AGENDA

<table>
<thead>
<tr>
<th>1:00 pm – 6:00 pm Meeting</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Topic</strong></td>
</tr>
<tr>
<td>1) Welcome and Introductions</td>
</tr>
<tr>
<td>2) Review and Approval of Past Minutes and Action Items</td>
</tr>
<tr>
<td>3) Mission Statement Review</td>
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<tr>
<td>Port Electrification (PE)</td>
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<tr>
<td>4) IEC TAG 18/IEEE P1713 Update</td>
</tr>
<tr>
<td>5) MT 23H HVSC Connectors Update</td>
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<tr>
<td>6) EPRI PORTES Update</td>
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<tr>
<td>Truck Stop Electrification (TSE)</td>
</tr>
<tr>
<td>5) IdleAire Updates (Invited)</td>
</tr>
<tr>
<td>6) ShorePower Updates (Invited)</td>
</tr>
<tr>
<td>7) CabAire (Invited)</td>
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<tr>
<td>8) NEC changes for Electrified Parking Spaces</td>
</tr>
<tr>
<td>9) Rail yard emissions reduction briefing</td>
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<tr>
<td>10) Recommended Infrastructure Guidelines for cities and decision makers</td>
</tr>
<tr>
<td>11) Impact of PEVs on Electric Utility</td>
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<tr>
<td>12) EV Infrastructure Deployment: ETEC</td>
</tr>
<tr>
<td>12) Discussion: Future direction, topics and guests</td>
</tr>
<tr>
<td>13) Summary of Action Items/Adjourn</td>
</tr>
</tbody>
</table>

Adjourn

CARB - MLD Conference Center
Sacramento, CA

Transportation Electrification Committee Meeting Minutes (#09-3)

June 3, 2009
Detroit, MI

Welcome and Introductions

Brian Sisco, chair, and Andra Rogers, EPRI, welcomed the participants (see Attachment). Elsie Keddie, Manager of the ZEV Implementation Section of California Air Resources Board, also welcomed the participants to the CARB conference center. The agenda was modified to include a presentation by ETEC.
Review and Approval of Past Minutes and Action Items

The group approved the minutes (#09-2) of the previous meeting (June 3, 2009) in Detroit MI. The status of action items from the previous meeting is shown below.

### Action Items: June 3, 2009 (Detroit) Meeting

<table>
<thead>
<tr>
<th>#</th>
<th>ACTION ITEM</th>
<th>STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Jose Salazar and the Task Force will develop a recommended outline of information regarding EV charging infrastructure for cities and other decision makers.</td>
<td>Presented at this meeting</td>
</tr>
<tr>
<td>2</td>
<td>Mark Duvall will invite Navistar to the next meeting.</td>
<td>No update; ongoing</td>
</tr>
<tr>
<td>3</td>
<td>Gery Kissel will invite Charlie Groeller to discuss truck connectors at the next meeting.</td>
<td>No response to invitations; ongoing</td>
</tr>
</tbody>
</table>

### Mission Statement Review

There were no changes to the mission statement.

### IEC TAG 18/IEEE P1713 Update

Greg Nieminski, EPRI consultant, reported on IEC TC 18 MT 26 dealing with requirements for ship-to-shore connections. The group met last June and went through over 500 comments. The document will be circulated to national committees as a second Committee Draft (CD). Another meeting is scheduled in Japan and after that, the draft could be ready to go out for ballot. This will be the first international standard that combines IEC, ISO, and IEEE.

### IEC 23H Connector Updates

MT 23H deals with ship-to-shore connectors. The committee met in Stockholm the week of September 14. Most of the document has been completed except for a few questions. The committee will meet early next year and the document should be on its way to approval sometime next year.

### EPRI PORTES Update

Andra Rodgers, Project Manager of Non-Road Electric Transportation, gave an overview of EPRI’s non-road activities (see Attachments). The industries involved in non-road electric transportation include airports, warehouses and intermodal facilities, ports, truck stops, mining, and agriculture. Non-road vehicles account for a significant amount of criteria pollutants and greenhouse gases compared to on road vehicles. The EPRI work includes rail electrification activities, a PHEV system in a port, life cycle cost calculators, and electrification of a container/pallet loader. Monthly conference calls are scheduled to update members and an annual meeting is planned for Savannah, GA.

### IdleAire Updates

Greg Ward, IdleAire, gave an update on the IdleAire Advanced Truck Stop Electrification (ATE) technology (see Attachment). He described the seasonality of utilization, summarized their service offerings and pricing, and gave an update on their emissions reduction comparing TSE to APUs. He also presented a map showing their 131 locations and described their business model. During discussion Mr. Ward mentioned grant award opportunities
under the current administration and the possibilities for bus terminals and ambulance services. He noted that from a technological standpoint TSEs can also be used for EVs.

Shorepower Updates

Jeff Kim, Shorepower Technologies, gave an update on recent expansions (see Attachment). In addition to their existing facilities, Shorepower was recently awarded a grant to electrify 50 travel centers throughout the country. These travel centers have an average of between 24 to 36 parking spaces per site. Mr. Kim described the electric standby transport refrigeration unit, its energy management goals, and equipment. He also listed charging station locations for EVs and PHEVs. There have been no TSE control system or hardware failures in their system except for arcing in one receptacle most likely due to a user’s underrated cord and plug. The state of Oregon has proposed demand factors for charging stations in Oregon.

CabAire Updates

Dan Shanahan and Jim Bianco, CabAire, gave a presentation on their company’s activities. CabAire is working at the Delaware, New Jersey and Pennsylvania turnpikes as well as in North Carolina, Florida, and Alabama. They also have an electric bus with a 30-mile electric range and a 500-pound battery pack for use in Michigan. CabAire is working with the New Haven Port Authority to electrify about 20 spaces. With regards to transport refrigeration units (TRUs), they feel that the number of plug-ready, on-road TRUs is small, but applications in distribution centers may be high.

NEC Changes for Electrified Parking Spaces

Greg Nieminski, EPRI consultant, reported that 9 of the 36 proposals to amend Article 626 and submitted to the NEC were from the IWC. The NEC Task Force has agreed to respond to comments from Code Panel 12, including comments on non-locking type connectors, exceptions to legacy trucks, and increased protection for TRUs to prevent connecting or disconnecting under load. The NEC Task Force is looking for examples of equipment failures and injuries associated with making or breaking under load. During discussion, Ron Thompson explained the 150 KVA limit for defining risks from arc flash.

ACTION ITEM: Ron Thompson will provide information on the 150 KVA limits for risks from arc flash to the NEC Task Force.

Rail Yard Emissions Reduction Briefing

Brian Sisco, Eaton, reported that he, along with Andra Rodgers and Ted Yeider (PACECO Corp), visited the Amtrak and Burlington-Santa Fe facilities in Oakland. Amtrak had no interest in plug-in transportation electrification. With regards to intermodal transport, plugging in TRUs was viewed as the owner’s responsibility, therefore the group concluded there are no current opportunities in Oakland. This may change in the future due to regulation. During discussion, Cedric Daniel, Alabama Power/Southern Company, reported that Norfolk Southern has announced that they are deploying full-electric switchyard locomotives.

ACTION ITEM: Serge Roy will obtain information on full-electric switchyard locomotives for the next meeting.
Recommended Infrastructure Guidelines for Cities and Decision Makers

Jose Salazar, Southern California Edison, discussed the need, the opportunity, and the challenge with regards to developing a plug-in electric vehicle infrastructure installation guide to help communities, state agencies, cities and counties prepare for upcoming deployments. Different guides have been developed by the following companies: Southern California Edison, Pacific Gas & Electric, and BC Hydro. The proposed IWC guide should address the following: charging basics, electrical and building code requirements, installation requirements for different scenarios (single family, multifamily, fleet, workplace, and public charging), cost savings, load management mitigation strategies, and PEV communications.

During discussion Serge Roy mentioned that BC Hydro hired a technical writer to develop a guide in less than six months. Efrain Ornelas, PG&E, suggested looking at the existing documents, selecting one that had all the major components, deciding which sections to update, and leaving appendices for specific requirements of counties and cities. Cedric Daniels, Alabama Power, stated that Southern Company needs such a guide as soon as possible and may be able to help with funding. The following volunteered to work on the guide:

- Efrain Ornelas, PG&E (volunteered to lead this effort)
- Craig Childers, CARB
- Cedric Daniel, Alabama Power
- Manoj Karwa, Leviton
- Vaughn Nichols, Gulf Power
- Greg Nieminski, EPRI Consultant
- Joel Pointon, San Diego Gas & Electric
- Jose Salazar, SCE
- Brian Sisco, Eaton

ACTION ITEM: Jose Salazar will prepare a proposal for development of the infrastructure guide and send it to Andra Rodgers for Mark Duvall.

Impact of PEVs on Electric Utility

Pedram Mohseni, Duke Energy, discussed his company’s forecasting analysis of the impact of PEVs on electric utilities (see Attachments). Using historical data, he predicted a rebound in durable goods after the current downturn. Using hybrid vehicles as a proxy to study future PEVs, he clustered residential customers into 24 demographic segments and found that clustering was a significant problem when zooming down into the level of neighborhoods. He compared 6% market penetration with no intervention by 2020 to a 13% market penetration by 2020, which is made possible by promoting 50% more PEVs during the first year due to the snowballing effect. He also looked at daily usage patterns for uncontrolled charging at home, uncontrolled charging anytime, and controlled charging, and showed a significant impact of PEVs on summer system peak hour. Traffic data combined with the lithium ion battery charging shape give an indication of daily charge patterns. The analysis also provides forecast data on clustering, kVA per acre, potential locations of energy storage and charging stations, and hourly transmission and distribution risk analysis.
EV Infrastructure Deployment: ETEC

Kevin Morrow, ETEC, described various ETEC activities related to EV infrastructure (see Attachments). They are working with US DOE and Nissan on a mature charge infrastructure. The EV Micro-Climate program will provide a blueprint for a comprehensive EV infrastructure system and detailed action plans for implementation. Soft infrastructure development includes first responder training and installation contractor certification. ETEC is planning residential, commercial, and public infrastructure deployment involving Level 2 EVSE. Another activity involves Level 3 charging. With various project partners, ETEC will analyze vehicle and charger utilization and smart grid integration. The project is expected to be completed in 2013. During discussion Mr. Morrow explained that negotiations will be made on who will own the installed equipment after the project. ETEC is interested in studying user behavior and charging patterns.

Next Meeting

*The next meeting of the TEC is scheduled for December 2-3, 2009 in Palo Alto, CA.*

Summary of Action Items

<table>
<thead>
<tr>
<th>ACTION ITEM</th>
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<tbody>
<tr>
<td>Ongoing action item from the previous meeting:</td>
</tr>
<tr>
<td>Mark Duvall                                     will invite Navistar to the next meeting.</td>
</tr>
<tr>
<td>Gery Kissel                                     will invite Charlie Groeller to discuss truck connectors at the next meeting.</td>
</tr>
<tr>
<td>New action items:</td>
</tr>
<tr>
<td>Ron Thompson                                    will provide information on the 150 kVA limits for risks from arc flash to the NEC Task Force.</td>
</tr>
<tr>
<td>Serge Roy                                       will obtain information on full-electric switchyard locomotives for the next meeting.</td>
</tr>
<tr>
<td>Jose Salazar                                    will prepare a proposal for development of the infrastructure guide and send it to Andra Rodgers for Mark Duvall.</td>
</tr>
</tbody>
</table>

Adjournment

With no further business, the meeting was adjourned.
# TEC Attendance List

<table>
<thead>
<tr>
<th>First Name</th>
<th>Last Name</th>
<th>Company</th>
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</thead>
<tbody>
<tr>
<td>Larry</td>
<td>Hayashigawa</td>
<td>AeroVironment Inc.</td>
</tr>
<tr>
<td>Cedric</td>
<td>Daniels</td>
<td>Alabama Power Co.</td>
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<tr>
<td>Richard</td>
<td>Bogenberger</td>
<td>BMW Group Technology Office</td>
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<tr>
<td>James</td>
<td>Bianco (via webcast)</td>
<td>CabAire, LLC</td>
</tr>
<tr>
<td>Daniel</td>
<td>Shanahan (via webcast)</td>
<td>CabAire, LLC</td>
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<tr>
<td>Craig</td>
<td>Childers</td>
<td>California Air Resources Board</td>
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<tr>
<td>Elise</td>
<td>Keddie</td>
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<tr>
<td>Matthew</td>
<td>Crosby</td>
<td>California Public Utilities Commission</td>
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<tr>
<td>John</td>
<td>Engle</td>
<td>CenterPoint Energy</td>
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<tr>
<td>Jason</td>
<td>France</td>
<td>ClipperCreek Inc.</td>
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<tr>
<td>David</td>
<td>Packard</td>
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<tr>
<td>Mike</td>
<td>Rodgers</td>
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<td>Sally</td>
<td>Scripps (via webcast)</td>
<td>Consumers Energy</td>
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<td>Dave</td>
<td>Baxter</td>
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<tr>
<td>Ralf</td>
<td>Oestreicher</td>
<td>Daimler AG</td>
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<tr>
<td>Greg</td>
<td>Nieminski</td>
<td>DBA Greg Nieminski</td>
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<td>Raymond</td>
<td>Tison</td>
<td>Dominion Resources, Inc.</td>
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<td>John</td>
<td>Olsen (via webcast)</td>
<td>DTE Energy</td>
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<tr>
<td>Pedram</td>
<td>Mohseni</td>
<td>Duke Energy Corp.</td>
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<tr>
<td>Jorge</td>
<td>Emmanuel</td>
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<td>Brian</td>
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<td>Ron</td>
<td>Thompson</td>
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<td>Josephine</td>
<td>Garcia (via webcast)</td>
<td>Electric Power Research Institute (EPRI)</td>
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<tr>
<td>Karen</td>
<td>Larsen (via webcast)</td>
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<td>Andra</td>
<td>Rogers</td>
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<tr>
<td>Kevin</td>
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<td>Joby</td>
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<td>James</td>
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<td>Greg</td>
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<td>Manoj</td>
<td>Karwa</td>
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<td>Jeff</td>
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<tr>
<td>Angie</td>
<td>Doan</td>
<td>Plug Smart</td>
</tr>
<tr>
<td>Name</td>
<td>Company/Role</td>
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<tr>
<td>Dwight</td>
<td>MacCurdy Sacramento Municipal Utility Dist.</td>
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<td>Joel</td>
<td>Pointon San Diego Gas &amp; Electric Co.</td>
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<td>Ed</td>
<td>Wagner SatCon</td>
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<td>Jeff</td>
<td>Kim (via webcast) Shorepower Technologies</td>
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<tr>
<td>Reynaldo</td>
<td>Goco Southern California Edison Co.</td>
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<tr>
<td>Jose</td>
<td>Salazar (via webcast) Southern California Edison Co.</td>
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<td>Ralph</td>
<td>Boroughs Tennessee Valley Authority</td>
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<td>Kunihiko</td>
<td>Kumita Toyota Motor Engineering &amp; Manufacturing North America (TEMA)</td>
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<td>Massoud</td>
<td>Momeni Toyota Motor Engineering &amp; Manufacturing North America (TEMA)</td>
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<tr>
<td>Robert</td>
<td>Hawkins Ultimate Business Solutions</td>
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<tr>
<td>Ali</td>
<td>Ashtari (via webcast) University of Manitoba</td>
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EPRI Non-road Electric Transportation Program

Non-road Industry Advisory Council Meeting
July 29, 2009

Andra Rogers
Project Manager, Non-road Electric Transportation
Introducing EPRI…

EPRI is a company that…

…brings together great people…

…with new and exciting ideas…

…to help energize the world!

“Together…Shaping the Future of Electricity”
• Founded by and for the electricity industry in 1973

• Independent, nonprofit center for public interest energy and environmental research

• **Collaborative** resource for the electricity sector

• Major offices in Palo Alto, CA; Charlotte, NC; Knoxville, TN
  - Laboratories in Knoxville, Charlotte and Lenox, MA

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Our Members...

• 450+ participants in more than 40 countries

• EPRI members generate more than 90% of the electricity in the United States

• International participation in more than 15% of EPRI’s research, development and demonstrations

• Programs funded by more than 1,000 energy organizations
Our Role…

Help Move Technologies to the Commercialization Stage…

Basic Research and Development

Collaborative Technology Development Integration Application

Technology Commercialization

National Laboratories
Universities

EPRI

Suppliers Vendors

Technology Accelerator!

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Our Value...

Providing the public, our members and the electricity sector...

Thought Leadership

Industry Expertise

Collaborative Value
Portfolio Spans the Entire Electricity Sector

<table>
<thead>
<tr>
<th>Generation</th>
<th>Nuclear Power</th>
<th>Power Delivery &amp; Utilization</th>
<th>Environment</th>
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<td>Material Degradation/Aging</td>
<td>Distribution</td>
<td>Air Quality</td>
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<td>Fuel Reliability</td>
<td>Energy Utilization</td>
<td>Global Climate Change</td>
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<td>High-Level Waste and Spent Fuel Management</td>
<td>Grid Operations and Planning</td>
<td>Land and Groundwater</td>
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<td>Nondestructive Evaluation and Material Characterization</td>
<td>Substations and Asset Planning</td>
<td>Occupational Health and Safety</td>
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<td>Generation Planning</td>
<td>Equipment Reliability</td>
<td>Transmission and Increased Power Flow</td>
<td>T&amp;D Environmental Issues</td>
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<td>Instrumentation and Control</td>
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<td>Water and Ecosystems</td>
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<td>Risk and Safety Management</td>
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<td>Renewables</td>
<td>Advanced Nuclear Technology</td>
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<td>Low-Level Waste and Radiation Management</td>
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Meeting Objective

The objective of the meeting is to provide guidance and advice on overall goals and direction of the EPRI projects, review program activities, recommend areas of new collaboration efforts and for attendees to provide marketplace reality check on new technologies and competitive issues.
What is Non-road?

Industry Overview

- Airports
  - Ground support equipment
  - Ground power
  - Air conditioning

Industry Overview

- Warehouses and intermodal facilities
  - Forklifts
  - Rail equipment
  - Cranes and side loaders
What is Non-road?

Industry Overview

• Ports
  – Cranes (and RTG, RMG)
  – Mat’l handling equipment
  – Ships (and Dredge)

Industry Overview

• Truck Stop Electrification
What is Non-road?

Other

• Mining
• Agriculture
Data: TIAI estimates these achievable reductions in greenhouse gas and criteria emissions from electric drive transportation.
Today - Current Non-road Program at EPRI

Airports
• Electrification of an Airport Diesel Lower Deck Container/Pallet Loader
• John Wayne International Airport Electrification Analysis

Warehouse/Intermodal
• Outdoor Electric Lift Truck
• Rail Electrification Opportunities (new)

Ports
• PHEV System in a Port Application
• Electric Rubber Tired Gantry Crane Conversion (on hold)
• Ship to Shore Case Study and life cycle cost calculator: diesel, electric, and electric conversion comparison
• Rubber tired gantry crane life cycle cost calculator
Today - Current Non-road Program at EPRI

Truck Stop Electrification

• TSE Codes and Standards Case Study (May 2009 - 1019303)

Other

• Mining Fact Sheet
• ATV demonstration
• Education & Outreach – Meetings & case studies
  – Port, Rail, Truck Electrification (PoRTE) Monthly conf. calls
  – Port meeting – November 17-18 in Savannah, GA
  – Airport meeting (next mtg.) – March 15, 2010 in Las Vegas
  – Summary of incentives for non-road industries – done by Beacon Consultants. Similar results for on-road examples here.
Recent Tools within the Non-road Program

- Case study on Continental Airlines, Southwest, Port of Seattle, Class 1 Forklifts
- GSE Cost Model, Lift Truck Cost Calculator
Non-road Program

Next Steps:

• Industry Advisory Recommendations, what’s missing:
  – Mining, Agriculture
  – Rail
  – What is the need? R&D, Market Enhancement, other?
• Propose recommendations to EPRI Advisory Council in Chicago, September 1-2, 2009
• Develop scope/budget for 2010 efforts, by Dec. 31, 2009
Andra Rogers
Project Manager, Non-road Electric Transportation
Electric Power Research Institute, Inc. (EPRI)
3420 Hillview Avenue | Palo Alto, CA 94304
Tel: 650.855.2101 | Fax: 650.855.2737
Cell: 650.387.6642 | Email: arogers@epri.com

Together...Shaping the Future of Electricity
Moderator: Cedric Daniels, Alabama Power Company, a Southern Company subsidiary
Andra Rogers & Eladio Knipping, Electric Power Research Institute (EPRI)
Charlie Flynn, CenterPoint Energy
Ben Chavdarian, Port of Long Beach
Jamie Knapp, on behalf of Southwest Airlines
Together…Shaping the Future of Electricity
Plug-In Electric Vehicle Readiness Infrastructure Installation Guidelines

Jose A. Salazar, P.E.

EPRI IWC Quarterly Meeting TEC Working Group
Today’s PEV Infrastructure Landscape

• All major vehicle manufacturers have announced development and deployment plans for Plug-In Electric Vehicles
• Significant vehicle deployments are expected as soon as late 2010
• Many electric utility companies are preparing for vehicle deployments by:
  – Creating or updating Infrastructure Installation Guidelines
  – Creating or updating Distribution Design Standards
  – Creating or updating customer programs such as TOU rates
• Consumers are uneducated and or confused on how to prepare for owning a PEV
• PEV Infrastructure providers / installers are waiting for key standards to be adopted and or confused about current NEC requirements.
• Many cities and counties are ill prepared to properly inspect charging infrastructure
The Opportunity

• EPRI’s IWC TECWG has an opportunity to properly lead the market place by:
  – Educating the general public on codes and standards
  – Developing a design criteria that installers and builders can follow
  – Educating state agencies, cities and counties on inspection guidelines
  – Helping electric utilities develop internal standards and position statements
  – Helping businesses prepare for PEV fleets
The Challenge

• For EPRI’s IWC to develop and publish a “Plug-In Electric Vehicle Infrastructure Installation Guide” that helps advance electric transportation and prepare the PEV community for upcoming deployments

• The good news is that there are various existing documents that can be used as a base from various companies including:
  – Southern California Edison
  – Pacific Gas & Electric
  – BC Hydro
The Document

At minimum the document should address:

- **Charging Basics**
  - SAE Requirements
  - Vehicle Technology (HEV, PHEV, BEV…EREV)

- **Electrical & Building Code Requirements**
  - National Electric Code
  - Uniform Building Code

- **Installation Requirements for:**
  - Single Family Residential Charging Facilities
  - Multifamily Residence Charging Facilities
  - Vehicle Fleet Charging Facilities
  - Workplace Charging Facilities
  - Public Charging Facilities

- **Cost Savings / Load Management Mitigation Strategies**

- **PEV Communication**
Any Volunteers?
Shorepower Technologies
(Formerly Shurepower)
Electrified Parking

Jeff Kim
(503) 892-7345
jkim@shorepower.com

September 23, 2009
Shorepower Products

- Shorepower Truck Stop Electrification (TSE)
  - Shorepower Control & Monitoring System
  - Shorepower Pedestals
    - 120/208 VAC Power
    - Cable TV
    - Internet – WiFi
    - eTRU connections
- Charging Stations
  - Electric Vehicles (EV)
  - Plug In Hybrid Electric Vehicles (PHEV)
- Shorepower Kits
  - On-board equipment
  - OEM offerings
- Conversions
  - Plug-In Hybrid Electric Vehicle (PHEV)
  - Pure Battery Electric Vehicle (BEV)
**Long Term Idle Reduction Solution**

- No petroleum consumption
- Zero local emissions
- No undesirable noise
- Safe & proven technology
- Drivers have more freedom
- Focused on idle-reduction
- Most efficient
- Electric TRU standby power
- No recycled air
- Most cost effective technology
- Sustainable business model
Sleeper Cab System

I-87 Sleeper Cab Shorepower Conversion Showing Major Subsystems
Travel Plaza Benefits

- New Source of Revenues based on gross sales
- Attracts customers
- Growth Potential – modular expansion
- Increase Revenues from sales of appliances and installation of kits
- No up-front investment required
- Toll-free call center – no on-site labor required
- No loss in parking spaces
Shorepower Advantage

- Business model based on cost-effective electric service
  - Fundamental utility service
  - Never obsolete
- Charging stations for EVs & PHEVs
- Positive or low visual impact
- Simple installation
  - Minimal disruption to pavement
  - Fast construction
- Web based control system
  - Accessible anywhere in the world with an Internet connection
- Long Term Solution
Network of TSE Facilities

• 5 NW Facilities
  – Gee Cee’s Truck Stop
    • Toledo, WA
  – Flying J Travel Plaza
    • Ellensburg, WA
  – Jubitz Travel Center
    • Portland, OR
  – Truck N’ Travel TA
    • Eugene, OR
  – Mollies Truck Stop
    • Klamath Falls, OR
  – Arrowhead Travel Plaza
    • Pendleton, OR
  – Big Boys Travel Plaza
    • Kenly, NC

Coming Soon:
  – 7 Feathers Truck & Travel
    • Canyonville, OR
Expanding the Shorepower Network

Shorepower recently awarded a grant to electrify 50 travel centers through the country. Proposed sites shown above.
Electric Standby Transport Refrigeration Unit

eTRU

Shorepower Trailer Wiring System for eTRUs

eTRU Energy Management Goals

• Provide a ceiling for the maximum electricity draw of the overall eTRU facility system
• Minimize costs associated with using electricity (avoid demand surcharges)
• Monitor energy flows
**Energy Management System**

- Equip eTRUs with two way communication hardware
- Monitor operation of eTRUs
- Develop and implement methodology to control demand without additional risk to trailer contents
EV & PHEV Charging Stations
Charging Station Locations

1. PGE World Trade Center - Portland, Oregon
2. City of Lake Oswego, Oregon
3. Oregon Museum of Science & Industry (OMSI) – Portland, Oregon
4. PGE Salem Office – Salem, Oregon
5. PGE Contact Center – Tualatin, Oregon
6. City of Oregon City, Oregon
7. Nike – Beaverton, Oregon
8. Nike – Beaverton, Oregon
9. City of Gresham, Oregon
10. Shorenstein Realty – Lake Oswego, Oregon
11. Portland, City Hall, Oregon
12. City of Milwaukie, Oregon
13. North Carolina State University
15. Atlantic County Utilities - NJ
16. Kaiser Hospital – Portland, Oregon
17. Shaver Green Building – Portland, Oregon
18. Fred Meyer Stores – Portland, Oregon
19. Clackamas County, Oregon
20. Intel – Hillsboro, Oregon
21. Keizer City Hall, Oregon
**Fast Charging Concept**

- Charging station charges an energy storage device in charging station. Energy is then available to “fast charge” vehicles.
- Charging station voltage is 240 volts DC at up to 500 amps (100+kW)
  - Charge vehicles at up to 480 VDC
  - Uses standard 240 VAC 50 amp energy source to “charge” the charging station” (10 kW with 80% rule)
  - Charging at this rate would normally require over 400 amps at 240 VAC, which is enough for 2 large houses
  - This would require new utility service
- Charge vehicle in under 15 minutes depending on vehicle battery technology and capacity
  - Simplified example: 20 kWh battery / (336 VDC x 250 amps ave.) = 0.24 hours = <15 min.
- Doubles as an energy storage system
- Compatible with any EV/PHEV
- “Vehicle”-to-Grid capable (V2G) – Station-to-Grid (S2G), Station-to-Business (S2B), Station-to-Home (S2H)
- Patent pending
**Benefits to Utilities**

- Charging station to grid for reducing peak loads
- Distributed Energy Source
- Works with intermittent renewable energy sources such as solar and wind
- Charge during off-peak hours
  - New source of “off-peak” revenues
- Real time monitoring of plug-in vehicle loads
TSE Failures to Date

- No control system failures
- Minimal hardware failures
- Internet connectivity
- Power outages
Proposed Demand Factors for Charging Stations in Oregon

Scope of Ruling:
This ruling addresses the installation of electrical equipment supplying electric vehicle charging equipment. The acceptability of using the demand factor table to calculate loads for electric vehicle charging stations as an alternative to assuming a continuous load is contingent on meeting the following conditions:

1. Except as otherwise provided for in this alternate method, the provisions of the Oregon Electrical Specialty Code shall be applicable to all installations of electric vehicle charging equipment.
2. All provisions for enclosure integrity, conductor ampacity, and overcurrent protection in chapters 1 through 4 are met.
3. Load calculations for services and feeders that supply electrical vehicle charging equipment shall be permitted to be modified as indicated in notes (1) and (2) to the following table:

### Demand Factors

<table>
<thead>
<tr>
<th>Number of charging stations</th>
<th>Sum of charging station ratings (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-4</td>
<td>100</td>
</tr>
<tr>
<td>5-8</td>
<td>90</td>
</tr>
<tr>
<td>9-14</td>
<td>80</td>
</tr>
<tr>
<td>15-30</td>
<td>70</td>
</tr>
<tr>
<td>31-40</td>
<td>60</td>
</tr>
<tr>
<td>41-plus</td>
<td>50</td>
</tr>
</tbody>
</table>

Notes:
1. Where multiple charging stations are contained in a single enclosure, the demand factors in table 625.14 shall be permitted for each service and/or feeder supplying the multiple charging stations.
2. Where charging stations consist of only level 2 electric vehicle connectors and the demand factor of Table 625.14 are applied, the demand factor specified in 220.61(B) shall also be permitted.
Shorepower Sponsors

- US DOE
- New York State - NYSERDA
- Climate Trust
- Oregon Department of Energy
  - Business Energy Tax Credit
  - Small scale Energy Loan Program
- Washington Department of Ecology
- EPA
Questions? - For More Information

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www.shorepower.com

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Rome, New York 13441
(315) 404-5613
Impact of PEVs on Electric Utility

Pedram Mohseni- Duke Energy
Learning from the past, been there done that

EPRI Journal Spring 1991

Electric Vehicles for the '90s

EPRI Journal Spring 2008

Plug-In Hybrids
Recessions magnitude

US MONETARY BASE
Banks Deposit at federal reserve + Currency held by banks and public

840,000,000,000$ in 50 years

930,000,000,000$ in 6 months
Inflation is coming: Durable Goods Rebound

Personal Consumption Expenditures: Durable Goods (PCDG)
Source: U.S. Department of Commerce: Bureau of Economic Analysis

Shaded areas indicate US recessions.
2009 research.stlouisfed.org

Confidential and Proprietary
Inflation is coming: Durable Goods Rebound

Personal Consumption Expenditures: Durable Goods (PCDG)
Source: U.S. Department of Commerce: Bureau of Economic Analysis

Shaded areas indicate US recessions.
2009 research.stlouisfed.org

Confidential and Proprietary
Energy Density tipping point

- Maximum useable energy in Li-Oxygen can exceed Gasoline
- Available but expensive
- Electric vehicles today are using batteries in this range
- Electric vehicles of early 90’s used batteries in this range

- Gasoline
- Lithium-Oxygen (Expected)
- Lithium-Oxygen (today)
- Lithium ion nanowire
- Lithium Thionyl Chloride
- Fluoride ion
- Hydrogen closed cycle H fuel cell
- Lithium Sulphur
- Lithium-manganese
- Lithium ion
- Zinc-manganese
- Silver-oxide
- NiMH low power
- Zinc Bromine flow (ZnBr)
- NiMH High Power
- Vanadium Bromide redox
- Nickel cadmium (NiCd)
- Lead acid
- Zinc-Carbon
- Vanadium redox

Energy density by mass (MJ/kg) - Useable Energy density by mass (MJ/kg)
Using Hybrid Vehicles as Proxy

- Hybrid vehicles were used as a proxy to future PEVs
- Residential customers were clustered to twenty four segments using demographics such as income, property value and vehicles type
Customer Segmentation Analysis

- Property Value
- Length of Residence
- Credit Score
- Age
- Owner / Renter

“Confidential and Proprietary”

Page 2
Customer Segmentation Analysis

**Segment 1**
House owners or high-end renters with higher than average property values tend to be 3.5 times more likely than average to own PHEV/EV.

**Segment 2**
House owners with very good credit score and are 3.2 times more likely than average to own PHEV/EV.

**Segment 3**
Mixed owners and renters who are less likely to revolve their credit card balance are 2.4 times more likely than average to own PHEV/EV.

**Segment 4**
House owners with borderline or revolving credit card balances are 2 times more likely than average to own PHEV/EV.

**Segment 5**
Wealthy retirement-ready people are 1.9 times more likely than average to own PHEV/EV.
Segment 1
House owners or high-end renters with higher than average property prices
Segment 2
House owners with superior credit score who pay off their monthly credit card payment
Segment 3
Mixed owners and renters who revolve half of credit card payment
Scoring Process

All customers scored using clustering and regression, to get Prob Value, eventually replaced with actual purchase (Prob=100%)
Scoring Process

All customers scored using clustering and regression, to get Prob Value, eventually replaced with actual purchase (Prob=100%)
## Daily usage shape – traffic pattern

<table>
<thead>
<tr>
<th>Hour</th>
<th>Freeway</th>
<th>Percent in the road</th>
<th>Percent Change</th>
<th>Net Cars Back to park</th>
<th>Net Cars out of park</th>
<th>Cars parked (Not Net)</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>1395</td>
<td>11%</td>
<td>-3%</td>
<td>20,644</td>
<td>-</td>
<td>20,644</td>
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<tr>
<td>2</td>
<td>1314</td>
<td>10%</td>
<td>-1%</td>
<td>4,697</td>
<td>-</td>
<td>4,697</td>
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<tr>
<td>3</td>
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<td>10%</td>
<td>0%</td>
<td>986</td>
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<td>-5%</td>
<td>33,865</td>
<td>-</td>
<td>33,865</td>
</tr>
</tbody>
</table>

Daily usage shape – traffic pattern

- Net Cars out of park
- Net Cars Back to park
- Percent in the road
- Cars parked (Not Net)
Daily usage shape - charging shape

Lithium-ion stage of charge

Confidential and Proprietary
Daily usage shape – Mixing charging shape and traffic pattern

<table>
<thead>
<tr>
<th>Cars parked (shape Max=1)</th>
<th>0.10</th>
<th>0.02</th>
<th>0.00</th>
<th>0.03</th>
<th>0.17</th>
<th>0.73</th>
<th>0.32</th>
<th>0.37</th>
<th>0.44</th>
<th>0.07</th>
<th>0.08</th>
<th>0.05</th>
<th>0.16</th>
<th>0.05</th>
<th>0.07</th>
<th>0.27</th>
<th>0.27</th>
<th>1.00</th>
<th>0.49</th>
<th>0.35</th>
<th>0.19</th>
<th>0.31</th>
<th>0.22</th>
<th>0.16</th>
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</thead>
<tbody>
<tr>
<td>15 kW Li-ion Charge shape</td>
<td>5.07</td>
<td>6.48</td>
<td>2.45</td>
<td>0.60</td>
<td>0.41</td>
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<td>0.00</td>
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<td>0.00</td>
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<td>0.00</td>
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<tr>
<td>Charging State</td>
<td>34%</td>
<td>16%</td>
<td>16%</td>
<td>4%</td>
<td>3%</td>
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<td>50,000</td>
<td>100,000</td>
<td>150,000</td>
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<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
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<td>Hour of day</td>
<td>1</td>
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<td>3</td>
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<td>5</td>
<td>6</td>
<td>7</td>
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<td>20</td>
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<td>22</td>
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<tr>
<td>10%</td>
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<td>0.02</td>
<td>0.00</td>
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</tr>
<tr>
<td>5%</td>
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<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Daily Charge Pattern

- Net Cars out of park
- Net Cars Back to park
- Percent in the road
- Cars parked (Not Net)

Uncontrolled (Charge at home)  Controlled  Uncontrolled (any time charging)
Most work commuters can not charge their PEVs during this time.
Daily usage shape – Peak shifting

Daily Charge Pattern

- Time of use pricing and/or in-home control devices

Uncontrolled (Charge at home)  Controlled  Uncontrolled (any time charging)
PHEV Forecast: Neighborhood Clustering in Clifton, Newport/ Covington
Some Clustering in Outlying Areas
1- Regional PEV energy needs
Predicting Plug-In Electric Vehicles market penetration and expected battery capacity, based on gasoline price elasticity, determines long term energy needs for PEVs.

2- Spatial PEV load analysis
Probability of PEV adoption is assigned to customers in the study area utilizing cluster analysis and segmentation methods. Regional PEV energy needs are distributed among those customers that are early adopter candidates.

3- T&D PEV load analysis
Aggregating customers PEV energy needs per acre of KVA density, and to circuit level (transformer, feeder, distribution lines and substations).

4- Hourly T&D risk analysis
Detecting where stressed T&D infrastructure might be due to highly clustered PEV users in same neighborhood, by analyzing likely charging patterns.
Charging stations
Using Minimum Cost and Distance analysis considering position of both power lines and PHEV/EV users

“Confidential and Proprietary”
Stationary energy storage and Charging station location
We Just can’t wait…
Questions…
Operations Summary

- Headquartered in Knoxville, TN, IdleAire has approximately 318 employees and operates 131 sites with a combined total of 8,536 spaces
  - Sites are open 24/7/365 and are strategically located on the lots of major travel centers (TA/Petro, Pilot, Independents) where truckers stop to refuel and rest during federally mandated resting periods \(^{(1)}\).

- The Company’s primary market, which consists of owners and drivers of long-haul heavy-duty diesel trucks with sleeper cabs, is estimated at approximately 1.3 million trucks in the US.

- The Company services this market by providing a less expensive alternative to idling (plus additional premium services) during these resting periods – a significant value proposition for the low-margin trucking industry.
  - Basic services (direct idling alternative) are paid by the fleets/owners, sold on an hourly basis and priced below the cost of idling;
  - Premium services are paid by the drivers and sold on an individual upgrade basis.

- Services are delivered through a patented Service Module (the “SM”), which connects to the truck cab through a plastic window adapter.
  - The SM includes a pentium-class microcomputer with a touch screen and LCD display, filtered air supply and return vents, satellite TV connection, USB connections for computer accessories and two internal and external 120 VAC electrical outlets.
  - The SM is connected, via a reinforced, flexible hose to an HVAC unit mounted on an overhead truss.

- After the SM is connected to the cab, drivers activate the system by swiping a payment card (fleet card, credit card, etc).
  - Once activated, drivers can access all services through the touch screen interface on the SM.

- Each individual SM is connected to a nationwide, secure, proprietary network which feeds into the centralized Network Operating Center located in Knoxville, TN.
  - This network structure enables the Company to remotely monitor and operate each SM, providing payment processing, trouble-shooting and customer service.

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\(^{(1)}\) Per DOT Federal Motor Carrier Safety Regulations, among other restrictions, drivers must rest 10 or more consecutive hours after driving 11 hours in any 14 hour on-duty window.
The chart below summarizes IdleAire’s service offerings, pricing and vendors:

<table>
<thead>
<tr>
<th>OFFERINGS</th>
<th>PRICING</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BASIC SERVICES</strong>&lt;br&gt;(Paid by Fleet/Owner)</td>
<td>HVAC &amp; Shore Power Electricity&lt;br&gt;- Basic Satellite TV (20 Channels)&lt;br&gt;- Local Telephone&lt;br&gt;- Service Module Internet Access</td>
</tr>
<tr>
<td><strong>PREMIUM SERVICES</strong>&lt;br&gt;(Paid by Driver)</td>
<td>Premium Satellite TV&lt;br&gt;- Movies on Demand&lt;br&gt;- Internet Access (Ethernet or Wireless)&lt;br&gt;- Unlimited Long Distance Telephone</td>
</tr>
<tr>
<td><strong>OTHER SERVICES</strong>&lt;br&gt;(Paid by Fleet)&lt;br&gt;(27 courses in total)</td>
<td>JJ Keller Safety Training</td>
</tr>
</tbody>
</table>

- The Company also generates revenue through discount membership cards and ancillary product sales, such as window adapters, ethernet cables, keyboards, extension cords, coax cables, etc.
Sales & Marketing – Fleets

- **Large Fleets**
  - Long sales cycle, more personnel to sell, more leverage for lower price, sometimes difficult value proposition, sophisticated understanding of idling costs
  - More hours of use potential, sophisticated driver communication, less customers needed for hours goals

- **Medium Fleets**
  - Shorter sales cycle, less personnel to sell, less leverage for lower price (higher fuel costs), easier value proposition, less sophisticated understanding of idling costs
  - Less hours of use potential, less sophisticated driver communication, more sells required to raise hours

- **Small Fleets**
  - Short sales cycle, few personnel to sell, less leverage for lower price (high fuel costs), easy value proposition, unsophisticated understanding of idling costs
  - Few hours of use potential, unsophisticated driver communication, many sells required to raise hours
IdleAire ATE Emission Reductions

<table>
<thead>
<tr>
<th>Emission*</th>
<th>Single Truck (grams/hr)</th>
<th>50 Spaces (10 Hrs/Day) (Metric Tons/yr)</th>
<th>500 Spaces (9.6 Hrs/Day) (Metric Tons/yr)</th>
<th>IdleAire Emission Reductions as of August 2009 (Metric Tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO(_x) (Nitrogen Oxide)</td>
<td>135.00</td>
<td>24.63</td>
<td>246.38</td>
<td>6,750.00</td>
</tr>
<tr>
<td>PM (Particulate Matter)</td>
<td>3.68</td>
<td>.67</td>
<td>6.72</td>
<td>184.00</td>
</tr>
<tr>
<td>VOC (Volatile Organic Compound)</td>
<td>6.84</td>
<td>1.25</td>
<td>12.48</td>
<td>342.00</td>
</tr>
<tr>
<td>CO (Carbon Monoxide)</td>
<td>56.14</td>
<td>10.25</td>
<td>102.45</td>
<td>2807.00</td>
</tr>
<tr>
<td>CO(_2) (Carbon Dioxide)</td>
<td>10,397.00</td>
<td>1,897.45</td>
<td>18,974.53</td>
<td>519,850.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>10,598.66</strong></td>
<td><strong>1,934.25</strong></td>
<td><strong>19,342.56</strong></td>
<td><strong>529,933.00</strong></td>
</tr>
</tbody>
</table>

*The emission factors for CO and VOC come from EPA’s Mobile6 Emissions Model to estimate the emissions from idling trucks. NO\(_x\) and PM factors are calculated based on 2004 EPA Guidance. Diesel CO\(_2\) emission values are based on Argonne models.
Technology

- **Call Center**
  - 24 x 7 x 365 customer support
  - Remote systems management & control
  - HVAC / video / power / internet
  - Wide Area Network (WAN) connects each parking space

- **Customer account and use profiles**
  - Complete history of visits, purchases, preferences
  - Valuable Customer Relationship Marketing (CRM) tool
Technology

- State-of-the-Art Data Center and Network
- Virtualization
- SAN
- WAN backbone
- Software tools
- Intelligent Truss system
- Networked systems (HVAC, power controls)
- Service Module (Single Board Computer with touch screen interface for controlling service)
<table>
<thead>
<tr>
<th>IdleAire</th>
<th>The Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ $10 truck window retrofit vs. $8,000 - $12,000</td>
<td>▪ Auxiliary Power Units (APUs)</td>
</tr>
<tr>
<td>▪ Immediate Cost Savings</td>
<td>➢ Produce electricity from a diesel engine that powers an HVAC unit and other electrical devices</td>
</tr>
<tr>
<td>▪ No Operating Costs</td>
<td>➢ Significant upfront equipment cost, $8,000 to $12,000</td>
</tr>
<tr>
<td>▪ No Maintenance &amp; Repair Costs or Inconvenience</td>
<td>▪ Battery Systems</td>
</tr>
<tr>
<td>▪ No Installations that Compromise the Truck’s Warranty</td>
<td>➢ Utilize stored electrical energy in high density batteries to power HVAC units and other in-cab electrical devices</td>
</tr>
<tr>
<td>▪ No Adjustments for 2007 EPA Exhaust Requirements</td>
<td>➢ Inadequate electrical power storage to supply driver HVAC &amp; electricity requirements, battery life questionable</td>
</tr>
<tr>
<td>▪ Operates in Extreme Weather Conditions</td>
<td>➢ Significant upfront equipment cost, $8,000 to $10,000</td>
</tr>
<tr>
<td>▪ Comprehensive Driver Work Environment Improvement</td>
<td>▪ Engine Optimizers</td>
</tr>
<tr>
<td>➢ Quiet, vibration free environment</td>
<td>➢ Device installed in a truck which turns the diesel engine on and off based on a thermostat setting</td>
</tr>
<tr>
<td>➢ Clean, Filtered Air</td>
<td>➢ Starting and stopping engine disrupts sleep</td>
</tr>
<tr>
<td>➢ Internet access for loads, weather, communication</td>
<td>▪ Truck Stop Electrification</td>
</tr>
<tr>
<td>▪ Offset Driver Turnover with Home Amenities</td>
<td>➢ Installs a 120V AC or 220V AC electrical power outlet (shore power) in the travel center parking lot</td>
</tr>
<tr>
<td>➢ Comforts of Home</td>
<td>➢ Requires trucks to have hybrid electric HVAC system</td>
</tr>
<tr>
<td>➢ Improves communications with friends &amp; family</td>
<td>▪ Bunk Heaters</td>
</tr>
<tr>
<td>➢ Entertainment options (TV, Movies and games)</td>
<td>➢ Burn fuel for heat source under driver’s bunk (seasonal use)</td>
</tr>
<tr>
<td>▪ Other Product Benefits</td>
<td>➢ Inexpensive to purchase, $1000 to $2500 installed</td>
</tr>
<tr>
<td>➢ Customized Driver Safety Training Modules</td>
<td>▪ Other Alternatives: Continue to Idle, Motel Rooms &amp; Team Drivers</td>
</tr>
<tr>
<td>➢ Additional communication options with drivers</td>
<td>▪ Use Gift Cards to Reward your best Drivers</td>
</tr>
</tbody>
</table>
## Competition (continued)

<table>
<thead>
<tr>
<th></th>
<th>Idling</th>
<th>IdleAire</th>
<th>APUs (1)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Upfront Costs</strong></td>
<td>na</td>
<td>$10</td>
<td>$8,000 - $12,000</td>
</tr>
<tr>
<td><strong>Lifetime</strong></td>
<td>na</td>
<td>20 years</td>
<td>36 months</td>
</tr>
<tr>
<td><strong>Operating Cost ($/hr) (2)</strong></td>
<td>$3.50</td>
<td>$1.85</td>
<td>$6.00 - $9.00</td>
</tr>
<tr>
<td><strong>Fuel Burned (gal/hr)</strong></td>
<td>0.8 - 1.2</td>
<td>0</td>
<td>0.25 – 0.35</td>
</tr>
<tr>
<td><strong>Emissions</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CO2 (gm/hr)</td>
<td>11,437</td>
<td>0</td>
<td>3,119</td>
</tr>
<tr>
<td>PM (gm/hr)</td>
<td>6.8</td>
<td>0</td>
<td>1.9</td>
</tr>
<tr>
<td>NOx (gm/hr)</td>
<td>205</td>
<td>0</td>
<td>56</td>
</tr>
<tr>
<td><strong>Noise (db)</strong></td>
<td>65 - 72</td>
<td>45</td>
<td>65 - 72</td>
</tr>
<tr>
<td><strong>Vibration</strong></td>
<td>Significant</td>
<td>None</td>
<td>Significant</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>na</td>
<td>3 oz.</td>
<td>450 lbs.</td>
</tr>
<tr>
<td><strong>Reliability</strong></td>
<td>99%</td>
<td>98%</td>
<td>89%</td>
</tr>
</tbody>
</table>

---

(1) Based on IdleAire’s experience with ThermoKing Tri-Pac APU installed on IdleAire show truck
(2) Included costs: fuel, preventative maintenance, repairs & time loss for repairs
Idle Reduction Alternative - APUs

- **Idle Reduction Alternative**
  - Smaller, Less Efficient Engine Replacing a Big Engine
  - Produces HVAC & electricity for appliances & engine block heater
  - Still burns fuel, produces diesel emissions, noise & vibrations

- **Driver Turnover Benefits: Retention & Recruitment**
  - No communications: Internet access, satellite TV or telephone
  - No stress reduction entertainment options: satellite TV, movies-on-demand
  - No filtered, bacteria reduced breathing air; increased air pollution

- **Remote Computer Based Training**
  - No audio-visual digital technology to provide company communications or training during driver downtime
  - No ability to remotely reduce catastrophic accident liability from high risk drivers

- **Costs and Return on Investment**
  - $8,000 - $12,000 up-front equipment retrofit costs versus a $10 IdleAire window adapter
  - Operating Cost inclusive of fuel, preventative maintenance (oil & filter changes), out-of-warranty repair, maintenance time revenue loss and extra weight totals $5 - $6 per hour versus idling @ $2.50 - $3.50 per hour versus IdleAire @ $1.99 per hour (average fleet price)

- **Other**
  - Engine & cab penetrations can void truck warranty
  - Added weight (400 lbs) reduces revenue and adds operating cost
  - Limited authorized service locations increases maintenance revenue loss
The Site Network (131 Locations, 8,536 Spaces)
A Typical Site
The Service Module

- **Night Light**
  - Lighted On/Off button for the screen, so you can find it easily in the dark

- **Card Reader**
  - At login, slide your Member Card then your Fuel Card or other form of payment and follow instructions

- **Movies On-Demand**
  - The hottest titles at your fingertips

- **Built-in TouchScreen**
  - Control your home on the road and surf the Internet

- **Help**
  - Available 24/7. On-Screen Context Sensitive Help or dial 611 from your cab phone or [877] 738-7024 or [885] 437-4000 from any phone

- **120V Electric Outlets**
  - Inside and outside your cab for appliances, block/fuel heaters and other accessories

- **High Speed Internet**
  - High-Speed Ethernet Port for Internet on your computer - wireless Internet also available

- **Filtered Heat & A/C**
  - Thermostat controlled filtered air flow recycled from your cab

- **Go Buttons**
  - One touch access to main functions

- **USB Ports**
  - Use a keyboard or mouse

- **Telephone**
  - Plug in a regular phone for incoming and outgoing calls. Dial 611 for Customer Support

- **Television**
  - Connect your TV with standard COAX cable for television programming
The Installation Process

1. Park in IdleAire Space
2. Install Window Adapter
3. Insert Service Module Into Window Adapter

4. Open Service Module
5. Pay for the Services You Want in Your Cab
6. Make Your Choices

Payment Types accepted - Fleet Fuel Cards: Comdata, EFS, T-Chek, and more; Credit Cards: Visa & M/C, IdleAire Silver and Gold Member Cards, more coming ....
Business Model / Value Proposition

Truck Owners
- Reduces fuel costs
- Reduces engine wear/maintenance costs
- Reduces driver turnover
- Reduces accident costs

Truck Drivers
- Improves quality of rest
- Provides relaxing entertainment
- Provides business and personal communication tools

Travel Center Operators
- New revenue source with no cost
- Stops idling noise and emissions
- Provides broader service offering
- Improves parking lot safety and security

Environmental & Community Benefits
- Stops idling emissions
- Compliance with Clean Air Act
- Conserves energy
- Improves highway safety
Lessors

- With the exception of 2 custom trucking terminal sites, the Company’s sites are strategically located on the lots of major travel centers

<table>
<thead>
<tr>
<th>TA / Petro Corporate</th>
<th>Sites</th>
<th>Spaces</th>
<th>TA / Petro Franchise</th>
<th>Sites</th>
<th>Spaces</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>98</td>
<td>6,646</td>
<td>9</td>
<td>542</td>
<td></td>
</tr>
<tr>
<td></td>
<td>74.8%</td>
<td>77.8%</td>
<td>6.9%</td>
<td>6.3%</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Grand Total</th>
<th>Sites</th>
<th>Spaces</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>131</td>
<td>8,536</td>
</tr>
<tr>
<td></td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pilot</th>
<th>Sites</th>
<th>Spaces</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10</td>
<td>585</td>
</tr>
<tr>
<td></td>
<td>7.6%</td>
<td>6.8%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Independents / Other</th>
<th>Sites</th>
<th>Spaces</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>14</td>
<td>763</td>
</tr>
<tr>
<td></td>
<td>10.7%</td>
<td>8.9%</td>
</tr>
</tbody>
</table>

- The travel centers, as the Company’s lessors, receive monthly payments which are generally structured as a tiered % of specific site revenue