Illinois Commerce Commission
Initiative on Plug-In Electric Vehicles
August 15, 2011

Response for Supplemental Comments

Comments of CD, LLC d/b/a Carbon Day Automotive

Summary

Carbon Day Automotive thanks the Commission for its proactive stance by initiating a series of workshops specific to Electric Vehicle (Charging) Supply Equipment (EVSE). Based on the prior written comments submitted in the ICC's EV Plug-In Initiative Workshop in March and the ongoing dialogue between the parties at the Commission's previously sponsored workshop, there are many areas of consensus, both in identifying critical issues and proposing solutions for them.

1. Electric Vehicles Help State Meet Energy and Environmental Goals:

Plug-In Hybrids (PHEV) and Battery Electric Vehicles (BEVS) collectively referred to as "EVs" hold promise for solving national and just as important local energy issues, including reduced reliance on fossil fuels, curtailment of greenhouse gas emissions, fostering energy independence and creating sustainable investment opportunities.

2. The EV and EVSE Industry Has Launched in Illinois

Carbon Day is pleased to report to the ICC that currently there are over 100 EVSE installed and another 350 planned this year with a combination of Level 1 and Level 2 EVSE known as CT2100 and CT500 manufactured by Coulomb Technologies in operation in Illinois on the ChargePoint EV energy network electric vehicle drivers nationwide consumed 35 MW of electricity last month on the ChargePoint car charging energy network The ChargegPoint Car Charging Network 35 MW of energy is equivalent to over one million electric miles driven on an annual basis throughout the USA by GM's Volt, the Nissan Leaf and a host of other electric vehicles. Illinois residents are playing their part in this historic transition as the nation's drivers have begun to make the choice to shift the type of energy they use for powering their vehicles from oil to electrification. The ABI Research report "Electric Vehicle Infrastructures: Charging Stations for Electric and Hybrid-Electric Vehicles" ABI EV Industry Report examines the state of the electric vehicle charging market, with forecasts of the number of stations to be installed worldwide, by major region and country, from 2011 through 2016.By 2016 Illinois is projected to have 190,869 charging stations to serve the EV industry.

3. Consumers can benefit from the Commission's Unique Role in Supporting EVs

The birth of the new transportation electrification industry is an opportune moment for Illinois policy makers. This is especially true in light of the current environmental renewable energy portfolio, energy efficiency and clean air legislative accomplishments and laws presently in place.

Illinois' policies as determined by the ICC will play a pivotal role in accomplishing President Obama's goals of One Million Electric Vehicles (EVS) on the road by 2015. Governor Quinn recently stated he envisions Illinois as a capital for manufacturing EVs. Becoming the global leader will mean that the State of Illinois by default must build a reliable and intelligent smart grid to effectively reach these policy goals. The timing of the electric car, the software and communication technology utilized in today's advanced charging infrastructure and the development of the smart grid is a convergence of policy, environmental and economic challenges that require a studied effort to understand new business models and ways to support clean energy for Illinois energy markets. See the recently Passed Electric Vehicle Act forming a statewide task force to initiate additional policy issues.

Whatever the ultimate roadmap for achieving the promise of electric vehicles will look like, it will be achieved based on the best collective efforts of all the Illinois stakeholders. By leveraging the deployment of the EVSE infrastructure the ICC will have the ability to learn by the deployment and be in a position to adopt policy decisions that facilitate Illinois' Clean Air Goals on a faster timetable then expected, unleash a wave of economic investment and help to encourage the electric vehicle technology that inevitably is destined to be the elusive break though for changing the habits of the Illinois consumer. No doubt that the consumer awareness is awakening with the deployment of smart meters and Home Area Networks, and this recognition of bi-directional communications and the ability to better understand electricity usage patterns is quickly developing. This will become especially true when the electric vehicle's charging sage almost doubles the consumer's monthly electric bill. As a result to facilitate intelligent choices the consumer must be able to select rate plans that provide intelligent and verifiable choices for their energy consumption. Utilities must be able to transfer the usage on EV electricity amongst utilities as EVD travel in different utility jurisdictions. Sharing this data in an open and transparent energy network that supports the consumer's ability to choose pricing, the type of energy they prefer to charge their batteries (renewable wind, local solar, remote solar, fossil free, fuel locally generated, nonrenewable energy, etc), the cost of accessing their electric energy and the convenience of locating charging stations by power level, station location availability and consumer today wants the option to make a reservation at a charging station. As electricity usage proportionately increases in their transportation patterns the consumers will see a dramatic drop from now through 2016 in their energy costs.

Carbon Day projects that there will be a consumer energy savings of over $1.775 Billion Dollars annually when Illinois Drivers drive 10% of their miles on Illinois' grid power when driving a vehicle with a 24 mpg combustion engine powered by gasoline at $4.25 per gallon!! The cost per mile of energy is almost 75% less expensive then relying upon oil. Recognizing that the cost of purchasing EVs today are more costly and are subsidized its projected that as battery technology improves and as the manufactures production increases prices for EV components will also fall to more efficient pricing. It's expected that the costs differences between purchasing an EV or gas powered car will diminish probably in about five years.

In Illinois EVs will be powered by substantially more fossil free and renewable energy then most areas. Illinois's existing electricity mixes will result in creating the world's most sustainable neighborhood streets as zero emission driving grows. In a few years as EVs begin to scale up zero emissions will help alleviate the cause of asthma and other inner city breathing illnesses. At the same time the goals of the State and City of Chicago's Climate plans were planned their goals for carbon reduction are likely to be surpassed, as the metrics of the EVs were not well known to most policy makers when these Climate Plans were created. The result from the stimulus funds fast tracked the development of electric vehicles, but the expenses of funding the infrastructure will be left to local communities. Perhaps incentivized with tax credits or grants, but the current economic conditions require creative and new business model.

4. EV Drivers Require Guaranteed Access to Electric Grids

Carbon Day is experiencing frustrated EVDs who are being told by their employers they can not charge their cars even at Level One 110 VAC outlets. EVDS are starting to complain about the lack of infrastructure in Chicago especially in the suburbs or outside of Chicago's downtown. Legislation is required that guaranties the EVD convenient access to electric power. See HB3754: Pending Electric Vehicle Infrastructure Act

Given the fact that several billion in stimulus and private funding dollars is funding hundreds of projects ranging from new electric vehicle technology, manufacturing vehicles, batteries, power electronics and infrastructure to connect to the smart grid any delay in implementation of the EVSE deployment would be devastating to Illinois' clean air, the State's goals of energy independence, the Renewable Portfolio Standard, its energy efficiency program and its efforts to create jobs and expand economic development goals.

5. Smart Grid Controlled EVSE

There are basically two types of EVSE in the marketplace (1) units that are controlled charging stations that are smart grid capable and (2) uncontrolled charging stations that do not have the software and communications intelligence inherent in connecting the EVSE intelligently to a smart grid application.

First and foremost the ICC should consider requiring all public charging stations should be incentivized to be controllable and smart grid capable. EVSE that is installed today that is not either controllable or smart grid capable will have the tendency to add to greater and unnecessary costs for Illinois consumers. By either extreme weather conditions or large electricity consumers unique load applications there are times when peak demands distort the load Illinois buys. The quicker the grid can receive a response to peak-reduction signals from customers participating in demand response markets the earlier the utility can react and begin shifting the demand and in doing so reduce the peak loads. When there are sufficient customers of the population who have the ability to reduce their load by lowering or eliminating peak charging that reduces costs by replacing the capital need for unnecessary generation. Controllable and intelligent communication functionality is key to encouraging consumers to charge at home whenever possible at night, and seems to work better for consumers in the long term.

A demand response capable EVSE infrastructure will facilitate the Illinois Power Agency ability to go out to buy power and buy in flatter blocks, it costs less then when Prices are higher in peak demand. In lieu of adding nonresponsive additional electrical loads to the grid, it would seem prudent to shift the cost of the added load directly to the consumer of that load and not have that load subsidized by other non charging customers. EVSE must have the ability to provide demand response capabilities, and allow the EV Driver to choose either a less expensive alternative by use of the demand response or choose to continue charging at the higher price imposed for peak time charging.

6. Sub Meters should be owned by the Building Owner as part of the EVSE

There also needs to be EVSE that has sub-meters that has the functionality to do measurements for determining in any given meter, which portion of the electric bill relates to transportation consumption through a J1772 plug or a 110 VAC cord connected to an EVSE. The introduction of the electric vehicle and related EVSE is expected to add Level One and Level Two loads immediately and without a way to separate transportation consumption from building consumption it will make it impossible for the utilities and the State to truly measure the ability of the net energy efficiency savings. For example a building with a 250-kW/h annual load could replace its lights with energy efficiency fixtures, incorporated an energy management system reducing its HVAC loads say by 15% and installed a Fast charger (12-80 kW) or 6 EVSE (6.6 kW) to fuel EVs. The property owner could even have purchased their energy efficiency equipment in the and then discover that by adding a Fast Charger say at a pharmacy where visits are less then 20 minutes turn what appeared to be a successful energy savings program instead may into a massive disruption on the surface of what was otherwise of a very well planned energy efficiency effort. By requiring EVSE infrastructure in the public sector to include smart grid functionality EVSE can be symbiotic with Illinois energy efficiency and demand response goals only when the EVSE is equipped to report the data collected to allocate the energy usage between transportation and building usages to foster compliance with Illinois' environmental laws and goals.

7. The Energy Network Deployed Must Have the Ability to Store, Share and Report Data and Information

Ideally the smart grid capable EVSE should be connected to an energy network with the degree of control and management by approved software that can perform vital energy controls, including creating the data not only reporting for the measurement of electricity used for transportation as compared to electricity consumed in manufacturing, buildings or homes but to measure the amount of electricity consumed by vehicle, driver, from identifiable locations. Such information must be measured so it will be identifiable and verifiable later as the EVSE

In a very recent report PJM have shown that managed charging through a Central Network Operator (CNO) using real time LMPs have the ability to substantially reduce EV grid impacts compared to charging schemes without a CNO. The CNO managed charging algorithm charges batteries based on a number of criteria: *a)* energy needed for next planned trip; *b)* time until energy is known or predicted to be needed; *c)* current battery state-of-charge; *d)* time of day; *e)* forecasted LMPs; and *f)* real-time LMPs. For CNO managed charging of 1 million EVs using real-time LMPs, we have shown that PJM will save $350 million annually on cost increases due to the added load of EVs, compared to the unmanaged charging scenario. This represents a 45% reduction in additional energy costs that would otherwise be incurred from ad hoc charging of EVs by consumers.

The scenario with time of use (TOU) pricing reflects a distributed intelligence platform with a fixed pricing schedule that does not have a CNO. The two-tier pricing scenario, modeled on the pilot EV tariff developed by Southern Illinois's Edison (SCE) for EV charging [1], was evaluated and found to provide no significant benefit. Compared to the unmanaged charging scenario, there was actually an additional cost of $32 million (4%) annually. Wholesale energy cost was chosen as the primary metric for grid impacts because of its physical significance and transparency on the power system. Wholesale energy costs, which are calculated using nodal LMPs, include the costs of energy, congestion, and losses, meaning that any cost from generation to nearest transmission substation is reflected by LMPs. We therefore believe that any credible charging scheme that aims to reduce grid impacts will result in decreased wholesale energy costs.

This analysis was carried out using Better Place's network models and experience as a CNO. However, the results of this study are intended to be extensible to any CNO that provides managed EV charging. Carbon Day is utilizing the ChargePoint Network which as compared to Better Places serves the EV industry in its entirety including the Better Place EVs. The Coulomb Technology ChargePoint Network operates on open ended architecture and the ICC should adopt findings that the EVSE installed especially in public charging locations should be adoptable to these.

8. The EVSE Owner is Not a Utility and Should not Be Regulated

The recently issued California PUC Proposed Decision concluded the "benefits of utility ownership of EVSE do not outweigh the competitive limitation that may result from utility ownership." *Phase II Decision Establishing Policies to Overcome Barriers to Electric Vehicle Deployment and Complying with Public Utilities Code Section 740.2*, PD 09-08-009, March 15, 2011 at 68. The proposed decision is available at:

California PUC Decision Re: EV Charging Does Not Constitute the Sale of Electricity

We note that in California the PUC supported unregulated markets for the electric vehicle service providers (EVSP). By finding that the charging of electric cars though EVSE connected to an existing panel and served by an existing utility meter is not the sale of electricity. This finding in Illinois is essential to encourage the continued deployment of EVSE in Illinois. Currently consumers, universities, property owners, real estate managers, educational institutions, shopping centers, office buildings, parking garages, condos, governmental agencies and apartment buildings in Illinois are underway in contracting with CD, LLC doing business as Carbon Day, and the other EVSP companies to install EVSE as part of the building the electric vehicle energy network. Intelligent and smart grid capable EVSE is serving as the catalyst for the electric vehicle streets, boulevards and highways under a myriad of deployment Projects. See The ChargePoint EV Charging Network for a real time view of BEVs and PHEVS charging their batteries nationwide, including Illinois.

In the end, what utilities are seeking from the Commission is not so much flexibility but guidance. There would be inherent philosophical and practical conflict arising from the Commission's stated desire to facilitate a competitive market and its willingness to allow regulated utilities to have the capacity to join that market and use non-competitive advantages in the process. While flexibility is a virtue in an emerging market with many unknowns, third parties nonetheless need some degree of certainty that utilities won't be allowed to crowd out the rapid evolution of a cost effective, innovator- led market for the charging infrastructure space. Stated alternatively, the foundational rules of the market must be sound and predictable. Accordingly, this is the Commission's best early market opportunity to provide guidance in a clear manner and protect the competitiveness of this fledgling industry. The decision regarding this issue should be part of an ICC docket.

Utility involvement in the early EV charging services market in the form of education and support is necessary and desirable.

9. Metering and Sub Meters

The ICC must allow the private sector the opportunity to develop a competitive marketplace to viable operational scale. In the case of ownership of PEV submeters, The ICC should, as in California PUC decision find that customer-ownership of submeters is consistent with the industry's noted PEV metering goals, especially those policy goals related to customer choice, supporting technological advances and minimizing cost. For example, we anticipate that customer ownership of submeters will allow customers to take advantage of new metering technologies to support new billing methods.

Therefore, the ICC should find that PEV submeters should be treated consistent with the treatment of any other equipment located on the customer side of the meter. The primary meter, as opposed to the PEV submeter, should of course remain under the ownership of the utility. A submeter would measure PEV load and be used by the utility in its billing calculations. This arrangement will provide utilities with control over the total billing level and limit opportunities for fraud or meter tampering. Most likely, incidences of fraud would be limited to tampering with the submeter's calculation of the PEV subload, which does not impact the utility calculation of the total load at the primary meter.

10. Rate Design Guideline

CD, LLC doing business as Carbon Day agrees with Comed's comments regarding the BES and BESH Rates in the last proceeding. Any option being considered must reflect the need for consumer choice and flexibility while ongoing data is collected.
CD, LLC doing business as Carbon Day is still very concerned with the potential impact of demand charges on EVSE installations, particularly small commercial customers who are likely sites for DC fast-charging stations. These sites, like convenience/gas stations, often have high traffic and limited pre-existing electric service, and their operation of EVSE or DC fast chargers will exceed their monthly peak and incur demand and capacity charges that may prove untenable. We have encountered this in other parts of the country and anticipate encountering it in Illinois, particularly as placement of DC fast chargers gain speed. We strongly recommend the Commission allow the creation and availability (mandatory or otherwise) of a separate EV TOU rate to commercial EVSPs to address this concern wherever demand charges would otherwise render charging stations uneconomic. We recognize that whatever option is initially chosen will likely be adjusted later as more information concerning costs, consumer behavior and market penetration clarify how best to encourage off-peak charging. Pilot studies or voluntary joint collaboration with utilities on the issue of submetering might also occur concurrently to better define and resolve any technical and logistical issues. Any proposed rate design should also reflect the degree to which EV users deliver system benefits as an additional rate based incentive. As EV use and its smart charging technology exerts greater impact on utility load, the Commission should allow the use of discounted rates or dynamic pricing as a means of allocating to EV users an equitable share of the resulting savings.

11. Barriers and Obstacles:

Illinois's transportation sector accounts for approximately 30 percent of statewide greenhouse gas (GHG) emissions, and substantial portion of all public health-related air pollution. Given the anticipated environmental and energy security benefits of electrified vehicles (EVs), it is prudent for policymakers to encourage and accelerate the deployment of these technologies. However, vehicle consumer preferences combined with Electric Vehicle Supply Equipment (EVSE) deployment barriers (e.g. equipment and installation costs, consumer knowledge, contractor service, and permitting

procedures and expertise) may delay or prevent the societal benefits associated with EV technologies from being realized.

12. Environmental Policy Implementation & EVSE Deployment

The current Plug-In initiative recognizes the benefits of EV deployment. 5 While there are several barriers to large-scale EV deployment (e.g. upfront costs, near-term EV supply constraints, limited travel range, consumer education, and electric grid preparedness), local governments can play an important role in accelerating consumer access to EVSE throughout Illinois.

13. Near-Term EVSE Options

Near-term EV purchasers can use Level 1 EVSE technology (i.e. 120-volt, standard three prong outlet) to charge their vehicles. However, vehicle consumers are likely to prefer Level 2 EVSE technology (i.e. 240-volt, washer-dryer outlet) due to its faster charging time and standardized vehicle-to-charger connection. The barriers to Level 2 EVSE infrastructure installation (e.g. upfront costs, consumer knowledge, contractor service capability, and permitting procedures & expertise) will require special attention from both public and private sector entities.

14. Recommended Local Government Actions

Through a suite of existing mechanisms, innovative financing tools, and regulatory/process reforms, local Illinois governments can help to facilitate EVSE deployment at the pace and scale needed to achieve Illinois's current emissions mitigation mandates.

15. EVSE Deployment Options for Local Government

(a) . Formalized Strategy - Counties should begin with an accurate quantification of the local emissions mitigation benefits of operating Battery Electric Vehicles (BEVs) and Plug-In Hybrid Electric Vehicles (PHEVs) instead of Hybrid-Electric Vehicles (HEVs) and conventional internal combustion engine vehicles (CVs). An EV Impact Analysis & Transition Plan ties in well with existing Planning and Municipal Associations of Governments commitments and will help to implement the Illinois EVSE deployment strategy.

(b) Public Charging - Local governments may have a role in building public charging infrastructure to motivate EV demand because many private providers are reluctant to invest in and build charging stations before clear evidence of consumer demand. EV charging infrastructure deployed at public places can increase public awareness of the growing electric vehicle presence in the Illinoisan the short run if placed at highly visible places.

© ***Multi-Dwelling Units (MDUs)/Apartment Buildings*** - Municipalities should assist in the build-up of curbside charging stations near residential areas that do not have access to private or home charging stations.

(d) ***Planning Codes*** - Local planning codes should be adapted to prepare and encourage the widespread use of EVs. This includes requirements that new residential and commercial buildings finalized after a certain point in time (e.g. 2012) feature wiring of electric lines which allow for easy connection of Level 2 chargers.

(e) ***Renewable Energy*** - To realize the full air quality and climate change benefits offered by EV technologies, the electricity used to fuel EVs should be generated by low and/or zero emission energy technologies (e.g. wind and solar). This will ensure that transportation emissions are actually reduced rather than simply being displaced to the electricity generation sector.

(f) ***Educate EV Stakeholders*** - EVSE installers and potential consumers should be aware of options and operations of EV technologies. Consumer education is a critical component for the success of any proposed rate guideline. Allowing utilities to recover the costs of a consumer education program is reasonable provided such programs reflect educational goals which are dispassionate and designed primarily to ensure safety, reliability and cost reductions for the utility's electric system.

(g). ***Forge support for public-private partnerships*** - Set the stage for private companies to take the lead in the future charging infrastructure market.

(h) ***Financing*** - Obtain fiscal support from all federal, state, and regional funding sources, and establish alternative revenue streams (e.g. municipal bonds, sales tax surcharges, etc.).

(i) ***Lobby decision makers on the federal and state level*** - Lobby decision makers for funding and policy support for alternative transportation fuels and vehicle deployment in the Illinois.

(j). ***Property-Assessed Clean Energy (PACE) Financing for EVSE***

PACE financing programs allow state and local governments to extend the use of land-secured financing districts to fund energy efficiency and renewable energy improvements on private property. This financing mechanism should be expanded to include residential and commercial EVSE projects. EVs and PHEVs save consumers money when compared to CVs and HEVs. *See proposed edits to PACE by adding EV charging asd an eligible item under proposed PACE legislation.*

(k) Streamlining the EVSE Installation Process

This analysis offers the following four-step process for all Level 2 EVSE installation projects.

Step 1 - Consumer schedules and pre-purchase installation inspection with a licensed EVSE contractor to determine local grid preparedness, permitting needs, and project costs.
Step 2 - Consumer visits vehicle dealership to purchase EV, apply for electric utility time of use (BES or BESH) rates (if necessary), and schedule EVSE installation appointment.
Step 3 - EVSE contractor works for consumer and utility to obtain permits and materials.
Step 4 - EVSE contractor installs charger and submits an installation inspection report to relevant public agencies and the electric utility.

(l) *Local Government's Role in Accelerating EVSE Installation*

There are several important areas within the accelerated process model that will require direct action by local governments. The following is a list of action areas that local governments can focus on to improve the efficiency of the EVSE installation process.

1) *Consumer & Contractor Outreach* – Establish inclusive outreach campaigns that educate vehicle consumers and EVSE contractors regarding the benefits of an accelerated process (e.g. time and financial consumer surplus).

2) *EVSE Permitting & Reporting Standardization* – Collaborate with intraregional governments to standardize and digitize the permitting and reporting process for EVSE installations throughout the region (e.g. through The Electric Vehicle Task Force (JPC)).

3) *Lobbying for EVSE Deployment & Process Reform* – Vehicle consumer education and outreach support, EVSE contractor education and licensing requirements, pre-purchase EVSE installation estimate and inspection promotion, EVSE time of use (BES or BESH) metering, expedite EVSE installation permitting, and simplify EVSE installation reporting.

Conclusion

CD, LLC doing business as Carbon Day appreciates the opportunity to voice its concerns and recommendations to the Commission. EVs will play an important role in reducing air pollution and GHG emissions from the transportation sector. Ways to overcome barriers to EV market penetration must include local governments, who should take steps to act to reduce these barriers.

Key Recommendations
1) Public charging stations
2) Curbside charging station deployment for multi-unit dwellings

3) Adaptation of urban planning codes
4) Stakeholder education
5) Public-private partnerships
6) Establishment of a financing mechanism for private charging stations
7) Streamlining the charging station installation process
8) Develop a New Form of Private/Public/Utility Partnership or
9)Expand the Energy Efficiency Program to Fund EVS or Create Smart Grid Rebates and Grants Program Similar to energy efficiency on the utility Bill.

We respect the participation of all the stakeholders, and particularly the Commission's staff, in the healthy debate over the best regulatory policies for promoting the deployment of EVs and their charging infrastructure. While we agree with the need to remain open to policy change as data from the EVSE infrastructure project experiences to date and other studies lend clarity going forward, we also believe that the public interest is best served by establishing the ground rules for a competitive and open market, when capital investment is at its most sensitive stage. Providing clear and unambiguous guidance at this stage will serve to create a fertile investment environment, will create a partnership between the stakeholders and will successfully launch the technologies all of us agree are of critical importance to our national interests and the ongoing transformation of the grid.

Submitted

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