



Leadership in Technology and Research: Supporting Alternative Energy in an Academic Setting

North Carolina State University's Commitment to Plug-in Electric Vehicles
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With petroleum prices maintaining historic heights and a growing emphasis for more fuel/energy efficient vehicles, the transportation industry is in need of new ideas and innovation. On North Carolina State University's Centennial Campus, where academia and research blend to foster future technology advances and change, plug-in electric vehicles (PEVs) are dynamically launching a new research platform as part of a living laboratory.

PLUG-IN ELECTRIC VEHICLES AS A SOLUTION

Understanding the scope and gravity of the problems transportation faces, NCSU teamed with Centennial Campus partner Advanced Energy to provide workplace electric vehicle charging to support the availability of first generation PEVs. This partnership launched a platform from which research on electric grid implications, user habits and charging demand can be analyzed. The aspect of living lab is complete in that commuters, students and visitors to Centennial Campus can travel emission and petroleum free, recharge, and continue their travel using one-fourth of the net energy required by petroleum fueled vehicles.

ENABLING INNOVATION AND ADOPTION

Advanced Energy leveraged the U.S. Department of Energy (DOE) and North Carolina State Energy Office (NCSEO) consumer adoption initiatives to offer \$15,000 in incentives to early adopters toward the purchase of a Nissan LEAF in exchange for participation in Advanced Energy's PEV Consumer Usage Study (\$7,500 off of the purchase price and \$7,500 in federal tax rebates).



Plug-in electric vehicles take advantage of new charging stations offered on NCSU's Centennial Campus

Also, in collaboration with Triangle J Council of Governments and DOE Clean Cities organizations, Advanced Energy worked with corporate campus partners in the North Carolina Research Triangle Area to deploy 24 charging stations and provide employee education on the benefits of electrified transportation through the Carolina Blue Skies Initiative.

CHARGING INFRASTRUCTURE

Three Centennial Campus commuters are participants in Advanced Energy's PEV Usage Study, which seeks to evaluate changes in driving and vehicle operating behaviors throughout a two-year period by collecting unique, specific data from 40 individual owners of the all-electric Nissan LEAF.



Supporting Alternative Energy in an Academic Setting

Under the Carolina Blue Skies Initiative, NCSU installed 10 Level 2 PEV charging points at five different locations across campus.

Advanced Energy assisted the installation through site selection and education for interested employees. NCSU's Centennial Campus charging stations have proven successful in accommodating campus PEVs, providing a living laboratory for research and development, and showcasing transportation energy alternatives in public spaces and roadways.

NEXT STEPS

Next steps include attracting electric vehicle technology researchers to locate on and benefit from the unique synergistic opportunities on Centennial Campus. NCSU leadership plans to expand charging station availability to NCSU's main campus and increase consideration of electric powered vehicles for University operations and maintenance.

PEV LEADERSHIP

Research among a variety of alternative energy solutions for transportation continues at the Centennial Campus. Electric powered transportation and supporting electric power infrastructure are an integral part of Centennial Campus's next generation research and development.

Advanced Energy is a North Carolina and global resource that focuses on energy efficiency for commercial and industrial markets, electric motors and drives, plug-in transportation and applied building science. Their facility houses state-of-the-art laboratories, where testing and applied research is performed in all of these evolving disciplines. The Freedom Center houses the latest developments on Smart Grid Technology including vehicle to grid applications. ABB and other industry partners are continuing research and development on campus of next generation power systems security including micro grid operation for vehicle to grid applications. For more information on NCSU Centennial Campus partners, visit www.ncsu.edu/partners.



NCSU's Centennial Campus installed Level 2 charging stations at five different location across campus.



LESSONS LEARNED

Site Selection

Sites were chosen to locate charging opportunities within a short walk to campus buildings. Two centrally located parking decks on-site had adequate electrical supply to accommodate charging station placement. The site selection process and installation was straight forward. Other locations selected were convenient surface lots. NCSU is exploring placement of additional stations on Main Campus.

Equipment Selection

Hubbell pedestal “PEP” chargers were selected through a competitive bid RFP solicitation. The units are attractively mounted with an integral pedestal eliminating the need for protective bollards. Functionality of the Level 2 chargers includes full charge-event recording software, vehicle to owner communications, and the ability to integrate “Pay for Charge” events as needed.

Installation

Installation was performed by Hubbell in accordance with the RFP awarded. The installation was straightforward with no significant hurdles described or brought to the attention of Centennial Campus. Installation within the selected sites were chosen based on their convenience and proximity to adequate power supply. The total cost to purchase and install five stations at five different sites was \$125,000. Funding through U.S. DOE totaled \$50,000 and leveraged a \$75,000 investment from Centennial Campus Development office.

Employee Education

On April 19, 2012 Brian Jones with the Centennial Campus Development Office announced the upcoming completion of Level 2 electric vehicle charging station installations in conjunction with Centennial Campus’s Sustainability Day Celebration via a Town Hall Meeting. The celebration included PEVs on display and a question and answer session.

Operation/Policy

Anyone working at or visiting Centennial Campus (e.g., employees, contractors, visitors, students, etc.) may use the chargers free of charge for up to four hours; however, a parking permit is required.

Maintenance

The RFP award with Hubbell includes a two year maintenance contract. There have been some connection issues that have required some stations to be reset. Hubbell and NCSU continue to monitor the situation.



ABOUT ADVANCED ENERGY

Advanced Energy, headquartered in Raleigh, N.C., serves as a national resource, focuses on Transportation, Renewables, Motors and Drives, Industrial and Buildings, creating economic, environmental and societal benefits through innovative and market-based approaches to energy issues.

Advanced Energy's Transportation Initiatives team is working to assist communities in understanding, planning for and implementing electric transportation initiatives. An established figure in the development and deployment of plug-in electric vehicle technologies, Advanced Energy successfully facilitated the creation of the world's first commercially available plug-in hybrid vehicle in 2007. Advanced Energy also works with municipalities, electric utilities and National Laboratories monitoring and evaluating the performance of numerous fleets of plug-in hybrid vehicles across the country, including the Plug-in Hybrid Electric School Bus program.

Advanced Energy currently manages the NC Get Ready and the NC PEV Taskforce programs to accelerate the adoption of electrified transportation in North Carolina – two of the key initiatives in the nation making a true commitment to the widespread acceptance of electrified transportation. For more information, visit www.advancedenergy.org.

