Electrify Heartland Plan

Section 10: Develop Corridors

Project title: Kansas – Missouri
Community Readiness for EV and EVSE

Funded by: US DOE DE-EE0005551

By: Metropolitan Energy Center

and Kansas City Regional Clean Cities Coalition

With: Black & Veatch

Metropolitan ENERGY CENTER

Kansas City Regional Clean Cities

BLACK & VEATCH

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Electrify Heartland Plan

Electrify Heartland Project Abstract

Electrify Heartland is an electric vehicle planning project managed by Metropolitan Energy Center. It is a product of the Greater Kansas City Plug-In Readiness Initiative, co-chaired by Kansas City Regional Clean Cities Coalition. Our goal is to produce a regional plan to prepare public resources and secure the economic and environmental benefits of plug-in vehicles within targeted metro areas with estimated 2.7M population. The targeted metro areas include Kansas City, MO & KS; Jefferson City, MO, Wichita, KS; Salina, KS; Lawrence, KS; and Topeka, KS. (14 Counties: Cass, Clay, Cole, Douglas, Jackson, Johnson, Leavenworth, Miami, Platte, Ray, Saline, Sedgwick, Shawnee, Wyandotte).

Electrify Heartland Steering Committee

Team	Organization	Name
Charging Stations	Initiatives	Troy Carlson
Charging Stations	LilyPadEV	Larry Kinder
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Project Administration	Metropolitan Energy Center	Kelly Gilbert
Public Education	Nation Ranch Marketing, Inc.	Bill Patterson
Training	Kansas City Kansas Community College	Bob McGowan
Training	National Electrical Contractors Association	Jim Cianciolo
Utility Grid	Black & Veatch	Sam Scupham
Vehicle & Fleet	University of Missouri at Kansas City	Henry Marsh

Exhibit i-i. Electrify Heartland Steering Committee Members

Section 10: Develop Corridors

Section Abstract

This section addresses the very important step of developing electric vehicle travel corridors. Within our planning area there are many stretches of highway between major cities that exceed the limitations of a plug-in electric vehicle. In order to pave the way for electric vehicles to become more than just commuter vehicles we must develop these strategic corridors. This section discusses how we can approach this barrier to adoption.

Section Authors:

Troy Carlson, Initiatives and Larry Kinder, LilyPad EV

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10 Develop Corridors

10.1 Identify corridors for recommending number and locations of future EVSE installations

Information in this section is distilled from experiences of Washington State's EV corridor development. Western Washington Clean Cities had some exposure to the West Coast Green Highway, stretching between Washington, Oregon, California and British Columbia. They worked with the Washington Department of Transportation and did not go about telling them how to establish the highway. The only highway project where this was done was I-5 in California and Mexico.

The proper spacing of stations so that they are close enough for first generation vehicles like the Nissan Leaf is approximately 40 to 60 miles distance.

Their metropolitan planning organization did a study with Department of Registration and mined data to see where Prius owners lived via registrations. Prius owners have a high correlation with future battery or plug-in ownership.

They queried where the Prius vehicles were located in their region and tied in other data points. They also asked, "Where do they travel?" and "How long do they stay there?" People typically travel the longest for entertainment (ball games, theater, etc.). Based on this information they prioritized locations on presumed early adopters and where they would travel the farthest for entertainment.

They ran into a federal statue citation 230.5.c that cannot establish private businesses at rest stops. There were concerns that the state was not the right entity to operate EVSE. When they looked for private entities to host the stations, locations were also changed. Strategy changed when some installed level II and some installed DC fast chargers to eliminate longer Level II charging times at rest stops.

The following is a link to the presentation that describes how they chose charging station sites in the Puget Sound Region http://psrc.org/assets/4144/Station_siting_July2010.pdf

Using similar principles, Electrify Heartland conducted a travel corridor study in Kansas provided as Appendix Q. Travel corridors to be studied were chosen during discussions with Kansas Department of Transportation and anchor cities. The study considers travel between Kansas City and Topeka and between Topeka and Wichita. Major travel corridors are I-70 and I-35. It concludes that Level 2 charging is adequate between Kansas City and Topeka, assuming an all-day commuter trip, and recommends DC fast charging between Topeka and Wichita.

10.2 Recommended EVSE Locations

Extrapolating from these travel corridor studies and best practices, Electrify Heartland recommends EVSE installations at the following locations along interstate highways.

"What you want are EVSEs where people spend time."

Travel between Kansas City and Wichita, KS (Northeast to Southwest on I-35):

- Olathe Exit 215
- Ottawa
- Beto Junction
- Emporia
- Matfield Green
- El Dorado
- Wichita K-96 Exit

Travel between Kansas City and Salina, KS (East to West on I-70):

- Legends in KCK
- Lawrence
- Topeka Wanamaker Exit
- I-40 Wamego Exit
- Junction City
- Abilene
- Salina (135/I-35 Interchange)

Travel between Kansas City and Columbia, MO (West to East on I-70):

- Independence
- Warrensburg Exit
- Marshall/Sedalia Exit
- Boonville Exit

In addition, Mid-America Regional Council (MARC) updated the likely destination maps provided in the Greater Kansas City Plug-in Readiness Strategy. Destination analysis updates based on the latest census are provided in Exhibit 9-2. These maps help to identify recommended EVSE location in the Greater Kansas City metropolitan planning area.

10.3 Identify possible partners and owners of future EVSE

A tremendous amount of groundwork has already been laid with potential partners across the United States. Examples include ChargePoint America, NRG and Ecotality. In addition

there is tremendous opportunity with businesses that want to attract new traffic, such as shopping malls, theaters, bowling alleys, merchants, and retailers. Look at www.Ecotality.com and their partners (Macy's, Best Buy, IKEA, Kohl's, ABB). Another important group of public EVSE owners is municipalities

There are three general categories of public charging stations:

1) Networks
2) Retailers
3) Public

What you want are EVSEs where people spend time (retail, sports, entertainment, etc). In addition to those locations you want them installed at parking garages, airports, train stations, city parking facilities, and parking lots, primarily public and some private. On street parking is considered a more difficult market to target.

10.4 Identify needed signage

The signs in Exhibit 10-2 were shown to workshop participants and their feedback solicited. The left sign is from the U.S. Department of Transportation's (DOT) Manual on Uniform Traffic Control Devices. As described in Section 6.2, U.S. DOT gave interim approval to this sign on April 1, 2011. The middle sign is similar to the U.S. DOT 10.03b Sub Title B but also contains the charging levels supported at the charging station. The right sign is an adaptation of the U.S. DOT sign intended to resemble a parking sign for the disabled.

Workshop participant's remarks

- It is odd for the sign to resemble a gasoline pump.
- Providing the charging levels would be helpful.
- Some kind of tow warning to conventional vehicles should also be included.
- Consistency is important, though it is difficult to achieve consistency at the local level.
- The color blue indicates it is a special parking spot.
- Mass-produced signs can be less expensive.
- The sign can act as an advertisement for an EV community.
- Using an image of a car with a plug might be better (similar to the logo at www.pluginamerica.org).
- Friendly signs can work better. Portland, Oregon has signs that say "thank you for saving this space for an EV to recharge."
- Signage helps locate charging stations. Errors in data exist including where EVSE are located, when they are available, and what kind of charging level they support. Existing mobile and web-based apps are insufficient.

- Regarding changing the sign with U.S. DOT, it took 17 years to get the sign so it may be prudent to avoid trying to change it. [1]

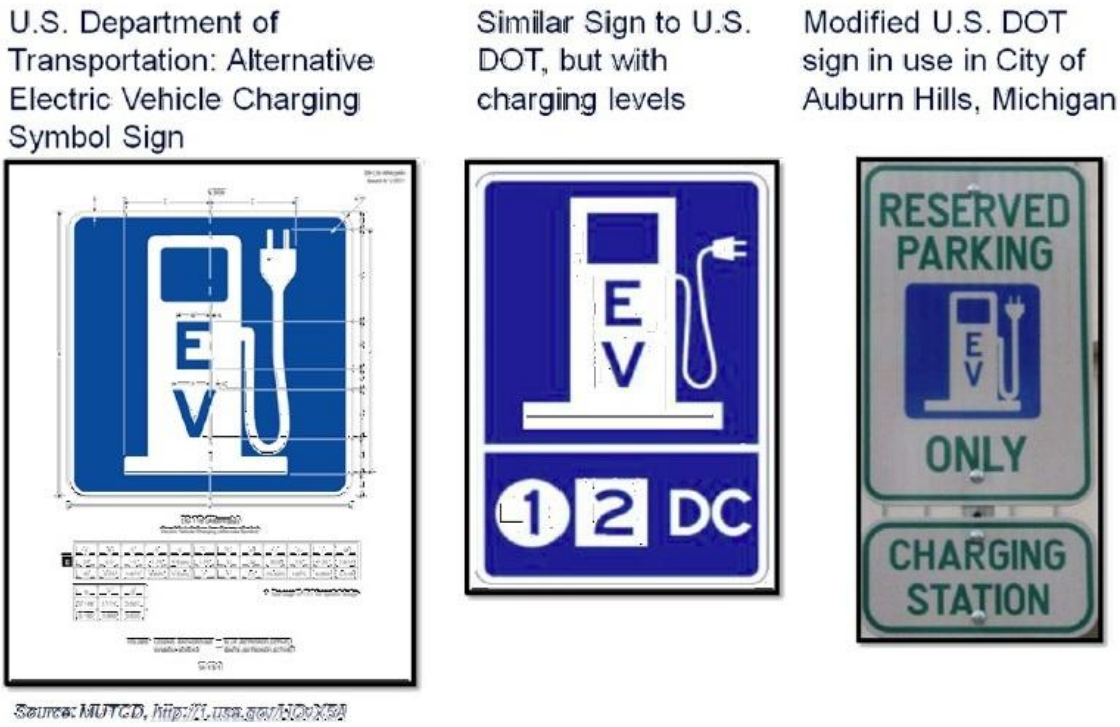

Exhibit 10-1 Three different U.S. DOT signs

10.5 Identify Signage Barriers

The following is an excerpt from "Get Ready Central Florida (GRCF)"[2]:

"Currently, the generic sign used to identify Electric Vehicle Service Equipment (EVSE), otherwise known as Public Charging Stations, is green with white letters, typically found at area sign shops. Unfortunately EVSE signage can vary from state to state. GRCF would like to see a national sign developed by the Department of Transportation, the agency responsible for designing national street signs. We plan to work with Project Get Ready and the Department of Transportation to develop a national EVSE sign. This would help EV drivers that live and visit Florida easily identifies public charging stations. We also plan to

[1]Nigro, Nick, comp. *Summary Report: Clean Cities Plug-in Electric Vehicle Community Readiness Partners Discussion Group*. Los Angeles, CA: Center for Climate and Energy Solutions, 2012.Print.

[2] "Future Projects." *Get Ready Central Florida*. N.p., n.d. Web. 10 Dec. 2012. <HTTP://WWW.PLUGANDGONOW.COM/WHAT-WERE-DOING/FUTURE-PROJECTS/>.

work with transportation planners to have highway exits marked with signs directing drivers to the nearest public charging stations."

10.6 About the Author

Troy Carlson is a business executive with 25 years of diverse business development and leadership experience. He has a proven track record for driving business growth and increasing market share in a competitive environment. Throughout his career, he has consistently taken various businesses to the next level through vision, strategic planning and execution. He led a business development project with a consortium of construction labor and management groups called the Kansas City Construction Partners (KCCP) where he received the Labor Management Cooperation Leadership Award. Mr. Carlson also led the establishment of the Kansas Logistics Park that now serves as the foundation for the wind energy manufacturing and logistics industry cluster. In 2009, he helped land its first client: a $66million wind energy manufacturing facility that will employ over 400 people. Mr. Carlson graduated Magna Cum Laude with a BA from Wichita State University. His professional affiliations include selection as a "40 under 40" business leader in 2001 by the Wichita Business Journal, 2000-2002 Past Chairman of the Wichita Area Outlook Team for the Center for Economic Development and Business Research, 1997 Past President for the Central Kansas Association of Health Underwriters, current member of KansasBio, MoBio, the Better Business Bureau of Greater Kansas City and a member of the Greater Kansas City Chamber of Commerce. Mr. Carlson understands the challenges and rewards of leading and managing a profitable business from both the top and bottom lines.

Larry Kinder is the CEO and founder of LilyPad EV, a provider of electric vehicle charging stations. Mr. Kinder is committed to a cleaner world with increased energy independence by using domestic electricity as a transportation fuel in a manner that makes solid business sense. He formed LilyPad EV to help create the charging infrastructure needed by drivers of plug-in electric vehicles that are arriving from almost all auto manufacturers.

He doesn't just 'talk the talk'; he 'drives the drive'. Having driven over 14,000 electric miles, Mr. Kinder is a knowledgeable electric transportation advocate and entrepreneur striving to help communities, businesses, and individuals benefit from electric transportation.

The LilyPad EV team has worked with many customers, large and small, to purchase, install and maintain electric charging stations. Mr. Kinder regularly speaks to communities and organizations to educate and help prepare them for plug-in readiness, economic growth, and a cleaner, greener future.

Kansas City Regional Clean Cities Coalition Administered by Metropolitan Energy Center, the coalition is a public-private partnership among fleet managers and manufacturers, vendors and service providers in the alternative fuels and vehicle industries. It works in communities across Kansas and in western Missouri. Kansas City's coalition is a partner since 1998 with the U.S. Department of Energy's Clean Cities Program, whose mission is to advance the energy, economic, and environmental security of the United States by supporting local actions to reduce petroleum use in transportation. The coalition administers more than $40 million in clean transportation projects in Kansas, Missouri, Iowa and Nebraska. For more information visit www.metroenergy.org/kccleancities.aspx.About

Metropolitan Energy Center is a nonprofit organization with a threefold mission to create resource efficiency, environmental health, and economic vitality in the Kansas City region. Over the past three decades, MEC has grown to be a recognized catalyst for regional energy partnerships that satisfy the triple-bottom-line approach. Founded in 1980, MEC is a catalyst for community partnerships focused on energy conservation. It works through a variety of educational and training programs, including Kansas City Regional Clean Cities Coalition, Home Performance, Project Living Proof and EnergyWorks KC. Every energy dollar conserved through MEC's work remains available for investment in the local economy. MEC was awarded more than $17 million in federal funding for transportation projects in recent years and is a partner in other multi-million-dollar projects in Kansas and Missouri. MEC has been the recipient of many awards recognizing its contribution to energy conservation and was host of the national Affordable Comfort Conference in 2003 and 2009