extend nationally and internationally.

NES digital controllers and peripherals are scalable and conform to several building management system (BMS) and energy management system (EMS) communication platforms, as well as monitor / report on energy consumption/savings.

Nagle Energy Solutions Contact: Frank Nagle (650) 854-1992 or frank@nagle-energy.com.