Energy+Environmental Economics

# Transportation Electrification Cost-benefit Analysis

EV Roadmap 9

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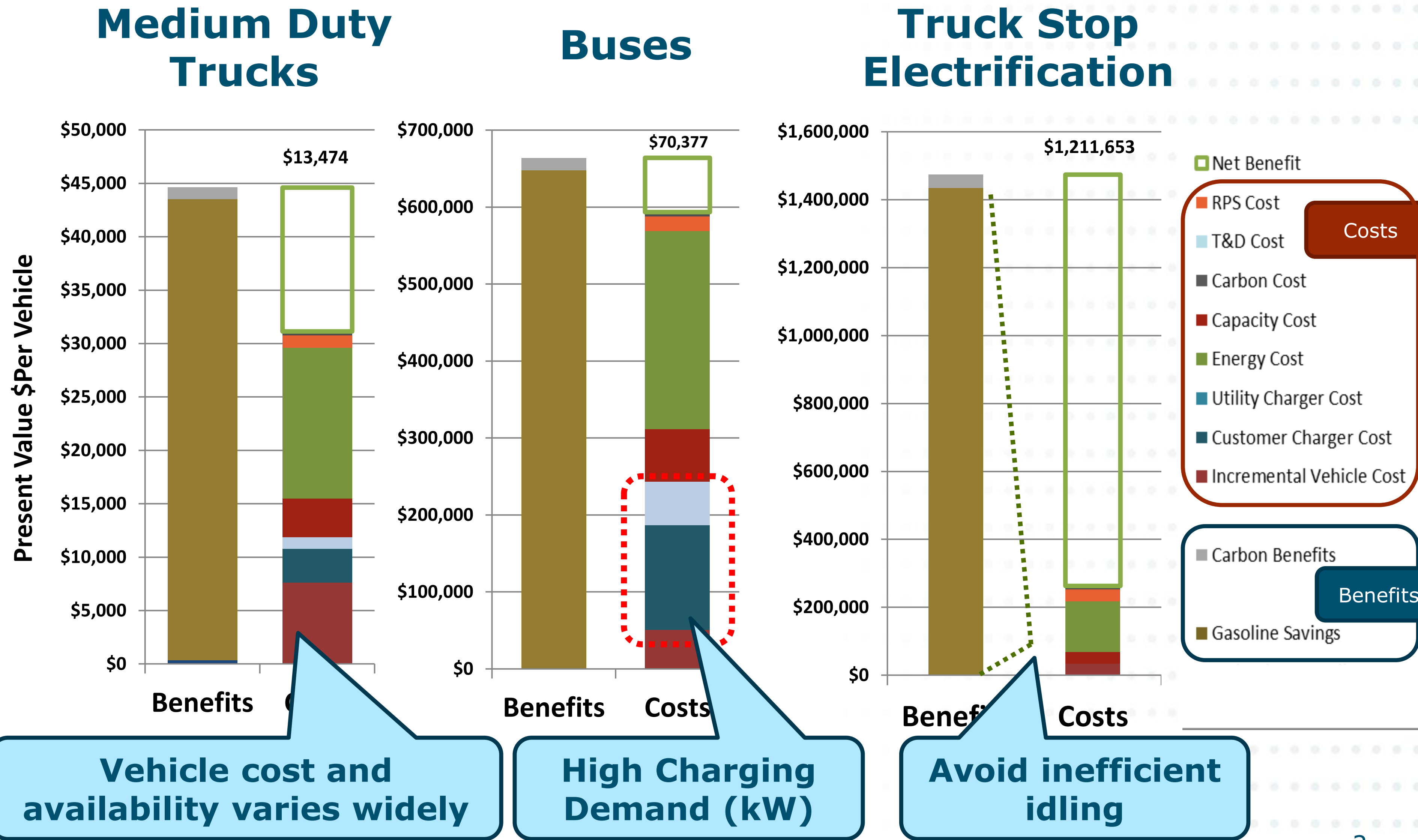
# MDV/HDV sectors are very diverse

## California Utilities' Service Territory Costs & Benefits

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# MDV/HDV Benefits for Utilities

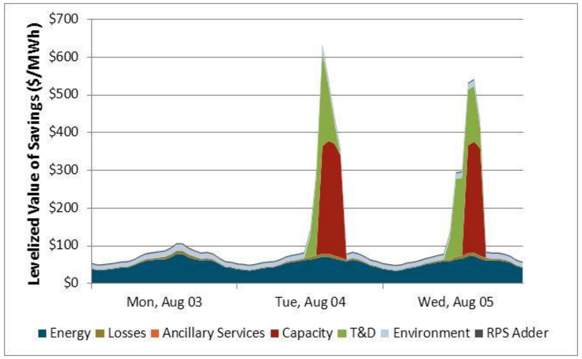
- Incremental load per customer is higher for fleet vehicles, increasing the efficiency of administrative spending
- Fleet vehicles charge reliably and are paired specifically with charging infrastructure, reducing the risk of stranded infrastructure assets
- Many fleet vehicles (buses, taxis, trucks) are highly visible to public, providing educational benefits that can further adoption
- Encouraging adoption for EVs other than LDVs reinforces that EVs are not only for the wealthy
- Often occur in disadvantaged communities, providing social equity opportunities
- Can suffer from market failure of split incentives between site hosts and vehicle operators, creating strong case for utility investment

# Key Rate Issues for PEVs

- **Relative to 'traditional' class average loads, PEV loads may differ for:**
- **Cost Allocation**
  - Capacity costs attributable to PEV load may be lower
- **Coincidence with Peak Load**
  - PEV peaks can be shorter duration (e.g.15 min. vs. 4 hours), with lower cost impacts
  - PEV peak loads may have lower probability of coincidence with other customer loads
- **Billing Determinant**
  - Billing determinant (e.g. non-coincident peak demand) may cause PEVs to pay more than their share

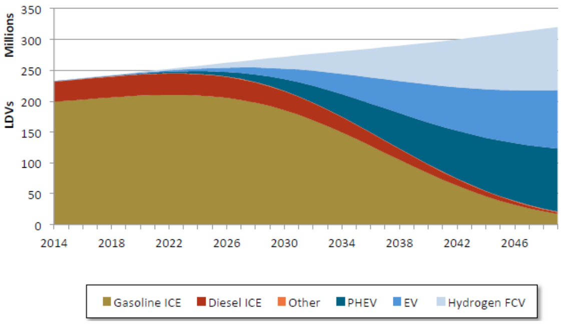
# Cost-benefit analysis is driven by goals

## + Utility Cost-effectiveness Framework




- reduce cost and emissions required to meet forecasted loads with distributed energy resources
- Compare cost of delivered electricity to conventional resource plan (*$/kWh, $/kW-Yr*.)
- Evaluate marginal changes in energy sector

## + GHG Pathways Framework




- Minimize costs to achieve forecasted GHG reductions across energy, transportation and industrial sectors
- Compare cost of carbon reduction in transformational resource plans (*Hint: not just comparing $/ton*)
- Evaluate systemic changes across multiple sectors

# But energy efficiency approach is only partially applicable

| Useful Tools from EE | Key Differences for TE |
| --- | --- |
| Established methods for calculating 'avoided cost' (benefits) | Requires coordination across utility and transportation sectors |
| Established cost-benefit framework | Nascent market with many unknowns outside energy sector |
| Using 'total' and 'societal' benefits to justify utility ratepayer funding | Hard to 'attribute' increase in adoption to specific actions or actors |
| Emphasis on transparency and stakeholder process | Risk of stranded assets if EV adoption is low |
| Utility role in bridging market gaps and barriers | |

**Transportation electrification poses different threshold questions for regulators (and stakeholders)**

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# Thank You!


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