Swimming Against the Tide—
Gauging HVAC Quality
Installation and Quality
Maintenance Program Efforts
to Establish a Foothold in the
Market

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Agenda

- Study Objectives
- Programs and Market Transformation Indicators
- Data Sources
- Findings
- Recommendations
Study Objectives

• Provide baseline for CPUC HVAC residential and small commercial customer programs to help assess future market effects

• Address market transformation indicators (MTIs) established for HVAC programs

• Develop estimates for energy-efficient HVAC equipment of market share, sales, saturation
CPUC HVAC Subprogram Areas

• Quality Installation (QI) and Quality Maintenance (QM)
  – Industry standards (ANSI/ACCA/ASHRAE) establish minimum requirements for the installation, inspection and maintenance of HVAC systems
  – Promote thermal comfort, indoor air quality, and energy efficiency.

• Upstream HVAC Equipment
  – Incentives provided to distributors for selling high efficiency HVAC equipment
## CPUC HVAC Subprograms and Market Transformation Indicators (MTIs)

<table>
<thead>
<tr>
<th>Subprogram</th>
<th>Subprogram Name</th>
<th>MTI</th>
<th>MTI Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HVAC-1</td>
<td>Upstream HVAC Equipment Subprogram</td>
<td>MTI-1</td>
<td>Market share of climate appropriate HVAC equipment.</td>
</tr>
<tr>
<td>HVAC-2</td>
<td>Residential Energy Star Quality Installation Subprogram</td>
<td>MTI-2</td>
<td>Percentage change in the use of Quality Installation guidelines among all California Residential HVAC installation contractors.</td>
</tr>
<tr>
<td>HVAC-3</td>
<td>Commercial Quality Installation Subprogram</td>
<td>MTI-3</td>
<td>Percentage change in the use of Quality Installation guidelines among all California Commercial HVAC installation contractors.</td>
</tr>
<tr>
<td>HVAC-4</td>
<td>Quality Maintenance Development Subprogram</td>
<td>MTI-4</td>
<td>Percent change in the employment of Quality Maintenance practices among all California HVAC contractors and technicians.</td>
</tr>
</tbody>
</table>
Data Sources

- Data sources for baseline MTIs and secondary indicators
  - HVAC Maintenance Behavioral Research Study
  - RMST/CLASS
  - CMST/CSS
  - HVAC Impact Evaluation

- These included
  - Online and telephone surveys of residential customers, small commercial customers, and contractors
  - In-depth interviews with program staff and HVAC distributors
  - On-sites and field assessments of homes with cooling systems, recent installations, and recent maintenance
Progress Toward California Energy Efficiency Strategic Plan
Market Share Goal:
15% of HVAC equipment shipments optimized for California’s climate by 2015 and 70% by 2020

- Overall Sales 2011/12 Tier 1 or better: 57%
- Overall Sales 2011/12 Tier 2 or better: 13%
- CA Strategic Plan 2015: 15%
- CA Strategic Plan 2020: 70%
Contractor Awareness of and Adherence to Standards

**Installation Contractors**

<table>
<thead>
<tr>
<th>Category</th>
<th>Awareness of ACCA Standard 5 but do not adhere to specifications</th>
<th>Adhere to some of ACCA Standard 5 specifications</th>
<th>Adhere to all of ACCA Standard 5 specifications</th>
<th>Aware of ACCA Standard 5</th>
<th>Have formal installation policies and guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>0%</td>
<td>27%</td>
<td>14%</td>
<td>42%</td>
<td>75%</td>
</tr>
<tr>
<td>Small Commercial</td>
<td>4%</td>
<td>23%</td>
<td>8%</td>
<td>36%</td>
<td>59%</td>
</tr>
</tbody>
</table>

**Maintenance Contractors**

<table>
<thead>
<tr>
<th>Category</th>
<th>Awareness of ACCA/ASHRAE Standards but do not adhere to specifications</th>
<th>Adhere to some of ACCA/ASHRAE Standards specifications</th>
<th>Adhere to all of ACCA/ASHRAE Standards specifications</th>
<th>Aware of ACCA/ASHRAE Standards</th>
<th>Have formal maintenance policies and guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>2%</td>
<td>32%</td>
<td>10%</td>
<td>45%</td>
<td>63%</td>
</tr>
<tr>
<td>Small Commercial</td>
<td>0%</td>
<td>25%</td>
<td>7%</td>
<td>34%</td>
<td>58%</td>
</tr>
</tbody>
</table>
Contractors with IOU Training / Qualification

Installation Contractors

- Residential Installation Contractors: 3% PG&E, 3% SDG&E, 1% SCE
- Commercial Installation Contractors: 1% PG&E, 1% SDG&E

Maintenance Contractors

- Residential Maintenance Contractors: 10% PG&E, 2% SDG&E, 1% SCE
- Commercial Maintenance Contractors: 7% PG&E, 3% SDG&E, 2% SCE
Customer Awareness

QI

Residential Customers: 16% (Unaided), 25% (Aided)
Small Commercial Customers: 17% (Unaided), 28% (Aided)

QM

Residential Customers: 22% (Unaided), 40% (Aided)
Small Commercial Customers: 21% (Unaided), 36% (Aided)
# Customer Reported Frequency of Maintenance Visits (excluding repairs)

<table>
<thead>
<tr>
<th></th>
<th>Residential</th>
<th>Small Commercial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Three or more times a year</td>
<td>1%</td>
<td>19%</td>
</tr>
<tr>
<td>Two times a year</td>
<td>8%</td>
<td>16%</td>
</tr>
<tr>
<td>Once a year</td>
<td>15%</td>
<td>23%</td>
</tr>
<tr>
<td>Once every two years</td>
<td>10%</td>
<td>6%</td>
</tr>
<tr>
<td>Once every three years</td>
<td>10%</td>
<td>2%</td>
</tr>
<tr>
<td>Once every four years or less</td>
<td>13%</td>
<td>5%</td>
</tr>
<tr>
<td>Never</td>
<td>33%</td>
<td>25%</td>
</tr>
<tr>
<td>NA</td>
<td>10%</td>
<td>4%</td>
</tr>
</tbody>
</table>
Barriers to QI and QM

Residential
- Access to checklists: 22%
- Access to diagnostic tools: 16%
- Available technical training: 16%
- Contractors' knowledge: 16%
- Technicians' knowledge: 15%
- Customers' reluctance to pay: 11%
- Installation Contractors: 58%
- Maintenance Contractors: 52%
- No Barriers: 6%

Small Commercial
- Access to checklists: 16%
- Access to diagnostic tools: 16%
- Contractors' knowledge: 35%
- Customers' reluctance to pay: 66%
- Installation Contractors: 34%
- Maintenance Contractors: 52%
- No Barriers: 13%

Customers’ reluctance to pay
- Residential: 22%
- Small Commercial: 52%

Technicians’ inability to sell
- Residential: 39%
- Small Commercial: 39%

Customers unaware of... maintenance
- Residential: 37%
- Small Commercial: 37%

Equipment warranties deter...
- Residential: 27%
- Small Commercial: 28%

No Barriers
- Residential: 6%
- Small Commercial: 11%
Market Squeeze on Programs

• “Race to the bottom” in the market for HVAC service and installation
  – Low customer awareness of QI and QM
  – Customer inability to assess quality of contractor’s work
• The QI and QM Programs attempt to address this issue
• But may be caught between the pincers of a demand-side and supply-side squeeze
• On the demand side, customer reluctance to pay is a barrier
• On the supply side, up to one-quarter of HVAC technicians in California may be unlicensed contractors
• Strong cost pressures on licensed contractors
• May limit ability of QI and QM programs to gain traction in marketplace
Recommendations

- Design and operation of the HVAC subprograms
  - Focus on educating customers about QI and QM and the benefits of energy efficient HVAC systems
  - Step up efforts to have contractors participate in IOU training programs

- Research and monitoring of program indicators
  - Implement a market share tracking system for periodic reporting of market shares by efficiency level and sales
  - Customer focus groups may help assess perceptions of "Quality Installation" and “Quality Maintenance” versus the generic term “quality”
  - Further assess the magnitude of the problem of competition from unlicensed technicians