

## Linking Electricity to Transportation

Electric Transportation Quarterly Reports – Second and Third Quarter 2006

## **SUMMARY**

Our year end Advisory meeting was held September 26-27, 2006 in Knoxville, TN. We had an excellent 2 days of information sharing and strategy discussions. Within our 2 days, we had a guest speaker from Set America Free, Ms. Anne Korin. Set America Free was created to help overcome the issues of U.S. oil dependence. They have developed a "blueprint" for U.S. Energy Security and are taking it to the federal level. Within this blueprint, Plug-in Hybrid Electric Vehicles (PHEVs) stand out as a technology that is the long haul solution to our oil independence.

We also spent a lot of time discussing EPRI's Non-road program. The non-road electric technologies are maturing at a fast rate, and we think it is imperative to continue focus and emphasis the non-road electric applications. We plan to continue to educate utility management of the benefits of these technologies from emissions reductions to economic savings; all of which come with electrification. We have a strong program for 2006, and will continue to add research and activities into 2007.

## 2006 PROJECTS

## **18 A - Advanced Electric Drive Research and Prototype** Development

## 18.001 – PHEV - Automotive Platform - System Design & Modeling

EPRI worked with our automotive and utility partners to create a unified PHEV definition, which has helped to shape the discussions in government and industry surrounding plug-in technology. EPRI has increased its capability to model current and emerging commercial HEVs to allow the development of an Automotive System Specification to continue this discussion towards concrete implementations.

## **18.002 - PHEV System Analysis with Advanced Diesel Engine** Technology

EPRI has identified and contracted with the University of Applied Science in Esslingen, Germany, to begin an analysis, which will examine the characteristics and impacts of a PHEV architecture on both diesel and alternative fuel engines. This work is nearing completion, and is demonstrating the value of increased hybridization to both emissions and energy economy.

#### 18.003 - Optimization of PHEV Energy Management to Minimize CO2-Phase 1 System Specification

This work has started internally with the development of an operating profile to support the NRDC study and is on schedule.

## 18.004 – PHEV Prototype Data Collection and Analysis - 30 PHEV Sprinter/Service Truck

Three of the four PHEV Sprinters slated for the U.S. have entered U.S. fleet testing. The fourth is in the midst of a three-month demo program with FedEx in Paris and will be shipped to New York after completing this program. EPRI has designed and installed a custom Data Logging Module (DLM) on each of the four Phase 1 Sprinter vehicles and has been working with DaimlerChrysler to calibrate these systems and on identifying, filtering and storing the desired vehicle operating data. EPRI will store, process, and analyze this data for DaimlerChrysler and provide results to the members on a regular basis during these three-year demonstrations.

## **18 B - Electric Drive Expansion Opportunities**

Within our Non-road project set, we have had a lot of movement in Q2 and Q3. Also, October 10-11 we held our annual Non-road Advisory meeting in Seattle, WA. This meeting included a tour of the Port of Seattle to view their shore power capabilities and to view port operations while a ship was docked. The day included presentations and round table discussions on: Electric GSE, Truck Stop Electrification, Truck Refrigeration Unit Electrification, Lift Tuck Electrification, Environmental Aspect, Port Electrification, Material Handling Electrification and Demand Response Battery Testing. More information will follow in the next quarterly report.



Photo 1: Seattle Skyline from the Port of Seattle. Credits: Bob Hawkins

## 18.006 – Airport Electrification

After our Airport Advisory meeting in Las Vegas March 27, 2006, we left with great feedback on how Airlines were able to save money and efficiency by going electric. Continental Airlines is one who has seen great success, and whom we've recently conducted a case study on to review their operation and formula for success. This will be available in Q4 2006.

The next Airport Advisory meeting will again be held in conjunction with the GSE Expo in a new rotating East-West location, on March 20-22, 2007 at the Orange County Convention Center in Orlando, FL. For more information on the GSE Expo, please visit: www.aviationindustryweek.com.

## 18.007 - Seaport Electrification

We continue our monthly conference calls to share information on happenings across the nation within electrification and our Ports. We hope to continue to build relationships with at least one Port in each member's service territory to define and create a plan for electrification. If you would like to participate in the monthly conference calls, please contact Andra Rogers (arogers@epri.com). The 1 hour conference calls are held on the first Monday of the month.

Our task for 2006 is to collaborate and create multiple projects within our Advisors service territory that would show the value and benefits of electrifying activities within the Ports. To date, here is the status of these efforts:

- Texas (Galveston): Electric Lift Truck Demonstration Started. This demonstration is to demonstrate 4 electric lift trucks (versus propane trucks) within an enclosed area within the Cruise Terminal at the Port of Galveston. The demonstration will last 4 months with different operating scenarios to determine the most efficient operation. We have installed one AeroVironment Posicharge MVS 400 (multi-vehicle system) at the Cruise Port of Galveston. The MVS 400 draws 56 amps at 480 volts, and has the capacity to charge 4 fork trucks simultaneously. We have rented (4) 5,000 pound counterbalance lift trucks from Hyster with 48 volt 680 Amp hour batteries. The batteries are smaller then what is normal for that truck, and we could put larger batteries in the truck if we need to. With the smaller batteries, the lift's true capacity is only 4,700 pounds, but the management at the port suggests that 4,700 pounds is more than enough to handle the loads they will face at the cruise terminal.
- 2. California (Long Beach): Plug-in Hybrid Yard Hostler Development and Demonstration Awaiting approval to start. We plan to assess the Yard Hostler equipment and determine if a Plug-in configuration would provide additional benefit. If this assessment is positive, we would like to develop 1 prototype and demonstrate next to a hybrid configuration, which is planned to be demonstrated in the next few months.
- 3. Alabama (Mobile): Truck Stop Electrification (TSE) *Scope completed, awaiting additional information to determine electrification technology and gain approvals. We would like to do a baseline to quantify the actual idling time prior to determining the electrification technology that would best fit this scenario.*
- 4. California (Los Angeles): Feasibility study of Land Side Electrification *Started. We have access to a detailed equipment inventory and will begin analysis on the potential and expected benefits of land-side electrification. A meeting is planned for EPRI to visit the Port of Los Angeles on November 8, 2006.*
- 5. New York (Red Hook Container Terminal): Yard Hostler Active Diesel Particulate Filter (DPF) Demonstration *Started*.
- 6. Ohio (Toledo) *TBD*.

In addition, to the activities above, EPRI plans to highlight the environmental and electrification strategies used (including shore power), at the Ports of Seattle and Houston, through two case studies planned to begin in Q4 2006.

The annual conference "Faster Freight, Cleaner Air: A Summit on North American Goods Movement and Air Quality" is now open for early registration. The 3-day conference expo will be held at the Long Beach Convention Center on February 26-28, 2007. It will highlight the innovative programs, policies and technologies now being implemented in ports around the nation to improve efficiency and reduce air emissions. Additional information can be seen here: http://www.ffca2007.com/

## **18 C - Environmental Value of Electric Transportation**

# 18.008 – Economic Analysis of the Environmental Benefits of EVs to communities

The development of a model for forecasting the economic value of emissions reductions to a region (in this case, the five-county Greater Cleveland Area) has been completed. EPRI will provide emissions reductions figures for this model from the NRDC study project in early November and the technical update is schedule for on-time completion by the end of the year.

## 18.010 – Greenhouse Gas and Energy Consumption impact of PHEVs

The initial draft results of this study were concurrently presented at the EPRI Advisory Meeting in Knoxville and at the ZEV Technology Symposium as part of the PHEV Technology Session organized by EPRI (both events were September 26-27). EPRI is completing the final modeling now and the final report is on schedule for delivery January 31, 2007.

# 18.011 - Emissions credits for On and Non-Road Electric drive vehicles: Business case

This work has begun with the objective to research the current mobile emissions reduction credits (MERCs) programs and develop strategies for them to be more useful and user friendly. The research will include:

- Overview of emissions reduction credit programs and the challenges for mobile ERCs
- Identification of attributes for successful MERC implementation
- Developing a strategic plan for EPRI members

The recommendations will highlight program attributes specific to electric transportation technologies that could lead to MERC program success. Similarly, the recommendations will identify policy actions that may be needed to allow electric transportation to participate in MERC programs in the future.

## **18 D - Electric Transportation Infrastructure Advancement**

## 18.012 - Infrastructure Working Council

The second IWC meeting was held at New York Power Authority (NYPA) headquarters in New York on June 13-15, 2006. The following meetings were held:

- June 13 the TSE Code Revision Task Force (9 am 5 pm);
- June 14 is the TSE Committee (11 am 5 pm); and
- June 15 is the IWC-HEVWG (8 am 12 pm), and ISC (1 pm 3 pm) meetings.

The last IWC meeting was held October 10-12, 2006, in Palo Alto, CA. More information will follow in the next quarterly report. For more information or the minutes, please contact Andra Rogers (arogers@epri.com).

## Deliverables completed in Q2-Q3 2006

Product ID	Product Name	<u>Available</u>	Product Type
1013648	Diesel Engine Idle Reduction in Class 8 Trucks Using On-Vehicle Equipment with Optional Shore Power	08/31/2006	Tech Update 4- Tech Issue
1013691	Electric Transportation: An Environmental Positive	08/07/2006	Fact Sheets
1014348	Driving Environmental and Strategic Benefits to Electric Companies With Electric Transportation	08/07/2006	Supplemental Project
1013701	Energy Efficiency Reference Guide - Residential	06/28/2006	Supplemental Project
1013332	Terminal and Gate Electrical Infrastructure Assessment at San Francisco International Airport	06/13/2006	Technical Report
1013285	Electrifying Transportation	06/08/2006	Fact Sheets
1013300	Electric Transportation Quarterly Report - March 2006	04/28/2006	Tech Update 5- Newsletter
E223900	Public Policy and Industry Meeting at Electric Drive Transportation Association (EDTA)	06/07/2006	Meeting
E223896	Airport Electrification Industry Advisory	03/27/2006	Meeting

## **Additional Efforts**

## A123 Battery Testing

A123 has shipped the first battery modules to Southern California Edison (SCE), who will begin testing them as soon as possible.

## Plug-In Hybrid Electric Utility Trouble Truck with Eaton

Eaton and Eaton have completed the full development proposal for the Ford F550 PHEV Trouble Truck and have identified the first phase of activities—development and engineering of both gasoline and diesel PHEV powertrains, vehicle integration, and construction of the first prototype. EPRI is executing a contract with Eaton for the first phase. We are seeking additional partners on this project, more information can be found here: <u>http://www.epriweb.com/public/0000000001014431.pdf</u>.

## NRDC Study – Environmental Impacts of Electric Transportation

This is a cross-sector effort between Electric Transportation and EPRI's Environment and Climate Change sector to quantify the two primary environmental impacts of electric transportation—air quality and climate change. There are two study components. The first is a nationwide analysis of net CO2 emissions from PHEVs in a 2010 to 2050 timeframe. The second is a detailed study of PHEV impacts on air quality, conducted nationwide using a coarse grid of 36 km and then a finer grid of 12 km for California and Ohio. EPRI has contracted with Charles Rivers Associates, Intl for the power plant dispatch modeling and emissions and with Environ for the transportation sector emissions and the overall air quality analysis. Modeling is currently underway for both a base case and high PHEV penetration case for the year 2030. We are seeking additional partners on this project, more information can be found here: <a href="http://www.epriweb.com/public/00000000001014348.pdf">http://www.epriweb.com/public/00000000001014348.pdf</a>.

#### **EPRI** Advisory meeting

The last Advisory meeting of 2006 was held on September 26-27 in Knoxville, TN. For two days the EPRI Electric Transportation Advisors and EPRI staff discussed and collaborated on 2006 projects and the direction for 2007 and beyond. The minutes and presentations are available; please contact Andra Rogers (arogers@epri.com) for this information.

#### **EPRI Web - updates**

Please visit <u>www.epri.com/et</u> for details specific to Electric Transportation. This website is open to the public and contains downloadable documents and contact information.

#### **PG&E joins Plug-in Partners**

Pacific Gas and Electric Co. recently joined Plug-in Partners, and are asking its 5.1 million customers to petition automakers to speed up development of plug-in electric-gasoline hybrid vehicles. This insert went out in their September 2006 bill, see below:

# Imagine driving to work every day with the needle never moving.



Find out why PG&E supports the Plug-In Partners program. This national grassroots initiative demonstrates to automakers that a market for Plug-In Hybrid Electric Vehicles exists *now* if they make them available.

Turn over to see how you can support this energy-saving initialive...



#### The Plug-In Hybrid can save you big money at the pump and help save our environment.

Imagine plugging your car into a standard electric socket in the evening, then driving to work or on errands the next morning without using a drop of gas. Plug-In Hybrid Electric Vehicles significantly reduce gasoline consumption, and they cut greenhouse gas emissions and other pollutants to help our environment.

#### PG&E uses low-emission technology now.

We operate the largest low-emission vehicle utility fleet in the U.S. In 2005, this saved half-a-million gallons of petroleum. It also kept 19 tons of nitrogen oxide and 832 tons of carbon dioxide out of the environment.

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Help us support Plug-Ins. As an official Plug-In Partner, we've pledged to automakers that we would buy

Plug-in Hybrids to make our vehicle fleet even cleaner. Become a Plug-In Partner, too, and make a difference. Go to www.pluginpartners.org and sign the online petition asking automakers to make Plug-in Hybrids.



#### THREE KEY FACTS

- Half the cars on U.S. roads are driven 25 miles a day or less. Plug-In Hybrids can eliminate gasoline use in the daily commutes of tens of millions of Americans. Source: EPRI (Electric Power Research Institute).
- The technology has been demonstrated at UC Davis Hybrid Center.
- Battery technology is advancing rapidly with costs expected to decrease.

## **Upcoming Events**

Date	Time	Title	Location	Contact
12/04/06	12pm PST	Port Electrification Conference	888-225-4119 – Pin 8483	Andra
	2pm CST	Call		
	3pm EST			
02/13/07 -	8 am to	EPRI Advisory Meeting	Renaissance Parc 55 Hotel	Karen
02/14/07	4pm		55 Cyril Magnin Street	
			San Francisco, CA 94102	
			http://www.parc55hotel.com/	

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Together...Shaping the Future of Electricity

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