Don’t Phone it in – On-sites are Necessary

Priya Sathe

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QUESTION: ARE TELEPHONE SURVEYS ACCURATE FOR COMMERCIAL BASELINE STUDIES?

» Commercial baseline surveys collect information on customers characteristics and the types and efficiencies of equipment
  • The data are complicated and heterogeneous
» Telephone surveys provide a low cost option
» On-site surveys are preferred for their accuracy and detailed information
» Use findings from on-site surveys nested within phone survey to determine accuracy
OUTLINE

» The Study
» Available data
» Incidence analysis
» Comparison analysis
» Conclusion
THE CALIFORNIA COMMERCIAL SATURATION SURVEY (CSS)

» Investigated measures currently installed in commercial buildings (2010-2012)
» Conducted surveys of non-residential customers in the CA IOU service territories. Funded by CPUC.
  • Telephone Surveys – 7,980
    - Collect information on business characteristics and the types of lighting, TVs, refrigeration, and HVAC equipment at their site
  • On-Site Surveys – 1,439
    - Collect information on measures Currently Installed in Commercial Buildings; Lighting, Small HVAC, Refrigeration, TVs, Office Equipment, EMS
  • Web site: http://capabilities.itron.com/wo024/
» The on-sites were recruited from the telephone survey
» Produced results by IOU, business type, customer size, and EE program participation
INCIDENCE VERSUS COMPARISON ANALYSIS

» Investigate the nature and extent of inaccuracies in self-report telephone data compared with on-site survey data.

» Incidence Analysis: Average incidence of measures
  • Can telephone surveys be used to correctly estimate the average incidence of equipment?
  • Do errors cancel out in aggregate?

» Comparison Analysis: Site level matching of responses
  • How accurate are individual customers during telephone surveys?
  • Are some technologies accurately reported?
  • Are some groups of customers more accurate?
INCIDENCE ANALYSIS

» The incidence analysis compares the overall incidence rate from the phone survey to the incidence rate derived from the on-site survey.

» Analysis uses all of the responses from the telephone and the on-site data collection effort.

» If errors cancel, telephone surveys can describe average distributions accurately
  • Incidence of many, but not all measures, were under-reported relative to data from the on-sites.
### INCIDENCE ANALYSIS - FINDINGS

<table>
<thead>
<tr>
<th>Technology</th>
<th>Telephone Survey ($n = 7,890$)</th>
<th>On-site Survey ($n = 1,439$)</th>
<th>Telephone Incidence Relative to On-site</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linear Fluorescents</td>
<td>79%</td>
<td>94%</td>
<td>- 15%</td>
</tr>
<tr>
<td>T12/ Fat tubes</td>
<td>19%</td>
<td>42%</td>
<td>- 23%</td>
</tr>
<tr>
<td>T8/ Second Generation T8/ Skinny Tubes</td>
<td>43%</td>
<td>71%</td>
<td>- 28%</td>
</tr>
<tr>
<td>T5</td>
<td>5%</td>
<td>6%</td>
<td>-1%</td>
</tr>
<tr>
<td>CFLs</td>
<td>47%</td>
<td>62%</td>
<td>- 15%</td>
</tr>
<tr>
<td>LEDs</td>
<td>19%</td>
<td>4%</td>
<td>15%</td>
</tr>
<tr>
<td>Occupancy Sensors</td>
<td>21%</td>
<td>17%</td>
<td>4%</td>
</tr>
</tbody>
</table>
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</tr>
</thead>
<tbody>
<tr>
<td>No Cooling</td>
<td>25%</td>
<td>23%</td>
<td>2%</td>
</tr>
<tr>
<td>Split System – Cooling</td>
<td>9%</td>
<td>12%</td>
<td>-3%</td>
</tr>
<tr>
<td>Packaged System – Cooling</td>
<td>37%</td>
<td>52%</td>
<td>-15%</td>
</tr>
<tr>
<td>TV</td>
<td>38%</td>
<td>47%</td>
<td>-9%</td>
</tr>
<tr>
<td>Solar PV</td>
<td>3%</td>
<td>2%</td>
<td>1%</td>
</tr>
</tbody>
</table>
SITE LEVEL COMPARISON ANALYSIS

» A site specific analysis restricted to sites in both surveys

» Phone respondents often know if they have a general class of technologies (linear technologies and TVs) but have less understanding of the specific technology.

» Little evidence that the accuracy of responses was dependent on the end use or the novelty of the technology.
CSS PHONE VS. ONSITE – COMPARISON ANALYSIS -HIGHLIGHTS

» Findings of Comparison Analysis consistent with Incidence analysis for T12s, T8s and CFLs which are under-reported by Phone surveys, and for LEDs which are over-reported.

» Comparison shows that site level false positives and false negatives cancel each other to bring overall incidence for phone and on-sites close for T5s.

» The discrepancies in the phone and onsite survey findings regarding the presence of solar generation is relatively low, but is higher for other types of distributed generation.
CSS PHONE VS. ONSITE – CONCLUSIONS

» Large businesses were found to have greater discrepancies in phone and on-site survey findings regarding the square footage of their premises than small businesses.

» Schools and chain businesses may provide incorrect responses due to confusion about the exact site being discussed.

» A potential source of disparity is the wording of the phone survey question.

» Also a source of disparity could be new purchases between the time of the phone survey and the on-site survey.
CSS PHONE VS. ONSITE - CONCLUSIONS

» Trade-off between Cost and Reliability is Large.
» What is the optimal mix of on-site and telephone survey data?
» Findings support the need to continue with on-site surveys and contractor studies to maintain a clear understanding of the efficiency distribution of technologies.
THANK YOU