



Virginia Clean Cities DC Fast Charger Deployment Project 2014-15

Prepared by Matthew Wade, Deputy Director
Virginia Clean Cities
September 9, 2015



Electric Vehicles

Virginia's DC Fast Charger Deployment 2014-15

Program Activity: Virginia Stakeholder Technical Assistance and Coalition Support

Accomplishment: Deployment of 25 DC Fast Chargers (by September 30, 2015) throughout Virginia where there were previously none.

Private investment: More than \$750,000 in equipment and technical assistance provided to site hosts

Outreach Activities: Virginia Clean Cities (VCC) conducted target outreach to nearly 30 site hosts. VCC held press events and ribbon cuttings at four DCFC openings (Staunton, Richmond, Williamsburg, and Ashland).

Project Beginnings

Prior to 2015 there were zero DC Fast Chargers (DCFC) for electric vehicles outside of Northern Virginia. Virginia Clean Cities identified the need for DCFC through talking to EV drivers and EV manufacturers. The DC Fast Charger Deployment program began in July 2014 with conversations between business leaders in the private sector and Alleyn Harned and Michael Phillips of Virginia Clean Cities. These discussions were focused on Virginia Clean Cities' ability to find suitable site hosts for Signet DC Fast Chargers. The goal of this program was to build out the publicly accessible quick charging infrastructure in Virginia by removing the chief impediment to installation: cost. By helping support the acquisition of the equipment and providing financial and technical assistance with installation, existing barriers were reduced and site hosts became more eager to participate. VCC would act as the "boots on the ground" and find and vet potential site hosts.



Figure 1: VCC Staff with Staunton and Ryder-Pingry staff at the Staunton ribbon cutting event.

A second component of this project was the advertisement of Tesla Destination chargers for businesses. VCC played an active role in responding to questions about the availability of Tesla Destination Chargers and directing interested parties to contacts with Tesla.

The Outreach Strategy

The original scope of the project called for VCC to find site hosts for six DCFCs in Richmond and Norfolk. VCC staff, led by Matthew Wade, strategized on the parameters for deployment and began by using Google Maps to pinpoint potential locations in these two larger metro areas. These locations included shopping centers, entertainment districts, historic downtowns, local government parking lots, hotels, movie theaters, gas stations. Each potential site was evaluated based on the following categories:

- 1) Proximity to major interstate (< 3 miles)
- 2) Proximity to commercial districts and retail or cultural experience (45 minutes or greater)
- 3) Availability of three phase, 208V or 480V, 100 amp electrical service
- 4) Availability of parking in a safe area.



Figure 2: A LEAF recharges in Ashland.

Contact information for site hosts was found utilizing publicly available Google information to find managers or staff at each location. VCC also utilized internal state contact databases. VCC then contacted each potential location to inform them of this program and determine their level of interest.

In addition to targeted outreach, VCC hosted a monthly regional conference call and made presentations on the benefits of the program the Virginia Green Tourism Program and the Virginia Parking Association.

Project partners and site hosts

Private business partnerships

First and Market parking lot (Charlottesville)
Homewood Suites (Charlottesville)
Mac's Service Center (Ashland)
Crenshaw Avenue Parking Deck (Carytown/Richmond Parking)
New Town (Williamsburg)
Woodfin Pit Stop (New Kent)
RMA Parking Lot (Staunton)

Woodard Water Street Parking Lot (Charlottesville)
Aloft (Short Pump)
Courtyard Marriott (Glen Allen)
Homewood Suites (Chester)
Hilton Garden Inn (Colonial Heights)
Residence Inn (Newport News)
Courtyard Greenbrier (Chesapeake)
Bojangles (Virginia Beach)

Econo Lodge Oceanfront (Virginia Beach)
In Development - Historic Hampton Inn (Lexington)
In Development - 5 Guys (Harrisonburg)

Public or government partnerships
Main Street Station (Downtown Richmond)
Scope Arena (Norfolk)
Pretlow Library (Norfolk)
MacArthur Center (Norfolk)
Downtown Roanoke
In Development - Town Hall (Blacksburg)
In Development - Front Royal Visitor Center (Front Royal)

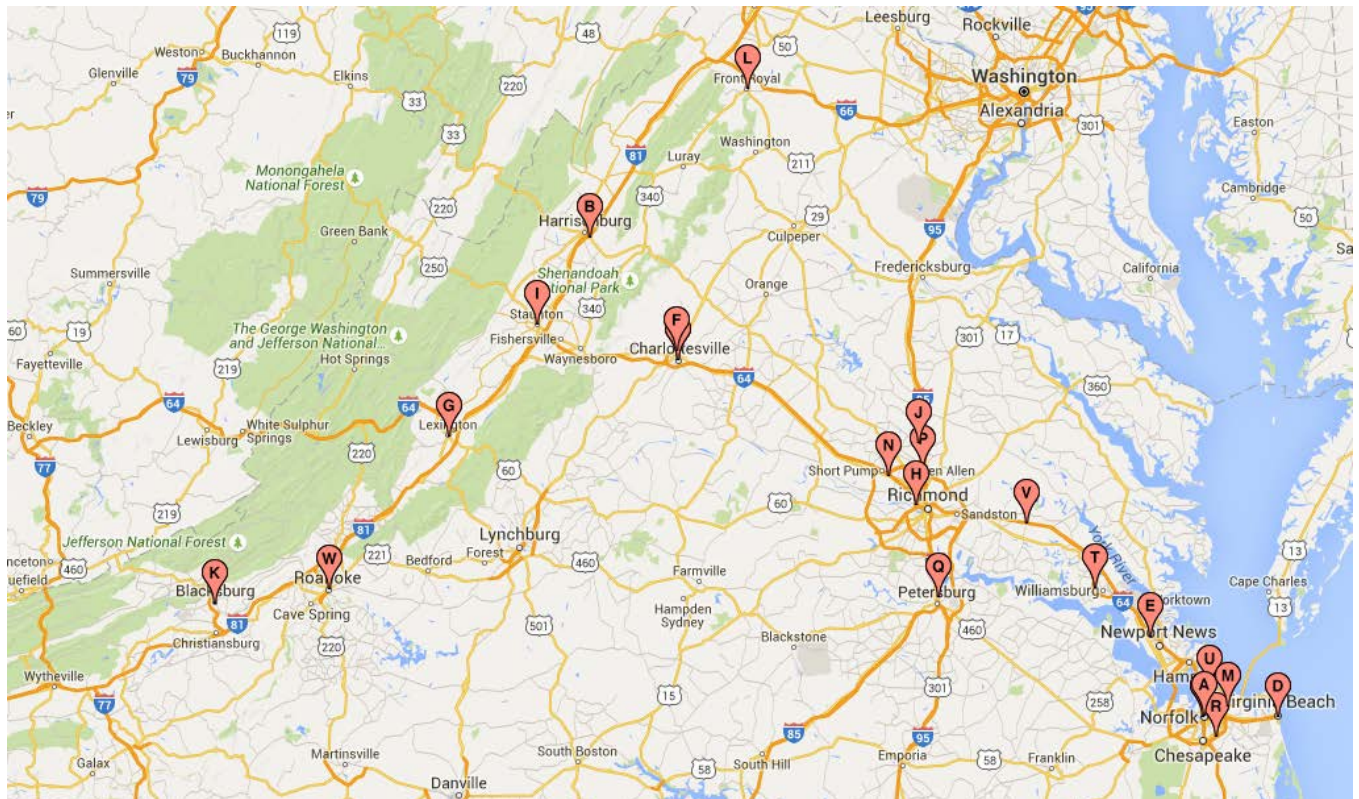



Figure 3: Map of VCC's DCFC Deployment through September 9, 2015.

Many stations are intentionally free to access the charging equipment. However, some are located in pay-to-park lots. Several site hosts have chosen to assess a low fee for the use of the equipment.

Type of equipment:
Signet FC50K+SAE Combo Charger




SIGNET
SIGNET SYSTEMS INC.

Electric Vehicle Charging Infrastructure Solutions

DC Fast Chargers

Multi-standard 50kW fast charger - for both CHAdeMO & SAE Combo standards



Type		CHAdeMO + SAE Combo	
Model		FC50K-CC-S	
Mechanical Max. Size, Weight		680D*780.4W*1129H (mm) * ADA Compliant	
AC Input	Voltage	3phase 4wire, AC 380 ~ 480V (Standard) 3phase 3wire, AC 208 ~ 280V (Optional)	
	Frequency	50/60 Hz	
	Power Factor	over 0.95	
	Amperage Requirement for 50kW output	3phase 3wire 208V 154.39 A	3phase 3wire 480V 66.90 A
DC Output	Max. Voltage	500 Vdc	
	Max. Current	125 Adc	
	Max. Power	50 KW	

Figure 4: Signet FC50K + SAE Combo DC Fast Charger

Tesla Destination Charger



- More than twice the power of typical charging stations (80A – 240V)
- Guests stopping for a few hours can quickly recharge
- Valet can charge several cars overnight
- Good looking, weatherproof design

Figure 5: Tesla Destination Charger

Tesla Destination Charger locations in Virginia as of September 9, 2015

Lexington	Charlottesville	Richmond
Raphine	Keswick	Broad Run
Waynesboro	Christiansburg	Arlington
Harrisonburg	Pearisburg	Williamsburg
Luray	Floyd	Onacock
Boyce	Rocky Mount	Portsmouth

Installation Process and Challenges

The primary installation challenge revolved around the availability of adequate electrical service at the proposed charger site. VCC worked with an equipment consultant and Dominion Power to analyze the feasibility and cost of upgrading electric service at each site. The installation process can be broken into four phases. The first phase includes:



Figure 6: VCC staff member Michael Phillips at the ribbon-cutting at Main Street Station in Richmond.

- *A Site Visit by VCC and Equipment Consultant.* VCC and the equipment consultant visit the proposed site, take pictures, and discuss the project with the site host.
- *A Site Evaluation by the Equipment Consultant.* The Consultant provides a professional estimate on the cost to install the charging equipment and a recommendation to proceed or not.
- *Initial Utility Coordination with Dominion.* If the project receives a positive recommendation from equipment consultant, then begin coordination with the electrical provider.
- *Client Scope Review.* The equipment consultant provides the legal contract for the Client to review and authorized.
- *Notice to Proceed Issued.* The equipment consultant issues a Notice to Proceed to the site host stating they are upgrading the electrical service (if necessary), procuring the equipment and shipping it to the site.

The second phase of installation involves pouring a concrete pad, trenching for electric conduit, and connecting the equipment to the power supply.

- *Equipment Acquisition.* The charging equipment is shipped from the warehouse to the site.
- *Final Utility Coordination.* The equipment consultant and the local electricians perform a final check with Dominion to ensure site is ready to be modified.
- *Permitting.* Any electrical or construction permits are secured from the local permitting department.
- *Utility Construction.* The electrical service is upgraded or modified to accommodate the additional usage from the charging station.
- *Site Preparation.* The trenching from the electrical service box is performed and the conduit laid and connected. The concrete pad is poured and the pedestals installed.
- *Equipment Arrival.* Charging equipment arrives from the warehouse and is transferred to the parking space. Delivery typically takes 5 business days.
- *Equipment Installation.* Charging station is set on the pedestals on the concrete pad and connected to the electrical supply.



Figure 7: Argonne Intern Kayla Cook demonstrating a DCFC in New Kent.

The third and final phase involves inspections, marketing and signage.

- *Final Inspection.* The equipment is inspected by the installing electrician and Dominion.
- *As Builts.* Actual construction compared against the original design and any changes are included in the updated blueprints.
- *Commissioning.* The station is activated. Online data management and customer service, such as Greenlots, is activated.
- *Signage Designed and Installed.* Virginia Clean Cities provides an EV parking sign or the local government design their own.
- *Press Releases and Ribbon Cutting.* Virginia Clean Cities issues media advisory on the availability of the station and holds a ribbon cutting and a press conference for local media.
- *Public Websites.* At this time the station is added to the online public map of stations via the Alternative Fuel Data Center Station Locator and PlugShare.

Legal and Insurance Issues

Several legal issues arose during this deployment program. The equipment provider's contract stipulated that the equipment became property of the site host. There was a question of liability. The issue was resolved by asking a third-party equipment manager to buy general liability insurance for the equipment to protect against damage to vehicles. Signet now offers liability insurance that can be purchased through the company.

Another site host asked for information on the cost of replacement parts for a DCFC but Signet was unwilling to disclose that information at this time. In some cases the town or city attorney also wanted to include an addendum regarding the Virginia Public Procurement Act to the Notice to Proceed. VCC was ultimately able to move the project forward in these cases.

Maintenance Issues

Not all site hosts treated their equipment equally. The local governments in the program have a better track record (to date) than the hotels in ensuring the equipment is operational. VCC is using PlugShare to monitor the operational status of each charger and when a station malfunctions VCC attempts to contact an electrician to repair the issue in a timely manner.

The CCS Combo charging port was not initially activated on these stations due to a legal issue. This caused some frustration for drivers of CCS Combo vehicles who wanted to charge their vehicles at these stations but were unable to do so.



Figure 8: EV Parking Sign

Signage is very important for DCFC. Drivers have to be able to see the stations in order to locate them. Signs that designate the parking space as reserved for electric vehicles are also important. This prevent the parking spot from being used by a non-electric vehicle. VCC designed a parking sign for site hosts and has worked with local governments on their own specific sign designs.

Usage Data

VCC will periodically request usage data from the stations managers. This will enable VCC to determine if additional stations are necessary for specific geographic areas.

Virginia Clean Cities will continue to work with our partners to find suitable site hosts in Virginia for DCFC equipment. VCC will also monitor usage and maintenance issues and seek to resolve customer service problems with the equipment.

Summary and Lessons Learned

DCFC is a new technology in an emerging vehicle market that few people have experienced. But the number of EV drivers is increasing every month, and VCC's team was able to educate site hosts about the value proposition that a DCFC could bring to their business or as part of a downtown revitalization plan. No question was too small or too complex for VCC to find the answer. VCC's role as an alternative fuel and technology non-profit allowed us to be the perfect partner on this Virginia equipment and infrastructure deployment project.

Internal and external communication is vital for a project that is a public-private partnership to succeed. Internally, VCC maintained weekly and monthly conference calls with project partners and site hosts to ensure projects were staying on schedule. Externally, VCC was able to utilize its partners in the media to gain valuable press coverage of station openings (see attached media advisory and press release). More education of Chevy Volt and plug-in hybrid drivers was needed to make them aware that their vehicles are not compatible with this equipment.

With multiple projects located in different areas of the Commonwealth moving at once, time and project management were essential. VCC's ability to respond to an array of previously unforeseen issues with creative and low-cost solutions enabled many of these projects to succeed.



Figure 9: A DCFC awaiting its next EV visit in Charlottesville.



For Immediate Release
August 24, 2015

Contact: Michael Phillips
Virginia Clean Cities
(804) 482-1790

First Official Plug-in at First DC Fast Electric Vehicle Charging Station and Tesla Supercharger in Richmond

- WHO:** Michael Phillips, Virginia Clean Cities and Virginia Division of Energy
Grant Neely, Chief of Staff – Office of the Mayor, City of Richmond
Jeannie Welliver, Main Street Station Multimodal Transportation Center
- WHAT:** The first official plug-in will take place at Main Street Station, the site of the first publicly-available DC Fast Charging Electric Vehicle Charging Station and Tesla Supercharger in Richmond.
- WHEN:** Tuesday, August 25
10 a.m.
- WHERE:** The Plaza at Main Street Station
1500 East Main Street
Richmond, VA
23219
- DETAILS:** *To schedule interviews or electric vehicle demonstrations with Virginia Clean Cities, please contact Michael Phillips at (804) 482-1790 or mphillips@vacleancities.org.*

BACKGROUND: New charging stations at historic Main Street Station include two Level 2 Chargers, a Tesla Supercharger and a DC Fast Charger. A DC Fast Charger can fully charge an electric vehicle in as quickly as 30 minutes. Main Street Station will be the home of a future downtown Welcome Center, and EV charging adds one more amenity for local residents as well as the interstate traveler.



For Immediate Release
2/4/15

CONTACT: Alleyn Harned
(540) 568-8896
aharned@vacleancities.org

First Public DC Fast Charger in the Richmond Region

Mac's Service Center Announces Availability of DC Fast Charging

Ashland, VA—2/4/15 —Mac's Service Center at 308 England Street in Ashland, is proud to announce the immediate availability of the first, publicly-available, DC Fast Charger in the Richmond region, enabling owners of electric and plug-in electric vehicles traveling on Interstate 95 and Route 1 to re-charge their vehicles quickly while also visiting downtown Ashland. This equipment can recharge an electric vehicle in 30 minutes.

Mac's Service Center is an independently-owned repair facility dedicated to the most advanced diagnostic and repair strategies. Evidence of this commitment is on display at their location in Ashland. A brightly colored plug-in hybrid shuttle, hybrid loaner cars and now a newly installed DC Fast Charging Station. The new Fast Charger is currently free for electric and plug-in electric vehicle charging. "We are inviting electric vehicle owners to experience the Town of Ashland as well as recognize Mac's Service Center's achievements in the ever evolving high tech world of automobile repair," states Mac Manus, owner of Mac's Service Center.

Driver Impact

Many electric vehicle drivers have already benefited from the deployment of DC Fast Chargers in Northern Virginia. This type of electric vehicle charger uses three-phase, 208 volt, 100 amp electrical current and can fully re-charge a Nissan LEAF in 30 minutes and a Tesla Model S in one hour. The charging station is equipped to provide charging service to both CHAdeMO (Nissan and Toyota) and SAE (GM, Ford, and BMW) standards. Drivers traveling from Northern Virginia will now have a convenient location to stop and re-charge on their way to and from Richmond. Said Ashland Mayor George Spagna, "We are excited about this installation for several reasons, even beyond its obvious environmental benefits. First and foremost, it highlights the innovative and forward-looking business environment in Ashland. We welcome positive attractions that bring people off the interstate and into our Town. We know that once they come and see for themselves, they'll come back!"

Virginia Clean Cities, an alternative fuels and air quality non-profit, assisted with acquiring the equipment. "This is an important step for electric vehicle charging infrastructure. With 200 EV charging locations in Virginia and more than 500 public charging outlets, this Fast Charger helps round out the regional EV network and promotes cleaner air, economic vitality, and energy security," said Alleyn Harned, Executive Director of Virginia Clean Cities.

Demand for Quick, Convenient Charging

With the exponential growth of electric vehicles in Virginia, there is a growing demand for fast and accessible charging infrastructure near retail and cultural destinations. Previously the

nearest DC Fast charger was in Fredericksburg. This newest DC Fast Charger at Mac's Service Center's addresses a critical regional transportation need and shows his commitment to the most cutting-edge vehicle technologies. For more information on this equipment and how you can access it, please visit www.macsservicecenter.com or www.plugshare.com.

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About the Virginia Clean Cities Coalition

Virginia Clean Cities is a regional nonprofit organization dedicated to advancing our energy, economic, and environmental security through petroleum reduction and clean transportation. Virginia Clean Cities is a state and federally recognized coalition stakeholders staffed in partnership with James Madison University. Virginia Clean Cities operates dozens of domestic fuel and environmental education and deployment projects for federal, state, agencies and private partners. To learn more please visit www.vacleancities.org.