Toolkit Predicting Spatial Evolution of EVs

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PEV Growth in Southeastern Pennsylvania

Number of PEVs

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of PEVs</th>
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<tbody>
<tr>
<td>2012</td>
<td>146</td>
</tr>
<tr>
<td>2015</td>
<td>2236</td>
</tr>
<tr>
<td>2017</td>
<td>4864</td>
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PEV Planning Needs

- Where will owners live?
- Where will owners work?
- Where will owners charge?
- Who needs access to this information?
  - Building owners
  - Transportation officials
  - Electric Distribution Companies (EDCs)
  - Charging equipment manufacturers
Market Forecast Using Census Data

Work Charging Based on Market Scenario

ArcGIS Interface Allows You To Make Your Own Scenarios

Fast Charging - Estimates Take into Account Existing Chargers

Source: UC Davis, 2017
Market Analysis Tool

- Predicts spatial location of PEV owner households by census block group
- Inputs include ACS, LODES, and PEV Sales
- Two-Step Tool
  1. Prepare ACS and LODES data
  2. Calculate PEV Sales

LODES = LEHD (Longitudinal Employer-Household Dynamic) Origin-Destination Employment Statistics
2. Calculate PEV Sales

- Market Assignment Input Table (created in the previous tool)
- The ACS Subset Table contains current PEV sales
- Total PEV vehicles to assign
- Feature Class of Census Tracts

Advanced Settings:
- Diffusion of Innovation
- Market limit-Charging Facility Accessibility Restriction
- Socio-Demographic Variable's Impact
- Field Map: Market Assignment Input Table
Workplace Charging Tool

- Predicts workplace charging demand by census block group
  - kWh of demand
  - Number of charging events
- Data inputs
  - Market Tool results showing where EV owners live
  - LODES and TDM data to determine workplaces and commuting distances
  - PEV Scenario – specified mix of EVs and their respective ranges
  - Pricing and frequency scenarios
Work Charging Analysis

This tool will calculate the work charging demand of each block group based on LODES commute trip data, user-defined PEV ownership, and user-defined PEV split ratio.
Fast Charging Analysis Tool

- Evaluates demand for DC fast charging based on travel patterns and demand at existing and proposed sites

- Data inputs
  - Results of Market Tool
  - Long trip data
Tool Results

• All results will be available in an online, interactive map hosted on DVRPC’s website.
  ▪ Beta version
Next Steps

• Search for ways to obtain data for Fast Charging Tool
• Offer analysis to other parties
  ▪ EDCs
  ▪ Businesses
  ▪ Developers
  ▪ EV charging companies
  ▪ Local governments
  ▪ State governments
  ▪ Regional planners
Case Study – West Chester Borough

West Chester Borough, Chester County, PA
Case Study – West Chester Borough

PEVs in West Chester Borough, Chester County, PA as of December 2017
Case Study – West Chester Borough

PEVs in West Chester Borough, Chester County, PA at 200,000 Regional PEVs
Case Study – West Chester Borough

PEV Work Charging Demand in West Chester Borough, Chester County, PA at 200,000 Regional PEVs - Work Charging Free

Number of Charging Events Per Day

216

Parking

*WCU demand allocated to block group containing payroll address.
Thank you!

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