

Garage DCV System Case Study: Donatello Hotel, San Francisco

A 91.6% reduction in baseline energy consumption despite a 185% increase in garage fan runtime



The Donatello Hotel, 501 Post Street, S.F.

The Property

The Donatello is a boutique hotel in the heart of San Francisco's shopping and theater district and nearby Union Square.

The property possesses a four-story parking garage that accommodates approximately 150 hotel guest vehicles. The garage is open to hotel guests and the public seven days a week.

The Code Adherence Challenge

Recent revisions to the California Energy Code (Title 24) require commercial garages in properties with occupants (residents, guests, shoppers, employees, et al.) to run their garage ventilation systems during building-occupied hours. As such, simply shutting off garage fans to avoid expensive energy fees – which jeopardizes the health and safety of building occupants – is now prohibited.

To that end, Donatello Hotel management had set (via a remote timer) its single 25-horsepower (HP) garage exhaust fan motor to run a bit less than 12 hours (11.8) per day Monday through Friday, and leaving it off on the weekends.

That equates to an annual runtime of 3,076 hours, which meant having to ramp its garage-fan runtime to a 24/7 schedule (hotels are occupied continuously) to meet the new code standards. That equates to 8,760 hours per year – a 185% increase in fan runtime.

Add to the mix that the type of carbon monoxide (CO) system that for years has served as the industry standard – known as an “on/off” or “start/stop” system – completely disregards some basic engineering designs for proper building operation and ensuring the health and safety of its occupants, so it is now out of code.

The Energy Savings Challenge

Measurements taken by NES¹ to determine the garage fan motor's true power consumption showed the kilowatt-hour (kWh) usage to be 71,628 kWh per year, while peak kilowatt (kW) demand amounted to 23.28 kW. At a utility rate of \$0.1337/kWh, Donatello management paid \$9,577 a year to ventilate its garage.

Our challenge was to help hotel management meet the new code requirements, i.e., continuously ventilate the garage, while further reducing a relatively low-to moderate baseline of energy consumption due to the limited runtime of the garage fan motor.

The NES Solution

NES convinced the Wyndham sustainability team and hotel management to install an innovative, sensor-based, demand-control ventilation (DCV) system for commercial garages, highlighting its ability to manage huge increases in fan runtime(s) yet significantly reduce kWh and peak kW demand consumption.

In contrast to “on/off” CO sensor ventilation strategies, the garage demand-control ventilation system deployed by NES utilizes a proprietary, smart-control logic that detects and measures vehicle fumes in the space and then modulates fan speeds to prevent CO levels from exceeding 10 parts per million (ppm) for extended periods of time.

In doing so, the NES system better ensures (vs. “on/off”) the health and safety of building occupants and visitors by continually ventilating the garage while maximizing energy savings – up to 97%.

The Results

Two (2) weeks of post-installation data logging showed remarkable results. The system installed by NES provided an annual energy savings amounting to 65,617kWh and 22.1 kW in demand reduction. That represents a 91.6% reduction in kWh consumption and a 97.1% decrease in peak kW demand – after having increased the fan runtime by 185%!

Energy Use	Pre Installation	Post Installation	Savings	% Savings
Total kWh	71,628	6,010	65,617	91.6%
Total Cost @ \$0.1337/kWh	\$ 9,577	\$ 804	\$ 8,773	91.6%
Total kW Demand	23.3	1.2	22.1	97.1%

Our system reduced annual garage-operating costs by \$8,773. Hotel management now pays just \$804 per year – or \$2.20 per day – to ventilate the hotel's parking garage. PG&E rebated \$7,509 for the energy savings captured by our system, which pays for itself in just 28.5 months.

About Nagle Energy Solutions (NES)

Nagle Energy Solutions, LLC (www.nagle-energy.com) is a manufacturer, distributor and installer of an innovative demand-control ventilation (DCV) system for commercial garages that reduces energy consumption by an average of 93% – with quantifiable savings as high as 97% achieved.

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.

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1 NES utilizes a Summit Technology PowerSight 3000 Energy Analyzer/Meter to measure the baseline energy consumption. We monitored the voltage, current, true power and power factor for each phase of the fan motor. The PS 3000 readings/measurements are typically taken at 10-second intervals for approximately 12 to 15 minutes per fan motor.

kWh = Power Demand (based on actual measurements utilizing the PowerSight 3000 Analyzer/Meter) X operating hours per year.