



## City of Raleigh Electric Vehicles Infrastructure Project Wrap-Up

Between November 2010 and December 2011, City of Raleigh installed 29 electric vehicle (EV) charging stations; 18 public charging stations and 11 fleet charging stations. The approximate cost of \$303,272 was financed through grants created by the American Recovery and Reinvestment Act (ARRA): \$250,000 from Alternative Fleet Advancement Vehicle Technology, including a City match of \$125,000; \$30,000 from the Energy Efficiency & Conservation Block Grant; and \$23,272 from Clean Fuels Technology.

The 18 City installed public charging stations have a total of 31 plugs. Ten are Level 1, which take 10-to-12 hours to fully charge a vehicle and 21 are Level 2 stations. Sixteen of the Level 2 stations are also up-fitted with Level 1 outlets. The public EV infrastructure is designed to allow consumers to “top off” the EV battery, not provide full charging – which is typically done at home. The public charging stations are pay-to-park, free-to-charge.

The City’s installation of EV charging infrastructure lines up with its strong commitment to electric transportation as well as to other forms of alternative fuels. “Raleigh had several goals and priorities in preparing for and supporting PEV adoption,” said City of Raleigh Sustainability Manager Paula Thomas in describing why Raleigh took on this project. She continued, “These goals and principles include potential for economic development, providing leadership for other municipalities, developing new partnerships, and of course, environmental protection.”

Additional accomplishments related to the EV infrastructure installation include:

- Raleigh successfully removed and reduced barriers to plug-in vehicle adoption by offering contractor and inspector education and training, and by addressing building codes, electrical codes, and city ordinances related to uniform standards, signage, parking, and fees for charging;
- Raleigh streamlined the permitting and inspections process for electric vehicle supply equipment installation;
- Raleigh is one of three cities, and the only city on the east coast, to participate with the Rocky Mountain Institute Project Get Ready initiative to prepare the national roll out of plug-in vehicles;
- Raleigh’s vehicle fleet upgrades include plug-in electric vehicles;
- Raleigh, in partnership with Progress Energy Carolinas, recently installed the city’s first Solar-Powered charging station which will provide information for research, evaluation and development.

Raleigh’s EV infrastructure accomplishments have garnered widespread attention. In May 2012, the City was listed among international metropolises such as Barcelona, Berlin and Shanghai, as well as American municipalities of Los Angeles, New York and Portland, Ore, as a leader in PEV readiness in the international report, “Electric Vehicle EV City Casebook: A Look at the Global EV Movement,” published by the Center for Climate and Energy Solutions (C2ES).

Other emerging issues regarding public perception of electric vehicles and EV charging stations:

1. Growth of plug in electric vehicles (PEVs) in NC:

- a. Plug in Electric Vehicles are here in North Carolina and the numbers are growing.
  - i. NC DMV records show that as of August- there are over 700 registered vehicles in NC.
  - ii. PEVs have only been available in NC for approximately one year - so we are still in the beginning stages.
- b. PEVs, nationally, are being adopted at a faster rate compared to the launch of hybrids in the early 2000s because of sustained rising gas prices, federal tax incentives, and the buy-in from all major automakers.
- c. The sales of PEVs are steadily increasing each month nationally (see chart at bottom of this response)
- d. An article released Oct 28 reports that the Prius is now the top selling vehicle in California. [http://www.upi.com/Business\\_News/2012/10/28/Auto-Outlook-Is-California-the-trend-setter-Prius-No-1/UPI-38501351416600/](http://www.upi.com/Business_News/2012/10/28/Auto-Outlook-Is-California-the-trend-setter-Prius-No-1/UPI-38501351416600/)
- e. PEVs are a long-term, viable alternative to gasoline powered cars; it is reasonable that widespread adoption will be a decades-long process as was the uptake of gasoline vehicles over 100 years ago. We must allow time for the public and private investments already made to bear fruit.

2. Use of public charging stations:

- a. Most charging occurs at home so it should be expected that public charging stations will not always be in use; they are for topping off charges.
- b. The charging stations help stakeholders learn consumer behavior so they can optimize their future investments.
- c. Because electric vehicles have only been available in North Carolina for only a year, it is expected that the usage will be lower for the first few years. The City of Raleigh, which aims to be a 21<sup>st</sup> Century City of Innovation, installed the charging stations in order to be ahead of the adoption curve; and it was expected that the usage would remain low at the beginning of this initiative.
- d. City of Raleigh collects usage data on the installed charging stations using Periscope monitoring software. The data shows:
  - i. Throughout 2012 usage of the electric vehicle charging stations consistently increased each quarter, with the total number of charging occurrences registering at 4737. The first eight days of 2013 show 120 charging occurrences.
  - ii. The average charge time is between 1-2 hours. This is consistent with assumption models that indicate a majority (80%) of charging will occur at home. Some



Figure 1 Charging Cycle Image, Advanced Energy, Residential Charging Station Installation Handbook

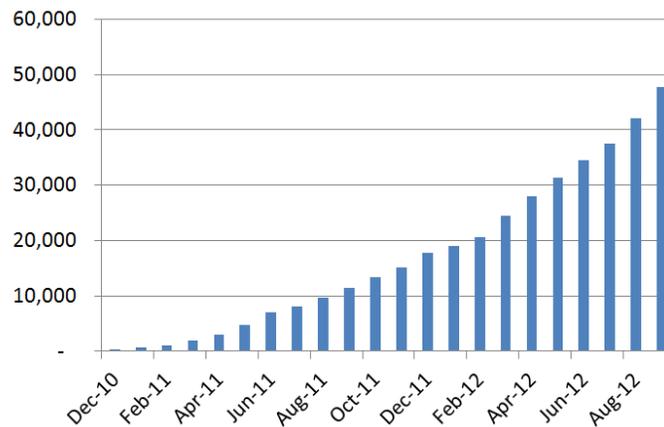
have expressed concern regarding the lack of consistent use of public charging stations. However, the intent of public charging is not to recharge a car completely, but to top off or add range while the user is frequenting local businesses.

- e. In general, installation of public charging stations is an important part of the adoption process. It helps to assure the public who are considering purchasing a PEV that there are public charging options available.

### 3. Investment of public funds

- a. It is the City's position that government should not fund the entire infrastructure costs for PEVs. The initial, small investments made will help automakers, electric utilities, and infrastructure providers learn how to deploy charging infrastructure cost-effectively. This is more about learning and helping to enable a new market – not about wasting taxpayer dollars.
- b. Government has a history of supporting new and innovative technologies. Similar to the provision of wi-fi service at public venues, charging stations support an innovative technology. Supporting electric transportation could be compared to fostering mobile computing, which has spawned much research and many enterprises across the Triangle.
- c. Improve the Quality of Life of its citizens.
  - i. Government support of electric transportation through the provision of public charging stations reassures citizens that a PEV is suitable for them, encouraging adoption.
  - ii. PEV usage can reduce or eliminate point-source emission of criteria air pollutants, thus improving air quality wherever the vehicles are utilized.
  - iii. Controlling criteria air pollutant emissions helps to ensure compliance with federal requirements tied to highway funding, so PEV usage helps ensure that the region receives that funding.
- d. Fostering Economic Development. North Carolina is establishing itself with several clusters of plug-in electric vehicle industries. The NC Clean Energy Industries Census, released October 2012, by the NC Sustainable Energy Association, found that there are 57 industries in NC that work with alternative fuel vehicles, including electric vehicle components and infrastructure. The Clean Energy Census indicated that the clean energy field is growing in North Carolina even with the recent economic recession. In fact, in the 2011 Clean Industry Census, electric vehicle technology was categorized with energy storage technology. In that year, the Clean Industry Census noted that there was significant growth since 2009 which led to alternatives fuels being categorized in a separate section in 2012. Some examples of local businesses working in the electric vehicle industry include Eaton, Siemens, Schneider Electric, and GE. These industries are employing workers in the high tech fields in the Raleigh area, as well as manufacturing positions.

## Cumulative PEV Sales



Data Source: [www.green.autoblog.com](http://www.green.autoblog.com)

### Contributors:

City of Raleigh  
Advanced Energy  
Center for Climate and Energy Solutions (C2ES)  
Triangle Clean Cities Coalition

### Additional resources:

[2012 in Review: EVs find success by the numbers](http://reneweconomy.com.au/2012/2012-in-review-evs-find-success-by-the-numbers-42219)

<http://reneweconomy.com.au/2012/2012-in-review-evs-find-success-by-the-numbers-42219>

Response to op-ed on “Middle America climate strategy”:

<http://www.c2es.org/blog/greenwaldj/%E2%80%9Cmiddle-america%E2%80%9D-climate-strategy-must-include-policies-bring-clean-energy-market>

Response to NJ expert blog on EVs after A123 bankruptcy:

<http://www.c2es.org/blog/claussene/patience-policy-needed-drive-toward-sustainability>

Raleigh listed among global leaders in PEV readiness. “Electric Vehicle EV City Casebook: A Look at the Global EV Movement”:

<http://www.iea.org/evi/evcitycasebook.pdf>

Triangle Recognized As A Global Leader In Driving Electric Transportation

<http://www.raleighnc.gov/home/news/content/CorNews/Articles/DrivingElectricTransportation.html>

Letter to Editor in response to op-ed on EVs:

<http://www.c2es.org/newsroom/opeds/pev-industry>

PEV Action Plan Announce:

<http://www.c2es.org/blog/nigrn/time-some-action-pevs>

EPRI Plug-In 2011 Overview:

[www.youtube.com/watch?v=2w5r8prDM5o](http://www.youtube.com/watch?v=2w5r8prDM5o)

Project Get Ready

[http://www.rmi.org/project\\_get\\_ready](http://www.rmi.org/project_get_ready)

Raleigh Sparks Innovation with Electric Vehicles

<http://www.youtube.com/watch?v=PxBqs-tDC2w>

Five Real-World Facts About Electric Cars

[http://blog.rmi.org/blog\\_Five\\_Real\\_World\\_Facts\\_AboutElectric\\_Cars](http://blog.rmi.org/blog_Five_Real_World_Facts_AboutElectric_Cars)