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Study Approach

• Estimate the scale of public and private charging infrastructure (# ports) required to support different levels of PEV penetration in representative Utility service territories

• Compare the estimated cost of this infrastructure to other benefits provided by PEVs

  ✓ PEV owner savings
  ✓ Electric customer savings
  ✓ GHG reductions

  o This work used a state-level PEV cost-benefit framework previously developed by MJBradley & Associates, state-level estimates of public charging infrastructure needs developed by NREL using the EVI-Pro model, and estimates of infrastructure costs developed by ACEE, RMI, the National Academy of Sciences, and NREL

This analysis was undertaken by MJB&A on behalf of Ceres
These 12 utilities cover 60% of all residential customers in these 7 states

41.8 million customers

*with an estimated 80 million vehicles*

*~30% of LDV fleet*
Total Estimated PEVs & Chargers

By 2035 there will be 2.9 million PEVS in these 12 utility service territories under the EIA scenario and 19.1 million under the 80x50 scenario.

To accommodate this number of PEVs 121,000 public charge ports will be required under the EIA scenario, and 754,000 under the 80x50 scenario.

Only 4% of required public chargers are DCFC, with the rest Level 2.
Estimated cost of PEV charging infrastructure in these 12 utility service territories is $2.7 billion through 2035 under EIA scenario and $17.6 billion under 80x50 scenario.

- $703/PEV for home chargers
- $162/PEV for public L2 chargers
- $66/PEV for DCFC

By 2035 PEV benefits are estimated to be $300-$800/PEV annually.

By 2035 cumulative societal benefits from PEVs will total $10 billion under EIA scenario and $58 billion under 80x50 scenario.

**Benefits Outweigh Costs 3:1**
Key Recommendations

- Develop ambitious, cost-effective and scalable PEV charging infrastructure plans
- Identify key obstacles to increased PEV deployment and develop solutions
- Implement programs that reduce financial risk for private charging station owners
- Design PEV market incentives
- Develop and approve customer rate designs, such as time-of-use rates for PEVs
Appendix: Duke Energy Ohio
PEV Infrastructure Cost/Benefit Analysis

![Chart showing PEV Cumulative Benefits Compared to Charger Costs NPV $ millions](chart1)

![Chart showing Cumulative PEV Net Benefits Compared to Range of Estimated Charger Costs (NPV $ Millions)](chart2)

- **Benefits**
  - Utility Customer Savings
  - PEV Owner Savings
  - Value of GHG Reduction

- **Costs**
  - Home Chargers
  - Public Chargers

### Chart 1: PEV Cumulative Benefits Compared to Charger Costs NPV $ millions

### Chart 2: Cumulative PEV Net Benefits Compared to Range of Estimated Charger Costs (NPV $ Millions)

- **Estimated Charger Costs**
  - High
  - Average
  - Low

Projected total charger costs based on NREL estimate of range of charger needs per PEV, and range of estimated average costs per charger from different sources.