



**University of Central Florida
Orlando, Florida**

Transportation - 100 Percent Solar Powered Fleet Vehicle

SCHOOL

The University of Central Florida (UCF) is the nation's 3rd largest public 4-year university with over 53,000 students. The main campus is located in thriving, dynamic Orlando, Florida. UCF students can choose between 225 degree programs from one of its 12 colleges on 11 regional campuses. UCF's culture of opportunity is driven by its diversity, history of entrepreneurship, youth, energy, and Orlando's environment.

ABSTRACT

The University of Central Florida (UCF) may be the only university in the United States with a quirky, solar-electric fleet vehicle in daily use that runs solely on solar energy. The department of Sustainability & Energy Management purchased a Zenn car in 2008 and retrofitted it with three solar panels. The rooftop solar panels have successfully maintained the vehicle charge to date. This means no fuel, no plugging in, and no emissions for close to 3,000 miles so far; a nearly carbon neutral mode of transportation for UCF!

GOALS AND OUTCOMES

Goals

UCF is committed to being a leader in sustainability. The solar-electric car reduces UCF's dependence on fossil fuels, minimizes its emissions, and raises awareness of the benefits of solar energy. The solar-electric car is utilized for daily business activities and educational outreach to UCF students and the wider community. David Norvell, director of UCF's department of Sustainability & Energy Management, hoped that UCF's solar car would educate and inspire others to start driving green. "When people see our solar car around campus, they always stop and ask about it," Norvell said, "It's such a great way to educate people about sustainability." Additionally, the solar-electric car is a demonstration project to ascertain if it could meet the on-campus driving needs of a department. If successful, the department would advocate for an expansion of solar-electric vehicles for the University's fleet.

Accomplishments and Outcomes

UCF's department of Sustainability & Energy Management purchased a Zenn electric car and retrofitted it to run on solar power alone. Three solar panels were installed to the roof of the vehicle at the beginning of 2009. Two of the three panels, connected in a series, are used to power a 48V charge controller. The remaining panel powers a 24V charge controller. Together, the two produce the needed 72V for the vehicle. The solar panels, secured on the car's roof, convert the sun's energy into electricity that keeps the battery charged, even at night and on overcast or rainy days. Without the solar panels, the car would need to be plugged into an electrical outlet every 35 miles for eight hours to recharge the battery. The rooftop solar panels have successfully maintained the vehicle charge to date. This means no fuel, no plugging in, and no emissions for close to 3,000 miles so far; a nearly carbon neutral mode of transportation for UCF! UCF's solar-electric vehicle has demonstrated that it can meet the on-campus driving demand for the

department of Sustainability & Energy Management. The University is currently working on obtaining the necessary approvals from governmental agencies to expand this initiative.

Challenges and Responses

The UCF solar-electric car is registered in Florida as a neighborhood electric vehicle, or NEV, which means, by law, it is allowed only on roads with speed limits of up to 35 miles per hour. This makes it an ideal vehicle for getting around college campuses, residential communities, and resorts. The department utilizes the solar-electric car for on-campus driving and has a gas-electric hybrid vehicle for long-distance, highway driving. Owning a solar-powered car might seem pricey to some, but David Norvell feels that it's important to factor-in the low maintenance costs, zero fuel costs, and the current federal stimulus tax credits available to buyers of "green" vehicles. In 2009, a federal tax credit of nearly \$3,500 was available to buyers of neighborhood electric vehicles.

Campus Climate Action: Your School's Carbon Footprint

All the energy needed to power UCF's solar-electric vehicle comes from the sun, a renewable resource. Consequently, there is no fuel, no plugging in, and no emissions for close to 3,000 miles so far; it is a nearly carbon neutral mode of transportation for UCF!

Commentary and Reflection

The solar-electric car has performed beyond our expectations in keeping the vehicle charged to date and generating interest within the community. The solar-electric vehicle has traveled close to 3,000 miles, so far, without additional fuel, no plugging in, and no emissions. Additionally, when people see our solar car around campus, they always stop and ask about it. It is a great conversation starter and a great way to educate people about sustainability.

ENGAGEMENT AND SUPPORT

Leaders and Supporters

UCF had involvement from numerous students and staff from purchasing the vehicle, installing the solar panels, to marketing the vehicle in educational outreach programs.

Funding and Resources

UCF purchased the Zenn electric car with air conditioning for \$18,000. The solar panels were purchased separately from a local retailer for \$2,000. Professional installation of the solar panels might cost \$500. In comparison, a new, mid-sized hybrid vehicle, powered by gasoline and battery, can cost more than \$20,000. All-electric plug-in vehicles capable of higher speeds can cost \$50,000 or more. The solar-electric car's electric motor means the car has no oil, timing belts, fuel injectors, spark plugs, mufflers, or other typical fuel-engine parts to maintain. The battery pack, at \$2,000, typically lasts three years, but the solar panels extend the battery life by providing a constant charge. This cost is much less than what it would cost to fuel and maintain a gas-powered car for three years. Tire and brake maintenance costs are comparable to the costs for similar-sized vehicles. Because of the car's lower speed, the brakes will last longer than brakes on high-speed vehicles.

Education and Community Outreach

UCF's solar-electric car is a great example for the students, staff and faculty on how they can help reduce their own carbon emissions. The vehicle is driven daily as part of an effort to spread the word to the University community about the benefits of solar energy and carbon neutrality. As such, the solar-electric car is an often requested vehicle for community events and "green" educational outreach programs. These events can range from programs with the Boy Scouts, Junior Achievement, to student groups and departments on-campus. Additionally, the department of Sustainability & Energy Management had a

contest to name the solar-electric car. The winning name was “Sunny” and the student who suggested that name won the honor of driving the vehicle during the 2009 Homecoming Parade.

National Wildlife Federation’s Campus Ecology Program

The Campus Ecology program provides great resources about what other institutions are doing in the field of sustainability.

CONTACT INFORMATION

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MORE ABOUT YOUR SCHOOL

Campus Sustainability History

In 2007, UCF President John Hitt took a stand on climate change and pledged that UCF would become climate neutral as soon as possible, or by year 2050 at the latest. Dr. Hitt’s plan is to reduce UCF’s environmental footprint and integrate sustainability into core aspects of the university, including:

- Educating students and our community members about their impact and creating valuable solutions through programs such as the Unifying Theme, an interdisciplinary, academic discussion about the environment, potential solutions, and opportunities for direct student involvement; experiential learning; and community service.
- Minimizing the university’s footprint through conservation, efficiencies, the use of cleaner fuels, renewable energy, and carbon mitigation and offsets. This includes goals such as constructing all new buildings to meet at least LEED Silver standards and having all major buildings on campus ENERGY STAR certified.
- Research into products, methods, technology and policies to advance sustainability.