

An Electronic Newsletter  
of EEA's Environmental  
Consulting Activities

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**EEA, Inc.**  
55 Hilton Avenue,  
Garden City, New York 11530  
(516) 746-4400, (212) 227-3200  
(800) 459-5533

additional New York offices:  
Stony Brook  
(631) 751-4600  
Albany  
(518) 573-7222  
Asheville, NC  
(828) 777-0610

e-mail addresses:

General:  
<mailto:eea@eeaconsultants.com>

Individual:  
First initial and last name  
[@eeaconsultants.com](mailto: @eeaconsultants.com)

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**INSIGHTS**



## **A**utomated Parking Systems Offer Air Quality and Fuel Consumption Benefits

*(printer friendly version uses Acrobat Reader)*

One of the newer technologies developed overseas and trying to make inroads into North America is the automated parking garage. An alternative to both valet parking and self-parking, with an automated garage, the driver enters the facility's staging area, driving just a short distance before stopping and turning off the engine. From there robotic platforms automatically convey the vehicle to a designated parking space. When the driver returns, the process is reversed with the vehicle conveyed back to the staging area, where the driver starts the engine and exits the garage.



**Automated Parking Garage**

Because the automated system involves much less driving within the garage, vehicular emissions should be greatly reduced, resulting in some quantifiable benefits to both air quality and fuel consumption. The [U.S. Green Building Council](#) crafted the [Leadership in Energy and Environmental Design \(LEED\)](#), a green building rating system that has been implemented internationally to promote green building design, construction, operations and maintenance solutions. The LEED Certification Program allows for independent evaluations to verify if a building meets the green building standards. Automated

**contact:**

Phase I ESAs

[Richard Fasciani](#)

Phase II/III Haz-Mat

Testing and Remediation

[Nicholas Recchia, VP, CPG](#)

Dredge Management Testing

[Jeffrey Shelkey](#)

EAS/EIS Studies

[Janet Collura, CWS](#)

Wetlands Studies and Design

[Laura Schwanof, RLA](#)

Marine Ecology

[Michelle Nannen](#)

Terrestrial Ecology

[Denise Harrington, AICP](#)

Air Quality and Noise

[Victor Fahrer, P.E.](#)

Environmental Management

Systems (ISO 14000)

[Robert Clifford](#)

Director of Strategic Planning

[James McAleer](#)

Restoration Ecologist

[Erin Brosnan](#)

Invasive Species Specialist

[Bill Jacobs](#)

EEA, Inc. –

Founded in 1979

Principals

Leland M. Hairr, Ph.D.

President

Allen Serper, M.S., P.E.

Vice President

Roy R. Stoecker, Ph.D.

Vice President

parking garage systems have been applied successfully to LEED building designs. The LEED rating system is based on achieving a certain number of points. The Automated System can give a project up to 12 LEED points.

EEA worked with [Simmatec](#)'s automated parking garage system to quantify the vehicle emissions this past year. EEA compared the potential emissions and fuel consumption impacts of an automated parking garage to those of a conventional (manual) parking garage. Although the procedures in the analysis were for a representative garage in New York City, the results should be comparable for garages in other metropolitan areas.

Emissions were estimated for vehicle travel within a 350-space manual parking garage versus a 350-space automated garage. The specific pollutants of concern were carbon monoxide (CO), volatile organic compounds (VOC),

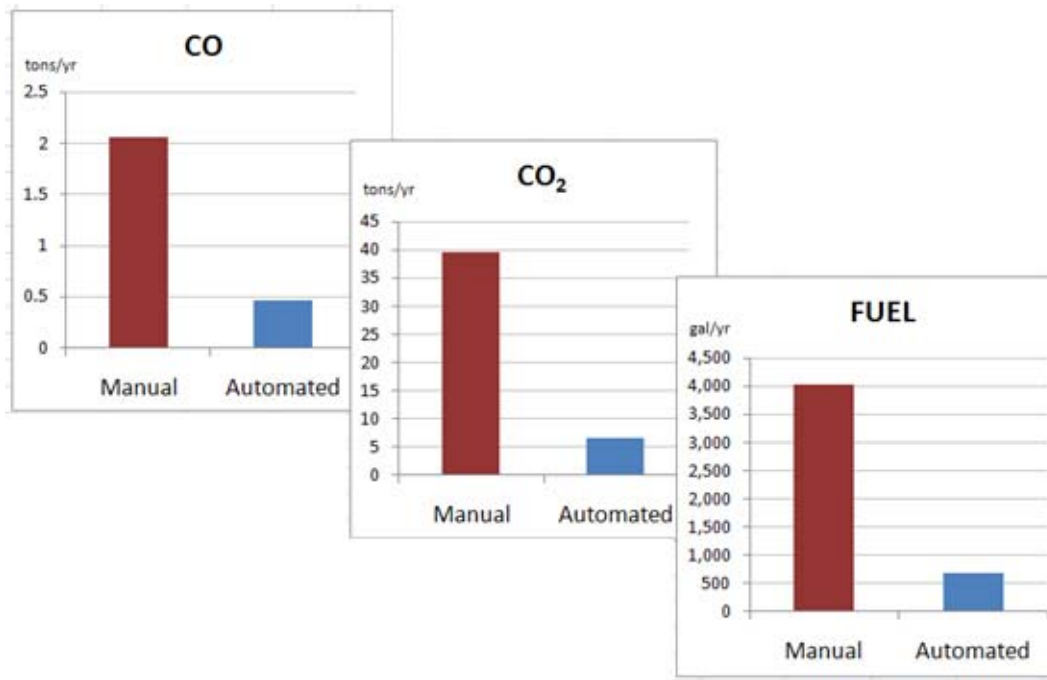
nitrogen oxides (NO<sub>x</sub>), and carbon dioxide (CO<sub>2</sub>), a “greenhouse” gas of concern with respect to global warming. In addition, gasoline and diesel fuel consumption was also evaluated. Parking garage emissions and fuel consumption were determined based on the hourly volumes of entering and exiting vehicles, the distance traveled, the average speed, and the amount of idling time.



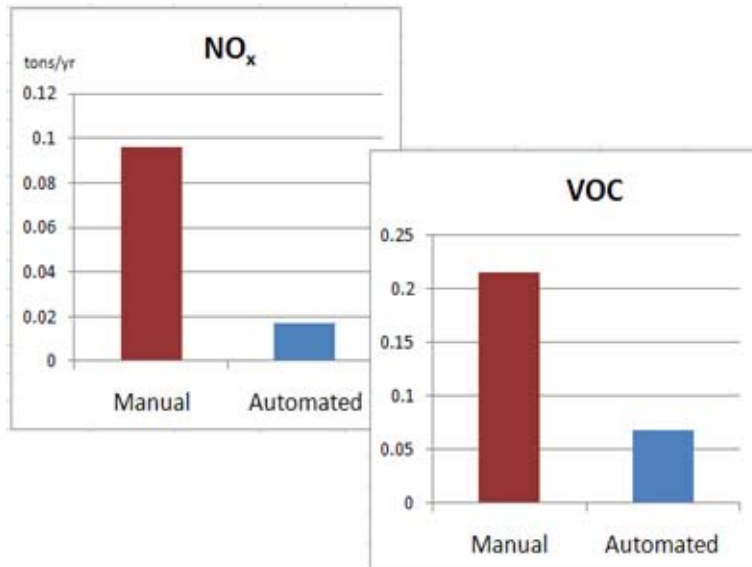
USEPA factors were used to determine the emission and fuel consumption rates for the parking facilities.

The hourly and daily pollutant emissions and fuel consumption for the manual and automated garages were then determined. The annual reductions, shown in the table below, were estimated by multiplying the daily values by 365 days per year. As can be seen, the automated garage results in a much lower level of emissions and fuel usage.

Parking Facility Type	Emissions (ton/year)				Fuel (gal/year)
	VOC	CO	NO <sub>x</sub>	CO <sub>2</sub>	
Manual Parking Garage	0.216	2.061	0.096	39.5	4,036
Automated Parking Garage	0.068	0.473	0.017	6.7	689
Reduction (%)	68	77	82	83	83



The analysis represented only an estimate of the mission reductions and fuel savings associated with an automated parking garage. The emissions and fuel consumption were based on a public garage operating 12 hours per day (7AM - 7 PM), 365 days per year. Although the results would vary for other types of parking facilities (e.g., accessory garages) and operating hours, the overall conclusion would remain: in comparison to manual parking garages, automated parking systems offer significant reductions in air pollutant emissions and fuel consumption. Although the absolute annual pollutant emissions from a single garage are not large, several hundred automated parking systems would result in a significant reduction in emissions.



In addition to the reduced emissions, Automated Parking Garages offer other benefits. They have an operating cost just under 50% of a Traditional Garage of the same number of spaces and have lower land acquisition costs due to a smaller footprint. The automated system also boasts a high safety rating. Many types of crimes, accidents and death-related incidents are eliminated including sexual assaults, automobile related accidents with children, damage to personal property caused by vehicular dents, car theft and break-ins.

For more information, please contact our Director of Air Quality & Noise, Vic Fahrer, at [vfahrer@eeaconsultants.com](mailto:vfahrer@eeaconsultants.com), or Bill Larson at Simmatec, at [williaml@areaco.com](mailto:williaml@areaco.com). You can also contact Vic at our Asheville, NC location (828) 777-0610.



INTERNET LINKS:



[Automated Parking, Robotic Parking, Parking Systems | Simmatec USA™ Automated Parking](#)

[National Parking Association](#)

[USGBC: Intro - What LEED Is](#)