

**ICC Docket No. 10-0527**

**Commonwealth Edison Company's Response to  
Illinois Commerce Commission ("STAFF") Data Requests**

**DLH 2.01- 2.05**

**Date Received: September 9, 2010**

**Date Served: September 30, 2010**

**REQUEST NO. DLH 2.04:**

Provide copies of all workpapers, in Excel format with working formulas as appropriate, for ComEd Exhibits 1.0, 2.0, 3.0, 4.0, 5.0 and related exhibits.

**RESPONSE:**

See the table below for the reference to the workpapers supporting the following ComEd witnesses' testimony:

<b>Witness' Testimony</b>	<b>ComEd Ex</b>	<b>Attachment</b>
Direct Testimony of Ross Hemphill	ComEd Ex 1.0	DLH 2.04_Attach 01 – 04
Direct Testimony of Michael McMahan	ComEd Ex 2.0	DLH 2.04_Attach 05 - 06
Direct Testimony of Fidel Marquez	ComEd Ex 3.0	None
Direct Testimony of Michelle Blaise	ComEd Ex 4.0	DLH 2.04_ Attach 07 – 11
Direct Testimony of Mary Anne Emmons	ComEd Ex 5.0	DLH 2.04_Attach 12

**ICC Dkt. No. 10-0527  
 DLH 2.04\_Attach 05  
 Summary**

<b>ComEd EV Pilot Program Assets</b>	<b>Unit Cost</b>	<b>Quantity</b>	<b>Total ComEd Cost</b>
Plug-in car	\$ 36,000	45	\$ 1,620,000
Plug-in cargo/service vehicle	\$ 135,000	8	\$ 1,080,000
Hybrid bucket truck (non-pluggable)	\$ 250,000	4	\$ 1,000,000
PHEV digger-derrick	\$ 350,000	2	\$ 700,000
Level 2 charging stations for company vehicles	\$ 10,000	55	\$ 550,000
Incidental equipment and contingency	\$ 50,000		\$ 50,000
<b>Total Vehicles:</b>		<b>59</b>	
<b>Total Charging Stations:</b>		<b>55</b>	
<b>Total EV Pilot Program Investment:</b>			<b>\$ 5,000,000</b>

<b>MONTH/YEAR</b>	<b>ITEM</b>	<b>QUANTITY</b>	<b>COST</b>	<b>ITEM</b>	<b>QUANTITY</b>	<b>COST</b>	<b>Total</b>
Jun-11							-
Jul-11							-
Aug-11	Charging Station	15	10,000				150,000
Sep-11	Charging Station	15	10,000				150,000
Oct-11	Charging Station	15	10,000				150,000
Nov-11	Charging Station	10	10,000				100,000
Dec-11				Plug-in Cargo/Service Vehicle	2	135,000	270,000
Jan-12	Plug-in Car	10	36,000	Plug-in Cargo/Service Vehicle	4	135,000	900,000
Feb-12	Plug-in Car	10	36,000	Plug-in Cargo/Service Vehicle	2	135,000	630,000
Mar-12	Plug-in Car	10	36,000	Hybrid Bucket Truck	2	250,000	860,000

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**DLH 2.04\_Attach 05**  
**Summary**

Apr-12	Plug-in Car	10	36,000	Hybrid Bucket Truck	2	250,000	860,000
May-12	Plug-in Car	5	36,000	PHEV Digger Derrick	2	350,000	880,000
							<b>4,950,000</b>

ComEd Clean Cities Grant Proposal

ICC Dkt. No. 10-0527  
 DLH 2.04\_Attach 05  
 Cost Estimates

<b>Vehicle Costs</b>	<b>Cost p.u.</b>	<b>Quantity</b>	<b>Total Cost</b>
<b>Plug-in Car</b>			
Price based on Nissan Leaf cost estimate	\$ 36,000	45	\$ 1,620,000
<b>Plug-in Cargo/Service Vehicle</b>			
Price based on Navistar eStar cost estimate	\$ 135,000	8	\$ 1,080,000
<b>Hybrid Bucket Truck (non-p;uggable)</b>			
Price based on existing cost for hybrid bucket truck	\$ 250,000	4	\$ 1,000,000
<b>PHEV Digger Derrick Truck</b>			
Price based on cost of Dueco PHEV digger derrick	\$ 350,000	2	\$ 700,000
			<b>Total Cost</b>
<b>TOTAL VEHICLE COSTS</b>		<b>59</b>	<b>\$ 4,400,000</b>

ComEd Clean Cities Grant Proposal

**ICC Dkt. No. 10-0527**  
**DLH 2.04\_Attach 05**  
**Cost Estimates**

Charging Infrastructure Costs			
Level 2 Charging Station	Cost p.u.		
Coulomb Technologies Smart Charging station	\$ 5,000		
Installation (labor, material)	\$ 5,000		
Total equipment costs per charge point	\$ 10,000		
		Quantity	Total Cost
<b>Charging Stations for ComEd plug-in vehicles</b>		55	\$ 550,000
<b>Incidental equipment and contingency</b>			\$ 50,000
Contingency for unforeseen installation costs			
<b>TOTAL PROJECT COSTS</b>			<b>Total Cost</b> <b>\$ 5,000,000</b>

10-Year Gas-Powered to Electric-Powered Car Analysis

	Gas (Ford Focus)	Electric (Nissan Leaf)				
Estimated Retail Total Delivered Cost:	\$ 16,640	\$ 32,700				
EV Range in miles:	288	93	<b>Weekly:</b>	<b>Days:</b>	<b>Daily:</b>	<b>Estimated -</b>
Gas-powered vehicle average MPG:	24	n/a			50	Weekday
The Average Miles Driven per day (based on details to right):	35	35			0	Weekend
The Average Miles Driven /Year	13,000	13,000	250	7	13,000	X 52 weeks
The Average Price per Gallon of Gasoline	\$ 3.000	n/a				
Average Off-Peak Cost per kWh of Electricity	For EVs only \$ 0.080					
Calculated Fuel Cost / Mile	\$ 0.125	\$ 0.018	15%	EV-to-Gas cost ratio		
The Average Annual Energy Inflation Rate	4.0%	4.0%				
The Average Hours the EV will be Plugged in Per Day	For EVs only 16					
EV Estimated Watt Hour/Mile (Wh/mile) allows for 9% charging losses	For EVs only 227.5					
The Estimated Battery Pack Life in Years	For EVs only 10					
Battery Storage (kWh)	For EVs only 25					
Net Battery Storage (kWh) (85% Depth of Discharge)	For EVs only 21.3					
Battery charger throughput in KW:	For EVs only 3.3					
Number of EVs to make up 1 Mega Watt-Hour (if 100% available)	For EVs only 303					
Estimated 10-year battery replacement costper kWh:	For EVs only \$ 300					
Total estimated 10-year battery pack replacement Cost	For EVs only \$ 7,500					

Green House Gases Emissions: 6.7 1.2 Tons per year

Maintenance Costs per Mile:

Est. Cost Per Service:	Miles Per Service:	Gas Cost/Mile:	Electric Cost/Mile:	
\$ 30	3,500	\$ 0.009	n/a	Oil Changes
\$ 550	65,000	\$ 0.008	n/a	Brakes (Gas)
\$ 550	130,000	n/a	\$ 0.004	Brakes (EV)*
\$ 300	50,000	\$ 0.006	n/a	Tune-Ups
\$ 250	50,000	\$ 0.005	n/a	Transmission
\$ 2,000	100,000	\$ 0.020	n/a	Belts, Hoses, etc.
\$ 7,500	130,000	n/a	\$ 0.058	Batteries
Fuel per mile from above:		\$ 0.125	\$ 0.018	
<b>TOTAL COST PER MILE:</b>		<b>\$ 0.173</b>	<b>\$ 0.080</b>	

Maintenance Costs per Year based on:

Gas Powered:	Electric:		Lifetime Costs:
\$ 111	n/a	Oil Changes	\$ 1,114
\$ 110	n/a	Brakes (Gas)	\$ 1,100
n/a	\$ 55	Brakes (EV)*	\$ 550
\$ 78	n/a	Tune-Ups	\$ 780
\$ 65	n/a	Transmission	\$ 650
\$ 260	n/a	Belts, Hoses, etc.	\$ 2,600
n/a	\$ 750	Battery Pack (10% / year)	\$ 7,500
see below	see below	Fuel costs	
<b>\$ 624</b>	<b>\$ 805</b>	<b>PER YEAR</b>	

13000 miles / year:

\* Due to regenerative braking in EV, longer brake life.

Monthly Cash Flow Analysis:

	Gas Powered:	Electric:
Cost of the vehicles:	\$ 16,640	\$ 32,700
(Down payment 5%)	\$ 832	\$ 1,635
Net Loan (less 5% down):	\$ 15,808	\$ 31,065
Payment 72 months & 6% interest rate:	\$ 262	\$ 515
Average Fuel Savings per month:	none	\$ (139)
Net Payment (Income) per month:	\$ 262	\$ 376

Ten-Year Analysis:

(Inflation Adjusted \$)		Vehicle Cost:		Annual Fuel Costs		Cumulative Costs		Cumulative Miles	Year	Annual Fuel Savings Electric vs. Gas
Elect. / kWh	Gas / Gal.	Electric cost:	Gasoline cost:	Gas Powered:	Electric:					
				\$ 16,640	\$ 32,700					
				none	(7,500)					
\$ 0.080	\$ 3.000	\$ 237	\$ 1,625	\$ 18,889	\$ 26,242	13,000	1	\$ 1,388		
\$ 0.083	\$ 3.120	\$ 246	\$ 1,690	\$ 21,204	\$ 27,293	26,000	2	\$ 1,444		
\$ 0.087	\$ 3.245	\$ 256	\$ 1,758	\$ 23,586	\$ 28,354	39,000	3	\$ 1,502		
\$ 0.090	\$ 3.375	\$ 266	\$ 1,828	\$ 26,038	\$ 29,425	52,000	4	\$ 1,562		
\$ 0.094	\$ 3.510	\$ 277	\$ 1,901	\$ 28,564	\$ 30,507	65,000	5	\$ 1,624		
\$ 0.097	\$ 3.650	\$ 288	\$ 1,977	\$ 31,165	\$ 31,599	78,000	6	\$ 1,689		
\$ 0.101	\$ 3.796	\$ 299	\$ 2,056	\$ 33,846	\$ 32,704	91,000	7	\$ 1,757		
\$ 0.105	\$ 3.948	\$ 311	\$ 2,138	\$ 36,609	\$ 33,820	104,000	8	\$ 1,827		
\$ 0.109	\$ 4.106	\$ 324	\$ 2,224	\$ 39,457	\$ 34,949	117,000	9	\$ 1,900		
\$ 0.114	\$ 4.270	\$ 337	\$ 2,313	\$ 42,394	\$ 36,091	130,000	10	\$ 1,976		
								<b>\$ 16,669</b>		

Ten-Year Cumulative Savings - Electric vs. Gas: \$ 6,304

Green shading in ten-year analysis indicates break even point (EV has lower accumulated total cost than Gas powered).



Friday, August 27, 2010

Mr. Dan Gabel  
Manager, ComEd Fleet Services  
630-437-2288 (office)  
630-689-8090 (mobile)  
daniel.gabel@comed.com

Mr. Gabel:

Carbon Day Automotive and Coulomb Technologies are pleased to offer you this pricing quotation. Enclosed is pricing for electric vehicle products necessary to ensure proper system installation and function. We are committed to working with ComEd to create the most robust Electric Vehicle ready City in the country.

We look forward to working with you to help transform the transportation industry. Please feel free to contact us at anytime.

Best regards,

Brian Levin  
Carbon Day Automotive, Vice President  
363 W. Erie Suite 400-W  
Chicago, IL 60654  
O: 312.275.5747 ext. 5  
F: 312.275.7107  
C: 847.903.6652  
BrianL@CarbonDay.com  
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Mr. Dan Gabel  
 Manager, ComEd Fleet Services  
 630-437-2288 (office)  
 630-689-8090 (mobile)  
 daniel.gabel@comed.com

**Price Quote**

Quote #: AEC-ComeED.2.1

Quote Date: 8/27/2010  
 Quote Expires: 11/27/2010

Model Number	Description	Quantity	Price Per unit	Total price
<b>Bollard, Wall or Poll Mount</b>	<u><a href="#">Special Confidential Pricing For ComEd</a></u>			
CT-2100	CT2100 Series Dual Output ChargePoint Networked Charging Stations, <u>Dual</u> 208/240-30A and 120V-12A Output	Each.	\$4,350	
CT2000	CT2000 Series ChargePoint Networked Charging Stations, <u>Single</u> Output 208/240-30A	Each	\$3,850	
CDMA	<b>Integral Gateway Add-On:</b> First unit at a location must have Gateway component to group of stations to the network	each	\$900	
CCR	<b>Contactless Credit Card Reader</b>	each	\$150	
Provisioning	<b>Provisioning of units onto the network after installation</b>	each	\$50	
<b>Total Price</b>	<b>Before Shipping, Installation, Taxes and Tax Credits</b>	<b># Stations</b>		

**\*\* Other Standard Terms & Conditions:**

- Invoice Terms are Net 30 Days, with 50% due at upon placement order and 50% due net 30 days after shipment of product.
- Coulomb Technologies, Inc Standard Warranty Applies for all products. Warranty will be between purchaser and Coulomb Technologies.
- Service Warranty subject Carbon Day Maintenance contract terms – provided in separate quote, One-year warranty included, optional 5 year warranty available. Prices do not include local sales tax, installation costs, or shipping charges.
- Estimated Shipping Per Station: \$70-\$125

[www.CoulombTech.com](http://www.CoulombTech.com) or [www.CarbonDayAutomotive.com](http://www.CarbonDayAutomotive.com)



### Extended Coulomb Parts Warranty Options:

#### **CT2000 Series**

5 Year Parts Only Extended Warranty \$1050

5 Year Parts Only Extended Warranty –Gateway \$1,300

#### **CT2100 Series**

5 Year Parts Only Extended Warranty - \$1250

5 Year Parts Only Extended Warranty –Gateway - \$1470

### CT2000 and CT2100 Series

There are different variations of the ChargePoint networked charging stations:

- **ChargePoint Single Mode (240V) Pole/Wall/Bollard Mount Model: CT2000** It supports 240V/32A circuits with an attached J1772 connector, capable of supplying up to 240V, 80 Amps.
- **ChargePoint Dual Mode (240V/120V, 30A) Bollard Model: CT2101** This model is also a bollard. It supports a dual 120V/15A and 240V/32A circuits with an attached J1772 connector, capable of supplying up to 240V, 80 Amps. The bollard is supported by a 2 feet tall, 3.5” outer diameter, galvanized pipe which mounts to a base plate supported by 3 J-bolts set in concrete. The ChargePoint slides over this galvanized pipe and is locked in place with set screws. The mounting plates prevent the charging station from being rotated and the set screws prevent it from being lifted off.
- **ChargePoint Dual Mode (240V/120V, 30A) Pole Mount Model: CT2102** This is a model that straps on to a streetlight pole. Since energy is already pulled into the streetlight, the installation costs associated with this model is greatly reduced. It supports 120V/15A circuits and can be used with a normal household cord and can also connect to cars with the J1772 cable, supplying up to 240V, 30 Amps.
- **ChargePoint Dual Mode (240V/120V, 30A) Wall Model: CT2103** This is a smaller version of the floor mount Level 1 and Level 2 networked charging stations that mounts to the wall in parking structures. The main purpose is to minimize

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the install footprint in garages and parking structures and to minimize installation costs. It supports 120V/15A circuits and can be used with a normal household cord and can also connect to cars with the J1772 cable, supplying up to 240V, 30 Amps.



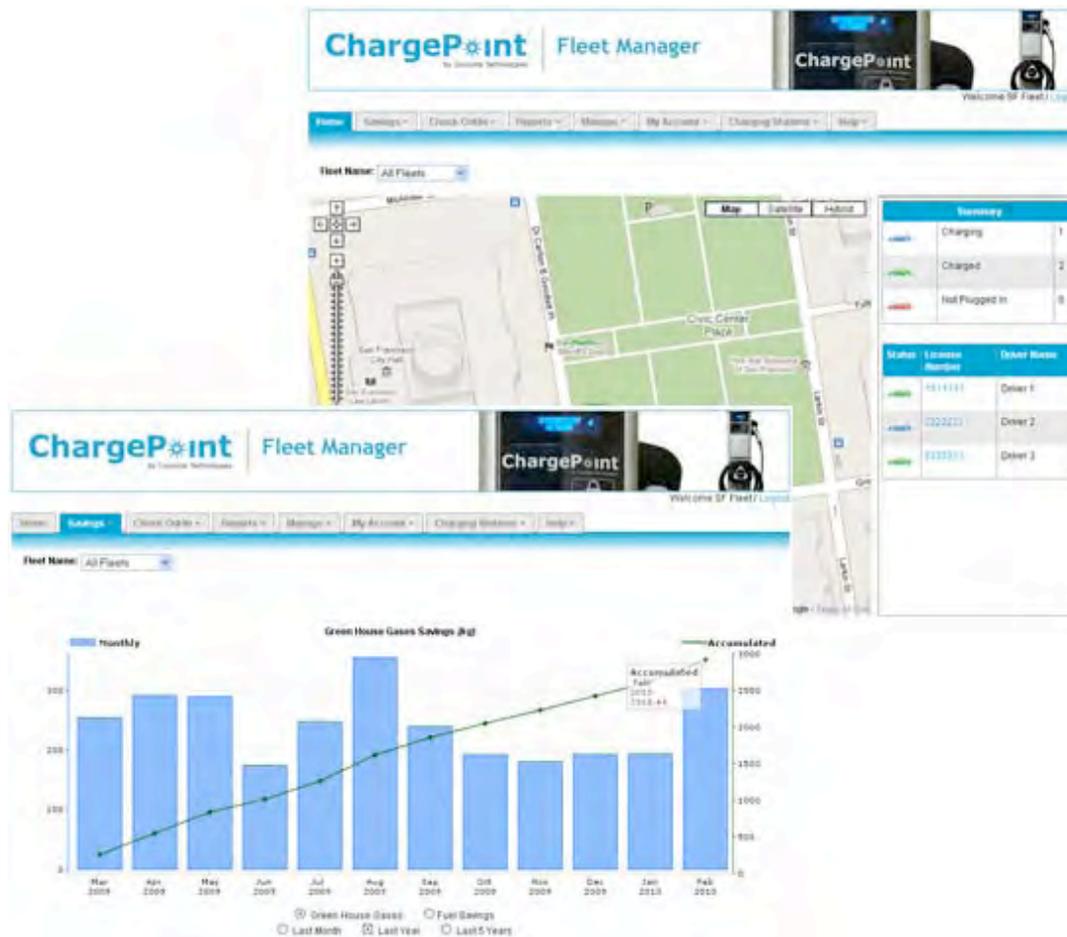
*Dual Mode (240V/120V) Bollard Mount, Dual Mode (240V/120V) Pole Mount, Dual Mode (240V/120V) Wall Mount*

Charging stations must be easily accessible for these potential charging set-ups: curbside (single-sided), charging “island” (dual-sided), parking space, including handicap spaces. The charging cable will be easily accessible and usable by a person of average size and strength and be no more difficult than fueling an internal combustion vehicle.



## Fleet Manager

*Coulomb Technologies on-demand software applications services make it easy to provision, manage and maintain ChargePoint Charging Stations for large fleets.*



[www.CoulombTech.com](http://www.CoulombTech.com) or [www.CarbonDayAutomotive.com](http://www.CarbonDayAutomotive.com)



The ChargePoint Network Fleet Manager provides **ComEd with a centralized point of control** for delivering electric fuel with ChargePoint Charging Stations to your electric vehicle feet. Accessed via a feature-rich web interface, the Fleet Manager helps you:

- Ensure fleet vehicle availability by knowing fleet charging status at all times
- Learn immediately of fleet vehicle charging issues before they become costly operational failures
- Manage department costs by fleet, department and driver
- Export and combine data with other vehicle information to manage vehicle lifecycle or to transfer costs to other departments

**Feature List**

**Feature Description**

Real-time EV charging location and status	View real-time charging status of all fleet EV. Show fleet EV location and status on the map when EV is charging.
Fleet summary alert	Elect to receive daily SMS, Email fleet vehicle charging summary status.
Vehicle due to be plugged-in alert	Elect to receive SMS, Email alert when any fleet EV charging is due.
Vehicle charged alert	Elect to receive SMS, Email alert when any fleet EV charging is complete.
Vehicle charging fault alert	Elect to receive SMS, Email alert when a charging fault occurs for any fleet EV (Plug Out, GFCI Trip, Abnormal Termination, Over Current Detection).
Usage reports	View graphical or tabular usage reports, with CSV export, for all or individual fleet EVs. Filter the report to include only the desired dates and vehicles.



## ChargePoint Network Standard Service

Station/Year \$140  
2 Year Pre-Pay \$260  
5-year Pre-Pay \$580

Standard Service includes On-going Station Software OTA updates, Network Operation, 24/7/365 Driver Support, Station Manager and Flex Billing Manager.

### Service Manager

Station/Year \$60  
2 Year Pre-Pay \$110  
5-year Pre-Pay \$240

### Fleet Manager

Vehicle/Year \$60  
2 Year Pre-Pay \$110  
5-year Pre-Pay \$240

### Early Adopter "Grandfather " Benefit

1. Hosts that have purchased and paid for ChargePoint Charging Stations prior to July 1 2010 that were delivered or scheduled to be delivered prior to Jan 1 2011 will automatically receive a 10 Year Prepaid ChargePoint Network Standard Service Subscription at no cost. The Subscription term begins at station delivery.
2. Hosts that purchase ChargePoint Charging Stations between July 1 2010 and Jan 1 2011 for delivery in 2010 will automatically receive a 2 Year Prepaid ChargePoint Network Standard Service Subscription at no extra cost. The Subscription term begins at station delivery.
3. This Benefit is non-transferrable
4. Coulomb reserves the right to extend the period of this benefit.

### Conditions

1. Prices do not include value added, sales or other applicable taxes or any regulatory charges that may be imposed by any governmental authority
2. All Subscriptions for Software Application Services include Software Updates for both firmware embedded in Charging Stations and Web-based Software Application Services for the term of the applicable Subscription.
3. Subscriptions for ChargePoint Services require acceptance of the terms and condition set forth in the Master Services Subscription Agreement
4. Subscriptions for ChargePoint Services are effective commencing on the date you accept the Master Services Subscription Agreement and continued for the applicable Subscription Term.
5. All Software and Services are sold by distributor at List Price. For volume discount pricing contact factory

## ChargePoint Networked Charging Stations

### CT2100 FAMILY



ChargePoint® Networked Charging Stations, by Coulomb Technologies, offer municipalities, corporations, fleets, and utilities, high-reliability, plug-in electric vehicle charging that drivers prefer. The easy-to-use stations provide multiple power options, integrating aesthetics and ergonomics with sturdy construction—ideal for residential, commercial and outdoor public applications.

The CT2100 family of charging stations are dual output stations designed for public outdoor applications for the North American marketplace. The 7.2 kW output delivers Level II (208/240 V @ 30 A) charging via a standard SAE J1772™ connector and fixed 18-foot cable. The 2 kW output delivers Level I (120 V @ 16 A) charging via a standard NEMA 5-20 receptacle protected behind a locking door. Both outputs can deliver energy simultaneously.

To eliminate energy theft and to enhance safety, drivers access and energize the station with a ChargePass™ card or contactless credit card. The station's highly visible display guides drivers with instructive messages and can be used to display custom advertisement or greetings for drivers.

#### ChargePoint Network Enabled

Includes 24/7 driver assistance, station location, station availability, trip mapping, driver billing, and driver notification services. Compatible with remote management, billing, maintenance and other on-demand software applications.

#### Smart Card Reader

Integrated standards-based RFID reader that accepts ChargePass cards or contactless credit cards. Provides optional driver billing and custom access control, preventing electricity theft and enhancing safety.

#### Intelligent Power Control

Algorithms ensure power is delivered only when a driver is authorized and the EV connector is properly inserted.

#### Locking Door

Protects power insertion point and retains the EV charging cord to prevent theft during charging.

#### Vacuum Florescent Display with Multiple Language Support

Bright, easy-to-read display used for instructive, advertisement and greeting messages in many languages.

#### Integrated Fault Detection

- Ground Fault Detection: Integrated ground-fault detection circuitry with auto retry and driver notification.
- Over-Current Detection: Disconnects power to prevent nuisance breaker trips at service panel. Auto retry and driver notification.
- Plug-Out Detection: Algorithm disengages power and notifies the driver when a plug is removed.
- Charging Complete Detection: Algorithm detects completion of EV charge and notifies the driver.

#### Over-the-Air Station Upgrade

Upgrade station firmware remotely over-the-air to keep charging station current with future and evolving EV charging needs.

#### Utility Grade Energy Meter

Integrated power metering circuitry provides accurate bi-directional energy measurement.

#### Remote Diagnostics and Control

Real-time remote alarm monitoring and control minimizes the need for on-site maintenance.

#### Network Interface

Wireless mesh and cellular network interfaces allow seamless integration with back office business systems, utility Advanced Metering Infrastructures (AMIs), or home area networks.

#### Smart Grid Compatible

Utility grade meter and smart-grid interfaces enable demand response and Time-Of-Use (TOU) pricing.

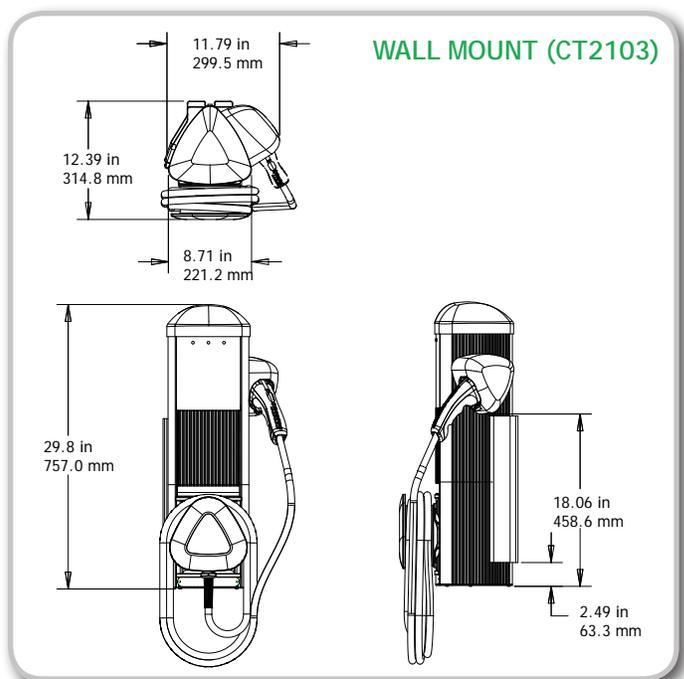
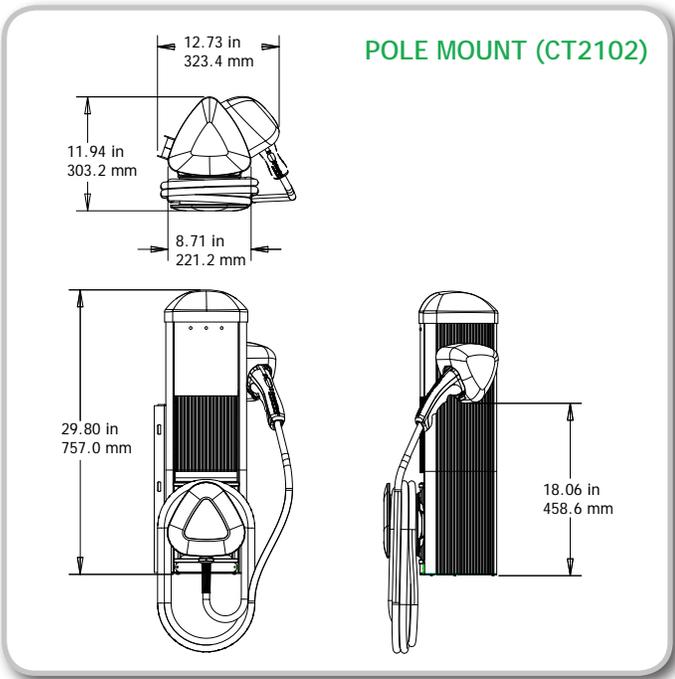
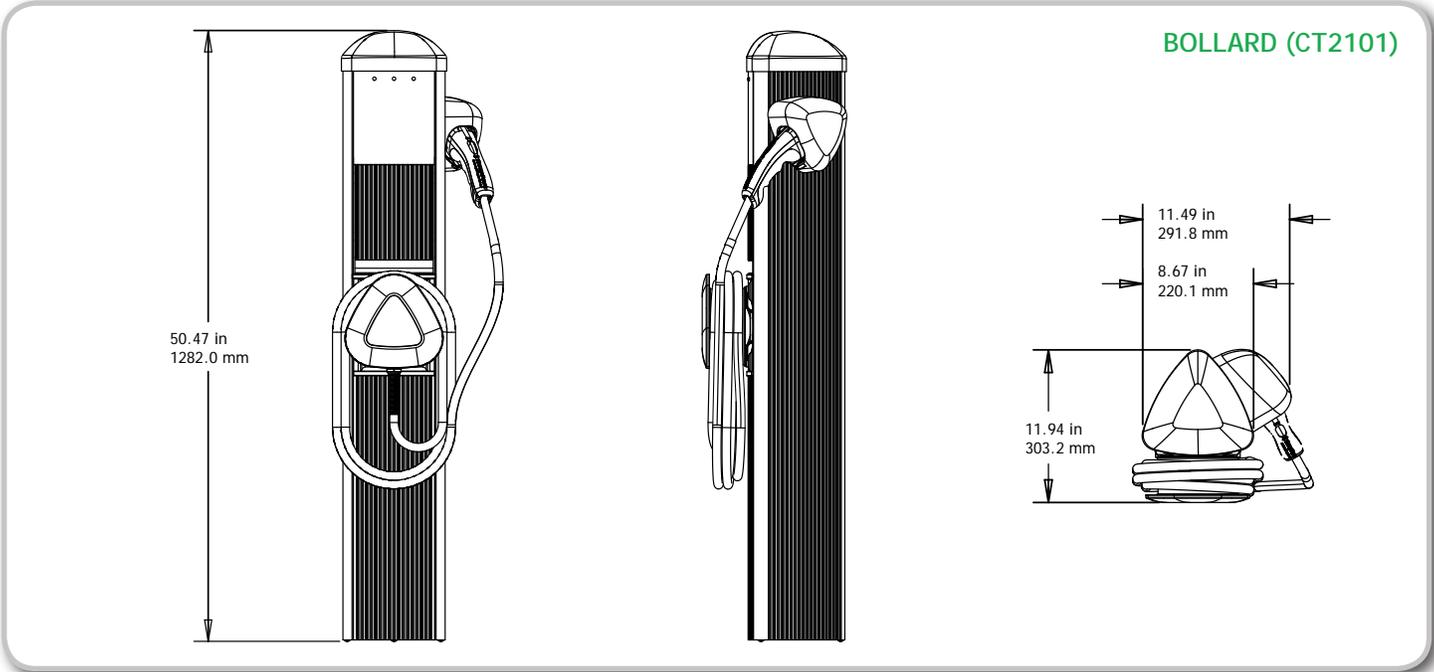


Coulomb  
Technologies

Coulomb Technologies, Inc.  
1692 Dell Ave.  
Campbell, CA 95008-6901 USA  
US toll free: +1-877-370-3802  
www.coulombtech.com  
www.mychargepoint.net

## Mechanical Drawings

### CT2100 FAMILY





## Specifications

### CT2100 FAMILY

Electrical Input	Level I	Level II
Input Power	2.0 kW	7.2 kW
Input Voltage	120 VAC	208/240 VAC
Input Current	16 A	30 A
Input Power Connections	Line, Neutral, Earth	Line 1, Line 2, Earth
Recommended Service Panel Breaker	20 A single pole breaker (non-GFCI type) on dedicated circuit	40 A double pole breaker (non-GFCI type) on dedicated circuit
Standby Power	5 W typical	

#### Electrical Output

Output Charging Power	2.0 kW	7.2 kW
Output Voltage	120 VAC	208/240 VAC
Output Current	16 A	30 A
Output Charging Connector	NEMA 5-20 receptacle	SAE J1772™ EV connector on 18' (5.48 m) cable

#### Functional Interfaces

Card Reader	ISO 15693, 14443	
Ground Fault Detection	5 mA CCID with auto retry (15 minute delay, 3 tries)	20 mA CCID with auto retry (15 minute delay, 3 tries)
Plug-Out Detection	Programmable arm and trip current thresholds	Power terminated per SAE J1772™ specification
Power Measurement	2% @ 5 minute intervals; IEC Class 1 capable (special order)	
Local Area Network	2.4 GHz 802.15.4 dynamic mesh network	
Wide Area Network	Commercial CDMA or GPRS cellular data network	

#### Safety and Operational Ratings

Safety Compliance	UL Listed for USA and cUL certified for Canada; Complies with UL 2594, UL 2231-1, UL 2231-2, UL 1998, NFPA 70, NEC Article 625
Surge Protection	6 kV @ 3,000 A. In geographic areas subject to frequent thunderstorms, supplemental surge protection is recommended.
EMI Compliance	FCC Part 15 Class A
Operating Temperature	-22° F to 131° F (-30° C to +55° C)
Operating Humidity	95% non-condensing
Enclosure	NEMA 3R per NEMA 250-1997
Terminal Block Temperature Rating	212° F (100° C)
Maximum Charging Stations per 802.15.4 Radio Group	100. Each station must be within 150 feet of at least one other station
Approximate Shipping Weights	Bollard (CT2101) 77 lbs (34 kg) Pole Mount (CT2102) 52 lbs (23 kg) Wall Mount (CT2103) 55 lbs (25 kg)

Coulomb Technologies, Inc. reserves the right to alter product offerings and specifications at any time without notice, and is not responsible for typographical or graphical errors that may appear in this document.

## Ordering Information

### CT2100 FAMILY



### Ordering Information

Specify model number followed by the applicable code(s). The order code sequence is:

*Model-Color-Modem-Holster-Card Reader-Warranty*

Option	Order Code
<i>Model</i>	
Bollard Mount	CT2101
Pole Mount	CT2102
Wall Mount	CT2103
<i>Color</i>	
Mocha	-M
<i>Modem</i>	
Integral CDMA ChargePoint Gateway Modem	-CDMA
Integral GPRS ChargePoint Gateway Modem	-GPRS
<i>Holster</i>	
Locking Holster	-LOCK
<i>Card Reader</i>	
Contactless Credit Card Reader	-CCR
<i>Warranty</i>	
5 Year Parts Only Extended Warranty	-EW5
5 Year Parts Only Extended Warranty - Gateway	-EW5GW

### Order Code Examples

If ordering this	The order code would be
Silver Pole Mount	CT2102
Mocha Bollard with CDMA Gateway	CT2101-M-CDMA
Mocha Wall Mount with GPRS Gateway, Contactless Credit Card Reader and 5 year extended parts warranty	CT2103-M-GPRS-CCR-EW5GW

For pricing and additional product information, contact the distributor in your area. For a complete list of distributors, go to [www.coulombtech.com](http://www.coulombtech.com) and click Purchase.

Coulomb Technologies, Inc. - 1692 Dell Ave. - Campbell, CA 95008-6901 USA  
 408.841.4500 - 877.370.3802 - [info@coulombtech.com](mailto:info@coulombtech.com)  
[www.coulombtech.com](http://www.coulombtech.com) - [www.mychargepoint.net](http://www.mychargepoint.net)

Listed by Underwriters Laboratories Inc. LISTED

**ICC Docket No. 10-0527**

**Commonwealth Edison Company's Response to  
Illinois Commerce Commission ("STAFF") Data Requests**

**JLH 1.01 – 1.12**

**Date Received: September 23, 2010**

**Date Served: October 8, 2010**

**REQUEST NO. JLH 1.01**

Please refer to lines 60-61 on page 3 of Company witness, Mr. McMahan's testimony (ComEd Ex. 2.0), he states "However, we cannot prudently deploy them on a widespread basis without first piloting them." ComEd purchased a hybrid bucket truck (non-pluggable) in May of 2006<sup>1</sup> and based on publically available information, as of February 2009, ComEd had 10 Prius plug-in hybrid electric vehicles and 2 biodiesel-electric hybrid bucket trucks<sup>2</sup>. In addition, ComEd funded the conversion of 2 Prius hybrids to plug-in hybrid EVs in the I-GO<sup>3</sup> car sharing program. Given that ComEd has been piloting electric vehicles for more than 1 year and has been piloting a hybrid bucket truck for at least 4 years, explain the basis for Company witness, Mr. McMahan's conclusion that it would not be prudent to deploy EVs on a widespread basis.

**RESPONSE:**

Unlike the vehicles to be piloted, the hybrid bucket trucks in ComEd's fleet are non-pluggable, and as such neither require nor use electric charging infrastructure. Additionally, two hybrid bucket trucks do not provide a sufficient sample size to understand the overall operational impacts and benefits of hybrid service vehicles as compared to their non-hybrid counterparts in a large commercial fleet.

The Prius plug-in hybrids in ComEd's fleet are after-market conversions that were converted primarily for ComEd to begin studying the use of smart grid technology to manage EV charging. In terms of both the operational costs and benefits and the charging infrastructure required, the converted Prius PHEVs are not typical of EVs expected to be commercially available over the next few years.

The vehicles referenced in Mr. McMahan's testimony are original equipment manufacturer (OEM) provided EVs that will allow ComEd to better understand the total life-cycle costs and benefits of EVs and the associated charging infrastructure required.

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<sup>1</sup>"ComEd Adds Hybrid Bucket Truck to its Fleet." May 10, 2006. Chicago, IL.  
<http://www.exeloncorp.com/news/pressrelease/comed/051006A.htm>

<sup>2</sup>"ComEd's Fleet of Green Vehicles Ranks 7th Largest in U.S.: Second-largest among utilities; part of leadership role to cut greenhouse gas emissions." February 26, 2009. Chicago, IL. News Room Release.  
[https://www.comed.com/sites/newsroom/News%20Room/newsroomreleases\\_02262009.aspx](https://www.comed.com/sites/newsroom/News%20Room/newsroomreleases_02262009.aspx)

<sup>3</sup>"I-GO Car Sharing and ComEd Introduce Plug-In Car-Share Vehicles to Downtown Chicago and South Loop – Governor Quinn recognizes I-GO and ComEd for their commitment to greening Illinois." April 21, 2009. Chicago, IL. News Room Release.  
[https://www.comed.com/sites/newsroom/News%20Room/newsroomreleases\\_04212009.aspx](https://www.comed.com/sites/newsroom/News%20Room/newsroomreleases_04212009.aspx)

**ICC Docket No. 10-0527**

**Commonwealth Edison Company's Response to  
Illinois Commerce Commission ("STAFF") Data Requests**

**JLH 1.01 – 1.12**

**Date Received: September 23, 2010**

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**REQUEST NO. JLH 1.02**

Please refer to the ComEd EV Pilot Program Assets table presented on line 86 of page 5 of Company witness, Mr. McMahan's testimony (ComEd Ex. 2.0). Describe the \$50,000 cost of "incidental equipment and contingency" proposed under the ComEd EV Pilot Program including examples of the type of equipment to be categorized as "incidental equipment and contingency."

**RESPONSE:**

The \$50,000 included for incidental equipment and contingency reflects the level of variability in the actual costs for installing the infrastructure for 55 Level 2 charging stations. Given that the final deployment locations for the EVs and their respective charging stations have not yet been identified, per-unit costs for charging infrastructure are based on estimates generated from conversations with charging infrastructure providers, and not actual quotes for work. Once approved, final deployment locations will be selected, and more detailed quotes will be obtained for the necessary infrastructure work. Types of equipment in this category include conduit, conductors, service panels, breakers, and other material and equipment necessary to provide electrical service to the 55 Level 2 charging stations, as well as any upgrades to electric supply. This contingency represents 1% of the project cost and, as such, is quite conservative.

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**JLH 1.01 – 1.12**

**Date Received: September 23, 2010**

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**REQUEST NO. JLH 1.03**

Please refer to lines 103-104 on page 6 of Company witness, Mr. McMahan's testimony (ComEd Ex. 2.0), he states that "ComEd currently does not plan on removing any vehicles from service prematurely as a result of this program."

- (a) What is the expected EV allocation to the ComEd departments? i.e., Which departments will be driving the additional cars?
- (b) Will the new EVs replace older vehicles that are at the end of their useful life?
- (c) If the answer to (b) is yes, please provide all documents detailing the specific vehicles to be replaced and their associated Vehicle Depreciation Rates (VDRs). Explain the Company's position regarding the inclusion of Retired Vehicle Plant (RVP) in the Electric Vehicle Assessment (EVA<sub>DC</sub>) equation (Original Sheet No. X+7, Rate ACEP, ComEd Ex. 1.2).

If the answer to (b) is no, please explain the Company's position regarding the inclusion of Retired Vehicle Plant (RVP) in the Electric Vehicle Assessment (EVA<sub>DC</sub>) equation (Original Sheet No. X+7, Rate ACEP, ComEd Ex. 1.2).

**RESPONSE:**

- a) The following departments are expected to receive the proposed EVs

<b>ComEd EV Pilot Program Assets</b>	<b>Assigned Department</b>
Plug-In Car	Meter Reading
Plug-in Cargo/Service Vehicle	Supply; Field & Meter Services
Hybrid bucket truck (non-pluggable)	Distribution System Operations; Construction & Maintenance
PHEV digger-derrick	Construction & Maintenance

- b) Yes, the vehicles in the pilot program will be used to replace older vehicles that are at the end of their useful life.
- c) Specific vehicles have not yet been identified as the 2011 replacement plan has not yet been finalized. Replacement vehicles will be like-for-like within the assigned departments listed in subpart a).
  - The Vehicle Depreciation Rates for each class of vehicles above:
    - Cars are depreciated at 11.59% (Source: Plant Accounting, General Plant)
    - The cargo vehicles, service vehicles, digger-derrick and trucks are depreciated at 7.70% (Source: Plant Accounting, General Plant)

- Retired Vehicle Plant (RVP) is defined in ComEd Ex. 1.2 on Original Sheet No. X+7 as “RVP = Retired Vehicle Plant, in \$, equal to the investment cost of the plant replaced by plant associated with the EVP [Electric Vehicle Plant].” In the determination of the Electric Vehicle Assessments (EVADCs), RVP is multiplied by VDR, which is defined in ComEd Ex. 1.2 on Original Sheet No. X+7 as “VDR = Vehicle Depreciation Rate, in decimal format, equal to the annual depreciation rate associated with the RVP.” To the extent that any RVP is fully depreciated, then VDR would equal zero. To the extent that there is no plant being replaced by plant associated with the EVP, then RVP would equal zero. As the EV Pilot is currently proposed, ComEd would only replace vehicles at the end of their useful lives with EVs, and therefore,  $VDR \times RVP$  would be equal to zero. Only in the event that the EVs would be replacing vehicles prior to the end of their useful lives would  $VDR \times RVP$  be something greater than zero to enable ComEd to recover the un-depreciated costs associated with the replaced vehicles.

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**JLH 1.01 – 1.12**

**Date Received: September 23, 2010**

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**REQUEST NO. JLH 1.04**

Please refer to lines 107-109 on page 6 of Company witness, Mr. McMahan's testimony (ComEd Ex. 2.0), he states that "While we are proposing the pilot period conclude at the end of 2013, ComEd believes it will have collected enough data by that time to develop a total life cycle cost of ownership for each class of vehicle as well as data on how the vehicles performed."

- (a) Please describe the type of data that will be collected.
- (b) How will the analysis of the data directly benefit ratepayers?
- (c) Provide the Company's detailed workplan with respect to EV Pilot implementation and data collection for the proposed EV Pilot.

**RESPONSE:**

- (a) Life-cycle cost data will be collected for the EVs and compared with equivalent "non-EV" vehicles in the ComEd fleet throughout the pilot period. Types of data to be collected include:
  - i. Initial purchase costs
  - ii. Petroleum fuel usage
  - iii. Electricity usage
  - iv. Annual maintenance (vehicles and infrastructure)
  - v. Vehicle fuel economy
  - vi. Greenhouse gas emissions
  - vii. Vehicle operations (reliability, driver feedback, etc.)
  - viii. Cost of charging infrastructure
  - ix. Battery performance over time
- (b) Data gathered throughout the pilot period will benefit ratepayers by providing actual costs and benefits of EVs vs. equivalent "non-EV" vehicles. This information will be valuable for both residential customers and commercial fleets considering adoption of EVs.
- (c) See response (a) above for the types of data to be collected and analyzed throughout the pilot period for each class of vehicle included in the pilot. Most of this information is available from ComEd's existing fleet management system. Ongoing feedback from the vehicle operators will be included, as well.

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**JLH 1.01 – 1.12**

**Date Received: September 23, 2010**

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**REQUEST NO. JLH 1.05**

Please refer to lines 110-111 on page 7 of Company witness, Mr. McMahan's testimony (ComEd Ex. 2.0), he states that "ComEd will use information acquired through the pilot to help our customers prepare for EV adoption."

- (a) Does ComEd have a market readiness strategy in place in preparation for EV adoption by customers?
- (b) How is ComEd preparing to respond to the evolving marketplace for EVs?

Please provide all supporting workpapers.

**RESPONSE:**

ComEd objects to this data request on the ground that the vast majority of the information sought is beyond the scope of the proposed alternative regulation proposal, beyond the scope of any finding required to approve the proposal, and beyond the scope of any ComEd testimony. This is a pilot of utility EVs, not public EVs. The only manner in which public adoption and use of EVs is relevant is that the pilot can provide useful information about EV operation to the public. Questions directed to the general impact of EVs on ComEd's system are not reasonably calculated to lead relevant and material evidence. Moreover, questions related to ComEd's plans to dealing with eventual EV deployment, to the extent that they are affected by this pilot, as necessarily premature. The pilot is designed to provide information on which decisions about future policies can be made.

Subject to these Objections and ComEd's General Objections, ComEd responds as follows:

- (a) ComEd's market readiness strategy for EV adoption by consumers is currently under development. ComEd is currently working with our peers in the utility industry and others (private and government parties) to understand the potential impacts to the electrical system as EVs become commercially available. For example, through our work with the City of Chicago and other local stakeholders, ComEd is helping develop a market that supports EV adoption by consumers and encourages EV manufacturers to deploy their vehicles in Illinois. This includes support of the City of Chicago's public charging infrastructure project, as well as ComEd's participation in the Chicago Electric Vehicle Consortium and Clean Cities organization.
- (b) ComEd is currently developing an initial assessment of the impacts of the introduction of plug-in electric vehicles on its system, in accordance with a request from the Illinois Commerce Commission as part of its Initiative on Plug-in Electric Vehicles.

The identification of these responses is preliminary and ComEd is not, at this time, taking a position on any response not limiting itself or its study to these specific potential responses. A major purpose of continuing investigation is to learn more and ComEd will adapt as more data becomes available.

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**JLH 1.01 – 1.12**

**Date Received: September 23, 2010**

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**REQUEST NO. JLH 1.06**

Please refer to Original Sheet No. X+7 in ComEd Ex. 1.2 (Rate ACEP tariff). Provide the Electric Vehicle Depreciation Rate(s) (EVDR) that ComEd is proposing along with all supporting documentation. Please indicate which of the EV Pilot Program Assets the specific EVDR applies to (ComEd EV Pilot Program Assets table presented on line 86 of page 5 of Company witness, Mr. McMahan's testimony, ComEd Ex. 2.0).

**RESPONSE:**

Please refer to ComEd's Data Request Response JLH 1.03 subpart c.

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Illinois Commerce Commission ("STAFF") Data Requests****JLH 1.01 – 1.12****Date Received: September 23, 2010****Date Served: October 8, 2010****REQUEST NO. JLH 1.07**

Please refer to Original Sheet No. X+7 in ComEd Ex. 1.2 (Rate ACEP tariff) "PTR = Pre-Tax Return, in decimal format, equal to the pre-tax return applicable to the Company determined in accordance with the applicable equation in this Accelerated Customer Enhancements Pilot Assessments section" and Original Sheet No. X+13 in ComEd Ex. 1.2 (Rate ACEP tariff) where the "PTR is computed in accordance with the following equation:

$$\text{PTR} = \left( \frac{\text{WCCE}}{(1 - \text{SIT}) \times (1 - \text{FIT})} \right) + \text{WCLTD}$$

Where: WCCE = Weighted Cost of Common Equity approved by the ICC for the Company in the most recent rate case. SIT = Illinois State Income Tax rate in effect at the time that the ICC issued its final Order in the most recent rate case. FIT = Federal Income Tax rate in effect at the time that the ICC issued its final Order in the most recent rate case. WCLTD = Weighted Cost of Long Term Debt approved by the ICC for the Company in the most recent rate case." To the extent applicable, all documents and workpapers should be provided in Excel format with working formulas.

- (a) Provide the WCCE and WCLTD that the Company originally proposed in the pending rate case Docket No. 10-0467, along with appropriate citations from the exhibits in Docket No. 10-0467.
- (b) Provide the WCCE and WCLTD that were approved by the ICC for the Company in the most recent rate case (Docket No. 07-0566).
- (c) Provide the SIT and FIT in effect at the time that the ICC issued its final Order for the Company in the most recent rate case.
- (d) Provide the PTR given part (a) and (c). Show all calculations.
- (e) Provide the PTR given part (b) and (c). Show all calculations.

**RESPONSE:**

- (a) The information requested is contained in ComEd's Response to Staff Data Request DLH 1.02, DLH 1.02\_Attach 1, page 4, and DLH 1.02\_Attach 3, page 4.
- (b) The information requested can be found at page 99 of the Final Order entered September 10, 2008 in ICC Docket No. 07-0566. The information requested is also contained in ComEd's Response to Staff Data Request DLH 3.02, DLH 3.02\_Attach 2, page 4, and DLH 3.02\_Attach 3, page 4.
- (c) The SIT and FIT are currently 7.30% and 35.00%, respectively, and have not changed since the Commission's Final Order in ICC Docket No. 07-0566. The information requested is also contained in (i) ComEd's Response to Staff Data Request DLH 1.02, DLH 1.02\_Attach 1, page 4, and DLH 1.02\_Attach 3, page 4, and (ii) ComEd's Response to Staff Data Request DLH 3.02, DLH 3.02\_Attach 2, page 4, and DLH 3.02\_Attach 3, page 4.

- (d) The information requested is contained in ComEd's Response to Staff Data Request DLH 1.02, DLH 1.02\_Attach 1, page 4, and DLH 1.02\_Attach 3, page 4.
- (f) The information requested is contained in ComEd's Response to Staff Data Request DLH 3.02, DLH 3.02\_Attach 2, page 4, and DLH 3.02\_Attach 3, page 4.

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**Commonwealth Edison Company's Response to  
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**JLH 1.01 – 1.12**

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**REQUEST NO. JLH 1.08**

Please refer to Original Sheet No. X+7 in ComEd Ex. 1.2 (Rate ACEP tariff) and the ComEd EV Pilot Program Assets table presented on line 86 of page 5 of Company witness, Mr. McMahan's testimony (ComEd Ex. 2.0). To the extent applicable, all documents and workpapers should be provided in Excel format with working formulas.

- (a) Please list any and all tax credits that may potentially be available for any of the assets proposed in the ComEd EV Pilot Program.
- (b) Please explain how ComEd plans to account for these tax credits under the proposed tariff Rate ACEP described in ComEd Ex. 1.2. In particular, how will these tax credits be considered with respect to the actual project costs incurred for the proposed EV Pilot Program?
- (c) Please list all grants that ComEd has been awarded to purchase EVs and/or EV charging stations. List the number and type (including technical specifications and negotiated prices) of charging stations and EVs that ComEd plans to purchase or has purchased with these funds.
- (d) Are grants already awarded to ComEd for EVs and charging stations going to be considered in the actual project cost calculations? If not, why not? If grants become available, how would they be accounted for under the proposed tariff Rate ACEP described in ComEd Ex. 1.2? In particular, how will these grants be considered with respect to the actual project costs incurred for the proposed EV Pilot Program?
- (e) Please explain how the proposed ComEd EV Pilot Program investments are different from investments already planned, implemented, and/or funded through grants. What additional knowledge does ComEd expect to acquire through the proposed EV Pilot Program that is incremental to the knowledge expected to be acquired through EV programs that are funded through grants<sup>1</sup> and those already implemented?

**RESPONSE:**

- (a) Electric vehicles (EVs) with a gross vehicle weight rating (GWVR) of not more than 14,000 lbs., purchased in or after 2010 may be eligible for a federal income tax credit of up to \$7,500. The credit amount will vary based on the capacity of the battery used to fuel the vehicle. (source: [www.fueleconomy.gov](http://www.fueleconomy.gov)). This tax credit would potentially apply to the plug-in cars and plug-in cargo/service vehicles shown in the ComEd EV Pilot Program Assets table presented on line 86 of page 5 of Company witness, Mr. McMahan's testimony (ComEd Ex. 2.0).

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<sup>1</sup> "ComEd Awarded \$4 million in Federal Economic Stimulus Funding To Expand Green Vehicle Fleet and Test Impact on Electric Grid." October 16, 2009. Chicago, IL. News Room Release.

[https://www.comed.com/sites/newsroom/News%20Room/newsroomreleases\\_10162009.aspx](https://www.comed.com/sites/newsroom/News%20Room/newsroomreleases_10162009.aspx)

The Alternative Fuel Vehicle Refueling Property Credit (IRS Form 8911) currently allows a rebate of 50% (up to \$50,000) of vehicle charging infrastructure costs. However, the current tax credit expires 12/31/2010 and it is not known at this time whether or not the tax credit will be extended. (source: <http://www.irs.gov/pub/irs-pdf/f8911.pdf>)

- (b) Any applicable tax credits that become available and that ComEd receives would offset the O&M recoveries under Rate ACEP.
- (c) ComEd currently is party to the following two grants:
  - i. CFDA No.81.086, "Conservation Research and Development" (the "Clean Cities Project"). The grant awards ComEd \$610,000 for vehicles, and \$421,480 for infrastructure. A break out of cost estimates and grant share for vehicles and infrastructure is shown in the attached spreadsheet. Under the terms of the grant, all vehicles and infrastructure are required to be in service by December 31, 2011. Refer to the attachment to ComEd's Response to Staff Data Request JLH 1.08 labeled as JLH 1.08\_Attach 1.
  - ii. DOE FOA-0000428, Transportation Electrification Grant. ComEd is partnering with the Electric Power Research Institute (EPRI), the South Coast AQMD, and several other utilities to demonstrate plug-in hybrid (PHEV) vehicles in a commercial fleet application. Under this grant, ComEd will deploy 25 PHEV bucket trucks. Each utility's cost share is the cost of the base vehicle (approximately \$106,000 per vehicle, in ComEd's case) while the grant covers the incremental PHEV cost. All vehicles acquired under this grant are expected to be in service by the second quarter, 2011.
- (d) The vehicles and infrastructure being deployed in conjunction with the two grants listed in response (c) above are separate and distinct from the vehicles and infrastructure included in the ComEd EV Pilot Program Assets table presented on line 86 of page 5 of Company witness, Mr. McMahan's testimony (ComEd Ex. 2.0). Therefore, these grants are not considered in the cost calculations for the ComEd EV Pilot Program.

Any applicable grants that become available and that ComEd receives would be treated in the same manner as the tax credits discussed in subpart b.

- (e) The proposed ComEd EV Pilot program discussed in Mr. McMahan's testimony compliments other pilots being conducted by ComEd through the deployment of additional EV platforms that are not part of other pilot programs, such as production-ready plug-in cars and plug-in cargo/service vehicles. Implementation of this EV Pilot Program will enable a more robust analysis of the life-cycle costs and benefits of EVs across multiple vehicle types and platforms, which will provide valuable information to residential customers and commercial fleets considering adoption of EVs.

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**JLH 1.01 – 1.12**

**Date Received: September 23, 2010**

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**REQUEST NO. JLH 1.08**

Please refer to Original Sheet No. X+7 in ComEd Ex. 1.2 (Rate ACEP tariff) and the ComEd EV Pilot Program Assets table presented on line 86 of page 5 of Company witness, Mr. McMahan's testimony (ComEd Ex. 2.0). To the extent applicable, all documents and workpapers should be provided in Excel format with working formulas.

- (a) Please list any and all tax credits that may potentially be available for any of the assets proposed in the ComEd EV Pilot Program.
- (b) Please explain how ComEd plans to account for these tax credits under the proposed tariff Rate ACEP described in ComEd Ex. 1.2. In particular, how will these tax credits be considered with respect to the actual project costs incurred for the proposed EV Pilot Program?
- (c) Please list all grants that ComEd has been awarded to purchase EVs and/or EV charging stations. List the number and type (including technical specifications and negotiated prices) of charging stations and EVs that ComEd plans to purchase or has purchased with these funds.
- (d) Are grants already awarded to ComEd for EVs and charging stations going to be considered in the actual project cost calculations? If not, why not? If grants become available, how would they be accounted for under the proposed tariff Rate ACEP described in ComEd Ex. 1.2? In particular, how will these grants be considered with respect to the actual project costs incurred for the proposed EV Pilot Program?
- (e) Please explain how the proposed ComEd EV Pilot Program investments are different from investments already planned, implemented, and/or funded through grants. What additional knowledge does ComEd expect to acquire through the proposed EV Pilot Program that is incremental to the knowledge expected to be acquired through EV programs that are funded through grants<sup>1</sup> and those already implemented?

**CORRECTED RESPONSE (subparts b and d):**

- (a) Electric vehicles (EVs) with a gross vehicle weight rating (GWVR) of not more than 14,000 lbs., purchased in or after 2010 may be eligible for a federal income tax credit of up to \$7,500. The credit amount will vary based on the capacity of the battery used to fuel the vehicle. (source: [www.fueleconomy.gov](http://www.fueleconomy.gov)). This tax credit would potentially apply to the plug-in cars and plug-in cargo/service vehicles shown in the ComEd EV Pilot Program Assets table presented on line 86 of page 5 of Company witness, Mr. McMahan's testimony (ComEd Ex. 2.0).

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<sup>1</sup> "ComEd Awarded \$4 million in Federal Economic Stimulus Funding To Expand Green Vehicle Fleet and Test Impact on Electric Grid." October 16, 2009. Chicago, IL. News Room Release.  
[https://www.comed.com/sites/newsroom/News%20Room/newsroomreleases\\_10162009.aspx](https://www.comed.com/sites/newsroom/News%20Room/newsroomreleases_10162009.aspx)

The Alternative Fuel Vehicle Refueling Property Credit (IRS Form 8911) currently allows a rebate of 50% (up to \$50,000) of vehicle charging infrastructure costs. However, the current tax credit expires 12/31/2010 and it is not known at this time whether or not the tax credit will be extended. (source: <http://www.irs.gov/pub/irs-pdf/f8911.pdf>)

- (b) ComEd would be receptive to a proposal in Staff's direct testimony that recommends including provisions in Rate ACEP – Accelerated Customer Enhancements Pilot (Rate ACEP) to recover any operations and maintenance (O&M) expenses related to the EV Pilot program, which would then be offset by any applicable tax credits that become available and that ComEd receives.
- (c) ComEd currently is party to the following two grants:
  - i. CFDA No.81.086, "Conservation Research and Development" (the "Clean Cities Project"). The grant awards ComEd \$610,000 for vehicles, and \$421,480 for infrastructure. A break out of cost estimates and grant share for vehicles and infrastructure is shown in the attached spreadsheet. Under the terms of the grant, all vehicles and infrastructure are required to be in service by December 31, 2011. Refer to the attachment to ComEd's Response to Staff Data Request JLH 1.08 labeled as JLH 1.08\_Attach 1.
  - ii. DOE FOA-0000428, Transportation Electrification Grant. ComEd is partnering with the Electric Power Research Institute (EPRI), the South Coast AQMD, and several other utilities to demonstrate plug-in hybrid (PHEV) vehicles in a commercial fleet application. Under this grant, ComEd will deploy 25 PHEV bucket trucks. Each utility's cost share is the cost of the base vehicle (approximately \$106,000 per vehicle, in ComEd's case) while the grant covers the incremental PHEV cost. All vehicles acquired under this grant are expected to be in service by the second quarter, 2011.
- (d) The vehicles and infrastructure being deployed in conjunction with the two grants listed in subpart (c) above are separate and distinct from the vehicles and infrastructure included in the ComEd EV Pilot Program Assets table presented on line 86 of page 5 of Company witness, Mr. McMahan's testimony (ComEd Ex. 2.0). Therefore, these grants are not considered in the cost calculations for the ComEd EV Pilot Program.

In the event that ComEd receives government funds for investment expenditures related to the EV Pilot, ComEd would apply a proportionate amount of such funds, as appropriate, as a reduction to the Electric Vehicle Plant (EVP).

- (e) The proposed ComEd EV Pilot program discussed in Mr. McMahan's testimony compliments other pilots being conducted by ComEd through the deployment of additional EV platforms that are not part of other pilot programs, such as production-ready plug-in cars and plug-in cargo/service vehicles. Implementation of this EV Pilot Program will enable a more robust analysis of the life-cycle costs and benefits of EVs across multiple vehicle types and platforms, which will provide valuable information to residential customers and commercial fleets considering adoption of EVs.

Vehicle Costs					
	Cost p.u.	Quantity	Total Cost	ComEd Share	Grant Share
<b>Ford Escape Hybrid *</b>					
Total vehicle cost	\$ 32,000	35	\$ 1,120,000	\$ 1,050,000	\$ 70,000
<b>Hybrid Bucket Truck **</b>					
Standard diesel vehicle	\$ 175,000	8	\$ 1,400,000	\$ 1,400,000	\$ -
Incremental hybrid cost	\$ 55,000	8	\$ 440,000	\$ -	\$ 440,000
Total vehicle cost	\$ 230,000		\$ 1,840,000	\$ 1,400,000	\$ 440,000
<b>PHEV Digger Derrick Truck ***</b>					
Standard diesel vehicle	\$ 250,000	1	\$ 250,000	\$ 250,000	\$ -
PHEV conversion	\$ 100,000	1	\$ 100,000	\$ -	\$ 100,000
Total vehicle cost	\$ 350,000		\$ 350,000	\$ 250,000	\$ 100,000
<b>TOTAL VEHICLE COSTS</b>		<b>44</b>	<b>\$ 3,310,000</b>	<b>\$ 2,700,000</b>	<b>\$ 610,000</b>

Charging Infrastructure Costs ***				
<b>Standard Coulomb Charging Station</b>				
		<b>Cost p.u.</b>		
Coulomb Technologies Smart Charging station		\$	5,000	
Installation (labor, material)		\$	5,000	
Total equipment costs per charge point		\$	10,000	
<b>Charging Station w/ 2.4 kW Solar Canopy</b>				
Smart Charging stations (2 per canopy)		\$	10,000	
Solar canopy, including design and installation		\$	75,740	
Total equipment costs per canopy		\$	85,740	
			<b>Quantity</b>	<b>Total Cost</b>
				<b>ComEd Share</b>
				<b>Grant Share</b>
<b>Charging Stations for ComEd plug-in vehicles</b>			25	\$ 250,000
- Level 2 charging stations				\$ 250,000
<b>Solar-Integrated Charging Stations for Public Use</b>			2	\$ 171,480
Charging stations for ComEd use (PHEV Prius, bucket trucks, digger derricks)				\$ 171,480
<b>TOTAL CHARGING INFRASTRUCTURE COSTS</b>			<b>27</b>	<b>\$ 421,480</b>
				<b>\$ -</b>
				<b>\$ 421,480</b>
<b>TOTAL PROJECT COSTS</b>			<b>Total Cost</b>	<b>ComEd Share</b>
			<b>\$ 3,731,480</b>	<b>\$ 2,700,000</b>
				<b>\$ 1,031,480</b>

\* Clean Cities grant funds actual incremental amount, up to \$2,000

\*\* Clean Cities grant funds actual incremental amount, up to \$200,000

\*\*\* Clean Cities grant funds 50% of infrastructure costs. Investment in base vehicle costs is counted towards ComEd's 50% cost share.

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**JLH 1.01 – 1.12**

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**REQUEST NO. JLH 1.09**

Please refer to the proposed ComEd EV Pilot Program discussed in Company witness, Mr. McMahan's direct testimony (lines 46-115 on pages 3-7 of ComEd Ex. 2.0) and ComEd EV Pilot Program Assets table presented on line 86 of page 5 of Company witness, Mr. McMahan's testimony (ComEd Ex. 2.0). To the extent applicable, all documents and workpapers should be provided in Excel format with working formulas.

- (a) Please provide all supporting calculations and documents for the unit cost estimates of the ComEd EV Pilot Program Assets.
- (b) Please provide all technical specifications, including the potential vehicle make and model, for potential EV Pilot Program Assets including the proposed plug-in cars, plug-in cargo/service vehicles, hybrid bucket trucks (non-pluggable), and PHEV digger-derricks.
- (c) Why is ComEd constructing a separate charging station for each plug-in EV?
- (d) Please provide all technical specifications (including potential manufacturers) for the level 2 charging stations in the proposed EV Pilot. At a minimum, the Company should provide the input voltage, input phase, input current, output voltage, output phase, connector/cable, operating temperatures, meter specifications, safety features, and any other features the Company expects the charging stations to have (if the features are unknown, please list the minimum requirements of the charging stations).
- (e) Please provide the expected locations for the level 2 charging stations for company vehicles.
- (f) Please list any permitting costs with governmental units associated with the level 2 charging stations and discuss whether the permitting costs are bundled into the charging station costs.
- (g) What is the expected installation cost of the level 2 charging stations? Is the installation cost bundled with the charging station cost?
- (h) Does the Company expect to install the level 2 charging stations or will an outside contractor install the stations?
- (i) Describe any anticipated upgrades or repairs to the portion of ComEd's electric distribution system that would service the level 2 charging stations that are proposed under the EV Pilot Program. Provide an Excel table showing the expected distribution upgrades (e.g., transformer upgrades) and explain whether these are bundled into the charging station costs.
- (j) Provide the calculations supporting the expected electricity charging costs over the battery life of the EVs. If the Company does not have an expectation for the battery life of the EVs, please provide the expected electricity charging costs of the EVs over the EV pilot period of which concludes at the end of 2013. Are these costs bundled into the charging station costs or the EV costs? Explain.
- (k) What safety inspections of the level 2 charging station equipment does the Company expect to conduct and how frequently? Does the Company expect to outsource the safety

inspections? Are the costs for safety inspections bundled into the unit charging station costs? Explain.

- (l) Is a warranty with the level 2 charging station manufacturer included in the cost of the level 2 charging stations? If yes, please indicate the number of years the warranty is expected to last. If no, please indicate how ComEd expects to fund any maintenance (which may be necessary to ensure safety) of the level 2 charging stations.
- (m) Will any Company vehicles, other than those specifically purchased through the proposed EV Pilot Program in this proceeding, have access to (charge) the level 2 charging stations being proposed? Explain. Will the charging stations be made available for employee or public use? If yes, what rate structure(s) does ComEd propose charging customers to charge their electric vehicles? In addition, discuss how non-ComEd customers would be charged for charging their electric vehicles. Discuss whether ComEd customers would have their electric vehicle charging costs added to their monthly electric bill or how exactly the payment structure would work.
- (n) Will ComEd employees take the EVs home? If yes, identify the electricity rate structure applicable to charging the vehicles.
- (o) According to the expected investment timeline presented in the table on page 6 of the Company witness, Mr. McMahan's direct testimony (ComEd Ex. 2.0), the level 2 charging stations are expected to be purchased and installed prior to purchasing any of the EVs proposed in the EV Pilot Program. Does the Company expect to utilize the level 2 charging stations before the EVs proposed in the EV Pilot Program are purchased? Explain. Discuss the potential impact on the incentive mechanism discussed in the proposed tariff Rate ACEP (ComEd Ex. 1.2) if the charging stations are purchased but the EVs are not available to purchase (e.g., if a massive recall of EVs occurs before the Company receives any EVs, or if the costs of EVs significantly increase due to pent up demand and the Company decides not to purchase the EVs).
- (p) Has the Company educated local emergency medical service personnel and law enforcement regarding safety precautions to take if an electric vehicle crashes (considering the Company has 10 Prius plug-in electric vehicles<sup>1</sup> deployed already)? If yes, provide the Company's workplan and all related documents. If no, please thoroughly explain the Company's position with respect to EV safety. If the Company plans to educate local emergency medical service personnel and law enforcement regarding safety precautions to take if an electric vehicle crashes, then provide the Company's workplan and all related documents.
- (q) What is the expected charging time that each EV needs after each workday? What are the expected hours over which the EVs are expected to be charging after each workday? Provide all assumptions used in the calculations including battery size, EV charging rate losses, amount of charge that a vehicle would be expected to take on a daily basis and how many kWhs of power would be needed to provide that much charge, and any other assumptions.
- (r) How many years does the Company expect the original battery in an EV to last before it can no longer hold a sufficient charge to make it feasible to drive on a daily basis (indicate the battery capacity associated with the expectations provided by the Company)?

<sup>1</sup> “ComEd Awarded \$4 million in Federal Economic Stimulus Funding To Expand Green Vehicle Fleet and Test Impact on Electric Grid.” October 16, 2009. Chicago, IL. News Room Release.  
[https://www.comed.com/sites/newsroom/News%20Room/newsroomreleases\\_10162009.aspx](https://www.comed.com/sites/newsroom/News%20Room/newsroomreleases_10162009.aspx)

<sup>2</sup> “ComEd Adds 50 Prius Electric Plug-ins and Hybrids To One of Nation’s Largest Green Fleets: Purchase to save utility 6,500 gallons of gas in 2009, reduce CO2 emissions.” January 8, 2009. Chicago, IL. News Room Release.  
[https://www.comed.com/sites/newsroom/News%20Room/newsroomreleases\\_01082009.aspx](https://www.comed.com/sites/newsroom/News%20Room/newsroomreleases_01082009.aspx)

**RESPONSE:**

- (a) Refer to the attachment to ComEd’s Response to Staff Data Request JLH 1.09 labeled as JLH 1.09\_Attach 1 for ComEd’s cost estimate on the EV Pilot Program assets.
- (b) Following are the proposed vehicles associated with ComEd’s EV Pilot Program:
  - a. Plug-in car: Nissan Leaf
  - b. Plug-in cargo/service vehicle: Navistar eStar
  - c. Hybrid bucket truck: International chassis with Eaton hybrid drive system and Altec TA40 aerial equipment
  - d. PHEV digger derrick: IHC chassis with DUECO C4047 plug-in hybrid digger derrick
  - e. Coulomb Technologies CT 2100 Level 2 charging station.
- (c) The Coulomb Technologies CT 2100 charging stations include one Level 2 connection per port. This charging station was chosen for its ability to be networked and remote communications capability, enabling aggregate management of the electrical load associated with ComEd’s fleet of plug-in vehicles.
- (d) The below link contains the specifications for the CT 2100 charging station:  
<http://chargepointnetworks.com/pdfs/CT2100%20Installation%20Guide.pdf>
- (e) Deployment locations for plug-in vehicles and the associated charging infrastructure have not been finalized. All locations will be at ComEd facilities and for the sole use of ComEd vehicles.
- (f) No permitting costs are included in the estimated costs for the charging stations.
- (g) Installation costs will vary by location based on existing electrical infrastructure, number of charging stations deployed at the site, and any service upgrades needed. Locations will be selected in order to optimize the balance between installation costs and vehicle deployment benefits.
- (h) The company expects to utilize one or more of its facilities contractors of choice to perform the installations.
- (i) Expected distribution system upgrades are not known at this time, and will be dependant on the locations selected for deployment of the EVs and the associated infrastructure. However, required upgrades will be one of the criteria used to select deployment locations.

- (j) Expected costs of electricity to charge the EVs are not bundled into the charging station costs or EV costs, and have not been calculated at this time.
- (k) ComEd anticipates utilizing its Fleet Services employees to conduct monthly visual inspections of the charging stations for signs of physical damage or wear. The cost of safety inspections is not bundled into the unit cost of the charging stations.
- (l) The charging stations include a 3-year warranty.
- (m) While charging stations will be designated for specific ComEd plug-in vehicles, they may be used occasionally by other ComEd vehicles, such as those traveling between ComEd regions. It is not anticipated that these charging stations will be made available for public or personal employee use.
- (n) It is not anticipated at this time that ComEd will take the EVs home unless there is an operational benefit to the company for the employee to do so. However, if such a case occurs, the electric rate on the employee's personal account will apply.
- (o) To clarify, it is expected that charging stations will be installed and operational prior to delivery of EVs. Since vehicles have a longer anticipated lead time than the charging stations, they will be scheduled for delivery as soon as possible after completion of installation of the charging infrastructure.

ComEd objects to the portion of this subpart beginning with the phrase "Discuss the potential impact on the incentive mechanism..." on the grounds that it calls for speculation of what may or may not occur in the future. Subject to and without waiving the foregoing objection or its General Objections, ComEd responds as follows: ComEd has not performed the analysis described as there is no reasonable basis to believe that the hypothetical as described will occur. The proposed program for EVs is a pilot, and ComEd designed the pilot to be an appropriate size which ComEd believes will lead to a fair test of EV technology.

- (p) Based on conversations with original equipment manufacturers (OEMs) such as GM, it is expected that OEMs will educate local emergency medical service personnel and law enforcement regarding safety precautions related to EVs.
- (q) It is anticipated that the EVs will generally take four to eight hours to charge at the end of a typical shift, dependent on the size of the battery in each vehicle and the state of the charge in the battery at the end of the shift. Based on this assumption and using Level 2 charging, each vehicle would be use between 13 and 26 kWh to recharge.
- (r) Based on conversations, with OEMs, it is expected that the batteries in the EVs will last 10 years.

**ICC Docket No. 10-0527**

**Commonwealth Edison Company's Response to  
Illinois Commerce Commission ("STAFF") Data Requests**

**JLH 1.01 – 1.12**

**Date Received: September 23, 2010**

**Date Served: October 22, 2010**

**REQUEST NO. JLH 1.09**

Please refer to the proposed ComEd EV Pilot Program discussed in Company witness, Mr. McMahan's direct testimony (lines 46-115 on pages 3-7 of ComEd Ex. 2.0) and ComEd EV Pilot Program Assets table presented on line 86 of page 5 of Company witness, Mr. McMahan's testimony (ComEd Ex. 2.0). To the extent applicable, all documents and workpapers should be provided in Excel format with working formulas.

- (a) Please provide all supporting calculations and documents for the unit cost estimates of the ComEd EV Pilot Program Assets.
- (b) Please provide all technical specifications, including the potential vehicle make and model, for potential EV Pilot Program Assets including the proposed plug-in cars, plug-in cargo/service vehicles, hybrid bucket trucks (non-pluggable), and PHEV digger-derricks.
- (c) Why is ComEd constructing a separate charging station for each plug-in EV?
- (d) Please provide all technical specifications (including potential manufacturers) for the level 2 charging stations in the proposed EV Pilot. At a minimum, the Company should provide the input voltage, input phase, input current, output voltage, output phase, connector/cable, operating temperatures, meter specifications, safety features, and any other features the Company expects the charging stations to have (if the features are unknown, please list the minimum requirements of the charging stations).
- (e) Please provide the expected locations for the level 2 charging stations for company vehicles.
- (f) Please list any permitting costs with governmental units associated with the level 2 charging stations and discuss whether the permitting costs are bundled into the charging station costs.
- (g) What is the expected installation cost of the level 2 charging stations? Is the installation cost bundled with the charging station cost?
- (h) Does the Company expect to install the level 2 charging stations or will an outside contractor install the stations?
- (i) Describe any anticipated upgrades or repairs to the portion of ComEd's electric distribution system that would service the level 2 charging stations that are proposed under the EV Pilot Program. Provide an Excel table showing the expected distribution upgrades (e.g., transformer upgrades) and explain whether these are bundled into the charging station costs.
- (j) Provide the calculations supporting the expected electricity charging costs over the battery life of the EVs. If the Company does not have an expectation for the battery life of the EVs, please provide the expected electricity charging costs of the EVs over the EV pilot period of which concludes at the end of 2013. Are these costs bundled into the charging station costs or the EV costs? Explain.
- (k) What safety inspections of the level 2 charging station equipment does the Company expect to conduct and how frequently? Does the Company expect to outsource the safety

inspections? Are the costs for safety inspections bundled into the unit charging station costs? Explain.

- (l) Is a warranty with the level 2 charging station manufacturer included in the cost of the level 2 charging stations? If yes, please indicate the number of years the warranty is expected to last. If no, please indicate how ComEd expects to fund any maintenance (which may be necessary to ensure safety) of the level 2 charging stations.
- (m) Will any Company vehicles, other than those specifically purchased through the proposed EV Pilot Program in this proceeding, have access to (charge) the level 2 charging stations being proposed? Explain. Will the charging stations be made available for employee or public use? If yes, what rate structure(s) does ComEd propose charging customers to charge their electric vehicles? In addition, discuss how non-ComEd customers would be charged for charging their electric vehicles. Discuss whether ComEd customers would have their electric vehicle charging costs added to their monthly electric bill or how exactly the payment structure would work.
- (n) Will ComEd employees take the EVs home? If yes, identify the electricity rate structure applicable to charging the vehicles.
- (o) According to the expected investment timeline presented in the table on page 6 of the Company witness, Mr. McMahan's direct testimony (ComEd Ex. 2.0), the level 2 charging stations are expected to be purchased and installed prior to purchasing any of the EVs proposed in the EV Pilot Program. Does the Company expect to utilize the level 2 charging stations before the EVs proposed in the EV Pilot Program are purchased? Explain. Discuss the potential impact on the incentive mechanism discussed in the proposed tariff Rate ACEP (ComEd Ex. 1.2) if the charging stations are purchased but the EVs are not available to purchase (e.g., if a massive recall of EVs occurs before the Company receives any EVs, or if the costs of EVs significantly increase due to pent up demand and the Company decides not to purchase the EVs).
- (p) Has the Company educated local emergency medical service personnel and law enforcement regarding safety precautions to take if an electric vehicle crashes (considering the Company has 10 Prius plug-in electric vehicles<sup>1</sup> deployed already)? If yes, provide the Company's workplan and all related documents. If no, please thoroughly explain the Company's position with respect to EV safety. If the Company plans to educate local emergency medical service personnel and law enforcement regarding safety precautions to take if an electric vehicle crashes, then provide the Company's workplan and all related documents.
- (q) What is the expected charging time that each EV needs after each workday? What are the expected hours over which the EVs are expected to be charging after each workday? Provide all assumptions used in the calculations including battery size, EV charging rate losses, amount of charge that a vehicle would be expected to take on a daily basis and how many kWhs of power would be needed to provide that much charge, and any other assumptions.
- (r) How many years does the Company expect the original battery in an EV to last before it can no longer hold a sufficient charge to make it feasible to drive on a daily basis (indicate the battery capacity associated with the expectations provided by the Company)?

<sup>1</sup> “ComEd Awarded \$4 million in Federal Economic Stimulus Funding To Expand Green Vehicle Fleet and Test Impact on Electric Grid.” October 16, 2009. Chicago, IL. News Room Release.  
[https://www.comed.com/sites/newsroom/News%20Room/newsroomreleases\\_10162009.aspx](https://www.comed.com/sites/newsroom/News%20Room/newsroomreleases_10162009.aspx)

<sup>2</sup> “ComEd Adds 50 Prius Electric Plug-ins and Hybrids To One of Nation’s Largest Green Fleets: Purchase to save utility 6,500 gallons of gas in 2009, reduce CO2 emissions.” January 8, 2009. Chicago, IL. News Room Release.  
[https://www.comed.com/sites/newsroom/News%20Room/newsroomreleases\\_01082009.aspx](https://www.comed.com/sites/newsroom/News%20Room/newsroomreleases_01082009.aspx)

**SUPPLEMENTAL RESPONSE (subpart o):**

- (a) Refer to the attachment to ComEd’s Response to Staff Data Request JLH 1.09 labeled as JLH 1.09\_Attach 1 for ComEd’s cost estimate on the EV Pilot Program assets.
- (b) Following are the proposed vehicles associated with ComEd’s EV Pilot Program:
  - a. Plug-in car: Nissan Leaf
  - b. Plug-in cargo/service vehicle: Navistar eStar
  - c. Hybrid bucket truck: International chassis with Eaton hybrid drive system and Altec TA40 aerial equipment
  - d. PHEV digger derrick: IHC chassis with DUECO C4047 plug-in hybrid digger derrick
  - e. Coulomb Technologies CT 2100 Level 2 charging station.
- (c) The Coulomb Technologies CT 2100 charging stations include one Level 2 connection per port. This charging station was chosen for its ability to be networked and remote communications capability, enabling aggregate management of the electrical load associated with ComEd’s fleet of plug-in vehicles.
- (d) The below link contains the specifications for the CT 2100 charging station:  
<http://chargepointnetworks.com/pdfs/CT2100%20Installation%20Guide.pdf>
- (e) Deployment locations for plug-in vehicles and the associated charging infrastructure have not been finalized. All locations will be at ComEd facilities and for the sole use of ComEd vehicles.
- (f) No permitting costs are included in the estimated costs for the charging stations.
- (g) Installation costs will vary by location based on existing electrical infrastructure, number of charging stations deployed at the site, and any service upgrades needed. Locations will be selected in order to optimize the balance between installation costs and vehicle deployment benefits.
- (h) The company expects to utilize one or more of its facilities contractors of choice to perform the installations.
- (i) Expected distribution system upgrades are not known at this time, and will be dependant on the locations selected for deployment of the EVs and the associated infrastructure. However, required upgrades will be one of the criteria used to select deployment locations.
- (j) Expected costs of electricity to charge the EVs are not bundled into the charging station costs or EV costs, and have not been calculated at this time.

- (k) ComEd anticipates utilizing its Fleet Services employees to conduct monthly visual inspections of the charging stations for signs of physical damage or wear. The cost of safety inspections is not bundled into the unit cost of the charging stations.
- (l) The charging stations include a 3-year warranty.
- (m) While charging stations will be designated for specific ComEd plug-in vehicles, they may be used occasionally by other ComEd vehicles, such as those traveling between ComEd regions. It is not anticipated that these charging stations will be made available for public or personal employee use.
- (n) It is not anticipated at this time that ComEd will take the EVs home unless there is an operational benefit to the company for the employee to do so. However, if such a case occurs, the electric rate on the employee's personal account will apply.
- (o) To clarify, it is expected that charging stations will be installed and operational prior to delivery of EVs. Since vehicles have a longer anticipated lead time than the charging stations, they will be scheduled for delivery as soon as possible after completion of installation of the charging infrastructure.

ComEd objects to the portion of this subpart beginning with the phrase "Discuss the potential impact on the incentive mechanism..." on the grounds that it calls for speculation of what may or may not occur in the future. Subject to and without waiving the foregoing objection or its General Objections, ComEd responds as follows: ComEd has not performed the analysis described as there is no reasonable basis to believe that the hypothetical as described will occur. The proposed program for EVs is a pilot, and ComEd designed the pilot to be an appropriate size which ComEd believes will lead to a fair test of EV technology.

Further responding, with respect to the scenario presented in this subpart, "if the charging stations are purchased but the EVs are not available to purchase", ComEd would not consider the EV Pilot to be completed as approved by the Commission in accordance with the provisions on Original Sheet X+2 in ComEd Ex. 1.2, and thus, there would be no final investment expenditure amount to calculate an Investment Recovery Component for the EV Pilot. ComEd would then likely seek to modify the EV Pilot via a petition to the ICC in accordance with the provisions on Original Sheet X+19 in ComEd Ex. 1.2.

- (p) Based on conversations with original equipment manufacturers (OEMs) such as GM, it is expected that OEMs will educate local emergency medical service personnel and law enforcement regarding safety precautions related to EVs.
- (q) It is anticipated that the EVs will generally take four to eight hours to charge at the end of a typical shift, dependent on the size of the battery in each vehicle and the state of the charge in the battery at the end of the shift. Based on this assumption and using Level 2 charging, each vehicle would be use between 13 and 26 kWh to recharge.
- (r) Based on conversations, with OEMs, it is expected that the batteries in the EVs will last 10 years.

**ICC Dkt. 10-0527  
 JLH 1.09\_Attach 1  
 Summary**

<b>ComEd EV Pilot Program Assets</b>	<b>Unit Cost</b>	<b>Quantity</b>	<b>Total ComEd Cost</b>
Plug-in car	\$ 36,000	45	\$ 1,620,000
Plug-in cargo/service vehicle	\$ 135,000	8	\$ 1,080,000
Hybrid bucket truck (non-pluggable)	\$ 250,000	4	\$ 1,000,000
PHEV digger-derrick	\$ 350,000	2	\$ 700,000
Level 2 charging stations for company vehicles	\$ 10,000	55	\$ 550,000
Incidental equipment and contingency	\$ 50,000		\$ 50,000
<b>Total Vehicles:</b>		<b>59</b>	
<b>Total Charging Stations:</b>		<b>55</b>	
<b>Total EV Pilot Program Investment:</b>			<b>\$ 5,000,000</b>

<b>MONTH/YEAR</b>	<b>ITEM</b>	<b>QUANTITY</b>	<b>COST</b>	<b>ITEM</b>	<b>QUANTITY</b>	<b>COST</b>	<b>Total</b>
Jun-11							-
Jul-11							-
Aug-11	Charging Station	15	10,000				150,000
Sep-11	Charging Station	15	10,000				150,000
Oct-11	Charging Station	15	10,000				150,000
Nov-11	Charging Station	10	10,000				100,000
Dec-11				Plug-in Cargo/Service Vehicle	2	135,000	270,000
Jan-12	Plug-in Car	10	36,000	Plug-in Cargo/Service Vehicle	4	135,000	900,000
Feb-12	Plug-in Car	10	36,000	Plug-in Cargo/Service Vehicle	2	135,000	630,000
Mar-12	Plug-in Car	10	36,000	Hybrid Bucket Truck	2	250,000	860,000
Apr-12	Plug-in Car	10	36,000	Hybrid Bucket Truck	2	250,000	860,000
May-12	Plug-in Car	5	36,000	PHEV Digger Derrick	2	350,000	880,000
							<b>4,950,000</b>

**ICC Dkt. 10-0527**  
**JLH 1.09\_Attach 1**  
**Cost Estimates**

<b>Vehicle Costs</b>	<b>Cost p.u.</b>	<b>Quantity</b>	<b>Total Cost</b>
<b>Plug-in Car</b>			
Price based on Nissan Leaf cost estimate	\$ 36,000	45	\$ 1,620,000
<b>Plug-in Cargo/Service Vehicle</b>			
Price based on Navistar eStar cost estimate	\$ 135,000	8	\$ 1,080,000
<b>Hybrid Bucket Truck (non-p;uggable)</b>			
Price based on existing cost for hybrid bucket truck	\$ 250,000	4	\$ 1,000,000
<b>PHEV Digger Derrick Truck</b>			
Price based on cost of Dueco PHEV digger derrick	\$ 350,000	2	\$ 700,000
			<b>Total Cost</b>
<b>TOTAL VEHICLE COSTS</b>		59	\$ 4,400,000

<b>Charging Infrastructure Costs</b>	<b>Cost p.u.</b>	<b>Quantity</b>	<b>Total Cost</b>
<b>Level 2 Charging Station</b>			
Coulomb Technologies Smart Charging station	\$ 5,000		
Installation (labor, material)	\$ 5,000		
Total equipment costs per charge point	\$ 10,000		
<b>Charging Stations for ComEd plug-in vehicles</b>		55	\$ 550,000
<b>Incidental equipment and contingency</b>			\$ 50,000
Contingency for unforeseen installation costs			
			<b>Total Cost</b>
<b>TOTAL PROJECT COSTS</b>			\$ 5,000,000

**ICC Docket No. 10-0527**

**Commonwealth Edison Company's Response to  
Illinois Commerce Commission ("STAFF") Data Requests**

**JLH 1.01 – 1.12**

**Date Received: September 23, 2010**

**Date Served: October 8, 2010**

**REQUEST NO. JLH 1.10**

Please list all plug-in cars, plug-in cargo/service vehicles, hybrid bucket trucks, plug-in hybrid electric digger-derricks, and charging stations that are (1) already included in ComEd's rate base, (2) being proposed to be included in rate base in the pending rate case Docket No. 10-0467, and/or (3) currently owned by ComEd. For each of these asset groups, provide the following information:

- (a) To the extent applicable, provide the vehicle make and model, the charging station make and model, purchase invoices/receipts, accumulated depreciation, depreciation rates, technical specifications, and any relevant documents associated with the purchase, use, maintenance, and cost savings of each asset.
- (b) For the assets already included in rate base, please indicate in which rate cases ComEd proposed to add them and whether the inclusion of the asset was challenged during the rate case docket.
- (c) If applicable, please indicate by docket, exhibit, schedule, and line number where these assets are listed.
- (d) Please describe the charging infrastructure currently utilized to charge the Company's 10 plug-in electric vehicles<sup>1</sup>. At a minimum, the Company should include the technical specifications of the charging infrastructure (e.g., input voltage, input phase, input current, output voltage, output phase, connector/cable, operating temperatures, meter specifications, safety features, and any other features the charging stations have), the initial cost of this infrastructure, the location of the infrastructure, the funding source, the charging time associated with fully charging the battery of the plug-in EVs when the battery is fully depleted, and the charging time associated with charging the battery of the plug-in EVs taking into consideration the average battery life remaining at the end of a typical day (provide battery capacity).
- (e) Please describe any upgrades or repairs to the portion of ComEd's electric distribution system that services the charging infrastructure utilized to charge the 10 plug-in electric vehicles the Company currently owns<sup>2</sup>.
- (f) Please provide all workpapers related to these assets.
- (g) To the extent applicable, all documents and workpapers should be provided in Excel format with working formulas.
- (h) What does ComEd seek to learn from the proposed ComEd EV Pilot Program that ComEd cannot learn from its current stock of electric vehicles?

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<sup>1</sup> "ComEd Adds 50 Prius Electric Plug-ins and Hybrids To One of Nation's Largest Green Fleets: Purchase to save utility 6,500 gallons of gas in 2009, reduce CO2 emissions." January 8, 2009. Chicago, IL. News Room Release. [https://www.comed.com/sites/newsroom/News%20Room/newsroomreleases\\_01082009.aspx](https://www.comed.com/sites/newsroom/News%20Room/newsroomreleases_01082009.aspx)

<sup>2</sup> "ComEd Adds 50 Prius Electric Plug-ins and Hybrids To One of Nation's Largest Green Fleets: Purchase to save utility 6,500 gallons of gas in 2009, reduce CO2 emissions." January 8, 2009. Chicago, IL. News Room Release. [https://www.comed.com/sites/newsroom/News%20Room/newsroomreleases\\_01082009.aspx](https://www.comed.com/sites/newsroom/News%20Room/newsroomreleases_01082009.aspx)

**RESPONSE:**

- (a) No charging stations, plug-in cargo/service vehicles or plug-in digger derricks are currently owned by ComEd. The following are the plug-in cars and hybrid bucket trucks currently owned by ComEd:

- Toyota Prius converted plug-in hybrids (quantity 10)
- International/Eaton hybrid bucket trucks (quantity 9)

Refer to JLH 1.10\_Attach 1 for copies of invoices for the vehicles listed above. With regard to depreciation, please refer to ComEd's Response to Staff Data Request JLH 1.03 subpart c.

- (b) One of the hybrid bucket trucks was put in service in 2006 and thus is currently in ComEd's rate base. ComEd has proposed inclusion of the remainder of the assets described in subpart a as part of the rate base in ComEd's current Rate Case before the Commission, Docket No. 10-0467.
- (c) A detailed listing of the assets described in subpart a) is not a part of any filing schedule in Docket No. 10-0467. To the extent the assets were placed in service prior to December 31, 2009, the assets are included in the balance reported in ComEd's 2009 FERC Form No. 1, page 207, row 89, column g.
- (d) ComEd currently uses standard 120 volt, 20 ampere outlets for charging its Toyota Prius converted plug-in hybrids, which include a 5 kWh battery. These outlets are installed at the following ComEd locations: Chicago North, Chicago South, Maywood, and Lincoln Centre. It takes approximately 3.5 hours to charge the vehicle's battery if fully depleted.
- (e) No distribution system upgrades were necessary, as existing equipment at each location had ample capacity to serve the additional load.
- (f) N/A
- (g) N/A
- (h) The proposed ComEd EV Pilot program compliments other pilots being conducted by ComEd through the deployment of additional EV platforms that are not part of other pilot programs, such as production-ready plug-in cars and plug-in cargo/service vehicles. Implementation of this EV Pilot Program will enable a more robust analysis of the life-cycle costs and benefits of EVs across multiple vehicle types and platforms, which will provide valuable information to residential customers and commercial fleets considering adoption of EVs. In addition, ComEd is currently developing an initial assessment of the impacts of the introduction of plug-in electric vehicles on its system, in accordance with a request from the Illinois Commerce Commission as part of its Initiative on Plug-in Electric Vehicles co-chaired by Acting Chairman Flores and Commissioner O'Connell-Diaz. This assessment is due to the Illinois Commerce Commission in mid-December.

**ICC Docket No. 10-0527**

**Commonwealth Edison Company's Response to  
Illinois Commerce Commission ("STAFF") Data Requests**

**JLH 1.01 – 1.12**

**Date Received: September 23, 2010**

**Date Served: October 8, 2010**

**REQUEST NO. JLH 1.11**

Please provide copies of any drafts of Electric Power Research Institute's (EPRI's) study<sup>1</sup> regarding the impacts of plug-in electric vehicles on ComEd's electric grid. This includes feeder-specific analysis of ComEd's system under various vehicle penetration levels and charging patterns.

**RESPONSE:**

The most recent draft of Electric Power Research Institute's (EPRI's) study regarding the impacts of plug-in electric vehicles on ComEd's electric grid is attached. Note that the study focuses on two specific feeders under various assumed penetration levels of EVs. Refer to JLH 1.11\_Attach 1.

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<sup>1</sup> "Current Technology State Overview." May 7, 2009. Illinois Statewide Smart Grid Collaborative Workshop. Electric Vehicle Strategy, Slide 17.  
<http://www.ilgridplan.org/ISSGC%20May%20Workshop%20Documents/ComEd%20Current%20State%20Presentation%20for%205-7-09%20ISSGC%20Workshop.pdf>

**ICC Docket No. 10-0527**

**Commonwealth Edison Company's Response to  
Illinois Commerce Commission ("STAFF") Data Requests**

**JLH 1.01 – 1.12**

**Date Received: September 23, 2010**

**Date Served: October 8, 2010**

**REQUEST NO. JLH 1.12**

Please provide ComEd's workpapers related to the purchase, use or performance of EVs, including but not limited to, the expected penetration levels, charging patterns, maintenance cost savings, driver habits, vehicle performance, direct load control, charge management strategies (including proposals for residential EV charging tariff structures and any proactive steps that ComEd has taken or plans to take regarding being notified of electric vehicle sales in ComEd's service territory—either directly from car dealerships or electricians) and impacts of plug-in electric vehicles on ComEd's electric grid (including impact on life of transformers and associated distribution cost increases). This includes any internal reports based on the plug-in electric vehicles<sup>1</sup> currently deployed in ComEd's Meter Reading organization as well as the hybrid bucket trucks<sup>2</sup> currently deployed by ComEd, unless otherwise provided in response to JLH-1.10(f).

**RESPONSE:**

All workpapers relating to testimony supporting the proposed EV pilot have already been produced in ComEd's Response to Staff Data Request DLH 2.04 in this docket. Nor are there any additional workpapers that were used in the development of the EV pilot.

No documentation concerning consumer penetration levels, charging patterns, maintenance cost savings, driver habits, vehicle performance, direct load control of EV charging, policy issues such as residential EV charging tariff structures, electric vehicle sales, or the impacts of consumer plug-in electric vehicles on ComEd's electric grid was either a workpaper related to Mr. McMahan's testimony or relied upon to support the proposal. ComEd's investigation of consumer EV issues is ongoing and will be conducted in substantial part in coordination with the Commission's recently-announced EV Initiative. Discovery into that subject is not relevant to any issue in this case.

Further answering, ComEd states that it has no internal reports based on the electric vehicles or bucket trucks currently deployed by ComEd.

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<sup>1</sup> "ComEd Adds 50 Prius Electric Plug-ins and Hybrids To One of Nation's Largest Green Fleets: Purchase to save utility 6,500 gallons of gas in 2009, reduce CO2 emissions." January 8, 2009. Chicago, IL. News Room Release.

[https://www.comed.com/sites/newsroom/News%20Room/newsroomreleases\\_01082009.aspx](https://www.comed.com/sites/newsroom/News%20Room/newsroomreleases_01082009.aspx)

<sup>2</sup> "ComEd's Fleet of Green Vehicles Ranks 7th Largest in U.S.: Second-largest among utilities; part of leadership role to cut greenhouse gas emissions." February 26, 2009. Chicago, IL. News Room Release.

[https://www.comed.com/sites/newsroom/News%20Room/newsroomreleases\\_02262009.aspx](https://www.comed.com/sites/newsroom/News%20Room/newsroomreleases_02262009.aspx)

"ComEd Adds Hybrid Bucket Truck to its Fleet." May 10, 2006. Chicago, IL. Press Release.

<http://www.exeloncorp.com/news/pressrelease/comed/051006A.htm>

ICC Docket No. 10-0527

**Commonwealth Edison Company's Response to  
Illinois Commerce Commission ("STAFF") Data Requests**

**JLH 2.01 – 2.06**

**Date Received: October 4, 2010**

**Date Served: October 19, 2010**

**REQUEST NO. JLH 2.01:**

Is it the Company's position that the "proceeding" referred to in the definition of "Biennial Review Proceeding Order" in the Definitions section on Original Sheet No. X of ComEd Ex. 1.2 the same type of "proceeding" that is referred to in 220 ILCS 5/9-244(c)?

**RESPONSE:**

The "proceeding" referred to in the definition of "Biennial Review Proceeding Order" in the Definitions section on Original Sheet No. X of ComEd Ex. 1.2 refers to a proceeding to be initiated by the Commission pursuant to Section 9-244(c) of the Public Utilities Act. As indicated on ComEd Ex. 1.2, Original Sheet No. X, in the definition of "Biennial Review Proceeding Order," the referenced proceeding is "the proceeding initiated **in accordance with the provisions of Section 9-244 of the Act ....**" *Id.* (emphasis added). As indicated on ComEd Ex. 1.2, Original Sheet No. X+19, the Biennial Review Proceeding "must be undertaken **in accordance with the provisions of Section 9-244 of the Act**" and requires the "final Order for such proceeding [to] be entered **no later than two hundred, seventy (270) days after such proceeding is opened.**" *Id.* (emphasis added). The 270-day period was intended to correspond with the requirement in Section 9-244(c) that the Commission take certain action "no later than 270 days after the proceeding is opened ...." 220 ILCS 5/9-244(c).

ICC Docket No. 10-0527

**Commonwealth Edison Company's Response to  
Illinois Commerce Commission ("STAFF") Data Requests**

**JLH 2.01 – 2.06**

**Date Received: October 4, 2010**

**Date Served: October 20, 2010**

**REQUEST NO. JLH 2.02:**

“The Commission shall open a proceeding to review any program approved under subsection (b) 2 years after the program is first implemented to determine whether the program is meeting its **objectives**, and may make such revisions, no later than 270 days after the proceeding is opened, as are necessary to result in the program meeting its **objectives**.” (220 ILCS 5/9-244(c), emphasis added) Referring to the three programs, (1) an accelerated Urban Underground Facility Reinvestment program; (2) a pilot of Electric Vehicles (“EVs”) in utility operations; and (3) a Low Income Assistance Program (ComEd Ex. 1.0, p. 1, at lines 15-16), please provide a comprehensive statement of all of the “**objectives**” for each of these programs.

**RESPONSE:**

1. As explained by ComEd witness Michelle Blaise, “the proposed Urban Underground Facility Reinvestment (“UUF”) program would accelerate and re-prioritize the process of testing, and where indicated by those tests, replacing underground mainline feeder cable. It also includes accelerated inspection and, where appropriate, repair, rebuilding, or replacement of the cable support hardware and, where necessary, the manholes through which mainline cable runs.” Direct Testimony of Michelle Blaise, ComEd Ex. 4.0, at line 34. The objective is to fulfill this program within the \$45 million budget: \$30 million in investments; \$15 million in O&M.
2. The EV pilot will study EVs’ operational, economic, and environmental costs and benefits, and assess EVs’ ability to replace carbon-fueled vehicles in the utility fleet. The objective is to fulfill this program within the proposed \$5 million budget.
3. The Low Income Assistance Program will continue several low-income programs that will expire in 2010. These programs will cost up to \$10 million annually. The objective is to continue providing assistance to needy customers who might otherwise be unable to afford their electric service.

ICC Docket No. 10-0527

**Commonwealth Edison Company's Response to  
Illinois Commerce Commission ("STAFF") Data Requests**

**JLH 2.01 – 2.06**

**Date Received: October 4, 2010**

**Date Served: October 20, 2010**

**REQUEST NO. JLH 2.03:**

Please refer to ComEd Ex. 1.2 at Original Sheet No. X+15, "For each program for which recovery of and on investment expenditures is allowed to begin under this tariff and for which the Company has a **final investment expenditure amount**, an Investment Recovery Component is determined." (emphasis added)

- (a) Please define and explain what ComEd is referring to by "final investment expenditure amount."
- (b) If applicable, define what is meant by "final investment expenditure amount" in the context of the proposed pilot programs assuming they are approved as proposed.
- (c) How will ComEd determine the programs for which it has a final investment expenditure amount? How will ComEd determine the final investment expenditure amount? What is the Commission's role in approving the final investment expenditure amount?
- (d) Is the calculation of a final investment expenditure amount tied to the quantity of assets purchased within an approved program? That is, should a quantitative assessment of the assets purchased or installed (e.g., number of Electric Vehicles ("EVs"), length of underground cable installed/repaired), be the only criterion used to determine whether a program has a final investment expenditure amount?
- (e) If ComEd purchases less than the number of EVs proposed in the EV Pilot Program, does this preclude the possibility that a final investment expenditure amount for the EV Pilot Program can ever be calculated?

**RESPONSE:**

- (a) Final investment expenditure amount, as used in ComEd Ex. 1.2 on Original Sheet No. X+15, means the sum of the actual capital costs ComEd incurred over the life of a program approved by the Commission in accordance with the provisions of Rate ACEP – Accelerated Customer Enhancements Assessments (Rate ACEP).
- (b) The final investment expenditure amount for a program approved in accordance with the provisions of Rate ACEP has the same meaning as described in subpart (a) but such amount will not be known until that program concludes or terminates.
- (c) Programs that are concluded or terminated will have final investment expenditure amounts determined for the program. ComEd will determine the final investment expenditure amount for a program by identifying the sum of the actual capital costs it incurred over the life of the program. For each program it approves and for which there are expected to be investment expenditures, the Commission approves the targeted investment expenditure amount for the program. ComEd's recovery of and on the final investment expenditure amount through the application of the provisions of Rate ACEP is

subject to the provisions in ComEd Ex. 1.2 on Original Sheet No. X+15. Later recovery of and on the final expenditure amount is subject to the provisions in ComEd Ex. 1.2 on Original Sheet No. X+20:

“In any general rate proceeding commencing after December 31, 2013, the Company must request inclusion in its rate base of plant and any remaining regulatory asset associated with the EVA<sub>DCS</sub>, UFA<sub>DCS</sub>, SMA<sub>DCS</sub>, DAA<sub>DCS</sub>, or APA<sub>DCS</sub>, as applicable. Such request must be made in accordance with all rules and procedures for inclusion of capital investments into rate base.”

- (d) The cost of the assets purchased in association with an approved program will be reflected in the final investment expenditure amount for the program. A simple quantitative assessment of the assets purchased or installed may not be the only criterion that should be used to determine when a program is concluded and for which a final investment expenditure amount should be determined.
- (e) No.

ICC Docket No. 10-0527

**Commonwealth Edison Company's Response to  
Illinois Commerce Commission ("STAFF") Data Requests**

**JLH 2.01 – 2.06**

**Date Received: October 4, 2010**

**Date Served: October 20, 2010**

**REQUEST NO. JLH 2.04:**

Please refer to ComEd's Data Request Response to Staff Data Request DLH-1.07, states "No later than April 6, 2013 ComEd must submit report... Biennial Review Proceeding commences" and in Verified Petition, page 10 it states "Ongoing Commission Review 18. As required by Section 9-244 of the PUA, the alternative regulation program is subject to review two years after it is initially approved and implemented. That review will commence in June of 2013." What date does ComEd propose the Biennial Review Proceeding to commence on?

**RESPONSE:**

As provided in ComEd Ex. 1.2 on Original Sheet No. X+19 (emphasis added here):

**“Beginning in 2013, on or before April 6 in each odd-numbered year**, in the event that ACEPA<sub>DCS</sub> had been applicable to retail customers during all or part of the immediately previous two calendar years, the Company must submit to the ICC a report that summarizes the operation of this tariff for costs incurred during such previous two calendar year period by the Company that are associated with programs, the costs for which recovery began in accordance with the provisions of this tariff.”

“In the event that the Company seeks to extend or modify any program, the costs for which recovery began through the application of the provisions of this tariff, the Company must submit a petition to the ICC seeking such extension or modification in accordance with the provisions of Section 9-244 on the same date that it submits the report described in the previous paragraph.”

**“Upon receipt of such report and any associated petition, the ICC must open a proceeding** to review the operation of this tariff during such previous two calendar year period. In the event that the Company submits a petition to (a) extend or modify any program, the costs for which recovery began through the application of the provisions of this tariff, or (b) propose any new program, the costs for which recovery is proposed to begin through the application of the provisions of this tariff, such proceeding must additionally address such petition.”

“Such proceeding must be undertaken in accordance with the provisions of Section 9-244 of the Act.”

“The final Order for such proceeding must be entered no later than two hundred, seventy (270) days after such proceeding is opened.”

In accordance with the aforementioned provisions from ComEd Ex. 1.2, ComEd proposes that the date for the commencement of the Biennial Review Proceeding is the date that ComEd submits its report to the Commission, which would be on or before April 6 in odd-numbered years. In making this proposal, ComEd notes that the proceeding would be completed on or before December 31 in such year. This timeframe allows for consistency in the determination of costs on a calendar quarter basis.

The Verified Petition, page 10, is in error in stating that the “review will commence in June of 2013.” The Verified Petition should have indicated “April 2013” consistent with the language in ComEd Ex. 1.2.

**ICC Docket No. 10-0527**

**Commonwealth Edison Company’s Response to  
 Illinois Commerce Commission (“STAFF”) Data Requests**

**JLH 2.01 – 2.06**

**Date Received: October 4, 2010**

**Date Served: October 22, 2010**

**REQUEST NO. JLH 2.05:**

Please refer to Company witness Mr. McMahan’s testimony (ComEd Ex. 2.0 at 4:84-5:88) where he states “The requested investment would be expected to purchase the following EV pilot equipment:

<b>ComEd EV Pilot Program Assets</b>	<b>Unit Cost</b>	<b>Quantity</b>	<b>Total ComEd Cost</b>
Plug-in car	\$ 36,000	45	\$ 1,620,000
Plug-in cargo/service vehicle	\$ 135,000	8	\$ 1,080,000
Hybrid bucket truck (non-pluggable)	\$ 250,000	4	\$ 1,000,000
PHEV digger-derrick	\$ 350,000	2	\$ 700,000
Level 2 charging stations for company vehicles	\$ 10,000	55	\$ 550,000
Incidental equipment and contingency	\$ 50,000		\$ 50,000
<b>Total Vehicles:</b>		<b>59</b>	
<b>Total Charging Stations:</b>		<b>55</b>	
<b>Total EV Pilot Program Investment:</b>			<b>\$ 5,000,000</b>

The costs of the investment will be recovered in accordance with ComEd’s alternative regulation proposal. Cost recovery is discussed by Dr. Hemphill.” (emphasis added) In addition, please refer to Company witness Mr. McMahan’s testimony (ComEd Ex. 2.0 at 4:79-84) where he states “ComEd proposes to invest \$5 million dollars in EVs for our utility vehicle fleet and associated charging stations, with \$4.43 million of that amount being functionalized to the distribution function and, therefore, identified as being ICC-jurisdictional based on current jurisdictional splits of transmission and distribution in ComEd’s current rate case, Docket No. 10-0467. ComEd requests that the Commission authorize this investment and provide for its recovery as discussed by Dr. Hemphill (ComEd Ex. 1.0).” (emphasis added)

Assume the Commission authorizes this investment and the approved Electric Vehicle (“EV”) pilot program, consisting of the assets listed in the table above, has been in effect for eight (8) months (February 2012). Suppose that ComEd determines in February of 2012 that the total life-cycle ownership costs of Hybrid Bucket Trucks are too high to be an economically sound investment (based on the results of the two Hybrid Bucket Trucks that ComEd is currently piloting).

- (a) If ComEd chooses not to purchase the four (4) hybrid bucket trucks included in the original budget of the EV pilot program listed in the table above, would ComEd propose to modify the budget during the biennial review process discussed at page 10 of the Petition (and in 220 ILCS 5/9-244(c)) and subtract the unit cost estimates of the hybrid bucket trucks from the approved budget?
- (b) Please refer to 220 ILCS 5/9-244(f). If ComEd chooses not to purchase the four (4) hybrid bucket trucks included in the original budget of the EV pilot program list in the table above, would ComEd petition the Commission to modify the budget before the biennial review process and subtract the unit cost estimates of the hybrid bucket trucks from the approved budget? Or would ComEd use the funds to purchase additional EV assets that do make economic sense?

**RESPONSE:**

ComEd objects to Data Request JLH 2.05 on the grounds that it constitutes an improper contention interrogatory and that it is premature for ComEd to address at this time. Because discovery and further investigation can change contentions and supporting information, contention interrogatories, if allowed at all, should be considered timely only at the end of the discovery period. Moreover, ComEd's positions concerning what requests it will make in future Commission proceedings may also be based on legal conclusions and consultation with counsel, the basis of which may be protected by the work product doctrine and attorney-client privilege.

Subject to and without waiving the foregoing objections or its General Objections, ComEd responds as follows:

- (a) One of the purposes of the EV pilot is to evaluate the total life-cycle ownership costs of the EVs, including the Hybrid Bucket Trucks. The assumption in this data request is not reasonable and is inconsistent with the assumption that the Commission approves the EV pilot. Under ComEd's alternative regulation pilot program, ComEd is committed to investing \$5 million in EVs, as specified in the proposed budget. This investment will take place *prior* to the biennial review process. While ComEd will not alter the investment to be made under the Commission-approved budget during the program itself, under the hypothetical scenario presented in this subpart where a decision is made not to make all investments called for under the Commission-approved budget for the EV pilot, ComEd may seek to modify the EV Pilot during the biennial review process via a petition to the ICC in accordance with the provisions on Original Sheet X+19 in ComEd Ex. 1.2.
- (b) ComEd intends to fulfill its commitment to make the EV investments as specified in the budget. Under the hypothetical presented in this subpart, ComEd would not intend to make changes to the work to be performed or investment to be made under a Commission-approved budget without prior Commission approval. The hypothetical presented contains incomplete facts, and ComEd declines to speculate regarding the timing of a request to modify a Commission-approved budget under the hypothetical.

**ICC Docket No. 10-0527**

**Commonwealth Edison Company's Response to  
Illinois Commerce Commission ("STAFF") Data Requests**

**JLH 2.01 – 2.06**

**Date Received: October 4, 2010**

**Date Served: October 20, 2010**

**REQUEST NO. JLH 2.06:**

The following questions are directed to Dr. Hemphill in reference to ComEd's Verified Petition, pages 7-8, par. 13, which states that "13. With respect to capital, ComEd will recover a return of and on its actual investment for each project until an order is entered in the Commission's biennial review proceeding after the project is **complete**. At that time, ComEd's performance on the **completed project** will be reviewed against the Commission-approved budget." (Verified Petition, pages 7-8, emphasis added) Does the Company consider a program/project with a final investment expenditure amount to be a "completed" program/project? What steps will ComEd take to determine whether a program/project is "complete"? What steps does ComEd propose the Commission to take to determine whether a program/project is "complete"?

**RESPONSE:**

ComEd considers a project to be "complete" when all investments to be made under the Commission-approved budget have been made and the project is in service or otherwise operational. ComEd does not take any special steps to transition between "incomplete" and "complete." During the biennial review process ComEd will provide the evidence it typically provides to demonstrate that the project is used and useful.

## Instructions on the use of the Electric vs. Gas Vehicle comparison Excel worksheet

### Background:

This worksheet was conceived and starting in September 2005. It was written and updated by Len Beck with the assistance from many others including Dr. Willett Kempton and his staff at the University of Delaware.

### Operation:

This worksheet is designed to be used as an analysis tool for individuals or organizations to learn the potential results of replacing gas-powered vehicles with all-electric vehicles equipped with vehicle-to-grid (V2G) technology.

The blue cells in the worksheet contain baseline data that is believed to be representative of the 'typical' or average American driver's situation that will use a VG car for local commuting only; as a 'second car' in a multi-car family. It is assumed that the other vehicles will be driven when a vehicle is needed for a destination greater than 100 miles away, or train or air travel will be the alternative means of transportation.

Change the data in the blue cells to customize the data to your own situation and the 'bottom line' results will be displayed. We suggest you read through this worksheet and as you pass the blue boxes, note the amounts. Keep those numbers that you feel fit your driving experience, and change the others so the results are meaningful to your planned application for the car(s).

See the third tab for the source of the baseline data.

Last updated July 2009

**Electric Vehicle (EV) and Vehicle-To-Grid (V2G) Analysis**

**10-Year Gas-Powered to Electric-Powered Car Analysis:**

	Gasoline Powered	Electric Powered				
Estimated Retail Total Delivered Cost:	\$ 16,000	\$ 39,000				
Range in miles:	288	113	Weekly:	Days:	Daily:	Estimated -
Gas-powered vehicle average MPG:	24	n/a		175	5	35 Weekday
The Average Miles Driven per day (based on details to right):	35	35		70	2	35 Weekend
The Average Miles Driven /Year	12,740	12,740		245	7	12,740 X 52 weeks
The Average Price per Gallon of Gasoline <sup>1</sup>	\$ 2.672	n/a				
The Estimated Off-Peak Average Cost of One Kilowatt Hour of Electricity <sup>2</sup>	For EVs only \$ 0.087					
Calculated Fuel Cost / Mile	\$ 0.111	\$ 0.024	21%	EV-to-Gas cost ratio		
The Average Annual Energy Inflation Rate	5.0%	5.0%				
The Average Hours the EV will be Plugged in Per Day <sup>3</sup>	For EVs only 22					
The eBox Estimated Watt Hour/Mile (Wh/mile) allows for 9% charging losses <sup>4</sup>	For EVs only 275					
The Estimated Battery Pack Life in Years	For EVs only 10					
The Gross Battery Storage (kWh) for the eBox	For EVs only 36.6					
The Net Battery Storage (kWh) for the eBox (85% Depth of Discharge)	For EVs only 31.1					
The eBox bidirectional battery charger throughput in KW:	For EVs only 20					
Number of eBoxes to make up 1 Mega Watt-Hour (if 100% available)	For EVs only 50					
Estimated year 2019 battery replacement cost \$250+\$15 labor per kWh:	For EVs only \$ 265					
Total estimated year 2019 battery pack replacement Cost	For EVs only \$ 9,699					
Regulation Service Rate per Mega Watt-hour <sup>5</sup>	For EVs only \$ 40.48					(See PJM data chart below for 6-year average)
Regulation Service participation rate per hour per eBox:	For EVs only \$ 0.810					
Estimated Aggregator Service Fee Per Year (33%):	For EVs only \$ 2,165					
Estimated Regulation Service Gross Income per year per eBox per above data:	For EVs only \$ 6,501					

<sup>1</sup> Price per gallon is the U.S. average as of 5/26/2008 source: <http://tonto.eia.doe.gov/oog/info/gdu/gasdiesel.asp>  
<sup>2</sup> \$ 0.087 per kWh used as an estimated off-peak rate for overnight recharging, 75% of \$0.11556/kWh, the actual winter national average for 2008.  
<sup>3</sup> The AC Propulsion Controller/Charger allows recharging to take place while providing Regulation Up and Down Services  
<sup>4</sup> Note: 200 watt hour/mile is the equivalent of 172.45 MPG per DOE.  
<sup>5</sup> Hour-by-hour rates available at: <http://www.pjm.com/markets-and-operations/market-settlements/preliminary-billing-reports/pjm-reg-data.aspx>

Green House Gases Emissions: 6.5 1.2 Tons per year

**Maintenance Costs per Mile:**

Est. Cost Per Service:	Miles Per Service:	Gas Cost/Mile:	Electric Cost/Mile:	
\$ 30	3,500	\$ 0.009	n/a	Oil Changes
\$ 550	65,000	\$ 0.008	n/a	Brakes (Gas)
\$ 550	130,000	n/a	\$ 0.004	Brakes (EV) <sup>6</sup>
\$ 300	50,000	\$ 0.006	n/a	Tune-Ups
\$ 250	50,000	\$ 0.005	n/a	Transmission
\$ 2,000	100,000	\$ 0.020	n/a	Belts, Hoses, etc.
\$ 9,699	127,400	n/a	\$ 0.076	Batteries
Fuel per mile from above:		\$ 0.111	\$ 0.024	
<b>TOTAL COST PER MILE:</b>		\$ 0.159	\$ 0.104	

**Maintenance Costs per Year based on: 12740 miles / year:**

Gas Powered:	Electric:		Lifetime Costs:
none	\$ (4,336)	Regulation Income	
\$ 109	n/a	Oil Changes	\$ 1,092
\$ 108	n/a	Brakes (Gas)	\$ 1,078
n/a	\$ 54	Brakes (EV) <sup>6</sup>	\$ 539
\$ 76	n/a	Tune-Ups	\$ 764
\$ 64	n/a	Transmission	\$ 637
\$ 255	n/a	Belts, Hoses, etc.	\$ 2,548
n/a	\$ 970	Battery Pack (10% / year)	\$ 9,699
see below	see below	Fuel costs	
\$ 612	\$ (3,312)	<b>PER YEAR</b>	

<sup>6</sup> Due to regenerative braking in EV, longer brake life.

**Ten-Year Analysis:**

(Inflation Adjusted \$\$\$)			Vehicle Cost:		\$ 16,000	\$ 39,000			
Regulation:	Elect. / kWh	Gas / Gal.	Electric cost:	Gasoline cost:	Gas Powered:	Electric:	Accum.	Year	Cash saved / year
\$ 40.48	\$ 0.087	\$ 2.672	\$ 305	\$ 1,418	\$ 18,030	\$ 35,993	12,740	1	\$ 1,114
\$ 42.50	\$ 0.091	\$ 2.806	\$ 320	\$ 1,489	\$ 20,132	\$ 32,511	25,480	2	\$ 1,169
\$ 44.63	\$ 0.096	\$ 2.946	\$ 336	\$ 1,564	\$ 22,307	\$ 28,704	38,220	3	\$ 1,228
\$ 46.86	\$ 0.101	\$ 3.093	\$ 353	\$ 1,642	\$ 24,561	\$ 24,555	50,960	4	\$ 1,289
\$ 49.20	\$ 0.106	\$ 3.248	\$ 370	\$ 1,724	\$ 26,897	\$ 20,048	63,700	5	\$ 1,354
\$ 51.66	\$ 0.111	\$ 3.410	\$ 389	\$ 1,810	\$ 29,319	\$ 15,165	76,440	6	\$ 1,421
\$ 54.24	\$ 0.117	\$ 3.581	\$ 408	\$ 1,901	\$ 31,832	\$ 9,885	89,180	7	\$ 1,492
\$ 56.95	\$ 0.122	\$ 3.760	\$ 429	\$ 1,996	\$ 34,440	\$ 4,191	101,920	8	\$ 1,567
\$ 59.80	\$ 0.129	\$ 3.948	\$ 450	\$ 2,096	\$ 37,147	\$ (1,939)	114,660	9	\$ 1,645
\$ 62.79	\$ 0.135	\$ 4.145	\$ 473	\$ 2,200	\$ 39,960	\$ (8,527)	127,400	10	\$ 1,728
									\$ 14,007

Notes: 1) Green shading indicates break even point (EV has lower accumulated total cost than Gas powered).  
 2) **Maintenance Costs** do not include a major gas engine repair or replacement over the ten-year life.  
 3) This analysis does not include Insurance savings for a range and top speed-limited vehicle that is less likely stolen.  
 4) See the attached pages for instructions and additional notes related to the baseline assumptions.

**Cash Flow Analysis:**

	Gas Powered:	Electric:
Cost of the vehicles:	\$ 16,000	\$ 39,000
(Down payment 5%)	\$ 800	\$ 1,950
Net Loan (less 5% down):	\$ 15,200	\$ 37,050
Payment 72 months & 6% interest rate:	\$ 252	\$ 614
V2G Income <sup>7</sup> :	none	\$ (501)
Average Fuel Savings per month:	none	\$ (117)
Net Payment (Income) per month:	\$ 252	\$ (4)

<sup>7</sup> Calculated using the 10-year average inflation rate-adjusted Regulation rates above.

**PJM Regulation History (2003 through 2008)**

Average \$ / MWH:	Year:
TBD	2009
\$ 41.09	2008
\$ 35.36	2007
\$ 31.18	2006
\$ 49.73	2005
\$ 42.75	2004
\$ 42.75	2003
\$ 40.48	Average

Row No.:	TOPIC:	DATA:	BASELINE DATA EXPLANATIONS:
2	Estimated Retail Total Delivered Cost (gas-powered):	\$16,000	Toyota Scion xB Retail price including delivery and related taxes and costs.
2	Estimated Retail Total Delivered Cost (electric-powered):	\$39,000	Estimated Scion xB converted to eBox converted in moderate volumes.
3	Range in miles (gas-powered):	288 miles	Based on 12 gallon tank and an average of 24 miles per gallon.
3	Range in miles (electric-powered):	113	Highway speed range based on storage and efficiency per mile (below).
4	Gas-powered vehicle average MPG:	24	Vehicle manufacturer estimated city driving efficiency.
5	The Average Miles Driven per day	35	Based on the EPA's Greenhouse Gas Emissions and miles driven report 2-2005.
6	The Average Miles Driven /Year	12,740	Based on a 364-day year for formula simplicity purposes (365 days = 12,775 miles)
7	The Average Price per Gallon of Gasoline	\$2.672	See worksheet footnote 1.
8	Estimated Off-Peak Average Cost of 1 kWh of Electricity	\$0.087	See worksheet footnote 2.
9	Calculated Fuel Cost / Mile (Gasoline):	\$0.111	Cost per gallon of gasoline divided by the miles per gallon efficiency.
9	Calculated Fuel Cost / Mile (Electric):	\$0.024	Cost per kWh of electricity divided by the estimated watt-hour/mile efficiency.
10	The Average Annual Energy Inflation Rate	5%	The national average inflation rate is about 2.75 per year. The Energy inflation rate averages a higher rate (for coal, gasoline and power, etc.) and we use 5% here. <b>Note:</b> The inflation rate impacts the future estimated cost of gasoline, electric and the value of regulation service, so the bottom line calculations vary with the inflation rate you choose to model in this worksheet.
11	The Average Hours the EV will be Plugged in Per Day <sup>3</sup>	22	Twenty-two hours allows the car driver to be off the grid 2 hours a day (one hour each way to and from work and for errands). Also see worksheet footnote 3.
12	The Estimated Watt Hour/Mile (Wh/mile) <sup>4</sup> :	275	The eBox rating is 250 wh/mile. The 275 rate allows for 9% recharging losses.
13	The Estimated Battery Pack Life in Years	10	Several O.E.M. including General Motors and BYD are suggesting greater than or equal to 10 year battery pack life as the goal.
14	The Gross Battery Storage (kWh) for the eBox:	36.6	Current rating for the eBox battery pack.
15	Net Battery Storage (kWh) for the eBox:	31.1	Current rating for the eBox battery pack (85% of gross storage above).
16	The eBox bidirectional battery charger throughput in KW:	20	Per AC Propulsion's current specifications. It is important to note that the power outlet serving the vehicle must be rated at 250-volt and 80 Amp for 20 KW capacity. Note: Tesla Motors is using a 70 Amp connection for their Roadster, which limits the bidirectional power flow to 17.5 KW (250 volts times 70 Amp)
17	No. of eBox to make up 1 Mega Watt-Hour (MWh):	50	50 eBox rated at 20 KW equal 1 MW if 100% are plugged-in and available for V2G.
18	Estimated year 2019 battery replacement cost per kWh:	\$ 265	Based on an estimated \$250 per kWh plus \$15 per kWh installation labor.
19	Total estimated year 2019 battery pack replacement cost:	\$9,699	
20	Regulation Service Rate per Mega Watt-hour <sup>5</sup>	\$ 40.48	See PJM chart below the worksheet.
21	Regulation Service participation rate per hour per eBox:	\$ 0.81	Line 23 divided by 50 eBoxes equals per vehicle rate per hour.
22	Estimated Aggregator Service Fee Per Year (33%):	\$ 2,165	Calculated as the hourly rate per vehicle (line 24) times the hours plugged-in per day times 365 days times 33%. The Aggregator fee to manage the V2G process for each car is estimated to equal 1/3 of the total vehicle gross income. This fee structure could also be set up as a flat fee per year. NOTE: No Aggregator Service is established at this time.
23	Est. Regulation Service Gross Income per year per eBox:	\$ 6,501	The gross income is 100% of the vehicle's estimated Regulation Service income.
30	Tons per year of Green House Gases (gas-powered):	6.5	The tons per vehicle per year are estimated with all recharge produced with electric (with 49.7% coal generation, the U.S.A. national average.) Per the Electric Power Research Institute (EPRI), Green House Gas (GHG) include carbon dioxide, methane and nitrous oxide (NO2). Gas powered = 465 grams per mile times 12,740 miles per year divided by 453 grams per pound divided by 2,000 for tons.
30	Tons per year of Green House Gases (electric-powered):	1.2	The tons per vehicle per year are estimated with all recharge produced with electric (with 49.7% coal generation, the U.S.A. national average.) Per the Electric Power Research Institute (EPRI), Green House Gas (GHG) include carbon dioxide, methane and nitrous oxide (NO2). Electric with 50% coal = 83 grams per mile times 12,740 miles per year divided by 453 grams per pound divided by 2,000 for tons. Note: Even with 100% coal-powered electric generation, the all-electric is nearly 3 times cleaner than gasoline-powered cars. Electric with 100% coal = 165 grams per mile.

**Electric Vehicle (EV) and Vehicle-To-Grid (V2G) Analysis**

ICC DKT. NO. 10-0527  
Modified DLH 2.04\_Attach 06  
Nissan Leaf vs. Ford Focus

**10-Year Gas-Powered to Electric-Powered Car Analysis**

	Gas (Ford Focus)	Electric (Nissan Leaf)				
Estimated Retail Total Delivered Cost:	\$ 16,640	\$ 32,700				
EV Range in miles:	288	93	Weekly:	Days:	Daily:	Estimated -
Gas-powered vehicle average MPG:	24	n/a	250	5	50	Weekday
The Average Miles Driven per day (based on details to right):	35	35	0	2	0	Weekend
The Average Miles Driven /Year	13,000	13,000	250	7	13,000	X 52 weeks
The Average Price per Gallon of Gasoline	\$ 3.000	n/a				
Average Off-Peak Cost per kWh of Electricity	For EVs only	\$ 0.080				
Calculated Fuel Cost / Mile	\$ 0.125	\$ 0.018	15%	EV-to-Gas cost ratio		
The Average Annual Energy Inflation Rate	4.0%	4.0%				
The Average Hours the EV will be Plugged in Per Day	For EVs only	16				
EV Estimated Watt Hour/Mile (Wh/mile) allows for 9% charging losses	For EVs only	227.5				
The Estimated Battery Pack Life in Years	For EVs only	10				
Battery Storage (kWh)	For EVs only	25				
Net Battery Storage (kWh) (85% Depth of Discharge)	For EVs only	21.3				
Battery charger throughput in KW:	For EVs only	3.3				
Number of EVs to make up 1 Mega Watt-Hour (if 100% available)	For EVs only	303				
Estimated 10-year battery replacement costper kWh:	For EVs only	\$ 300				
Total estimated 10-year battery pack replacement Cost	For EVs only	\$ 7,500				

Green House Gases Emissions: 6.7 1.2 Tons per year

**Maintenance Costs per Mile:**

Est. Cost Per Service:	Miles Per Service:	Gas Cost/Mile	Electric Cost/Mile:	
\$ 30	3,500	\$ 0.009	n/a	Oil Changes
\$ 550	65,000	\$ 0.008	n/a	Brakes (Gas)
\$ 550	130,000	n/a	\$ 0.004	Brakes (EV)*
\$ 300	50,000	\$ 0.006	n/a	Tune-Ups
\$ 250	50,000	\$ 0.005	n/a	Transmission
\$ 2,000	100,000	\$ 0.020	n/a	Belts, Hoses, etc.
\$ 7,500	130,000	n/a	\$ 0.058	Batteries
Fuel per mile from above:		\$ 0.125	\$ 0.018	
<b>TOTAL COST PER MILE:</b>		<b>\$ 0.173</b>	<b>\$ 0.080</b>	

\* Due to regenerative braking in EV, longer brake life.

**Maintenance Costs per Year based on:**

Gas Powered:	Electric:	
\$ 111	n/a	Oil Changes
\$ 110	n/a	Brakes (Gas)
n/a	\$ 55	Brakes (EV)*
\$ 78	n/a	Tune-Ups
\$ 65	n/a	Transmission
\$ 260	n/a	Belts, Hoses, etc.
n/a	\$ 750	Battery Pack (10% / year)
see below	see below	Fuel costs
<b>\$ 624</b>	<b>\$ 805</b>	<b>PER YEAR</b>

**13000 miles / year:**

Lifetime Costs:
\$ 1,114
\$ 1,100
\$ 550
\$ 780
\$ 650
\$ 2,600
\$ 7,500

**Monthly Cash Flow Analysis:**

	Gas Powered:	Electric:
Cost of the vehicles:	\$ 16,640	\$ 32,700
(Down payment 5%)	\$ 832	\$ 1,635
Net Loan (less 5% down):	\$ 15,808	\$ 31,065
Payment 72 months & 6% interest rate:	\$ 262	\$ 515
Average Fuel Savings per month:	none	\$ (139)
Net Payment (Income) per month:	\$ 262	\$ 376

**Ten-Year Analysis:**

		Vehicle Cost:	\$ 16,640	\$ 32,700				
		(Federal / State Tax Credit):	none					
(Inflation Adjusted \$)		Annual Fuel Costs		Cumulative Costs		Cumulative Miles	Year	Annual Fuel Savings Electric vs. Gas
Elect. / kWh	Gas / Gal.	Electric cost:	Gasoline cost:	Gas Powered:	Electric:			
\$ 0.080	\$ 3.000	\$ 237	\$ 1,625	\$ 18,889	\$ 33,742	13,000	1	\$ 1,388
\$ 0.083	\$ 3.120	\$ 246	\$ 1,690	\$ 21,204	\$ 34,793	26,000	2	\$ 1,444
\$ 0.087	\$ 3.245	\$ 256	\$ 1,758	\$ 23,586	\$ 35,854	39,000	3	\$ 1,502
\$ 0.090	\$ 3.375	\$ 266	\$ 1,828	\$ 26,038	\$ 36,925	52,000	4	\$ 1,562
\$ 0.094	\$ 3.510	\$ 277	\$ 1,901	\$ 28,564	\$ 38,007	65,000	5	\$ 1,624
\$ 0.097	\$ 3.650	\$ 288	\$ 1,977	\$ 31,165	\$ 39,099	78,000	6	\$ 1,689
\$ 0.101	\$ 3.796	\$ 299	\$ 2,056	\$ 33,846	\$ 40,204	91,000	7	\$ 1,757
\$ 0.105	\$ 3.948	\$ 311	\$ 2,138	\$ 36,609	\$ 41,320	104,000	8	\$ 1,827
\$ 0.109	\$ 4.106	\$ 324	\$ 2,224	\$ 39,457	\$ 42,449	117,000	9	\$ 1,900
\$ 0.114	\$ 4.270	\$ 337	\$ 2,313	\$ 42,394	\$ 43,591	130,000	10	\$ 1,976
								<b>\$ 16,669</b>

**Ten-Year Cumulative Savings - Electric vs. Gas: \$ (1,196)**

Green shading in ten-year analysis indicates break even point (EV has lower accumulated total cost than Gas powered).

**Electric Vehicle (EV) and Vehicle-To-Grid (V2G) Analysis**

ICC DKT. NO. 10-0527  
Modified DLH 2.04\_Attach 06  
Nissan Leaf vs. Ford Focus

**10-Year Gas-Powered to Electric-Powered Car Analysis**

	Gas (Ford Focus)	Electric (Nissan Leaf)				
Estimated Retail Total Delivered Cost:	\$ 18,821	\$ 47,161				
EV Range in miles:	288	93	Weekly:	Days:	Daily:	Estimated -
Gas-powered vehicle average MPG:	24	n/a	250	5	50	Weekday
The Average Miles Driven per day (based on details to right):	35	35	0	2	0	Weekend
The Average Miles Driven /Year	13,000	13,000	250	7	13,000	X 52 weeks
The Average Price per Gallon of Gasoline	\$ 3.000	n/a				
Average Off-Peak Cost per kWh of Electricity	For EVs only	\$ 0.080				
Calculated Fuel Cost / Mile	\$ 0.125	\$ 0.018	15%	EV-to-Gas cost ratio		
The Average Annual Energy Inflation Rate	4.0%	4.0%				
The Average Hours the EV will be Plugged in Per Day	For EVs only	16				
EV Estimated Watt Hour/Mile (Wh/mile) allows for 9% charging losses	For EVs only	227.5				
The Estimated Battery Pack Life in Years	For EVs only	10				
Battery Storage (kWh)	For EVs only	25				
Net Battery Storage (kWh) (85% Depth of Discharge)	For EVs only	21.3				
Battery charger throughput in KW:	For EVs only	3.3				
Number of EVs to make up 1 Mega Watt-Hour (if 100% available)	For EVs only	303				
Estimated 10-year battery replacement costper kWh:	For EVs only	\$ 300				
Total estimated 10-year battery pack replacement Cost	For EVs only	\$ 7,500				

Green House Gases Emissions: 6.7 1.2 Tons per year

**Maintenance Costs per Mile:**

Est. Cost Per Service:	Miles Per Service:	Gas Cost/Mile	Electric Cost/Mile:	
\$ 30	3,500	\$ 0.009	n/a	Oil Changes
\$ 550	65,000	\$ 0.008	n/a	Brakes (Gas)
\$ 550	130,000	n/a	\$ 0.004	Brakes (EV)*
\$ 300	50,000	\$ 0.006	n/a	Tune-Ups
\$ 250	50,000	\$ 0.005	n/a	Transmission
\$ 2,000	100,000	\$ 0.020	n/a	Belts, Hoses, etc.
\$ 7,500	130,000	n/a	\$ 0.058	Batteries
Fuel per mile from above:		\$ 0.125	\$ 0.018	
<b>TOTAL COST PER MILE:</b>		<b>\$ 0.173</b>	<b>\$ 0.080</b>	

\* Due to regenerative braking in EV, longer brake life.

**Maintenance Costs per Year based on:**

Gas Powered:	Electric:	
\$ 111	n/a	Oil Changes
\$ 110	n/a	Brakes (Gas)
n/a	\$ 55	Brakes (EV)*
\$ 78	n/a	Tune-Ups
\$ 65	n/a	Transmission
\$ 260	n/a	Belts, Hoses, etc.
n/a	\$ 750	Battery Pack (10% / year)
see below	see below	Fuel costs
<b>\$ 624</b>	<b>\$ 805</b>	<b>PER YEAR</b>

**13000 miles / year:**

Lifetime Costs:
\$ 1,114
\$ 1,100
\$ 550
\$ 780
\$ 650
\$ 2,600
\$ 7,500

**Monthly Cash Flow Analysis:**

	Gas Powered:	Electric:
Cost of the vehicles:	\$ 18,821	\$ 47,161
(Down payment 5%)	\$ 941	\$ 2,358
Net Loan (less 5% down):	\$ 17,880	\$ 44,803
Payment 72 months & 6% interest rate:	\$ 296	\$ 743
Average Fuel Savings per month:	none	\$ (139)
Net Payment (Income) per month:	\$ 296	\$ 604

**Ten-Year Analysis:**

		Vehicle Cost:	\$ 18,821	\$ 47,161				
		(Federal / State Tax Credit):	none					
(Inflation Adjusted \$)		Annual Fuel Costs		Cumulative Costs		Cumulative Miles	Year	Annual Fuel Savings Electric vs. Gas
Elect. / kWh	Gas / Gal.	Electric cost:	Gasoline cost:	Gas Powered:	Electric:			
\$ 0.080	\$ 3.000	\$ 237	\$ 1,625	\$ 21,070	\$ 48,203	13,000	1	\$ 1,388
\$ 0.083	\$ 3.120	\$ 246	\$ 1,690	\$ 23,385	\$ 49,254	26,000	2	\$ 1,444
\$ 0.087	\$ 3.245	\$ 256	\$ 1,758	\$ 25,767	\$ 50,315	39,000	3	\$ 1,502
\$ 0.090	\$ 3.375	\$ 266	\$ 1,828	\$ 28,219	\$ 51,386	52,000	4	\$ 1,562
\$ 0.094	\$ 3.510	\$ 277	\$ 1,901	\$ 30,745	\$ 52,468	65,000	5	\$ 1,624
\$ 0.097	\$ 3.650	\$ 288	\$ 1,977	\$ 33,346	\$ 53,560	78,000	6	\$ 1,689
\$ 0.101	\$ 3.796	\$ 299	\$ 2,056	\$ 36,027	\$ 54,665	91,000	7	\$ 1,757
\$ 0.105	\$ 3.948	\$ 311	\$ 2,138	\$ 38,790	\$ 55,781	104,000	8	\$ 1,827
\$ 0.109	\$ 4.106	\$ 324	\$ 2,224	\$ 41,638	\$ 56,910	117,000	9	\$ 1,900
\$ 0.114	\$ 4.270	\$ 337	\$ 2,313	\$ 44,575	\$ 58,052	130,000	10	\$ 1,976
								<b>\$ 16,669</b>

**Ten-Year Cumulative Savings - Electric vs. Gas: \$ (13,476)**

Green shading in ten-year analysis indicates break even point (EV has lower accumulated total cost than Gas powered).

**ICC Docket No. 10-0527**

**Commonwealth Edison Company's Response to  
Illinois Commerce Commission ("STAFF") Data Requests**

**DTR 1.01- 1.34**

**Date Received: September 23, 2010**

**Date Served: October 6, 2010**

**REQUEST NO. DTR 1.17:**

Please refer to ComEd Ex. 1.0 at page 12, lines 245-246. Please describe the EV Pilot budget in detail.

**RESPONSE:**

Please refer to the attachment labeled as DTR 1.17\_Attach 1 for the break out of ComEd's EV Pilot Program.

**ICC Dkt. No. 10-0527**  
**DTR 1.17\_Attach 1**  
**Summary**

<b>ComEd EV Pilot Program Assets</b>	<b>Unit Cost</b>	<b>Quantity</b>	<b>Total ComEd Cost</b>
Plug-in car	\$ 36,000	45	\$ 1,620,000
Plug-in cargo/service vehicle	\$ 135,000	8	\$ 1,080,000
Hybrid bucket truck (non-pluggable)	\$ 250,000	4	\$ 1,000,000
PHEV digger-derrick	\$ 350,000	2	\$ 700,000
Level 2 charging stations for company vehicles	\$ 10,000	55	\$ 550,000
Incidental equipment and contingency	\$ 50,000		\$ 50,000
<b>Total Vehicles:</b>		<b>59</b>	
<b>Total Charging Stations:</b>		<b>55</b>	
<b>Total EV Pilot Program Investment:</b>			<b>\$ 5,000,000</b>

<b>MONTH/YEAR</b>	<b>ITEM</b>	<b>QUANTITY</b>	<b>COST</b>	<b>ITEM</b>	<b>QUANTITY</b>	<b>COST</b>	<b>Total</b>
Jun-11							-
Jul-11							-
Aug-11	Charging Station	15	10,000				150,000
Sep-11	Charging Station	15	10,000				150,000
Oct-11	Charging Station	15	10,000				150,000
Nov-11	Charging Station	10	10,000				100,000
Dec-11				Plug-in Cargo/Service Vehicle	2	135,000	270,000
Jan-12	Plug-in Car	10	36,000	Plug-in Cargo/Service Vehicle	4	135,000	900,000
Feb-12	Plug-in Car	10	36,000	Plug-in Cargo/Service Vehicle	2	135,000	630,000
Mar-12	Plug-in Car	10	36,000	Hybrid Bucket Truck	2	250,000	860,000
Apr-12	Plug-in Car	10	36,000	Hybrid Bucket Truck	2	250,000	860,000
May-12	Plug-in Car	5	36,000	PHEV Digger Derrick	2	350,000	880,000
							<b>4,950,000</b>

**ICC Dkt. No. 10-0527**  
**DTR 1.17\_Attach 1**  
**Cost Estimates**

Vehicle Costs			
	Cost p.u.	Quantity	Total Cost
<b>Plug-in Car</b>			
Price based on Nissan Leaf cost estimate	\$ 36,000	45	\$ 1,620,000
<b>Plug-in Cargo/Service Vehicle</b>			
Price based on Navistar eStar cost estimate	\$ 135,000	8	\$ 1,080,000
<b>Hybrid Bucket Truck (non-p;uggable)</b>			
Price based on existing cost for hybrid bucket truck	\$ 250,000	4	\$ 1,000,000
<b>PHEV Digger Derrick Truck</b>			
Price based on cost of Dueco PHEV digger derrick	\$ 350,000	2	\$ 700,000
			<b>Total Cost</b>
<b>TOTAL VEHICLE COSTS</b>		<b>59</b>	<b>\$ 4,400,000</b>
Charging Infrastructure Costs			
<b>Level 2 Charging Station</b>	<b>Cost p.u.</b>		
Coulomb Technologies Smart Charging station	\$ 5,000		
Installation (labor, material)	\$ 5,000		
Total equipment costs per charge point	\$ 10,000		
		<b>Quantity</b>	<b>Total Cost</b>
<b>Charging Stations for ComEd plug-in vehicles</b>		<b>55</b>	<b>\$ 550,000</b>
<b>Incidental equipment and contingency</b>			<b>\$ 50,000</b>
Contingency for unforeseen installation costs			
			<b>Total Cost</b>
<b>TOTAL PROJECT COSTS</b>			<b>\$ 5,000,000</b>

**ICC Docket No. 10-0527**

**Commonwealth Edison Company's Response to  
Illinois Commerce Commission ("STAFF") Data Requests**

**DTR 1.01- 1.34**

**Date Received: September 23, 2010**

**Date Served: October 6, 2010**

**REQUEST NO. DTR 1.20:**

Please refer to ComEd Ex. 1.0 at page 12, lines 257-259. Please provide all analysis and supporting workpapers that support the statement that EVs "could be least cost in the long run."

**RESPONSE:**

Analyses vary with respect to whether or not plug-in electric provide a lower cost of ownership over the entire life cycle of the vehicle, and are dependent on many factors such as battery size and cost, assumed vehicle and battery life, EV type (PHEV, EREV, BEV) and petroleum costs.

One analysis tool that suggests overall cost may be lower is an Electric vs. Gas Vehicle comparison worksheet developed by the University of Delaware. Refer to the attachment labeled as DTR 1.20\_Attach 1 for an analysis of the total life cycle costs for a Nissan Leaf EV vs. a Ford Focus gasoline vehicle, based on the model developed by the University of Delaware. The model can be found at the following link: [http://www.udel.edu/V2G/page13/files/page13\\_2.xls](http://www.udel.edu/V2G/page13/files/page13_2.xls)

Other reports indicate that the total ownership cost of EVs may be higher over the life of the vehicle. One such report is the "Economics of Plug-In Hybrid Electric Vehicles" by the U.S. Energy Information Administration. The report can be found at the following link: [http://www.eia.doe.gov/oiaf/aeo/otheranalysis/aeo\\_2009analysispapers/ephev.html](http://www.eia.doe.gov/oiaf/aeo/otheranalysis/aeo_2009analysispapers/ephev.html)

Part of the value of ComEd's EV pilot program will be an analysis of the true life cycle costs of EV ownership compared with that of similar internal combustion engine vehicles.

Electric Vehicle (EV) and Vehicle-To-Grid (V2G) Analysis

10-Year Gas-Powered to Electric-Powered Car Analysis

	Gas (Ford Focus)	Electric (Nissan Leaf)				
Estimated Retail Total Delivered Cost:	\$ 16,640	\$ 32,700				
EV Range in miles:	288	93	Weekly:	Days:	Daily:	Estimated -
Gas-powered vehicle average MPG:	24	n/a		250	5	50 Weekday
The Average Miles Driven per day (based on details to right):	35	35		0	2	0 Weekend
The Average Miles Driven /Year	13,000	13,000		250	7	13,000 X 52 weeks
The Average Price per Gallon of Gasoline	\$ 3.000	n/a				
Average Off-Peak Cost per kWh of Electricity	For EVs only \$ 0.080					
Calculated Fuel Cost / Mile	\$ 0.125	\$ 0.018	15%	EV-to-Gas cost ratio		
The Average Annual Energy Inflation Rate	4.0%	4.0%				
The Average Hours the EV will be Plugged in Per Day	For EVs only	16				
EV Estimated Watt Hour/Mile (Wh/mile) allows for 9% charging losses	For EVs only	227.5				
The Estimated Battery Pack Life in Years	For EVs only	10				
Battery Storage (kWh)	For EVs only	25				
Net Battery Storage (kWh) (85% Depth of Discharge)	For EVs only	21.3				
Battery charger throughput in KW:	For EVs only	3.3				
Number of EVs to make up 1 Mega Watt-Hour (if 100% available)	For EVs only	303				
Estimated 10-year battery replacement costper kWh:	For EVs only	\$ 300				
Total estimated 10-year battery pack replacement Cost	For EVs only	\$ 7,500				

Green House Gases Emissions: 6.7 1.2 Tons per year

Maintenance Costs per Mile:

Est. Cost Per Service:	Miles Per Service:	Gas Cost/Mile:	Electric Cost/Mile:	
\$ 30	3,500	\$ 0.009	n/a	Oil Changes
\$ 550	65,000	\$ 0.008	n/a	Brakes (Gas)
\$ 550	130,000	n/a	\$ 0.004	Brakes (EV)*
\$ 300	50,000	\$ 0.006	n/a	Tune-Ups
\$ 250	50,000	\$ 0.005	n/a	Transmission
\$ 2,000	100,000	\$ 0.020	n/a	Belts, Hoses, etc.
\$ 7,500	130,000	n/a	\$ 0.058	Batteries
Fuel per mile from above:		\$ 0.125	\$ 0.018	
<b>TOTAL COST PER MILE:</b>		<b>\$ 0.173</b>	<b>\$ 0.080</b>	

\* Due to regenerative braking in EV, longer brake life.

Maintenance Costs per Year based on:

Gas Powered:	Electric:	
\$ 111	n/a	Oil Changes
\$ 110	n/a	Brakes (Gas)
n/a	\$ 55	Brakes (EV)*
\$ 78	n/a	Tune-Ups
\$ 65	n/a	Transmission
\$ 260	n/a	Belts, Hoses, etc.
n/a	\$ 750	Battery Pack (10% / year)
see below	see below	Fuel costs
<b>\$ 624</b>	<b>\$ 805</b>	<b>PER YEAR</b>

Monthly Cash Flow Analysis:

	Gas Powered:	Electric:
Cost of the vehicles:	\$ 16,640	\$ 32,700
(Down payment 5%)	\$ 832	\$ 1,635
Net Loan (less 5% down):	\$ 15,808	\$ 31,065
Payment 72 months & 6% interest rate:	\$ 262	\$ 515
Average Fuel Savings per month:	none	\$ (139)
Net Payment (Income) per month:	\$ 262	\$ 376

Ten-Year Analysis:

		Vehicle Cost:		\$ 16,640	\$ 32,700				
		(Federal / State Tax Credit):		none	\$ (7,500)				
(Inflation Adjusted \$)		Annual Fuel Costs		Cumulative Costs		Cumulative Miles	Year	Annual Fuel Savings Electric vs. Gas	
Elect. / kWh	Gas / Gal.	Electric cost:	Gasoline cost:	Gas Powered:	Electric:				
\$ 0.080	\$ 3.000	\$ 237	\$ 1,625	\$ 18,889	\$ 26,242	13,000	1	\$	1,388
\$ 0.083	\$ 3.120	\$ 246	\$ 1,690	\$ 21,204	\$ 27,293	26,000	2	\$	1,444
\$ 0.087	\$ 3.245	\$ 256	\$ 1,758	\$ 23,586	\$ 28,354	39,000	3	\$	1,502
\$ 0.090	\$ 3.375	\$ 266	\$ 1,828	\$ 26,038	\$ 29,425	52,000	4	\$	1,562
\$ 0.094	\$ 3.510	\$ 277	\$ 1,901	\$ 28,564	\$ 30,507	65,000	5	\$	1,624
\$ 0.097	\$ 3.650	\$ 288	\$ 1,977	\$ 31,165	\$ 31,599	78,000	6	\$	1,689
\$ 0.101	\$ 3.796	\$ 299	\$ 2,056	\$ 33,846	\$ 32,704	91,000	7	\$	1,757
\$ 0.105	\$ 3.948	\$ 311	\$ 2,138	\$ 36,609	\$ 33,820	104,000	8	\$	1,827
\$ 0.109	\$ 4.106	\$ 324	\$ 2,224	\$ 39,457	\$ 34,949	117,000	9	\$	1,900
\$ 0.114	\$ 4.270	\$ 337	\$ 2,313	\$ 42,394	\$ 36,091	130,000	10	\$	1,976
								\$	16,669

Ten-Year Cumulative Savings - Electric vs. Gas: \$ 6,304

Green shading in ten-year analysis indicates break even point (EV has lower accumulated total cost than Gas powered).