Planning for Electric Vehicles:
Review of Clean Cities’ Electric Vehicle Community Readiness Projects

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The presentations and discussions that occurred at the workshop form the basis for the content in this white paper. The presentation was filmed and webcast for interested parties who could not be present at the workshop. That content is available online at http://www1.eere.energy.gov/cleancities/electric_vehicle_workshop.html. The authors acknowledge the guidance and support of the workshop planning team and all those who contributed to the success of the workshop. This paper does not necessarily represent the views of the Howard H. Baker Jr. Center for Public Policy or of the workshop sponsors, chairs, speakers, or participants.

Workshop Sponsor:
Introduction

Electric vehicles (EVs), including both plug-in hybrid electric vehicles (PHEVs) and battery electric vehicles (BEVs), have emerged as an alternative transportation mode in response to rising questions about conventional, petroleum-fueled vehicles including long-term availability and costs, national security, and environmental concerns. As EVs and other alternative fuel vehicles enter the vehicle market and begin to gain market share, communities must adapt to support and accommodate them through support infrastructure, regulatory policies, and other measures. Participants in the Clean Cities Electric Vehicle Community Readiness Programs provide examples for communities to use and build upon as this new technology emerges.

The Clean Cities Electric Vehicle Community Readiness Program

Established in 1993, the Clean Cities program comprises 100 Clean Cities coalitions across the United States [1]. These coalitions work to reduce petroleum use by bringing together stakeholders from both public and private sectors to promote and encourage the implementation of strategies that reduce petroleum use. (Additional information on the DOE Clean Cities program is available through the Clean Cities website [2].) As part of the Clean Cities program, 16 projects were awarded a total of $8.5 million through “Community Readiness and Planning for Plug-In Electric Vehicles and Charging Infrastructure” awards to help communities prepare for plug-in electric vehicles and supporting electric vehicle charging infrastructure [3]. Details of these projects are summarized in Appendix A.

The projects varied in scope, with some focusing on smaller, regional goals and others including multiple regions or multiple States. Most projects received approximately $500,000, although the awarded funding varied to match the size and scope of the proposed project. As shown in Figure 1, the 16 awarded projects covered 24 States and included communities with varying levels of existing community EV readiness. While the projects differed, each was tasked with producing a publicly released, replicable plan on electric vehicle readiness. The plans typically included: an overview of EV and electric vehicle supply equipment (EVSE) or charging stations, an overview of the local EV market, a description of barriers and solutions to EV adoption and EV readiness, recommendations, and communications and outreach.
Furthermore, additional tools are available through the Department of Energy (DOE) for those who want to explore readiness for electric vehicles in their communities. These sources include the Alternative Fuels Data Center’s PEV Readiness Score Card [4] and numerous other manuals and references available through the Clean Cities program on topics such as outreach, EVSE permitting templates, training and education, vehicle searches and cost calculators, and EVSE station locators.

**Starting a Dialog**

In an effort to promote a dialog among the various groups working on electric vehicle readiness projects, a workshop was planned for the Howard H. Baker Jr. Center for Public Policy in collaboration with the DOE Clean Cities program. The workshop, *Technical Review of Clean Cities Electric Vehicle Community*
**Readiness Projects**, was held on May 1, 2013, at the University of Tennessee, and featured presentations by members of the various organizations involved in the 16 DOE Clean Cities Electric Vehicle Community Readiness Projects. Attendance at the workshop was by invitation only and included individuals from the electric vehicle readiness projects, the DOE, electric power companies, the automobile industry, research institutions, and other stakeholders. The DOE Clean Cities program sponsored the event.

The event provided a platform for interaction between those involved with readiness projects and representatives from utility service providers, automobile manufacturers, researchers, and others with an interest in the introduction of electric vehicles to the market. The objective of that discussion, and the focus of this white paper, was to bring together the ideas and experiences from each project, disseminate knowledge gained, and focus on moving forward.

This paper draws from the presentations and interactive discussions, which occurred during the workshop and presents an overview of the community readiness planning process based on the discussions and topics raised during the panel sessions of the workshop. It highlights the importance of bringing these groups together during the workshop and the areas of agreement or disagreement, between the projects. The paper also draws on comments received directly from attendees of the workshop. Comments were focused on best practices in electric vehicle community readiness and on the issues and practices moving forward with adoption of electric vehicles. These comments were varied, reflecting the varying opinions among the attendees on which topics are most important in preparing for electric vehicles.

This paper is intended to be a descriptive report of the workshop events. It should be noted that an effort was made to consolidate the viewpoints and discussions regarding EV adoption, particularly where there appeared a consensus or a clear division of opinion; however, as made clear through the workshop events, there are multiple paths to EV adoption and strategies for different regions can vary depending on regional characteristics.
**Planning for Electric Vehicle Readiness**

This workshop provided an important opportunity for those involved in electric vehicle community readiness projects to share and discuss the successes and challenges faced for their particular project, providing an opportunity for others to learn from the experiences that these projects faced. The event also presented an opportunity to highlight the barriers that still need to be addressed and the next steps to EV adoption. Several areas were identified throughout the event as important for electric vehicle community readiness, discussed below.

**Policy Planning and Collaboration**

Electric Vehicle Community Readiness projects were awarded to 16 different locations, each with different scope, creating a diverse pool of example projects. Of the projects, three have a regional focus, 11 are multi-regional or statewide, and 2 are multi-state projects. Since EV technology is new to both the public and to policy makers, planning for EVs brings many challenges.

Even across regions within the same state, local policies and regulations can differ. There is a need to coordinate planning for EV readiness across regions within the same state and collaborate on policies regarding EVs. Some communities within a region are less EV ready than others and require more assistance [5]. The same is true across state borders. Collaboration and assistance at different levels of jurisdiction, from an interstate level to a local level, is important for the success of EV readiness plans. Figure 2 depicts this relationship between levels and lists some key concepts for planning and coordination at each.

![Figure 2: Planning and Collaboration for EV Readiness at Different Levels of Jurisdiction](image-url)
Planning between states involves the largest number of stakeholders, and the most potential for variability in regulations and policies regarding EV readiness. Understanding the stakeholders could mean that flexibility is necessary in determining goals and regulations in order for the regions and states involved to make progress -- identifying best practices but not necessarily setting requirements. Analysis to identify infrastructure needs and areas of focus is also appropriate at this level.

Statewide planning can involve many stakeholders from different regions within that state. Statewide planning efforts should draw on the practices established at the multi-state planning level to establish goals and best practices for communities within the state. Assistance from planning efforts at the state level to local efforts was identified at the workshop as important to the overall success of EV readiness between regions. Development of strategies and assistance at the statewide level allow local planning efforts to proceed with a focus on local issues but with a wider vision. Examples of planning and collaboration efforts at the state level include:

- Develop a statewide toolkit;
- Initiate local coordinating councils;
- Hold one-day workshops with regional leaders; and
- Create a panel of experts at the state level to assist local groups;

It is expected that EVs will become more cost-competitive in the long-term with declining battery costs and increasing petroleum fuel prices [6]. Currently, however, one of the largest barriers to EV market penetration is the high initial cost associated with these vehicles as well as the high cost and uncertainty in installing EVSE. Offsetting this initial cost, at least in the short-term, is one method to promote EV adoption; however, among the locations involved in the readiness projects, there is inconsistency in the policies and incentives offered to EV users. In some cases there are no incentives available, putting that state or community behind in terms of EV adoption. In many cases while there is interest in EVs, there is resistance from some government agencies to support tax incentives for EVs or EVSEs, making it difficult to incentivize electric vehicle ownership. Local governments have experienced slower recovery from the recession, making it difficult to support EV initiatives. This type of concern brings the focus to the use of low cost incentives. Examples of low cost incentives include:

- Waive or reduce cost of EVSE permitting fees
- Offer preferred parking or free parking for EV users
- Offer free EV charging at city-owned charging stations
- Offer tax rebates or credits on EV purchases or on EVSE installation
Infrastructure Planning

At the forefront of the planning challenges is the development of infrastructure to support long-term adoption of EVs. Through the workshop events, the areas of interoperability between regions, the use of siting analysis in planning, and issues with ADA compliance were highlighted as key elements to EV infrastructure planning.

The complexity of planning EV support infrastructure is significant because of the variations in EVSE technologies. Some devices are confined to specific utility territories, while others operate seamlessly between territories. EV interoperability between regions and service areas stands as a major barrier to EV adoption. Cross-regional interoperability issues include varying utility rates and payment structures and varying charging systems for different vehicles. Compatibility between these territories allows EV adopters flexibility in crossing boundaries. An overview of inter-territory collaboration is presented in Figure 3.
Figure 3: Example Integration of Smart Grid and EVSE Technologies [7]

**Siting of Electric Vehicle Infrastructure**

Beyond interoperability planning between regions, siting analysis identifies locations suitable for new infrastructure by combining regional demographics and vehicle sales forecasts. Planning for EVSE infrastructure focuses on three categories:

- **Home Charging**: EV ownership potential is largely based on income and ownership of hybrid vehicles, although other factors also influence the likelihood of EV ownership such as home ownership, dwelling type, and
education level. Home charging requirements can be predicted by these socioeconomic variables.

- **Non-home Charging**: Away-from-home charging is important for many adopters of EV technology considering vehicle range. Siting analysis considerations for away-from-home charging include density of employment, roadways with high average daily travel volumes, high volume interchanges, and major long-duration activity destinations such as airports, shopping centers, and business parks.

- **Range of EVs**: Through study of driving and parking habits, vehicles with travel distances matching the range of current EV models can be identified. This analysis also points to the potential for at-work or away-from-home charging by identifying the length of time that vehicles are parked [8].

Incorporating these steps for siting analysis identifies that many current vehicles could be replaced by EVs [8]. However, interoperability issues may present a problem at charging locations away from home.

**Electric Vehicle Charging Station Considerations**

From siting analysis identification of EVSE needs, planning organizations should consider the design of facilities and EVSE location implications. Charging infrastructure priorities are depicted in Figure 4, which also reflects the complexity of EVSE infrastructure needs.

![Figure 4: EVSE Network Demand and Priorities\(^a\)](image)

\(^a\)DOE EVSE Charging Pyramid [9].
While a large percentage of EV charging is expected to be at-home charging in single-family units, there is a large amount of charging expected away from those locations. Figure 4 highlights the need for charging locations away from home, shown as workplace and public charging locations. It also highlights the need for charging infrastructure at multi-unit dwellings. Each type of charging infrastructure fulfills different needs for users. At-home charging allows for overnight EV charging, while workplace and public charging provide solutions for EV range extension and trip flexibility [10].

Considerations for EVSE siting locations:

- Workplace charging is a key method to accelerate EV market penetration. Providing charging infrastructure at the workplace, or at other destinations away from home, enables use for the typical commute and reduces range anxiety for EV users by allowing them to recover some portion of their travel range depending on how long the EV is parked and connected to a charger. Workplace charging can also provide an intermediate step where public charging, outside of the workplace, is not available. Workplace charging provides PHEV users a greater ability to replace petroleum fuels with lower cost electricity. Variety in EVSE needs among users presents a challenge for workplace charging. In addition, employers must address policies concerning utility services and payment strategies, safety around EVSE locations, and time of use.

- Many potential EV users live in multi-unit housing; nationally, 23% of Americans live in multi-unit dwellings. This percentage is higher in some affluent and dense urban areas (e.g., Miami). While charging at these dwellings provides a path to grow the EV market, this presents a challenge in providing suitable parking and charging infrastructure for these users at their place of residence. A potential solution for these users is community parking lots for EV charging. In addition, an increased reliance on public or workplace charging could meet the charging needs of some users living in multi-unit dwellings.

- EV users living in urban areas also face challenges, since dedicated at-home parking is not always available. Not all potential users own vehicles; some rely on public transportation, taxi services, or car-sharing. Updating building codes to include EV parking spaces and curbside charging can promote EV adoption in urban locations. Other methods to promote EV adoption in cities are through conversion of transit fleets, such as taxi services where possible, and through inclusion of EVs in car-share fleets. Dedicated spaces and EVSE infrastructure at urban parking garages can overcome some challenges. Training for garage attendants may be required so they understand the requirements and limitations of the EVSE infrastructure and unique and appropriate policies.
• There was significant discussion of charging at other locations or destinations away from home. There was mixed experience with generally low utilization of these EVSE infrastructure installations. Much of the discussion surrounded the policy challenges with installations at these locations. Particularly consistency of ownership, maintenance, standards, revenue, and availability. The DOE program highlights some resources to overcome these challenges (e.g., sample permitting and regulatory requirements). Some examples of other destinations used in the community readiness program include:

- Library
- Shopping Malls
- Hotels
- Restaurants
- Movie Theaters
- Public Parking Decks/Lots
- Visitor Centers
  - Universities/Community Colleges
- Grocery Stores
- Other destinations and attractions where parking for EVs are needed

**Regulatory Considerations**

Along with planning for EV support infrastructure, a number of regulatory measures should be considered by each region. A number of considerations are presented in the Community Readiness Projects’ reports. In each case, there is a high level of concern related to making regulations versus recommendations. One example of varying degrees of plan language is found in the Plug-In Ready Michigan report [11]. This example summarizes the types of language used in the different reports, and presents three levels of plan language for various regulations. These are:

• **Accepting plan language:** This language allows for EVs and EVSE infrastructure as permitted in area zoning codes.

• **Encouraging plan language:** This language requests that developers should provide for or install EVSE infrastructure. This type of plan language can also provide incentives for developers who install such infrastructure.

• **Assertive plan language:** In this type of plan language EVSE infrastructure is required in certain situations, such as at major activity centers, to promote EV friendly communities. This language could require, at least, electrical infrastructure that could support EVSE in the future.

The use of **plan language**, particularly in the short-term, is an important consideration as not all communities have the same level of existing EV readiness. The use of a particular style of plan language is also an important consideration depending on the goals of the particular community, region, or state adopting the
language. Plan language styles can be adopted specific to certain aspects of plan. For instance, it may be important to allow more flexibility with one plan aspect than another. In this case, language that encourages development of EVSE infrastructure is suitable for one aspect, while language requiring it is suitable for another. Communication between regions is important to the development of regulatory language. In addition to providing or supporting EVSE infrastructure at various types of locations, area zoning codes, permitting codes, building codes, electrical codes, and other applicable codes should consider:

- **Parking regulations**: EV parking often includes EVSE infrastructure. This can be accomplished with different types of parking designs. On-street EV parking can include parallel parking or pull-in parking, each with adjacent charging infrastructure. Off-street parking, either in parking lots or parking garages, can include dedicated spaces for EVs with chargers. This type of parking fits well with at-work or public charging infrastructure. Parking for EVs may include preferential parking or dedicated parking that is restricted to other vehicle types. Different regions may regulate parking for EVs differently. Example templates of EV parking designs are presented in Appendix D.

- **Signage for EV infrastructure**: While there is currently no standard for EV related signage, some Community Readiness Plans include examples of suitable signage. Since many EV parking spaces include charging infrastructure, signage may be appropriate to indicate the location of the EV charging infrastructure. Signage may also indicate preferential parking for EVs. Examples of appropriate signage are included in Appendix D.

- **Americans with Disabilities Act (ADA) regulations**: Providing parking and charging infrastructure for EVs also requires consideration of accessible parking for those with disabilities. The ADA [12] provides guidelines for accessible parking, which could extend to parking for EVs. Requirements for accessible and van accessible parking spaces vary based on the total number of provided spaces, beginning with one van accessible space for up to 25 provided spaces. ADA design elements provide a suitable template for all EV accessible spaces given that the movements involved with ADA vehicles and EVs are different than those of conventional vehicles. For instance, users must move around all sides of an EV for charging purposes. Obstacles around the EV accessible parking space could be seen as barriers, particularly for disabled users. A clear path around the EV space and leading to the EVSE is necessary. Common challenges include poorly placed EVSE protective bollards and cable management strategies (e.g., charge cables on the ground blocking access to EVSE). With the inclusion of dedicated spaces for EV parking or charging, ADA requirements should extend to include these spaces. Furthermore, ADA design elements for EVs are also applicable to other situations, such as locations that receive significant snowfall.
• **Codes enforcement**: Creating regulations for EV infrastructure rely on enforcement of those regulations. This may require adoption of an ordinance to allow for enforcement. Furthermore, some examples of more stringent ordinances and penalties are adopted for non-EV's that are parked at EVSE spaces and for EV's that are parked, but not using the infrastructure.

Area regulatory structures should also consider the impacts of EV market penetration on utility grid capacity and rate structures. Short-term grid impacts are not expected; however, increases in EV market penetration could create grid impacts. According to a study by Black and Veatch for the Electrify Heartland Plan [13], EV impact on utility feeders, some parts of utility feeder must be replaced with a 20% EV penetration (overloaded by 1% or less), transformers will also overload with increase in EV penetration. This general finding is echoed by other Community Readiness Plans (e.g., Clean Cities Atlanta/Center for Transportation and the Environment [14]). Regions should utilize EV demand forecasts to analyze grid impacts. System upgrade costs and changes to peak load are examined by the Sacramento Municipal Utility District [15]. Some discussions argued that local utility upgrades because of a few localized EV users in a neighborhood should not be borne by all rate-payers. Others argued that non-EV related upgrades are often absorbed by rate-payers already.

Utility rate structures can vary by region depending on utility provider, with some areas using a utility co-op. With increases in EV market share, some providers may propose new rates to account for increased demand. Time of use (TOU) rates are an example of potential new rates and provide an incentive for EV users to charge at a more efficient time. At-home EV charging could shift the peak in energy demand to a later time, corresponding to current off-peak rate shifts. The inclusion of smart metering allows utility providers to shift demand. Smart charging would allow EV users to delay or stagger charging periods to fit individual schedules and to reduce electricity load at a given time. It is expected that this could be a strong lever to control peak demand from EV charging.

**Education and Outreach**

Education and outreach is one topic that surfaced in every session of the workshop, either as a significant barrier to the project or as a significant step toward success. The needs in this area reach every level and aspect of planning for EV readiness. Several strategies exist for promoting EVs and EV readiness projects to increase EV awareness and dispel misconceptions among the public and government or other policy-making positions in order to create a supportive environment for EV deployment.

• **Project Branding**: A common theme among the projects that showed success from outreach campaigns was successfully branding the EV readiness project
in their area. Establishing a brand for the project works to inspire people in the area and creates a level of excitement about EVs. Successful project branding is also a method to reach potential EV users who are not already familiar with EV technologies.

- **Advertising Campaigns and Media:** Advertising Community Readiness Projects and EV technology is complementary to project branding as it reaches potential markets of EV users and helps promote a level of awareness of the technology. Advertising campaigns can be local, regional, or national; through television or radio advertisements or billboard advertising. At a local level, handout flyers containing project information are also a useful educational tool. Involving media partners, such as local television or radio stations, in outreach efforts can effectively reach a wide audience. Advertising through alternative media such as short films is also an effective outreach strategy used. Many of the current Community Readiness Projects have developed successful advertising campaigns for their regions, which serve as great examples for new projects.

- **Project Websites and Social Media:** In addition to traditional media advertising efforts, project websites are a tool to reach a broad audience of potential EV adopters and supporters. Project websites also provide a source of information to increase the level of education on EVs among the community. Links to DOE websites such as the Clean Cities website [2] or the Plug-In Electric Vehicle Readiness Scorecard [4] provide educational references for communities and potential EV users. Social media presence for projects is also useful methods to reach a larger audience of supporters and maintain real-time information dissemination.

- **Public Involvement:** Project visibility is simple and is one method to promote awareness among the public about EVs. Many EV Readiness programs participated heavily at public events. Promoting EV visibility can be achieved through participation in local events, such as parades, EV test rides, or sessions where potential EV adopters can meet current EV users. Such events build a level of comfort with EVs and help to dispel misconceptions about them. Engaging automobile dealers is another method to promote public awareness. By ensuring that dealers are familiar with EVs, misconceptions about the vehicles can be avoided on the sales floor. Having dealers showcase EVs at events increases the sales of EVs. There is a correlation between the number in attendance and the sales of EVs (Virginia Clean Cities/Richmond Electric Vehicle Initiative [16]). Through participation in local events, projects can gain additional media coverage, which helps with education and outreach efforts.

- **EV Readiness Training:** Educational initiatives are important to establish EV awareness among potential EV adopters, community members, business, and members of government. Outreach efforts to each group are important to the
success of EV readiness and EV market penetration. Training can be through reports, webinars, workgroup sessions, or panels with regional experts. Area businesses are often engaged through the local Chamber of Commerce. Training should also involve local first responders who should be familiar with identifying EVs and safety protocols specific to those vehicles. Local sites such as community colleges or conference centers provide suitable sites for training activities.

- **Government Outreach and Education:** Outreach for members of government is valuable to increase awareness about the vehicles and also about relevant topics of grid impact, air quality impacts, incentives policies, and taxation, which could affect legislative efforts. Government involvement is important to EV readiness to provide support where the private sector cannot, such as with educational efforts or incentives.

- **Sustainable Tourism:** Another strategy to promote EV adoption is demonstrated by Energizing Oregon [17], which connects EVs to area tourism by providing charging infrastructure along tourist routes. The strategy is effective to promote visibility and exposure for EVs to the public. Developing a sustainable tourism route requires education and outreach initiatives for hotels and restaurants along the route as well as outreach to rental car companies to provide EVs and promote the tourism effort.
Facilitating Connections Between Readiness Projects

Participants considered the workshops’ greatest contribution was bringing representatives from each Community Readiness Project together to contribute to a discussion about EV readiness. While the focus of the projects differs in some cases, there are many overlapping findings and areas of focus between the groups. From the experiences and recommendations from each project, an overview of the EV community readiness planning process is presented in Figure 5, showing an interrelated process where each element builds on or contributes to another.

![EV Planning Process Overview](image)

Crosscutting Themes and Best Practices

Several crosscutting themes exist among the current Community Readiness Projects, which are incorporated into the discussion of EV readiness planning and in Figure 5. While variations in the implementation of each component varied among the Community Readiness Projects, the major themes of educational initiatives, collaboration efforts, policy development, and charging infrastructure are important factors for the success of EV adoption.

The Strong Need for Educational Initiatives
Developing an understanding of EV technologies through educational initiatives was a topic of discussion in every panel session during the workshop. The topic was also mentioned many times as an important step moving forward with EV adoption. EV awareness and understanding is currently a major barrier in many areas, as they are perceived by much of the public as cost prohibitive compared to conventional vehicles. Education is also a major barrier in locations lacking any incentive policies for EV adopters.

Conversely, those areas with strong support for EV policies often have well developed education and outreach strategies. Outreach campaigns can increase the number of EV adopters in an area simply by introducing the public to EVs and creating a sense of comfort with the vehicle technology. Furthermore, an understanding of EV impacts to an area helps promote appropriate policy measures with regard to charging infrastructure, utility rates, and other city or regional initiatives.

**Collaboration Between Jurisdictions**

Policies regarding EVs can vary between different jurisdiction levels. Some degree of collaboration between jurisdictions is necessary for success of EV adoption. In the short-term, local and regional collaboration is important to establish consistency among policies and regulations within each area. As EV market share increases, state-to-state collaboration becomes increasingly more important to promote greater EV adoption and to promote increased EV use.

Two competing strategies to mitigate planning issues between jurisdictions are flexible plan creation, which accommodates the variation in EV readiness and different policies in place between zones, and EV policy regulation, which requires standardization of policies regarding EVs. Different elements of EV readiness plans appear suited to the different approaches in the short-term to best promote EV adoption in different areas; however, as the EV market share increases, more regulation is appropriate. Collaboration between regions promotes interoperability for users crossing regional boundaries.

**Developing Flexible Policies Versus Regulations**

The other topic that emerged often during the workshop is the balance between policies that require strict adherence and those that allow flexibility. The concern over balance stems from the current level of EV readiness among communities, some of which are already well prepared while others are not. Strategies for EV adoption must deal with variations in existing codes between these regions. As discussed previously, implementation of varying degrees of plan language can help mediate this issue; however, certain plan elements are more suited to assertive plan language than others. For instance, regulatory signage and parking and charging area design standards are elements that appear suited for assertive language or national regulation. On a regional level, interoperability is dependent on compatible charging infrastructure and utility rate structures. Open charge point protocol would allow for a variety of hardware using the same software, promoting
interoperability among regions, but would also create flexibility. Elements specific to cities or regions are more suited to flexible plan language. These elements include local city zoning and ordinances as well as enforcement policies. Cooperation between states, regions, and communities on plan development promotes uniformity between jurisdictions, reducing discrepancies in policy and reducing interoperability problems while improving the customer experience.

**Charging Infrastructure Away From Home**
Most demand for EV charging is expected to occur at home; however, charging locations away from the home serve an important purpose. Based on Figure 4, workplace charging is the next highest priority after at-home charging. These charging locations allow users to recover some portion of their travel range while at work, reducing range anxiety and increasing the number of potential EV users. Other charging locations away from home serve a similar purpose by allowing users to recover vehicle range while parked at a particular destination. Furthermore, these non-home charging locations allow for a complete EVSE network, supporting greater travel range and promoting greater EV adoption. For users of PHEVs, these locations increase the ability of the user to replace petroleum fuels with less expensive electricity. A main challenge is that EVSE demand fluctuates dramatically for non-home and non-work locations.

**Next Steps Moving Beyond Readiness**
The discussions at the workshop and the individual project reports of those involved in Community Readiness Projects provide a template of best practices and strategies for other communities becoming EV ready. Moving forward, additional steps are necessary to generate widespread EV adoption. A number of topics were presented during the workshop sessions and by workshop attendees for promoting EV adoption and achieving greater EV readiness among communities. Opinions on best practices moving forward varied greatly; however, some key practices are highlighted below:

- **Community Involvement and Interoperability:** To achieve widespread EV market penetration, more communities must become EV ready. Some readiness projects (e.g., North Carolina PEV Taskforce [18]) took steps to involve and prepare all of the communities in the project area during planning. This step involves education and outreach to these communities to create a level of understanding about the vehicles. It also includes engaging engineers, planners, and those in government leadership roles to become involved early in the process. ‘Toolkits’ for EV readiness are one method incorporated to help develop codes (e.g., Texas River Cities [7], Plug-In Ready Michigan [11]). Developing infrastructure standards is a national issue of importance. Lack of infrastructure interoperability is a significant barrier to the advancement of regional initiatives and programs. Seamless and easy to
use charging infrastructure is a key priority [7]. Engaging all communities and creating some level of readiness between all communities increases interoperability and promotes greater EV adoption.

- **Marketing Strategies**: A uniform and cohesive marketing strategy seems vital to promote EV technologies. Major barriers to EV adoption are cost, or at least public perception of high initial costs, and public acceptance of the technology. A coordinated marketing message could address public concerns and work to dispel negative perceptions about EVs, focusing on total cost of ownership, reliability and safety of the technology.

- **Fleet Adoption of EVs**: Incorporation of EVs into fleet operations at a regional level promotes technology visibility and generates comfort with the technology among the public. Fleet adoption also creates another market for EVs where they are applicable. It also reduces some of the challenges with charging infrastructure.

- **EV Travel Corridors**: Another public concern is limited range. Development of EV ready corridors reduces range anxiety associated with these vehicles and allows for greater travel with EVs. This could be in conjunction with new demonstration projects for EVSE installations. It could also involve new workplace charging installations. Both topics were suggested as important focuses for moving forward.

- **Public and Workplace Infrastructure**: Increasing the availability of public charging infrastructure stands as a vital element in EV market penetration, and it allows users to supplement any at-home charging that they use. Public charging infrastructure represents an opportunity for both the public and private sectors to invest. Workplace charging serves a similar role; although, development of workplace charging infrastructure is different than public infrastructure as it relies on company investment. Separate classification of workplace charging from public charging could help with the development of policies that apply to it and also help track company involvement.

- **Data Sharing**: In addition to creating a set of best practices and recommendations, creating and sharing a database of pertinent EV data could greatly help when planning for EV ready communities and developing policies around EVs. Some examples of valuable data that were highlighted by workshop participants include:
  
  - Incentives available by state, region, or community and EV sales for that area. A listing of State and Federal incentives is available on the Alternative Fuels Data Center website [19].
  - Volume of use by charging station type and location characteristics.
  - EV registration versus EVSE locations in an area.
• *Continued Outreach and Education:* Promoting EV readiness and adoption relies on general understanding of the technology. Education is a continuous process and is important at all levels of the planning process as well as moving forward to promote greater EV adoption. Increased support from automobile dealers and manufacturers allows outreach at a greater scale than is possible through regional initiatives.

**Conclusion**

This paper provided a descriptive report of the May 1, 2013, *Technical Review of Clean Cities’ Electric Vehicle Community Readiness Projects* workshop. A webcast of the program is available here: [http://tinyurl.com/nmvfr2x](http://tinyurl.com/nmvfr2x) Additional information on the workshop, the presenters, and the DOE Clean Cities Electric Vehicle Community Readiness projects are presented in the Appendices to this paper. In parallel to this paper, a separate report is in preparation, through the DOE, presenting a concise overview of the final reports of each of the readiness projects along with lessons learned and the resources produced.
## Appendix A: Overview Electric Vehicle Readiness Projects

<table>
<thead>
<tr>
<th>Awardee</th>
<th>Project</th>
<th>Location</th>
<th>Award Amount</th>
<th>Project Website</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Texas Triangle Plug-In Electric Vehicle Readiness</td>
<td>Dallas, Houston, San Antonio Corridor</td>
<td>500,000</td>
<td><a href="http://www.electrictechnologycenter.com/texas_triangle_plan.html">http://www.electrictechnologycenter.com/texas_triangle_plan.html</a></td>
</tr>
<tr>
<td>Center for Transportation and the Environment</td>
<td>Southeast Regional Readiness Workbook</td>
<td>Georgia, Alabama, South Carolina</td>
<td>545,400</td>
<td><a href="http://www.cleancitiesatlanta.net/component/content/article/130-electric-vehicle-readiness-workbook">http://www.cleancitiesatlanta.net/component/content/article/130-electric-vehicle-readiness-workbook</a></td>
</tr>
<tr>
<td>City of Austin, Austin Energy</td>
<td>Texas River Cities Plug-In Vehicle Initiative</td>
<td>Greater Austin and San Antonio</td>
<td>499,782</td>
<td><a href="http://cecmi.org/mobility/programs/pluginreadymichigan/">http://cecmi.org/mobility/programs/pluginreadymichigan/</a></td>
</tr>
<tr>
<td>Clean Fuels Ohio</td>
<td>Drive Electric Ohio</td>
<td>Ohio</td>
<td>500,000</td>
<td><a href="http://www1.eere.energy.gov/cleancities/pdfs/delaware_valley_readiness_plan.pdf">http://www1.eere.energy.gov/cleancities/pdfs/delaware_valley_readiness_plan.pdf</a></td>
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<td></td>
<td>Electrify Heartland</td>
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<td>441,178</td>
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</tr>
<tr>
<td></td>
<td>N/A</td>
<td>New York</td>
<td>418,612</td>
<td>N/A</td>
</tr>
<tr>
<td>New York State Energy Research and Development Authority</td>
<td>Northeast Electric Vehicle Initiative</td>
<td>New England</td>
<td>994,500</td>
<td><a href="http://www.transportationandclimate.org/content/northeast-electric-vehicle-network">http://www.transportationandclimate.org/content/northeast-electric-vehicle-network</a></td>
</tr>
<tr>
<td>Oregon Business Development Department</td>
<td>Energizing Oregon</td>
<td>Oregon</td>
<td>485,000</td>
<td><a href="http://www.evroadmap.us/content/energizing-oregon-plan">http://www.evroadmap.us/content/energizing-oregon-plan</a></td>
</tr>
<tr>
<td>South Coast Air Quality Management District</td>
<td>California Plug-In Electric Vehicle Readiness Project</td>
<td>California</td>
<td>1,000,000</td>
<td><a href="http://www.pevcollaborative.org/home">http://www.pevcollaborative.org/home</a></td>
</tr>
<tr>
<td>South Florida Regional Planning Council</td>
<td>Drive Electric Florida</td>
<td>Florida</td>
<td>500,000</td>
<td><a href="http://www.driveelectricflorida.org/">http://www.driveelectricflorida.org/</a></td>
</tr>
</tbody>
</table>
## Appendix B: Workshop Program

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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</thead>
<tbody>
<tr>
<td>8:00 – 8:15 a.m.</td>
<td><strong>Opening Session</strong></td>
</tr>
<tr>
<td></td>
<td>• Welcome and Meeting Objectives: Linda Bluestein – U.S. Department of Energy</td>
</tr>
<tr>
<td></td>
<td>• Clean Cities Overview: Dennis Smith – U.S. Department of Energy</td>
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</tbody>
</table>

**Panel Discussions:** Each speaker will present on their assigned topic for 15 minutes and will be followed by interactive discussions with all attendees. 8:15 – 9:15 a.m.

<table>
<thead>
<tr>
<th>8:15 – 9:15 a.m.</th>
<th>I. Multi-Region and Multi-State Collaboration and Policy Planning</th>
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<tr>
<td></td>
<td>High-level presentations on the benefits of establishing and working with large partnerships and the output from these. Speakers will discuss the products, reports, and strategies to roll them out to big audiences.</td>
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<tr>
<td></td>
<td>• Moderator: Julia Friedman – Program Manager, NASEO</td>
</tr>
<tr>
<td></td>
<td>• Multi-State: Adam Ruder – Associate Project Manager, NYSERDA</td>
</tr>
<tr>
<td></td>
<td>• Multi-Region: Josh Cunningham – Director of Programs, CA PEV Collaborative</td>
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<tr>
<td></td>
<td>• Policy and Incentives: Cynthia Maves – Director of Grant Administration, CFO</td>
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<tr>
<td></td>
<td>• Interactive session</td>
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</tbody>
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<thead>
<tr>
<th>9:15 – 10:15 a.m.</th>
<th>II. Infrastructure Planning: Interoperability, Siting Analysis, and ADA Compliance</th>
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<tbody>
<tr>
<td></td>
<td>• Moderator: Mark Duvall – Director of Power Delivery and Utilization, EPRI</td>
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<tr>
<td></td>
<td>• Interoperability: Kurt Stogdill – Innovation Program Manager, Austin Energy</td>
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<tr>
<td></td>
<td>• Siting Analysis: Robert Graff – Manager, DVRPC</td>
</tr>
<tr>
<td></td>
<td>• ADA Compliance: David Mayfield – Principal, Sustainable Transportation Studies</td>
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<td></td>
<td>• Interactive session</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>10:15 – 10:30 a.m.</th>
<th>Break</th>
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<tbody>
<tr>
<td>Time</td>
<td>Session</td>
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<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td>10:30 – 11:45 a.m.</td>
<td><strong>III. Market Planning: Workplace Charging, City Access, Multi-Unit Dwellings, and Eco-Travel</strong></td>
</tr>
<tr>
<td></td>
<td>• Moderator: Britta Gross – Director of Energy Systems, General Motors</td>
</tr>
<tr>
<td></td>
<td>• Workplace Charging: Sean Flaherty – Co-coordinator, Centralina Clean Fuels Coalition</td>
</tr>
<tr>
<td></td>
<td>• City Access: Christina Ficicchia – Executive Director, NY and Lower Hudson Valley Clean Cities</td>
</tr>
<tr>
<td></td>
<td>• Multi-Unit Dwellings: Christine Heshmati – Coordinator, SE FL Clean Cities Coalition</td>
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<tr>
<td></td>
<td>• Eco-Travel: Mark Brady – Clean Technology Strategist, Oregon Business Dev. Dept.</td>
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<td></td>
<td>• Interactive session</td>
</tr>
<tr>
<td>11:45 a.m. – 1:00 p.m.</td>
<td>Lunch</td>
</tr>
<tr>
<td>1:00 – 2:00 p.m.</td>
<td><strong>IV. Education and Outreach</strong></td>
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<tr>
<td></td>
<td>• Moderator: Amy Lopez – Director, Business Development and GoElectricDrive, EDTA</td>
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<td></td>
<td>• Kim Tyrrell – Program Assistant, Denver Metro Clean Cities Coalition</td>
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<td></td>
<td>• Anne Ku – Project Director, University of Hawaii – Maui College</td>
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<td></td>
<td>• Michael Phillips – Program Manager, Virginia Clean Cities</td>
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<td></td>
<td>• Interactive session</td>
</tr>
<tr>
<td>2:00 – 2:45 p.m.</td>
<td><strong>V. Local Ordinance Planning: Permitting, Zoning and Signage</strong></td>
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<tr>
<td></td>
<td>• Moderator: Tracy Woodard – Director of Government Affairs, Nissan</td>
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<tr>
<td></td>
<td>• Zoning and Signage: Mark Rabinsky – Coordinator, Ann Arbor Clean Cities</td>
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<tr>
<td></td>
<td>• Ordinance Guidebook: Dr. Milton Holloway – President and COO, CCET</td>
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<td></td>
<td>• Interactive session</td>
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<tr>
<td>2:45 – 3:30 p.m.</td>
<td><strong>VI. Utility Planning: Rate Structures and Grid Capacity</strong></td>
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<td></td>
<td>• Moderator: Drew Frye – Technology Innovation Power Utilization Engineer, TVA</td>
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<tr>
<td></td>
<td>• Rate Structure: Don Francis, Executive Director, Clean Cities –</td>
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<tr>
<td>Time</td>
<td>Session</td>
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<tr>
<td></td>
<td>Atlanta</td>
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<tr>
<td></td>
<td>• Grid Capacity: Kelly Gilbert – Director, Kansas City Regional Clean Cities Coalition</td>
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<tr>
<td></td>
<td>• Interactive session</td>
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<tr>
<td>3:30 – 3:45 p.m.</td>
<td>Break</td>
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<tr>
<td>3:45 – 5:15 p.m.</td>
<td><strong>Facilitated Discussion: Next Steps for Implementation</strong></td>
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<tr>
<td></td>
<td>This session focuses on discussion of possible next steps for communities that have engaged in planning activities and are ready to begin implementation of new policies and projects. Each speaker will have 5 minutes to explain their strategies for next steps followed by facilitated discussions.</td>
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<tr>
<td></td>
<td>Conversational Leaders:</td>
</tr>
<tr>
<td></td>
<td>• Dr. Milton Holloway – Next steps for fleets</td>
</tr>
<tr>
<td></td>
<td>• Sean Flaherty – Getting all North Carolina communities on board</td>
</tr>
<tr>
<td></td>
<td>• Cynthia Maves – Marketing strategy and workplace charging</td>
</tr>
<tr>
<td></td>
<td>• Adam Ruder – Funding new installations</td>
</tr>
<tr>
<td></td>
<td>• Kelly Gilbert – Next steps for corridors</td>
</tr>
<tr>
<td>5:30 – 7:30 p.m.</td>
<td><strong>Poster Session</strong></td>
</tr>
</tbody>
</table>
Appendix C: Workshop Speakers and Moderators

Dennis Smith is the National Clean Cities Director and serves as the technology deployment manager for the U.S. Department of Energy’s Vehicle Technologies Office in Washington, DC. In addition to coordinating the efforts of nearly 100 designated Clean Cities coalitions across the country, his duties include working closely with truck and auto manufacturers, fuel providers, state and regional governments, national laboratories, public safety officials, and other key stakeholders to expand the use of alternative fuels and other petroleum-reduction technologies and practices in the transportation sector. Smith is a registered professional engineer and a certified energy manager and has been working in the energy and environmental industry for over 30 years.

Linda Bluestein is Co-Director of DOE Clean Cities since May 2008. Clean Cities is a voluntary program supporting 87 coalitions nationwide with the mission of reducing petroleum consumption in motor vehicles. She was the regulatory manager for Alternative Fuel Transportation Program fleet requirements at the US Department of Energy from 2001-2008. She also has worked with the national energy laboratories to evaluate fuels on the basis of their environmental and energy benefits for inclusion under the Alternative Fuel Vehicle Transportation Program. In addition, Linda has provided input for legislative changes to the fuels and vehicles sections of various comprehensive energy bills. She has authored more than 100 articles on fuels and spoken at more than 100 energy-related events.

Moderators

Mark Duvall is Director of Electric Transportation and Energy Storage, Electric Power Research Institute (EPRI). He is responsible for EPRI’s research and development program for electric transportation, including electric, plug-in hybrid, and fuel cell vehicle programs and related advanced infrastructure, and non-road transportation electrification. He oversees a number of partnerships and collaborations between EPRI and electric utilities, automotive companies, local, state, and federal agencies, national laboratories, and academic research institutions. Prior to joining EPRI, Mark was Principal Development Engineer at the Hybrid Electric Vehicle Center of the University of California, Davis. He has worked in the field of advanced transportation since 1990 and has led the development of several prototype advanced vehicles. He received his BS in 1990, his MS degree in 1994, both in Mechanical Engineering from the University of California, Davis and a PhD in 1998 in Mechanical Engineering from Purdue University.

Julia Friedman serves as a Program Manager for the National Association of State Energy Officials. Her work covers renewable energy integration, transportation efficiency, industrial efficiency and advanced manufacturing, and other strategic initiatives within the energy sector. Previously she worked at the National
Association of Regulatory Utility Commissioners, the City of Newark, and the New Jersey Sustainable State Institute. She holds a Master of City and Regional Planning degree from Rutgers University and completed her undergraduate studies at the University of Chicago.

Andrew Frye is a Power Utilization Engineer in the Energy Utilization Technology group at the Tennessee Valley Authority (TVA). He provides technical support on various research and development projects including energy efficiency, demand response and electric transportation technologies. Frye has been with the Technology Innovation branch of TVA for about 2 years. He received his BS degree in Mechanical Engineering from the University of Tennessee and a MS in Power Systems Engineering from the University of Tennessee at Chattanooga.

Britta Gross is the Director of Advanced Vehicle Commercialization Policy at General Motors. She is responsible for steering the infrastructure and commercialization efforts for GM’s alternative fuel vehicle technology programs, including biofuel, natural gas, plug-in electric and hydrogen fuel cell electric vehicle programs. Gross has an extensive and diverse background in the Aerospace and Automotive industries. She received a degree in Electrical Engineering from Louisiana State University and studied language arts at the University of Wurzburg in Germany. She sits on the Board of Directors of the Electric Drive Transportation Association.

Amy Lopez is the Director of Business Development and GoElectricDrive for the Electric Drive Transportation Association (EDTA). She has been instrumental in the establishment of the GoElectricDrive Foundation, the charitable arm of EDTA. The foundation is embarking upon an exciting national education and awareness campaign to enable mass-market adoption of electric drive vehicles by consumers. Her chief responsibilities include strategy and pro-forma budget development, fundraising, assistance in recruiting a Board of Directors, managing the creative and fundraising consultants, and overseeing the creation of a multi-year, multi-million dollar education campaign.

Tracy Woodard, Director of Government Affairs, Nissan, is responsible for all federal and state government activities in the United States, including monitoring federal and state legislative and regulatory issues. Woodard is the head of the Washington, DC government affairs office, where she spends a great deal of her time. She also manages contract lobbyists who represent Nissan. For the last two years, she has been helping lead Nissan’s holistic approach to introducing the Nissan LEAF. Woodard is responsible for local, regional, and state government interaction as well as with other stakeholders such as utilities, major employers, universities, etc. Previously, Woodard was with the Nashville-based firm of Smith, Johnson & Carr, where she worked as a lobbyist for seven years. She had served as a legislative assistant for the Tennessee General Assembly and as a research aide for the Energy Environment and Research Center in Knoxville. She has a BA in political science from the University of Tennessee, Knoxville.
Project Speakers

Mark Brady, Clean Tech Strategist with Business Oregon, is responsible for promoting industries that leverage sustainability as a competitive advantage and foster the wise use of resources. He also helps ensure that state policies facilitate the growth of clean tech businesses and jobs. Specific focus areas are electric vehicles, energy storage and green chemistry. Mark is project manager for a statewide readiness plan for electric vehicles. Prior to joining Business Oregon, he served as Coordinator of the Puget Sound Clean Cities Coalition. Overall, Mark has 15 years of experience in public and private sectors and Master’s and Bachelor’s degrees in engineering from Columbia University and University of Miami, respectively.

Joshua Cunningham is currently working on advanced clean truck rule proposals that will further reduce heavy-duty vehicle greenhouse gas and criteria emissions in California. Joshua also worked on the Zero Emissions Vehicle (ZEV) light-duty regulations. In this role, Joshua led the light-duty vehicle greenhouse gas emission analysis on 2050 advanced vehicle scenarios, as well as the ZEV market and cost analysis for the Advanced Clean Car regulation focused on 2025.

Christina Ficicchia is the Executive Director at Empire Clean Cities, acting as the US Department of Energy Clean Cities Coalition Coordinator for the region. Prior to this, Ficicchia worked as an economic and environmental planner with Bronx Overall Economic Development Corporation where she worked on renewable energy projects, green roof projects, green building and other energy efficiency and improvement projects. She develops and executes long-range goals, manages operations, develops policies, coordinates work and exchange of information, seeks out increased membership enrollment and funding and promotes the acceptance of alternative fuel fleet vehicles.

Sean Flaherty has served as senior planner at Centralina Council of Governments in Charlotte, North Carolina since January 2012. He serves as the co-coordinator for the Centralina Clean Fuels Coalition and lead grant administrator of North Carolina’s Plug-In Electric Vehicle Planning Readiness Initiative: Plugging in from Mountains to Sea. Previously, Flaherty worked for Triangle J Council of Governments in the Research Triangle Park where he served as energy and environment planner for four years. In this role, he provided leadership and support for initiatives such as the Triangle Transportation Demand Management Program and Triangle Clean Cities Coalition, while also founding the Council for a Sustainable Triangle and Triangle Green Business Challenge. Prior to that, Flaherty worked for Advanced Energy and the NC Department of Environment and Natural Resources. Specializing in clean transportation, Flaherty has managed over $20 million in grant funding since 2007.

Don Francis was elected Executive Director of Clean Cities-Atlanta in April 2009. He served on the Board of Directors and as the Treasurer from 2000-2005. Francis has 40 years of experience in automotive engineering sales and marketing. He was employed by Georgia Power for 31 years, with 13 years in the company’s electric
transportation program. His primary responsibility was business unit manager for the sale, installation and service of electric vehicle chargers to internal and external customers. During this time, he served on many local community and industry committees working on electric vehicle infrastructure and market development. He is a member of the Society of Automotive Engineers and received a Bachelor’s Degree in Mechanical Engineering from General Motors Institute.

Kelly Gilbert has been with Metropolitan Energy Center since 2008, coordinating the Kansas City Regional Clean Cities Coalition, and became Transportation Director in 2010. She administers millions of dollars in projects across four states, which support a variety of alternative fuel refueling stations, deployment of hundreds of alternative fuel and advanced technology vehicles and reduces barriers for other fleets and communities to do the same. She and her transportation staff have been leading community EV readiness, education and deployment efforts since 2010.

Robert Graff manages the Office of Energy and Climate Change Initiatives at the Delaware Valley Regional Planning Commission (DVRPC), the MPO for Greater Philadelphia. He manages regional initiatives to reduce energy use and greenhouse gas emissions, and to prepare for the long-term impacts of a changing climate. Previously at Tellus Institute in Boston, Graff helped create the Global Reporting Initiative, now the global standard for corporate sustainability reporting. He holds an MPA-URP from the Woodrow Wilson School at Princeton University.

Christine Heshmati is a Senior Policy Analyst for the South Florida Regional Planning Council (SFRPC) and the Southeast Florida Clean Cities Coalition Coordinator. Christine serves a population of 51/2 million residents in the Counties of Monroe, Miami-Dade, Broward, and Palm Beach, including over 100 cities. Prior to working with the SFRPC, she was a planning manager for the Broward Metropolitan Planning Organization in Southeast Florida for ten years and prior to that, she worked with the Florida Department of Transportation for 8 years. In that position, she coordinated with five MPOs in the Southeast Florida region and oversaw the project justification process for the Congestion Mitigation and Air Quality (CMAQ) Improvement Program. Heshmati’s goals are centered on networking with other professionals to plan and implement ways to reduce Southeast Florida’s reliance on foreign oil and to promote sustainable communities and healthy lifestyles.

Milton Holloway is the President and COO of the Center for the Commercialization of Electric Technologies (CCET) in Austin. Since 2005, Dr. Holloway has led CCET in the development of technical advisory groups, quarterly meetings of the Board of Directors, development of alliances with ERCOT, EPRI, DOE and other organizations and in the planning and execution of technology and demonstration projects, including a $27M ARRA project, and a PEV Readiness planning project. Holloway’s consulting, research and teaching interests have focused on applied economics in both public and private sector venues. He was appointed Executive Director of the Texas energy policy office by Governor’s Briscoe and Clements during the energy
crises of the 1970s and early 80s. He has taught in the Executive MBA programs at University of Texas, Austin, Baylor University and St. Edward’s University. He holds BS, MS and PhD degrees in Economics.

Anne Ku directs the Maui Electric Vehicle Alliance, the Department of Energy Clean Cities funded EV-readiness project, which has seen the stakeholders multiply tenfold and its reach extended to the neighboring islands of Kaua‘i and the Big Island. The project’s main focus is on developing adequate infrastructure for mass adoption of electric vehicles to reduce reliance on fossil fuel imports and increase EV charging from renewable energy sources. The plan to deliver an electric vehicle paradise to the millions of visitors depends on local residents and businesses to pave the way. Anne holds a Bachelor of Music from Utrecht Conservatory, BSE in Electrical Engineering from Duke University, MSc in Operations Research from London School of Economics and PhD in Decision Science from London Business School.

Cynthia Maves oversees grant administration of more than $14 million in funding from the US Dept. of Energy, US EPA and Ohio Dept. of Transportation. Maves leads the Ohio electric vehicle stakeholder group and oversees EVSE installation projects funded by Clean Fuels Ohio’s (CFO) Recovery Act grant. She also manages CFO’s workplace charging initiative and leads the marketing campaigns for CFO’s Recovery Act projects and Ohio’s electric vehicle readiness initiative. Prior to joining CFO, Cynthia worked as a consultant for a solar energy firm and as an attorney with the State Medical Board of Ohio. While serving as a director of a community bank in Indiana, Maves led the effort to build the first LEED-certified bank branch in Indiana. She graduated with a BA from DePauw University and a JD from Indiana University at Bloomington.

David Mayfield founded Sustainable Transportation Strategies in 2011 to focus on reducing greenhouse gas emissions resulting from transportation. David has more than 20 years of experience in transportation planning including more than four years of experience planning infrastructure deployment for electric vehicles. Mayfield served as a member of Oregon Governor Kulongoski’s Transportation Electrification Executive Council. He has written or edited nine reports and professional articles on electric vehicles and EV charging station siting and design, including work conducted for the Oregon Department of Transportation, the US Department of Energy, Clean Fuels Ohio, Virginia Clean Cities, the American Planning Association and the New York State Energy Research and Development Authority.

Michael Phillips manages the Richmond Electric Vehicle Initiative (REVi), a program of Virginia Clean Cities (VCC). Michael also serves as VCC’s Richmond staffer, based in the Virginia Department of Mines, Minerals & Energy at the state capitol. During his time at VCC, he also led the organization’s public relations and media campaign resulting in extensive exposure throughout the state for various programs and alternative fuels. Prior to joining Virginia Clean Cities, Michael spent four years leading Mid-Atlantic public relations for Ford Motor Company. At Ford, he
strategically planned, managed and executed public relations campaigns for a region including Virginia, Maryland, DC, North Carolina and South Carolina with a particular emphasis on the company’s sustainability efforts. For Ford, Michael served as a spokesman and frequently planned and executed major events including vehicle electrification forums, sustainability forums, product launches, auto shows, national tours and press conferences. Michael is a graduate of the University of Virginia.

Mark Rabinsky is a project manager for the Clean Energy Coalition, and the Clean Cities Coordinator for Ann Arbor, Michigan. Mark recently finalized an electric vehicle infrastructure readiness plan for Michigan titled “Plug-in Ready Michigan”. This electric vehicle plan brought together more than 40 regional project partners and stakeholders with the goal of identifying best practices and opportunities related to planning, zoning, codes, permitting, and utilities. Mark holds a bachelor’s degree in finance from the University of Massachusetts and master’s degree in sustainable systems from the University of Michigan.

Adam Ruder is a project manager in New York State Energy Research and Development Authority’s (NYSERDA) Transportation group, focusing on NYSERDA’s transportation program planning and implementation programs. Ruder is managing NYSERDA’s efforts to expand electric vehicle use in the state, including overseeing grants that will be installing 900 EV charging stations in 2013. In his five years at NYSERDA, he has managed over 100 projects to deploy alternative fuel vehicles and infrastructure in public and private fleets and reduce emissions from vehicles already on the road. Ruder is a co-chair of the Clean Vehicles and Fuels workgroup of the Transportation and Climate Initiative, a coalition of the energy, environment, and transportation agencies of the 11 Northeast States and Washington, DC.

Kurt Stogdill works for Austin Energy within the Distributed Energy Services Group, with a focus on emerging distributed energy technologies including electric vehicles. Areas of particular interest include beta-testing and developing a business case for these emerging technologies within the electric utility industry as well as supporting other activities fostering their path to commercialization. He is also the principal investigator for the Texas River Cities initiative, a DOE grant funded regional planning project looking to develop a plan for plug-in electric vehicle infrastructure for a region stretching from San Antonio to Georgetown, Texas. Stogdill’s educational background includes a Bachelor’s degree in Economics and a Master of Science in Science and Technology Commercialization, both from the University of Texas at Austin.

Kim Hargraves Tyrrell has been with the Denver Metro Clean Cities Coalition for two years. She manages programs such as the Clean Air for Schools: Engines Off anti-idling program, coordinates marketing and membership efforts, and plans education and outreach initiatives. Prior to joining Clean Cities, Kim did environmental policy work for the Colorado Energy Office and the Colorado Department of Public Health & Environment. Tyrrell has her MBA from University of
Denver and is LEED, AP certified. She also serves on the Governor’s Pollution Prevention Advisory Board in Colorado.
Appendix D: Example Design Templates

Several templates for parking configuration, signage, and EVSE placement are presented in EV Community Readiness Plans. Some examples, which are typical of the templates presented in by the plans, are shown below.

EV and EVSE Signage

Figure D.1: Example EV Preferential Parking Regulatory Sign [11, 16]
Figure D.2: Electric Vehicle Charging Sign (D9-11b, Temporarily Approved) [20]
**EV Parking and EVSE Configurations**

Figure D.3: Typical EVSE Application to Parallel Parking [11]
Figure D.4: Typical EVSE Application to 90° Parking with ADA Parking Allowance [16]
Appendix E: References