

## ACUA's Electric Vehicle Technology

# Fact Sheet

## Ford Ranger Electric Vehicle



The ACUA is aggressively working to green its fleet and to encourage the development of infrastructure that will support the clean vehicles that are becoming available. The ACUA has been using alternative fuel vehicles for many years, from propane vehicles to biodiesel for its entire collection fleet, as well as an electric vehicle used onsite at the Wastewater Treatment Facility in Atlantic City.

The ACUA has installed electric charging stations at its Atlantic City and Egg Harbor Township sites and anticipates adding to its zero emission fleet. ACUA also opened a Compressed Natural Gas (CNG) filling station at the ACUA's Egg Harbor Township site in October 2010.

The ACUA has purchased a zero emission truck to be used in the wastewater operations. The vehicle is a 2000 Ford Ranger Electric Vehicle (EV), produced by the Ford Motor Company. Ford produced these electric trucks from 1998 to 2002.

ACUA purchased the EV truck from Blue Sky Motors of McClellan, California, a LLC that was established by the company first selected to provide mobile electric vehicle repair services for Ford postal electric vehicles in Northern California. The truck has less than 10,000 miles of use on it.

The Ford Ranger EV truck has a Nickel Metal Hydride (NiMH) battery pack located under the truck's bed, which charges in six to eight hours, has a driving range of 61 miles per charge and can reach maximum speeds of between 70 and 75 mph.

Electric vehicles offer a cleaner alternative to gasoline and diesel vehicles, especially when charged with electricity generated from renewable sources like wind, solar and landfill gas. The ACUA's Ford Ranger "fills up" on electricity generated from the ACUA's windmills and solar installation. Using the electric vehicle in place of a comparable gasoline powered truck will save the ACUA approximately \$1,259 per year; a 58 percent savings over fueling a comparable gasoline powered Ford Ranger.

Electric vehicles have a history of successful use and are seen as a viable alternative to cars and trucks powered by fossil fuels. Thousands of these clean vehicles—many of them zero-emission—are expected to start coming to auto dealerships in 2011.



*The newest edition to the ACUA's electric vehicle fleet is a Ford Ranger.*

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## Solar Powered Electric Vehicle

In 2008, the ACUA purchased its first electric vehicle, "Sunny." The vehicle is also known as a GEM, which stands for Global Electric Motors, a Chrysler company.

The ACUA's GEM is housed at the Wastewater Treatment Facility and is used for work on site. In just a little over a year, "Sunny" has provided 2000 miles of emission free service at the wastewater plant. The vehicle is a low-speed vehicle or neighborhood electric vehicle and is a legal street vehicle in nearly all U.S. states public roads that have a 35 mile-per-hour speed limit or less. New Jersey requires a local permit to operate the vehicle on public streets. It has a top speed of 25 mph and can travel up to 30 miles in distance on a single charge.



*The Atlantic County Utilities Authority uses solar and wind energy to power "Sunny" at the Wastewater Treatment Facility.*

"Sunny" has a battery which operates on a 72-volt system and can be recharged anytime and anywhere a standard 110-volt outlet is available. A 110-volt outlet is one of the most common types of outlets found in the home or office. The GEM can be charged by plugging into the very same outlet as that used for making coffee in the morning. It recharges in an average of six to eight hours.

The ACUA is recharging the vehicle with energy produced by its 500-kilowatt solar energy facility and the 7.5 megawatt Jersey-Atlantic Wind Farm. The power used to recharge the battery is clean and renewable and the vehicle itself does not emit any toxic or greenhouse gases.

"Sunny" is a GEM eS, a two-passenger vehicle with a short-back bed. Other models include a two-passenger GEM with a long-back bed, and a four-passenger and six-passenger GEM car. Each GEM model meets and exceeds all federal safety regulations for low-speed vehicles and are thoroughly tested at the Chrysler Automotive Proving Grounds for quality and endurance.

The vehicle was purchased from a local authorized dealer, Knopf Motors, located in Ambler, PA. in February of 2008 for \$12,000.



# Fact Sheet

## Electric Charging Stations

The ACUA has installed three Electric Vehicle Charging Stations at the Atlantic City Wastewater Treatment Facility and the Haneman Environmental Park in Egg Harbor Township. All three of the ACUA's charging stations are fed by the Authority's two microgrids and each station is powered by clean, 100% renewable energy sources. The Haneman Environmental Park's microgrid is powered by the ACUA's landfill gas to electric project while the Wastewater Treatment Plant's microgrid is powered by wind and solar energy. The ACUA hopes this project will jumpstart the use of electric cars and the development of charging stations, ultimately reducing pollution and its effects.



Wastewater Treatment Plant



Haneman Environmental Park

## V2G Technology

The ACUA, AC Propulsion, Comverge, Pepco Holdings (Atlantic City Electric's parent company), PJM Interconnect and the University of Delaware, as members of the MAGICC or Mid-Atlantic Grid Interactive Cars Consortium, have come together to further the development of vehicle-to-grid or V2G vehicles.

### WHAT IS V2G?

V2G is the technology that allows vehicles to run on electricity and generate revenue by storing and providing electricity for utilities. This technology, known as V2G or vehicle-to-grid, allows electricity to flow from the car's battery to power lines and back.

### HOW IT WORKS:

When the car is in the V2G setting, the battery's charge goes up or down depending on the needs of the grid operator. The V2G car will help balance the grid which often needs to store surplus power or use extra power to respond to the surges in use. The ability of the V2G car's battery to act like a sponge provides a solution for utilities, which pay millions to generating stations to help balance the grid. With these cars it will lessen such costs. V2G also provides an answer to the intermittency of renewables such as wind and solar. While electrical demand may have predictable peaks, wind and solar power do not always generate electricity when it is needed most.

Having several V2G cars plugged in to the grid can allow the vehicles to store the clean, renewable power and then act as a battery, putting the electricity from renewable sources back onto the grid when it is needed.

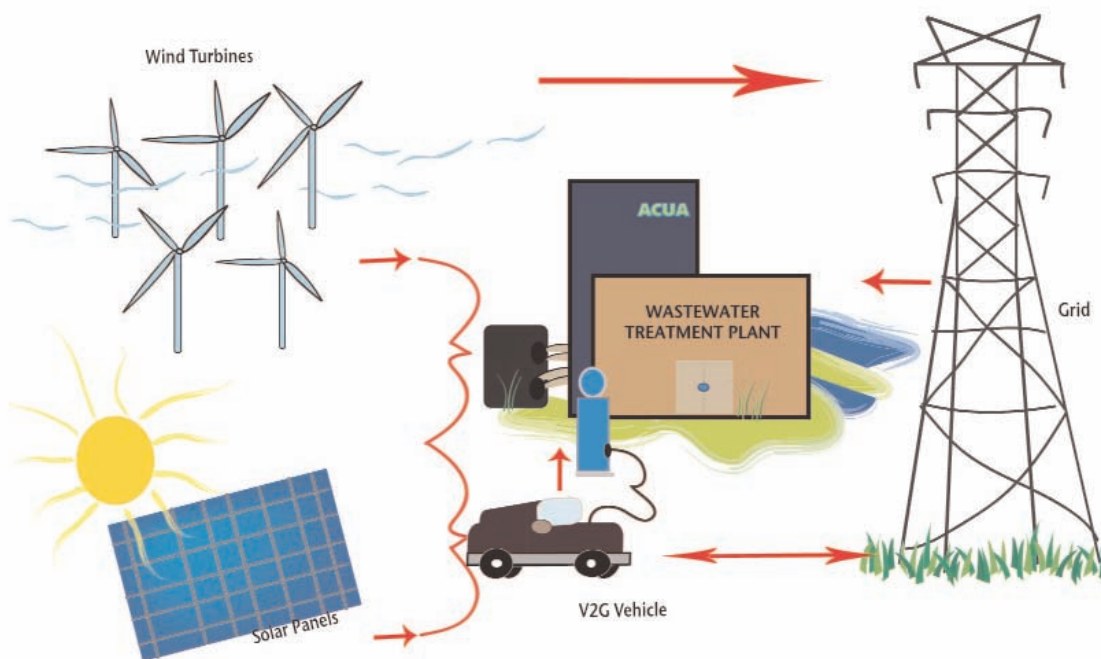


# V2G Technology



## V2G FACTS:

- University of Delaware has purchased a Toyota Scion retrofitted by AC Propulsion which operates as an all electric V2G car.
- This model provides both lightness and plenty of passenger room.
- Emissions: The car itself produces no carbon dioxide emissions
- Acceleration: 0 to 60 miles per hour in 7 seconds
- Top Speed: 95 miles per hour
- Range: 120 miles highway, 150 miles city
- Battery Life: 5 years or about 50,000 miles (being tested and verified)
- Recharge: 2 hours using 240-volt plug or overnight using 110-volt plug
- Maintenance: No oil changes; brakes last three times longer because the car has regenerative braking, a mechanism that slows the car and returns power to the battery.



Fuel/Price Comparison Chart

VEHICLE TYPE	FUEL PRICE	FUEL COST PER MILE	ANNUAL FUEL COST (10,000 MILES PER YEAR)
Plug-In Electric Car	\$0.085 per KWH (ACUA rate)	\$0.017	\$170
	\$0.130 per KWH (grid price)	\$0.026	\$260
High Efficiency Gasoline Car (32 mpg)	\$2.40 per gallon	\$0.075	\$750
	\$3.00 per gallon	\$0.094	\$940
Standard Efficiency Gasoline Car (25 mpg)	\$2.40 per gallon	\$0.096	\$960
	\$3.00 per gallon	\$0.120	\$1,200

