Evaluation Methodologies
From Other Practice Areas
CPUC TE PROGRAM EVALUATION METRICS WORKSHOP

May 9, 2019
Introducing Cadmus’s EM&V
Exceed expectations. Challenge and reward our team. Grow and prosper. Make a difference.

Since 1983
Employee-owned social good consultancy

33 years of helping our clients address complex challenges in a highly collaborative environment

Started with 2 Co-Founders, now 500+ strong

19 offices
Outline

- Evaluation Philosophy
- Evaluation Tools
- Transportation Electrification: Evaluation Opportunities and Challenges
EM&V definitions

Evaluation, measurement, and verification (EM&V)

Evaluation is at the program & portfolio levels

Measurement is at the project level

Verification is at the project level

Both M and V are often components of E!
Why do EM&V?

Program Plan

EVALUATE

Program Goal

Unexpected Program Results

EVALUATE
Evaluation types

All require solid researchable questions as the foundation

Process Evaluation

Process + Impact + Market Assessment = well-rounded evaluation

Market Assessment

Impact Evaluation
Outline

• Evaluation Philosophy

• Evaluation Tools

• Transportation Electrification: Evaluation Opportunities and Challenges
Example tools of the trade
Not a comprehensive list

### Process Evaluation
- Documentation review
- Pipeline and processing review
- Risk/opportunity analysis
- IDIs (administrator, implementor, stakeholder, etc)
- Customer surveys and intercept surveys
- Stakeholder engagement
- Focus groups

### Impact Evaluation
- Verification
- Regression
- Billing analysis
- Difference-in-differences
- Sampling techniques
- RCTs
- Propensity score matching
- Random encouragement
- Random recruit deny/delay
- Site visits

### Market Assessment
- Market data analysis
- GIS analysis
- IDIs with market actors
- Delphi panels
- Customer segmentation
- Choice-based conjoint analysis
Key Players

Interview key players in the program

- Utility staff
- Program managers and staff
- Market actors (e.g., dealers, EVSPs, contractors)
- Participating customers
- Other stakeholders

Are there others who could give insight to the program?

- Nonparticipating dealers
- Nonparticipating customers
- Program managers from other utilities with similar programs
- Industry experts
Application: Dealership (assess market lift)

LED Sales Lift Analysis

- Uses comprehensive data on program bulb sales before, during and after event (obtained from retailers)
- Analysis by type of bulb
- Compare actual sales during event to likely sales during same period with no event

How would it apply at a dealership?

- Vehicle purchases subject to additional seasonal patterns
- Cars are much more differentiated
- Difference in differences with comparable dealerships?
Application: Public Charging (capture data on mobile participants)

Intercept surveys where “participants” or “users” not tracked

**Traditional Evaluation**
- Often done for midstream retail programs
- To gather critical data not available through other means for evaluation
  - Baseline equipment (e.g. bulb) being replaced
  - Leakage
  - Early replacement of old equipment

**Transportation Electrification**
- Could be applied at any public charging location
  - Understand the site – are people waiting there? Are there peak periods?
  - Is the EVSP able to facilitate online methods or is intercept the only option?
- To gather data on how important this charging location is for user – access to charging elsewhere (home, work), whether the user would otherwise frequent this location, their satisfaction, etc

**Common needs:**
- Should be short (5-6 questions)
- Requires approval from retailer (or site host)
Application: Workplace or public charging (inform design)

Survey Sampling & Respondent Characteristics

EV Owners (n=271)
- Own or lease an EV
- Utility customer
- Employed, does not work from home
- Does not work in market research

Prospective EV Owners (n=411)
- Interested in purchasing or leasing an EV within 2 years
- Utility customer
- Employed, does not work from home
- Does not work in market research

<table>
<thead>
<tr>
<th></th>
<th>Avg. Age</th>
<th>SF Dwelling</th>
<th>Income &gt;$100k</th>
<th>Bachelor’s +</th>
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</thead>
<tbody>
<tr>
<td>EV Owners</td>
<td>46</td>
<td>84%</td>
<td>66%</td>
<td>80%</td>
</tr>
<tr>
<td>Non-EV Owners</td>
<td>46</td>
<td>91%</td>
<td>51%</td>
<td>66%</td>
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## Application: Workplace or public charging (inform design)

### Choice-Based Conjoint Model

<table>
<thead>
<tr>
<th>Payment Approach</th>
<th>Type Of Charging</th>
<th>Availability</th>
<th>Time Limit</th>
<th>Parking Proximity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Free/fully subsidized</td>
<td>Level 1</td>
<td>Plenty</td>
<td>No limit</td>
<td>Close</td>
</tr>
<tr>
<td>$15/m unlimited</td>
<td>Level 2</td>
<td>Share</td>
<td>Must move within 60 min of charge completion</td>
<td>Moderate</td>
</tr>
<tr>
<td>$30/m unlimited</td>
<td>D/C Fast Charge</td>
<td>Limited</td>
<td></td>
<td>Far</td>
</tr>
<tr>
<td>$1.50 per hr. charge</td>
<td></td>
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- **Parking Proximity**
  - Close
  - Moderate
  - Far
Outline

• Evaluation Philosophy

• Evaluation Tools

• Transportation Electrification: Evaluation Opportunities and Challenges
Challenges
Not entirely unique to TE, but arguably more acute in TE

<table>
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<tr>
<th>Disentangling program impacts</th>
<th>Complexity of participant motivation</th>
<th>Customer/host learning curve</th>
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<tr>
<td>Confidential operational data</td>
<td>Diversity of vehicles, EVSE, and use cases</td>
<td>Changes to schedule may require adaptive approach to eval</td>
</tr>
<tr>
<td>Limited historical data and standardization</td>
<td>Whether to purposely design control groups in each case?</td>
<td>PRPs/SRPs could impact each others’ success</td>
</tr>
</tbody>
</table>
Opportunities

Involve evaluators early for evaluability

Leverage non-intrusive data collection

Develop sophisticated, up-to-date understanding of customers and their barriers

Customize approach to current position along the technology curve

TE is a massive market with substantial momentum and mandates. Important to tailor evaluation approaches accordingly.
Thank You

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