Electrify Heartland Plan

Section 7: EV and EVSE Communication, Education and Training Plan

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

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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

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Exhibit i-i. Electrify Heartland Steering Committee Members

Section 7: EV and EVSE Communication, Education and Training Plan

Section Abstract

In our preparation to ready Kansas and Missouri for electric vehicles, citizens will need to be aware of the opportunities, benefits and truths about electric vehicles.

This educational process will require different approaches for each of the identified subgroups: consumers and the general public, elected officials and civic leaders, teachers and trainers, students and youth, electricians, auto technicians, first responders, recover/salvage personnel, electric vehicle enthusiasts and electric vehicle organizations.

These subgroups were identified by examining previous educational offerings from different programs and through input from stakeholders in the region. Many organizations offer training to each group identified. A curriculum for automobile technician training is offered in Appendix G based on survey of multiple training institutions.

Section Author:

Jim Cianciolo, Kansas City Joint Apprenticeship Training Center

Robert McGowan, Kansas City Kansas Community College

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7 EV and EVSE Communication, Education and Training Plan

7.1 Develop public education plan including methods of finding certified electricians and auto dealers

The consumer needs to understand why he or she should consider purchasing an electric car. How can they benefit from electric or plug-in vehicles and how can they become a plug-in vehicle owner? This education plan includes video presentations, computer presentations and scripts with handouts so anyone can view them.

Consumer information is intended for all audiences and should offer answers from a quick read with links for further information and greater detail. Much of this material is already available from different resources and will be included in our presentations.

The Electrify Heartland program has already created and is actively promoting a website, www.ElectrifyHeartland.org, that serves as a central reference point for consumers seeking information related to electric vehicles, electric vehicle service equipment (EVSE), qualified electricians who can safely handle EVSE installations, as well as the names and locations of auto dealers offering electric vehicles for purchase.

Additionally, the site contains links to government resources, such as the Department of Energy's Alternative Fuels Data Center (AFDC).

7.2 Develop training for EVSE installers

The electrician needs to understand the specifications and technical information regarding charging stations and their effect on the power delivery systems to the home or business, and within the home or business.

This technical training requires certified instructors with expertise in the specific methods of preparing the home or business for the installation of the charging unit.

Some homes will require electrical service upgrades to safely deal with the additional load that an electric car puts on their power systems and electricians need specific information to enable them to do their job. This will be technical training aimed at specific professionals in an advanced level delivery.

Kansas City is home to one of the nation's first five Electric Vehicle Infrastructure Training Programs (EVITP). EVITP is recognized as a training partner by the Department of Energy's Clean Cities Initiative and offers a comprehensive 24-hour course for licensed electricians across North America. The training includes instruction in electrical codes, safety and other building regulations and standards; renewable energy and electric vehicles, EVSE

installations; and customer relations. The course work also includes training for code officials and inspectors, first responders, a field installation practicum and written examinations.

> **"Kansas City is home to one of the nation's first five Electric Vehicle Infrastructure Training Programs (EVITP)."**

Developed in collaboration with automakers, utility companies, EVSE manufacturers and key stakeholders such as the International Association of Electrical Inspectors (IAEI), the National Fire Protection Agency (NFPA) and the National Electrical Contractors Association (NECA), the EVITP has certified more than 220 instructors and 800 electricians through the program and has representation in 35 states.

In addition to EVITP, regional career and technical colleges, junior colleges and four-year universities are developing curricula for training electricians, engineers and construction managers to address the specific needs of electric vehicles and EVSE installations in residential, commercial and industrial properties.

An informal advisory board, representing schools including the University of Kansas, Pittsburg State University, Johnson County Community College, Kansas City Kansas Community College, Metropolitan Community Colleges and Olathe Public Schools, has formed to share knowledge and develop in-classroom and hands-on programs to ensure a more skilled workforce serving the EV and EVSE industries.

7.3 Develop training for EV techs and dealers

Automotive and truck technicians need to understand how to repair electric vehicles.

Technicians are aware of electrified vehicles but few have received training in this new technology. This training will be at an advanced level offered by certified personnel. These training sessions will need to be added to current programs and offered as updates for working technicians.

Currently there are no real standards for certification by the Automotive Service Excellence (ASE) or any other service authority. This problem should be addressed quickly to assure clients and employers that technicians received quality training and are capable of safe repair and maintenance. Current vehicle trainers will need to be updated to understand this technology as a new specialty. Students need to have the ability to certify in electrified vehicles so they can present themselves as a specialist.

An accreditation development team will begin with meetings between schools that have training in electrified vehicles and ASE to complete educational standards with a standard for curriculum and list of learning outcomes. This will enable stakeholders to have a standard to begin offering training in a complete and consistent manor. The content must be inclusive of all vehicles that use electric propulsion.

The automotive technician is responsible for service to everything on the vehicle side of the plug and its related elements. When the Electrify Heartland plan is engaged, the Midwest region will begin to work on this standard by inviting service stakeholders to a meeting to launch the effort. Until such time, service training will be offered through many organizations, institutions and dealerships.

Safety is the key element in service of electric vehicles. No person should attempt service of any electrical components without adequate training or proof of competency in dealing with high voltage. These vehicles have been designed with many safety features for the service technician; however, accessing certain areas in the car could result in injury or death.

Automobile technicians have indicated a strong desire to learn about electric vehicles and will like to attend training updates and/or earn a credential. The greatest interest will be in the form of evening classes, one or two nights a week and occasional service updates.

Automotive technician resources include sample content and links to consultants, established school programs, sample presentations, photos, books and other related resource material for the working technician.

7.3.1 Vehicle recovery and salvage

People that are towing a vehicle or salvaging its components need knowledge of how to safely disable and disassemble electrified vehicles. Many of these procedures are outlined by the vehicle manufacturer. Tow truck operators must be aware of contact points that must be avoided and how to safely disable the electric storage devices of these vehicles.

Salvage of vehicles must be done in accordance with outlines that enable the safe recovery of components and proper disposal of batteries and hazardous components. Research of recycling centers that accept batteries needs to include review of certifications such as e-stewards and R2 - Responsible Recycling to ensure that toxic material streams are managed safely, responsibly, and legally by downstream vendors – all the way to final disposal. Salvage and insurance claims are excellent source of materials needed for hand on training of technicians.

7.4 Develop training plan for first responders

First responders need to understand how to deal with electrified vehicles in the case of an accident, an extraction or fire in or around the vehicle. Training needs to be specific for concerns that are common to all battery electric vehicles and vehicle-specific concerns for locations of shutoffs and cut points. Different battery types may affect strategies to properly deal with different events.

Training from colleges and other sources is available. The municipality can find lists of opportunities for training on our first response resources link. Two organizations that have nationwide safety training programs are National Fire Protection Agency (NFPA) and National Alternative Fuels Training Consortium (NAFTC). Also listed is specific information from each vehicle manufacturer about dealing with emergency situations.

7.5 Develop public communications materials

Many cities have electric vehicle clubs and organizations that meet regularly and have an abundance of expertise in the specifics of building and converting vehicles. Some active EV organizations in the Kansas City area are Mid-America Electric Automobile Association, who have chapters nationwide, Kansas ElectriCity has organized several events that feature EV, Kosher Fest emphasizes healthy, sustainable living, and Kansas City Advance Energy a group dedicated to advancing the capacity and capabilities in the Kansas City area for designing, engineering, commercializing, and manufacturing **advanced** energy systems including wind, solar, fuel cells, high energy battery, and advanced bio-fuels.

These organizations have been invited to public events to share their knowledge and enthusiasm with the public. School programs can also benefit from these organizations as they build electric vehicles as school projects. Many schools and individuals have chosen to build or should consider building an electric car to motivate students, enhance learning and shape character. Club members support these student efforts with their experience and advice.

7.6 Design presentations, webinars, web and social media campaigns for each audience

7.6.1 Teachers and Trainers

Instructors of any form should be able to gather material from our Website that includes presentations and scripts to promote a common message to as many consumers as possible. These presenter resources are readily available for download to anyone who wishes to obtain them.

7.6.2 Student and Youth Resources

Student resources are available for youth and adult education. Many primary school students need information for research when preparing papers and homework on this subject.

Electrify Heartland's student resources will offer people a place to gather scholarly information with sources and links enabling them to create papers and presentations, which can and should be adapted for younger students, who will grow up in a world where electric vehicles have always been an option and will therefore be more comfortable with electric vehicle technology.

Internet based and electronic communications are a youth-friendly environment enabling students with a path to simplify their work. Vehicle electrification is a common subject of discussion in our schools and this will be a great way for students and teachers to obtain quality information.

This education plan could include presentations on the history and future of oil and gasoline consumption and pricing, reasons for driving an electric car, electric vehicle safety, the history of hybrid and electric vehicles, reasons for industry purchase of electric cars and trucks and how to install a charger at home.

When the Electrify Heartland plan is implemented, videos will be produced on these and other related subjects for release to the public in many forms including presentations, YouTube and free download from our website.

7.6.3 Electric vehicles as a platform for math and science education

Electric vehicle training is beginning to appear as a component of auto technology classes, electric vehicle clubs or class projects in secondary institutions. In an effort to promote and enable students' safety, some basic standards need to be established.

Instructors and schools implement programs, projects or instruction using the electric vehicles to enhance understanding in science and engineering. Without basic training and curriculum standardization, building a class or program represents a challenge. While instructor training and curriculum is available, it is inconsistent and needs some organization.

It will be beneficial to identify suitable components that can be embedded into existing course curricula. The development of basic components of training for electric vehicles should be established by an institution such as the National Automotive Technicians Education Foundation (NATEF) or other entity with experience in automotive education.

No secondary student should ever be allowed access to live high voltage circuits under any circumstances. It is vital that all lab experiments remain at a safe power level. Lower voltage vehicles will be best so that the student could be more involved in the electrical work and remain safe. The principles involved in low voltage are the same as high voltage and of equal value at this level of learning.

Beyond the classroom, Electrify Heartland actively supports education programs such as Kansas City based MindDrive, which serves at-risk youth from the inner city, and has used electric vehicle technology to inspire young people to achieve inside and outside the classroom, while teaching practical, hands-on math and science skills at the same time.

In summer 2011, MindDrive students and their adult mentors drove an electric car that they designed and built themselves on a cross-country trip from San Diego to Jacksonville. Along the way, MindDrive students met with young people to talk about their program, their career aspirations and electric vehicle technology.

7.6.4 Electric vehicle training for post-secondary institutions

The value of learning and understanding the complexities of electric vehicles not only supports the goals of getting electric vehicles on the road but also supports the practice of higher-level understanding of scientific and engineering principles.

Basic standardization of curriculum offers the benefit of helping institutions start new programs and builds consistency of the subject matter. It is recommended that an existing group such as NATEF undertake this effort, or that a group be created from existing programs and stakeholders to build electric vehicle training program standards and optional accreditation. This will not be a governing agency but an asset to aid in the development of a program with an optional qualification for all parties to recognize. Students, faculty, schools, employers and government are all stakeholders that need a standard for building and maintaining electric vehicle programs.

At the college and technical school level, it becomes necessary for students to work around high voltage components, requiring a higher level of safety. A qualification standard should be established to ensure that students have a level of competency in electricity to allow them to work around high voltage components.

While it is assumed that each institution has some way to determine who is able to work around high voltage, it will be of value to all stakeholders in education to have a suggested standard and qualification that can be offered to the institution to evaluate each participant. This could be adopted from an OEM, established training school or developed by conference utilizing NATEF.

7.7 About the Author

Jim Cianciolo is a 35-year member of the International Brotherhood of Electrical Workers. He is a licensed Master Electrician and a BICSI Registered Communications Distribution Designer (RCDD). Mr. Cianciolo is currently the Training Director for the Kansas City Joint Apprenticeship and Training Center for Local Union 124 of the IBEW. He is a Master Instructor for the Electric Vehicle Infrastructure Training Program (EVITP), serves on the curriculum development committee and also volunteers for Electrify Heartland.

Robert McGowan is Associate Professor of Auto Technology at Kansas City Kansas Community College, where he initiated the Hybrid and Electric Vehicle Program to allow students to apply the technical skill necessary to repair hybrid electric, electric, and fuel celled vehicles. Mr. McGowan developed the program of study based on a survey he conducted of colleges in the area and includes high voltage safety, high voltage batteries, charging, inverter/converter operation, cooling systems, transmission, engines, and basic fuel cell technologies. Mr. McGowan is currently developing a program for students to concurrently earn a GED while earning an Automotive Technology certificate. The Hybrid and Electric Vehicle Program immerses the student in the latest theory, demonstration, and hands-on practice of this technology. Students use tools and diagnostic equipment from industry to understand, diagnose, and repair hybrid and electric vehicles in a professional atmosphere. Mr. McGowan believes actual "hands-on" training is essential because it allows students to learn by gaining job experience combined with the related technical information. Applied training at the college's Technology Education Center includes on-campus repairs to vehicles brought in by the public, insurance companies and manufacturing industry.

Bill Patterson is founder and president of Nation Ranch, a marketing communications company specializing in brand management, public relations and crisis communications. As a member of the Electrify Heartland Steering Committee, Mr. Patterson helped create public communications and outreach materials to educate civic and business leaders and the community at large on the positive economic and environmental impact the electric vehicle and related industries have in the region. A native Kansas Citian, Mr. Patterson has more than 20 years' experience in marketing communications, representing a variety of industries including aviation, hospitality and tourism, financial services and economic development. He holds a Bachelor of Science Degree from Boston University.

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