

# State of Wisconsin Public Service Commission of Wisconsin

Focus on Energy Evaluation

*Business Programs: Supply-side Evaluation*

April 22, 2010

Evaluation Contractor: PA Consulting Group, Inc.

Prepared by: Christopher Dyson, Shawn Bodmann, Karen Rothkin,  
Maggie Pinckard, Erika Morgan, Ryan Barry,  
and Miriam Goldberg, KEMA Inc.



**focus on energy**<sup>sm</sup>

*The power is within you.*

# State of Wisconsin Public Service Commission of Wisconsin

Focus on Energy Evaluation

*Business Programs: Supply-side Evaluation*

April 22, 2010

© PA Knowledge Limited 2010

Liaison Contact: Dr. David Sumi  
PA Consulting Group Inc.  
6410 Enterprise Lane, Suite 300  
Madison, Wisconsin 53719  
Tel: +1 608 316 3700  
Fax: +1 608 661 5181  
E-mail: [david.sumi@paconsulting.com](mailto:david.sumi@paconsulting.com)

Prepared by: Christopher Dyson, Shawn Bodmann, Karen Rothkin, Maggie Pinckard,  
Erika Morgan, and Ryan Barry, KEMA

Contributions by: Miriam Goldberg, KEMA

Acknowledgment: Ralph Prah, Prah & Associates, contributed critical review and analysis.

## TABLE OF CONTENTS

<b>1.</b>	<b>Executive Summary</b>	<b>1-1</b>
1.1	Introduction	1-1
1.2	Key Findings	1-1
1.3	Summary	1-19
<b>2.</b>	<b>Introduction</b>	<b>2-1</b>
<b>3.</b>	<b>Methodology</b>	<b>3-1</b>
3.1	The 2008 Channel Study	3-1
3.2	The Supply-side Study	3-3
<b>4.</b>	<b>Findings</b>	<b>4-1</b>
4.1	Hypothesized Market Effects from the Program Theory and Program Implementer Interviews	4-1
4.2	Comparing the Current Wisconsin and Illinois HVAC and Lighting Markets	4-5
4.3	Assessment of Hypothesized Market Effects	4-41
4.4	Estimating Untracked Attributable Savings	4-92
<b>5.</b>	<b>Summary and Conclusions</b>	<b>5-1</b>
<b>Appendices</b>		
	<b>APPENDIX A: Methodology</b>	<b>A-1</b>
	<b>APPENDIX B: Market Actor Survey Instruments</b>	<b>B-1</b>

## 1. EXECUTIVE SUMMARY

---

### 1.1 INTRODUCTION

This Supply-side Study builds upon findings from the 2008 Focus BP Channel Study. The 2008 Channel Study, which was also conducted by KEMA, provided baseline estimates for the Focus on Energy BP market effect contract metrics and investigated other potential indicators of program market effects. The 2008 Channel Study found some evidence that Focus BP might be having sizable additional program effects on the market that were not already being captured by the program tracking and current evaluation activities. The authors of the 2008 Channel Study concluded that these and other findings “support the existence of market effects and therefore KEMA advises the PSCW to pursue supplemental supply-side research.”

This Supply-side Study expands the scope of the 2008 Channel Study in a number of ways including:

- Identifying the causes of differences between Wisconsin and Illinois energy efficiency activities
- Quantifying untracked attributable savings (UAS)
- Expanding the number of energy-efficient measures
- Expanding the range of market actors
- Expanding the data sources.

Key sources of information for this Supply-side Study included:

- Review of the program theory that Focus BP implementers developed in August 2009
- In-depth interviews with Focus BP implementers and PSCW staff
- Interviews with lighting and HVAC market actors in Wisconsin and Illinois
- An analysis of the Focus BP tracking data
- The 2008 Focus BP Channel Study.

### 1.2 KEY FINDINGS

This section summarizes the key findings that are laid out in more detail in the main body of the report.

#### 1.2.1 Comparing the Wisconsin and Illinois HVAC markets on characteristics other than potential market effects

Before examining the evidence for potential market effects mentioned by the Focus BP program implementers, we compared the Wisconsin and Illinois HVAC markets on a number of other characteristics of interest. These included company size, services offered, equipment installed, important players in HVAC specification, cross-state market activity, awareness of

and involvement with HVAC rebate programs, and barriers to energy efficiency. Table 1-1 and Table 1-2 summarize the results of these comparisons.

**Table 1-1. Comparing the Wisconsin and Illinois HVAC Markets on Company Size, Services Offered, Equipment Installed, HVAC Specification, and Cross-state Market Activity**

Market Attribute	Key Findings
Company size, services, equipment	<p><b>Company size.</b> Wisconsin HVAC companies averaged \$1 million in annual revenue compared to \$1.8 million for Illinois companies. However, the average number of full-time employees was actually higher for Wisconsin (68) than Illinois (41) due to the presence of a single, very large HVAC company in the Wisconsin sample.</p> <p><b>Company services/ project mix.</b> Wisconsin companies were somewhat more diversified in service offerings (e.g., distribution, installation, specification, control systems) than Illinois companies. Both the Wisconsin and Illinois companies reported that the routine replacement or maintenance of existing HVAC equipment accounted for the largest share of their sales. However, many respondents commented about how the current economic downturn has severely curtailed their new construction opportunities, so it is not clear how typical these project distributions are.</p> <p><b>Equipment installed.</b> Wisconsin and Illinois companies were fairly similar in the frequency with which they sold/installed furnaces, chillers, packaged RTUs, and infrared heaters. Wisconsin companies were more likely to report selling/installing boilers, PTACs/PTHPs, ERVs, and stream traps. Illinois companies were more likely to report selling/installing split-system RTUs.</p>
HVAC specification process	<p><b>New construction projects.</b> A much higher percentage of Wisconsin HVAC companies said that contractors/distributors and customers were influential in the HVAC specification process than Illinois HVAC companies did.</p> <p><b>Major retrofit/remodeling projects.</b> The only significant difference between the Wisconsin and Illinois HVAC companies was that the Wisconsin companies were much more likely to cite customers as influential players.</p>
Cross-state market activity	<p>A quarter of the Wisconsin HVAC companies said that they had sales/installations in Illinois and a fifth of the Illinois HVAC companies said they had sales/installations in Wisconsin. However, the fully-weighted results showed that the Wisconsin companies with cross-state market activity were larger on average than their Illinois counterparts.<sup>1</sup></p>

---

<sup>1</sup> Throughout this report we will often present the responses to questions in two formats: (1) *percentage of respondents*—this is simply the unweighted percentage of respondents from the sample that gave a certain response to a given question and (2) *weighted for population and size*—this the percentage from (1) after adjustments for both a population expansion weight (e.g., adjusting for the fact that the percentage of respondents from a given stratum in our sample may be overrepresented or underrepresented compared to the general population) and a ratio estimator which uses the number of employees at that location as a weight to account for company size and potential market impact. The details of our weighting approach are described in Appendix A.

**Table 1-2. Comparing the Wisconsin and Illinois HVAC Markets on Rebate Program Awareness/Involvement and Barriers to Energy Efficiency**

Market Attribute	Key Findings
Awareness, involvement with HVAC rebate programs	<p><b>Program awareness.</b> Nearly all (97 percent) the Wisconsin HVAC companies said that they were aware of the Focus on Energy program but only 54 percent of the Illinois HVAC companies claimed awareness of the Illinois HVAC rebate programs. Levels of awareness of the programs across the border were similar in both states although the Wisconsin companies that were aware of the Illinois programs tended to be larger than the Illinois companies that were aware of Focus on Energy.</p> <p><b>Program involvement.</b> 77–87 percent (depending on weighting) of the Wisconsin HVAC companies said that they participated in at least one project that had received a rebate from Focus on Energy. In contrast only 16–18 percent of Illinois HVAC companies said that they had participated in a project rebated by the Illinois programs. The Illinois participation level was likely even lower since only Illinois HVAC companies that were aware of the Illinois rebate programs were asked about participating in a rebated project.</p>
Barriers to energy efficiency	<p><b>Barriers to energy efficiency.</b> We asked the HVAC companies what factors prevent them from selling a higher volume of energy-efficient equipment/services than they currently are. With a couple of exceptions (Wisconsin companies were more likely to name staffing levels, customer preferences) the Wisconsin and Illinois HVAC companies cited the barriers with similar frequency. For both groups the poor economy and higher equipment costs were the two most-cited barriers.</p> <p><b>Effects of the economic downturn.</b> Slightly over half of both the Wisconsin and Illinois HVAC companies said that their sales are down overall due to the poor economy. However, a higher percentage of the Wisconsin companies said that economic conditions have had no effect on their sales and the Illinois companies were more likely to say that the economy was limiting their sales of energy-efficient products.</p>

**1.2.2 Comparing the Wisconsin and Illinois lighting markets on characteristics other than potential market effects**

This subsection compares the Wisconsin and Illinois lighting markets on a number of market characteristics other than the potential market effects. These included company size, services offered, equipment installed, important players in HVAC specification, cross-state market activity, awareness of and involvement with HVAC rebate programs, and barriers to energy efficiency.

**Table 1-3. Comparing the Wisconsin and Illinois Lighting Markets on Company Size, Services Offered, Equipment Installed, Lighting Specification, and Cross-state Market Activity**

Market Attribute	Key Findings
Company size, services, equipment	<p><b>Company size.</b> The average number of employees was 41 for Wisconsin and 30 for Illinois. The biggest differences in the mix of employment size categories were that the Wisconsin sample had more companies in the 100+ employment category while Illinois had more in the 25–100 employment category. The average annual revenue estimate for the Wisconsin respondents was \$318 million and the average estimate for the Illinois respondents was \$430 million. Yet these averages were greatly increased by the presence of a few large lighting companies and the median annual revenue figures were much lower than this.</p> <p><b>Company services/project mix.</b> The Wisconsin lighting companies were overall more diversified in their service offerings than their Illinois counterparts. Based on the fully-weighted data, the Wisconsin companies were significantly more likely to offer distribution and design/specification services. This diversification—especially the broader range of Wisconsin companies doing lighting specification—should make it easier for the Focus BP Lighting Channel Initiative to produce market effects. Of course, this greater diversification could also be a market effect of the Focus BP. It is possible that greater lighting activity driven by the Focus BP incentives and Lighting Channel Initiative is encouraging lighting companies to broaden their services.</p> <p>The percentage of companies reporting the manufacture of lighting products was low in both states. The Wisconsin companies reported a higher percentage of lighting work from new construction than the Illinois companies did. Yet it is likely that the current economic downturn has limited new construction opportunities, so it is not clear how typical these project distributions are.</p>
Lighting specification process	<p><b>New construction projects.</b> The Wisconsin lighting companies were much more likely than the Illinois lighting companies were to say that engineers and customers were influential in new construction specification. The Illinois companies were much more likely to cite architects. The greater involvement of Wisconsin customers in new construction lighting specification may be an indicator of a more transformed lighting market.</p> <p><b>Major retrofit/remodeling projects.</b> Once again, the Wisconsin companies were more likely to name design engineers and customers as influential players than the Illinois companies were. A number of Illinois companies named architects although none of the Wisconsin respondents did.</p>
Cross-state market activity	<p>About a quarter of the Wisconsin and Illinois lighting companies reported sales across the border.</p>

**Table 1-4. Comparing the Wisconsin and Illinois Lighting Markets on Awareness of/Involvement with the Lighting Rebate Programs and Barriers to Energy Efficiency**

Market Attribute	Key Findings
Awareness, involvement with lighting rebate programs	<p><b>Program awareness.</b> Nearly all (94–95 percent) the Wisconsin Lighting companies said that they were aware of the Focus on Energy program. Awareness of the Illinois lighting rebate program among the Illinois lighting companies ranged between 68–82 percent depending on whether it was the ComEd or Ameren rebate program and on the weighting of the responses.</p> <p><b>Program involvement.</b> A large majority of the Wisconsin lighting companies (83–97 percent depending on weighting) reported participating in at least one project that had received a rebate from Focus on Energy. Slightly more than half of the Illinois lighting companies (55–57 percent) reported receiving ComEd or Ameren rebates for at least some of their projects. The Illinois participation level was likely even lower since only Illinois lighting companies that were aware of the Illinois rebate programs were asked about participating in a rebated project. Over two thirds of the Wisconsin companies said they had participated in a Focus on Energy training or educational session, while only a little more than a quarter of the Illinois lighting companies said they had.</p>
Barriers to Energy Efficiency	<p><b>Barriers to EE.</b> We asked the Wisconsin and Illinois lighting companies what factors prevent them from selling a higher volume of energy-efficient equipment/services than they currently are. The Wisconsin companies were much more likely to cite the state of the general economy as a barrier. The Illinois companies were more likely to point to customer preferences. The lighting companies were also asked what sorts of concerns that end users or contractors might raise about energy-efficient lighting. The Wisconsin companies were more than twice as likely to say that end users and contractors do not raise concerns, which might be another indicator that the Wisconsin lighting market is being transformed.</p>

### 1.2.3 Comparing the hypothesized HVAC market effects with the evidence

In the in-depth interviews, the Focus BP implementers mentioned a number of possible market effects that the evaluators should look for in the HVAC market. The following tables compare these hypothesized market effects for high-efficiency boilers, boiler controls, boiler tune-ups, high-efficiency RTUs, and many other HVAC measures with the evidence from the market actor surveys as well as other sources such as the in-depth interviews and the Focus BP tracking database.



**Table 1-5. Comparing the Hypothesized Market Effects for the Wisconsin Market Penetration of High-efficiency Modulating Boilers with the Evidence**

Hypothesized Market Effects	Evidence from the Market Actor Surveys
<p>A high market penetration of high-efficiency modulating boilers in Wisconsin</p>	<p><b>Evidence of market effects</b></p> <p>The fully-weighted Wisconsin estimate of the percentage of high-EE modulating boilers (88 percent) was statistically different than the Illinois estimate (66 percent) at the 90% confidence level.</p> <p>The trend lines (current period vs. three years ago) for the market penetration of high-EE modulating boilers showed companies from both states reporting their market penetration increasing over time with a similar margin of difference between Wisconsin and Illinois being maintained over both time periods.</p>
<p>A high market penetration of high-efficiency modulating boilers in Wisconsin</p>	<p><b>Evidence of attribution of market effects to Focus</b></p> <p><b>Causes of high-EE boiler market penetration.</b> Rebate programs were the most-cited factors for both the Wisconsin and Illinois respondents. Yet a number of other factors were also cited by multiple respondents from both states including increased interest in energy efficiency, energy costs, and improvements in boiler technology/quality. The presence of these non-rebate-program factors may help explain why the Illinois trend line went up over time even though the Illinois rebate programs have only been in effect for a year and a half.</p> <p><b>High-EE boiler market penetration in the absence of Focus.</b> When asked for their best estimate of what their percentage of high-EE boilers would have been if the FOE program had not existed, the fully-weighted percentage of high efficiency dropped from 88 percent to 54 percent.</p> <p><b>Relatively low program rebate activity.</b> In calendar year 2009, there were only 47,238 therms in Focus BP tracked gross energy savings for modulating hot water boilers. This was much lower than claimed savings for boiler controls (875,860) and boiler tune-ups (7,154,384). However, the cumulative effects of past years of Focus boiler rebates and interventions with boiler companies may also be influencing market effects for the modulating boilers.</p>

**Table 1-6. Comparing the Hypothesized Market Effects for Condensing Boilers, Boiler Controls, and Boiler Tune-ups with the Evidence**

Hypothesized Market Effects	Evidence from the Market Actor Surveys
<p>A high market penetration of:</p> <ul style="list-style-type: none"> <li>- Condensing boilers</li> <li>- Boiler controls</li> <li>- Boiler tune-ups</li> </ul> <p>A high percentage of vendors offering boiler controls</p> <p>A great availability of high-efficiency boilers in stock.</p>	<p><b>Evidence of market effects</b></p> <p><b>Condensing boilers.</b> 75–84 percent (depending on weighting) of Wisconsin HVAC companies said that they install condensing boilers compared to 86–92 percent of Illinois HVAC contractors. None of the Wisconsin vs. Illinois differences were statistically significant.</p> <p><b>Boiler controls.</b> Wisconsin HVAC companies said that 73–81 percent (depending on weighting) of their boiler installations included boiler controls, compared to 32–37 percent of Illinois HVAC companies.</p> <p><b>Boiler tune-ups.</b> 47–71 percent (depending on weighting) of Wisconsin HVAC companies said that they offer boiler tune-up services compared to just 20–27 percent of Illinois HVAC companies.</p> <p><b>Stocking of high EE boilers.</b> 45–62 percent of Illinois HVAC companies said that they currently have high-EE boilers in stock compared to only 18–27 percent of Wisconsin HVAC companies.</p>
<p>A high market penetration of:</p> <ul style="list-style-type: none"> <li>- Condensing boilers</li> <li>- Boiler controls</li> <li>- Boiler tune-ups</li> </ul> <p>A high percentage of vendors offering boiler controls</p> <p>A great availability of high-efficiency boilers in stock.</p>	<p><b>Evidence of attribution of market effects to Focus</b></p> <p><b>Causes of boiler control penetration.</b> 14 Wisconsin and Illinois HVAC companies commented on some of the factors that were driving boiler control installations. Seven of the companies mentioned concerns over energy costs as drivers of boiler controls. Four of the companies reported that increasingly new boilers are coming out with controls already installed. Other drivers mentioned by multiple respondents included reductions in boiler control prices and increased customer interest.</p> <p><b>Relatively high program rebate activity.</b> In calendar year 2009, Focus claimed gross savings of 7,154,384 therms for boiler tune-ups and 875,860 therms for boiler controls. This compared to only 47,238 therms claimed for modulating hot water boilers.</p>

**Table 1-7. Comparing the Hypothesized Market Effects for High-Efficiency RTUs with the Evidence**

<b>Hypothesized Market Effects</b>	<b>Evidence from the Market Actor Surveys</b>
<p>A high Wisconsin market penetration of high-efficiency RTUs</p>	<p><b>Evidence of market effects</b></p> <p>The Wisconsin HVAC companies reported a statistically significant higher percentage of high-efficiency sales/installations for all RTU size classes except the largest one (240 MBh or higher). However, in this case the Illinois estimate is less reliable because of the very small sample size.</p> <p>In 2010, the percentages of RTUs sold/installed that were reported to be high-EE were about the same or lower as those reported in the 2008 Channel Study for all RTU classes but one. This was true for both Wisconsin and Illinois.</p>
<p>A high Wisconsin market penetration of high-efficiency RTUs</p>	<p><b>Evidence of attribution of market effects to Focus</b></p> <p><b>Possible causes of high-EE RTU trends.</b></p> <p><b>The tripling of the Focus RTU rebate followed by the increase in the minimum efficiency for Focus rebate qualification.</b> In FY 2008, Focus tripled the size of the RTU rebate. Then in 2008 a change in the Wisconsin building code raised the baseline energy efficiency for RTUs. Once the baseline efficiency was increased, Focus had to increase the minimum EE needed to qualify for its RTU rebates. According to some interviewees, this made the qualifying equipment more expensive and harder to obtain. This could help explain why the percentage of high EE RTUs in Wisconsin stagnated or dropped between 2008 and 2010. Yet some Focus program implementers questioned whether the Focus RTU incentives were large enough to influence purchaser behavior even after they had been tripled.</p> <p><b>The Wisconsin building code change.</b> Some interviewees thought the Wisconsin building code change has reduced the availability and increased the costs of RTUs.</p> <p><b>Perspectives from the market actors.</b> Over half of the Wisconsin respondents mentioned rebate programs as an explanatory factor for changes in their percentage of high-EE RTUs. Yet when responses were fully weighted “increased interest in energy efficiency” and “energy costs” became more important factors for the Wisconsin respondents. The Illinois respondents were much more likely to point to changes in the economy.</p>

**Table 1-8. Comparing the Hypothesized Market Effects for HVAC Controls and RTUs with VFDs with the Evidence**

Hypothesized Market Effects	Evidence from the Market Actor Surveys
<p>A high Wisconsin market penetration of HVAC controls</p> <p>A high percentage of Wisconsin vendors offering HVAC equipment with variable frequency drives (VFDs).</p>	<p><b>Evidence of market effects</b></p> <p>Sixty-four to eighty-three percent (depending on weighting) of Wisconsin HVAC companies reported designing or installing C&amp;I HVAC control systems compared to 20–48 percent of Illinois HVAC companies.</p> <p>Wisconsin HVAC contractors reported, on average, that 79 percent of the RTUs they sold/installed had dual enthalpy economizers fitted with them. This was up from 55 percent in 2008. The Illinois HVAC companies only reported fitting these economizers on 38 percent of their RTUs, down from 41 percent in 2008.</p> <p>Wisconsin HVAC contractors reported, on average, that 33 percent of the RTUs they sold/installed had CO<sub>2</sub> sensors and demand control ventilation systems. The Illinois HVAC companies only reported selling/installing these systems in 15 percent of their RTUs.</p> <p>On average Wisconsin HVAC companies said that 13–20 percent (depending on weighting) of the RTUs they sold/installed in the past year had VFDs already specified for system motors. In contrast, on average Illinois HVAC companies only reported two to three percent of their RTU sales had these specified.</p>
<p>A high Wisconsin market penetration of HVAC controls</p> <p>A high percentage of Wisconsin vendors offering HVAC equipment with variable frequency drives (VFDs).</p>	<p><b>Evidence of attribution of market effects to Focus</b></p> <p><b>The 2008 Wisconsin building code.</b> This code requires economizers on all split cooling systems and groundwater source cooling systems greater than 54,000 Btu/h and all other cooling systems greater than 33,000 Btu/h. Although the building code does not require these economizers to be dual enthalpy economizers, we would expect the dual enthalpy systems to gain a certain percentage of this new business, especially with Focus rebates available.</p> <p><b>Causes of HVAC control market trends.</b> Only six Wisconsin HVAC companies provided comments on what factors might be driving the market penetration of HVAC controls. Two of the six mentioned Focus rebates as a driving factor. Two others reported the economic downturn as hurting sales. Other factors mentioned included “market growth” and working with new contractors.</p> <p>Focus has been offering rebates for HVAC controls and HVAC systems with VFDs for many years.</p>

**Table 1-9. Comparing the Hypothesized Market Effects for ERVs, Steam Traps, and Infrared Heaters with the Evidence**

Hypothesized Market Effects	Evidence from the Market Actor Surveys
<p>A high percentage of Wisconsin vendors offering newer or less-common HVAC technologies such as:</p> <ul style="list-style-type: none"> <li>- Energy recovery ventilator (ERV) systems</li> <li>- Steam traps</li> <li>- Infrared heaters.</li> </ul>	<p><b>Evidence of market effects</b></p> <p><b>ERVs.</b> The difference between the percentage of Wisconsin HVAC companies reporting that they sell ERVs systems (69 percent) and the percentage of Illinois HVAC companies reporting this (53 percent) was not statistically significant at the 90 percent confidence level.</p> <p><b>Steam traps.</b> 45–67 percent (depending on weighting) of Wisconsin HVAC contractors reported selling/installing these compared to 21–30 percent of Illinois HVAC contractors.</p> <p><b>Infrared heaters.</b> 63–84 percent of Wisconsin HVAC contractors and 65–76 percent of Illinois HVAC contractors reported selling these. There were no statistically significant differences between the Wisconsin and Illinois estimates.</p>
<p>A high percentage of Wisconsin vendors offering newer or less-common HVAC technologies such as:</p> <ul style="list-style-type: none"> <li>- Energy recovery ventilator (ERV) systems</li> <li>- Steam traps</li> <li>- Infrared heaters.</li> </ul>	<p><b>Evidence of attribution of market effects to Focus</b></p> <p>Focus has been offering rebates on these measures for many years while the Illinois rebate programs have not offered rebates for these measures.</p>

**Table 1-10. Comparing the Hypothesized Market Effects That Wisconsin HVAC Companies Have Increased Awareness of the Benefits of EE with the Evidence**

Hypothesized Market Effects	Evidence from the Market Actor Surveys
<p>Increased Wisconsin HVAC awareness of the availability and benefits of high-efficiency HVAC products in general</p> <p>More Wisconsin distributors mentioning EE products in their promotional materials.</p>	<p><b>Evidence of market effects</b></p> <p><b>Importance of EE for promotions.</b> When asked how important the promotion of EE for their companies, Wisconsin respondents gave a slightly higher rating than their Illinois counterparts but this went away when the data was fully weighted. Yet when Wisconsin and Illinois companies were asked how their current importance ratings compared to what they were three years ago, Wisconsin reported a larger increase.</p> <p>Seventy-five of Wisconsin HVAC companies said that they featured Focus on Energy in their promotions compared to only 25 percent of Illinois HVAC companies featuring their native rebate programs.</p> <p><b>Important HVAC characteristics for their C&amp;I customers.</b> Wisconsin and Illinois HVAC companies were asked to rate how important various characteristics of HVAC equipment were for their C&amp;I customers. For the equipment characteristics that were most closely associated with EE—operating costs and life-cycle costs—there were no statistically significant differences between the Wisconsin and Illinois ratings.</p>
<p>Increased Wisconsin HVAC awareness of the availability and benefits of high-efficiency HVAC products in general</p> <p>More Wisconsin distributors mentioning EE products in their promotional materials.</p>	<p><b>Evidence of attribution of market effects to Focus</b></p> <p><b>Why EE became more important for HVAC companies.</b> When asked why EE had become more important over time, 45 percent of the Wisconsin respondents and 32 percent of the Illinois respondents cited rebate programs. About a third of each also mentioned increased interest in energy efficiency.</p> <p><b>Differences between Wisconsin and Illinois HVAC customers.</b> HVAC contractors who served both the Wisconsin and Illinois markets were asked whether there were differences between their Wisconsin contractors or customers and their Illinois contractors or customers in terms of how frequently they specified or asked for EE HVAC systems and products. None of the Wisconsin HVAC companies said that there were differences and only a small percentage of the Illinois companies said that there were.</p>

**1.2.4 Comparing the hypothesized lighting market effects with the evidence**

In the in-depth interviews, the Focus BP implementers also mentioned a number of possible market effects that the evaluators should look for in the lighting market. The following tables compare these hypothesized market effects for high-bay fluorescents, high-performance T8s, and lighting controls with the evidence from the market actor surveys as well as other sources.

**Table 1-11. Comparing the Hypothesized Market Effects of Increased Market Penetration of High-bay Fluorescent Lighting with the Evidence**

Hypothesized Market Effects	Evidence from the Market Actor Surveys
<p>A high Wisconsin market share of high-efficiency lighting products including high-bay fluorescents, high-performance T8s; and lighting controls</p> <p>Higher distributor and retailer inventory levels of energy-efficient lighting products in Wisconsin than in neighboring states</p>	<p><b>Evidence of market effects</b></p> <p><b>High-bay fluorescent sales.</b> Wisconsin lighting companies reported that 74–80 percent (depending on weighting) of their high-bay sales/installations were fluorescents compared to 38–58 percent reported by Illinois lighting companies. Reported sales/installations of the high-bay fluorescents have increased in both Wisconsin and Illinois over the past year and a half with the gap between the two states remaining of similar size.</p> <p><b>High-bay fluorescents in stock.</b> A slightly higher percentage of the Wisconsin respondents reported having high-bay fluorescents in stock than Illinois companies did, but this difference widened considerably when the response data was fully weighted.</p>
<p>A high Wisconsin market share of high-efficiency lighting products including high-bay fluorescents, high-performance T8s, and lighting controls</p> <p>Higher distributor and retailer inventory levels of energy-efficient lighting products in Wisconsin than in neighboring states</p>	<p><b>Evidence of attribution of market effects to Focus</b></p> <p><b>Sales in the absence of Focus.</b> Wisconsin lighting companies estimated, on average, that the share of their high-bay lighting that was fluorescent would decline from 74–80 percent to 35–38 percent in the absence of the Focus program.</p> <p><b>Factors that drove changes in mix of high-bay lighting.</b> Companies reporting changes in their mix of high-bay lighting specifications were asked what factors caused these changes. While rebate programs were one of the more important factors for the Wisconsin respondents, they cited improvements in product quality/performance even more often. For the Illinois lighting companies this was the most-cited factor. Many lighting companies said that the ability of high-bay fluorescents to turn on instantly and their greater compatibility with occupancy sensors made them preferable to metal halides. Other pointed to better color rendering and light quality.</p>

**Table 1-12. Comparing the Hypothesized Market Effects of Increased Market Penetration of High Performance T8s with the Evidence**

Hypothesized Market Effects	Evidence from the Market Actor Surveys
<p>A high Wisconsin market share of high-efficiency lighting products including high-bay fluorescents, high-performance T8s, and lighting controls</p> <p>Higher distributor and retailer inventory levels of energy-efficient lighting products in Wisconsin than in neighboring states</p>	<p><b>Evidence of market effects</b></p> <p><b>High performance T8 sales.</b> Wisconsin lighting companies reported that 63–82 percent (depending on weighting) of their linear fluorescent sales/installations were high performance T8s compared to 34–46 percent reported by Illinois lighting companies. Reported sales/installations of high-performance T8s have increased since 2008 for the Wisconsin lighting companies although they have actually declined for the Illinois companies.</p> <p><b>High performance T8s in stock.</b> A nearly equal percentage of Wisconsin (61 percent) and Illinois (62 percent) respondents said that they have high-performance T8s in stock, but these percentages changed significantly (72 percent Wisconsin, 23 percent Illinois) when the data was fully weighted.</p>
<p>A high Wisconsin market share of high-efficiency lighting products including high-bay fluorescents, high-performance T8s, and lighting controls</p> <p>Higher distributor and retailer inventory levels of energy-efficient lighting products in Wisconsin than in neighboring states</p>	<p><b>Evidence of attribution of market effects to Focus</b></p> <p><b>Sales in the absence of Focus.</b> Wisconsin lighting companies estimated, on average, that the share of their linear fluorescents sales/installations that were high performance T8s would decline from 63–82 percent to 42–58 percent in the absence of the Focus program.</p> <p><b>Factors that drove changes in their mix of linear fluorescents.</b> Companies reporting changes in their mix of linear fluorescents were asked what factors caused these changes. While rebate programs were one of the more important factors for the Wisconsin respondents (29 percent), they cited lower first cost for high performance T8s (43 percent) increased interest in energy efficiency (36 percent), and customer education (21 percent) as other important factors. Of course some of these other factors cited besides the Focus on Energy program—such as customer education/awareness, increased interest in energy efficiency, and even the lower first cost for the high-performance T8s—could be effects of Focus.</p>



**Table 1-13. Comparing the Hypothesized Market Effects of Increased Market Penetration of Lighting Controls with the Evidence**

Hypothesized Market Effects	Evidence from the Market Actor Surveys
<p>A high Wisconsin market share of high-efficiency lighting products including high-bay fluorescents, high-performance T8s; and lighting controls.</p>	<p><b>Evidence of market effects</b></p> <p><b>Lighting control sales and specifications.</b> Wisconsin lighting companies reported that 50–63 percent (depending on weighting) of their orders/jobs included lighting controls compared to 36–38 percent reported by Illinois lighting companies. Wisconsin companies also reported that 72–79 percent of their job where they are specifying the lighting have lighting controls. This compares to 32–43 percent of lighting specifications reported by Illinois companies. Yet the average percentage of lighting jobs with lighting controls reported by Wisconsin companies (63 percent) was down from 68 percent in 2008.</p>
<p>A high Wisconsin market share of high-efficiency lighting products including high-bay fluorescents, high-performance T8s; and lighting controls.</p>	<p><b>Evidence of attribution of market effects to Focus.</b></p> <p><b>Sales in the absence of Focus.</b> Wisconsin lighting companies estimated, on average, that the share of their lighting jobs that would include lighting controls would decline from 50–63 percent to 40–47 percent in the absence of the Focus program.</p>

**1.2.5 Estimating untracked attributable savings**

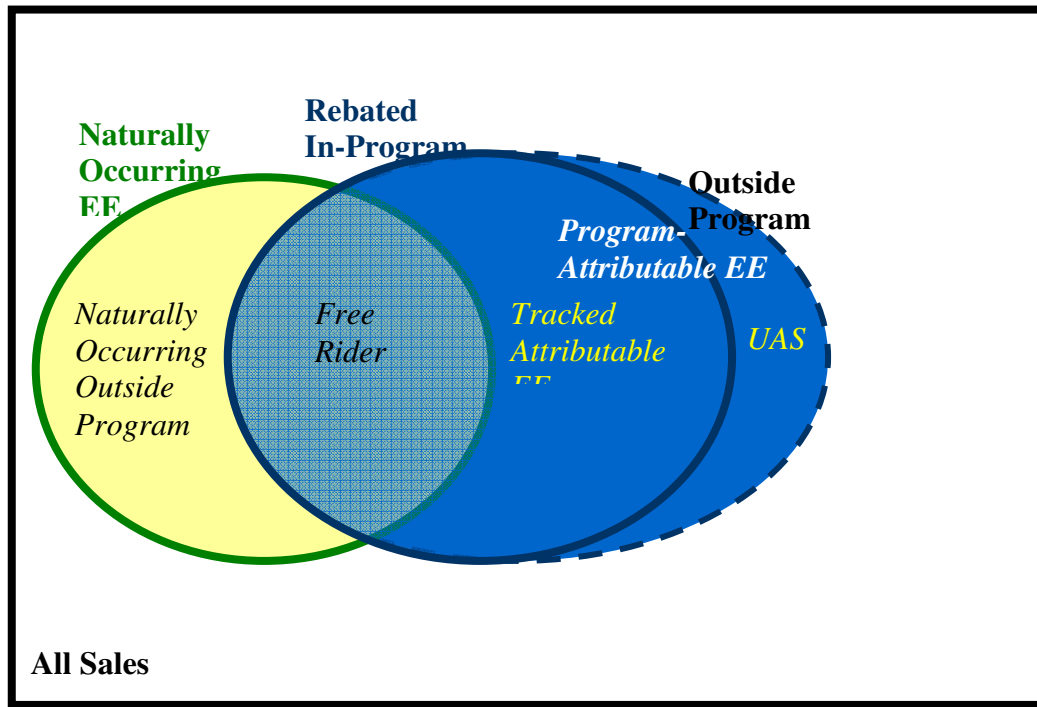
One of the major objectives of this Supply-side Study was to produce an estimate of untracked attributable savings (UAS)—energy savings that were attributable to Focus BP, but which were not currently being tracked and claimed by the program. The UAS includes both participant and nonparticipant spillover (sometimes referred to as “free ridership”).

The net savings reported in the most recent impact report is the portion of tracked or in-program savings that is attributable to Focus. The tracked attributable savings is the gross tracked savings adjusted for free riders. Combining the tracked attributable savings with the untracked attributable savings gives total program-attributable savings. The ratio of total program-attributable savings to total gross tracked savings is the overall net-to-gross (NTG) ratio. This overall NTG ratio accounts for free ridership, participant spillover, and nonparticipant spillover.

**A. METHODOLOGY BASED ON SALES SHARE**

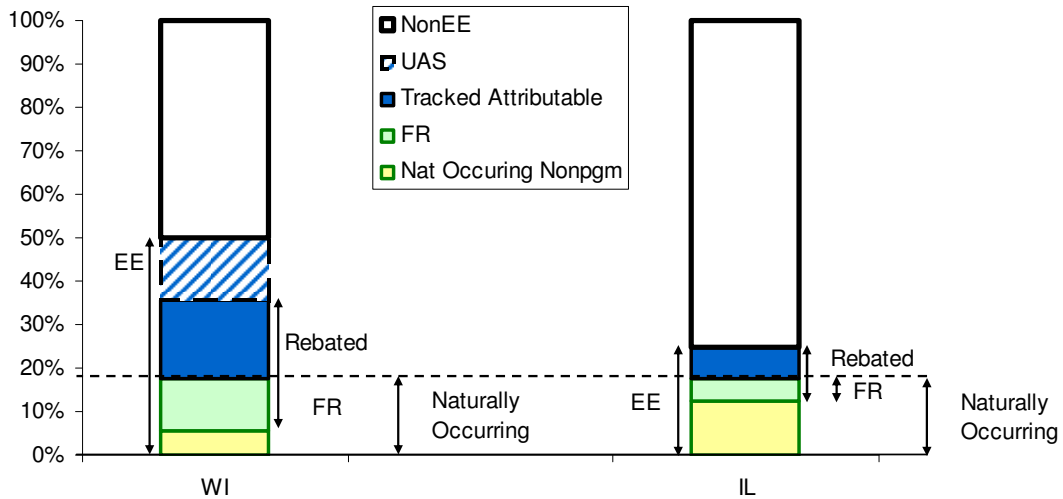
The relationship between the components of in-program and non-program sales of energy-efficient (EE) equipment is illustrated in Figure 1-1 below. The baseline of interest is the naturally occurring EE sales. Naturally occurring sales that receive rebates are free riders. The remainder are naturally-occurring sales outside the program. The portion of rebated- or in-program EE sales that are not free riders are program-attributable. Additional program-attributable EE sales occur outside the program. These are the untracked attributable savings (UAS).

Figure 1-1. Market Components of Energy-efficient Sales



This classification is the basis for the baseline and UAS estimation, illustrated in Figure 1-2.

Figure 1-2. Illustration of UAS Estimation



From the supplier interviews, we obtained estimates for each state (Wisconsin, Illinois) of:

- The fraction of sales that are energy-efficient,  $F_{EE}$
- The fraction  $P$  of energy-efficient sales that are rebated by the program.

We made two key assumptions:

1. For Illinois, given the early stage of the program, untracked attributable EE sales are negligible.
2. The naturally occurring EE sales share in Illinois is the same as the naturally occurring sales share in Wisconsin.

With these assumptions, we were able to estimate baseline sales that would have occurred without the program. Some of the estimates used in our methodology, such as the estimates of total market size for a given measure (the derivation of which is explained in Section 4.4 and Appendix A) would likely be improved by obtaining actual sales data. As the Illinois program matures and the assumption of negligible effects outside the program becomes less justified, the methods used here will no longer be applicable.

As described in Section 4.4, we performed this calculation with three assumptions or models for the currently unknown free ridership levels for Illinois.

1. **That there is no free ridership in the Illinois rebate program: everyone who got a rebated piece of energy-efficient equipment would not otherwise have bought that energy-efficient equipment.** In this scenario, the "natural" energy efficiency penetration is all the energy efficiency equipment that did not receive rebates. This is the most generous baseline for Wisconsin as far as calculating UAS.
2. **That there is 100 percent free ridership in Illinois rebate program: everyone who got a rebated piece of EE equipment would have bought it anyway.** In this case, the "natural" energy efficiency penetration is the rebated energy-efficient equipment plus the non-rebated energy-efficient equipment. This is the least generous baseline for Wisconsin in terms of calculating UAS.
3. **That the free ridership rate in Illinois is similar to what it is in Wisconsin.** In this case, the "natural" energy efficiency penetration is the non-rebated energy-efficient equipment plus the quantity of rebated energy-efficient equipment multiplied by the free ridership rates from the recent Focus BP Impact Analysis report<sup>2</sup>. We used the Wisconsin free ridership rates as proxies for the Illinois free ridership rates because the latter are currently not available. We would be willing to revise or revisit our calculations using the actual Illinois free ridership rates once they become available.

The first two assumptions provide outer bounds on possible estimates. We do not consider either to be likely.

Before showing our estimates of UAS for Calendar Year 2009, it is important to explain why we calculated UAS for some energy-efficient measures that Focus BP promotes and not for others. As explained in the methodology subsection, the measures that we chose to focus on in the market actor surveys were measures that were identified by the Focus BP implementers as having the potential for market effects.

---

<sup>2</sup> The Focus on Energy Evaluation Team. *State of Wisconsin Public Service Commission of Wisconsin, Focus on Energy Evaluation, Business Programs Impact Evaluation Report, Last Three Quarters of the 18-month Contract Period and First Three Quarters of Calendar Year 2009. Draft March 3, 2010.*

Table 1-14 shows the outputs from the models described above. As noted, Model A and Model B are not realistic scenarios but are essentially the ceiling (Model A) and the floor (Model B) for defining the range of potential UAS. Model C and the Binary Method produce the UAS estimates that we believe are appropriate for Focus BP for CY 2009.<sup>3</sup>

**Table 1-14. Outputs from the UAS Models**

Energy Type (Measure)	Gross Tracked Energy/ Demand Savings from CY09 Focus BP Tracking Database	Total Untracked Attributable Savings			
		Model A	Model B	Model C	Binary Method
		Using 0% Free-ridership in Illinois (Ceiling)	Using 100% Free-ridership in Illinois (Floor)	Using Wisconsin Estimate of Free-ridership for Illinois	
<b>kWh</b>					
Boiler Tuneups	0				
High Performance T8	10,625,229	4,296,919	761,928	2,868,783	
High bay fluorescents	141,126,197	63,586,871	24,483,082	47,788,940	
Modulating HW Boilers	0	0	0	0	
Rooftop AC	346,844	694,629	678,232	690,874	
<b>kW</b>					
Boiler Tuneups	0				
High Performance T8	2,274	892	136	596	
High-bay fluorescents	29,554	12,962	4,773	9,751	
Modulating HW Boilers	0	0	0	0	
Rooftop AC	509	1,218	1,194	1,204	
<b>Therms</b>					
Boiler Tuneups	7,154,384				-931,192
High Performance T8	0	0	0	0	
High-bay fluorescents	0	0	0	0	
Modulating HW Boilers	47,238	3,937	-1,476	326	
Rooftop AC	0	0	0	0	

As explained in Section 4.4, these UAS models can also be used to calculate the net-to-gross (NTG) ratios for a given measure. Table 1-15 combines the UAS estimates and NTG

<sup>3</sup> The UAS estimation methodology described above is applicable only to equipment for which there are standard and energy-efficiency technologies with equivalent function, within a larger measure category. Examples include fluorescent lamps in high-bay applications that might otherwise use less efficient technologies or RTUs with a certain EER rating. For such equipment, it is meaningful to assess the level of market adoption in terms of the shares of the category sales that are the energy-efficient technology. Yet some energy efficiency measures, such as boiler or air-conditioner tune-ups, involve an addition or adjustments to existing equipment, rather than a high-efficiency versus standard efficiency choice within a particular category of new equipment. We refer to such measures as “binary.” That is, rather than choose an efficiency level within a category, a customer chooses whether or not to apply this measure. For such measures, the sales share approach above does not apply. For these measures we used an alternative “binary method” described in Appendix A.

estimates from Model C and the binary method into a single table. The shaded cells indicate the estimates that we believe are most reliable (see explanation in Section 1.3 and Section 4.4).

**Table 1-15. Summary Estimates of Untracked Attributable Savings and Net-to-Gross Ratios from the Supply-side Study**

Energy Type (EE Measure)	Untracked Attributable Savings (UAS) from this Supply-side Study*	Net-to-Gross (NTG) Estimates from this Supply-side Study*
<b>kWh</b>		
Boiler Tuneups	0	
High Performance T8	2,868,783	87%
High-bay fluorescents	47,788,940	93%
Modulating HW Boilers	0	-
Rooftop AC	690,874	276%
<b>kW</b>		
Boiler Tuneups	0	
High Performance T8	596	87%
High-bay fluorescents	9,751	94%
Modulating HW Boilers	0	-
Rooftop AC	1,204	274%
<b>Therms</b>		
Boiler Tuneups	-931,192	
High Performance T8	0	-
High-bay fluorescents	0	-
Modulating HW Boilers	326	34%
Rooftop AC	0	-

Note: \*As discussed above, all the UAS estimates are based on Model C except boiler tuneups, which is based on the binary method.

To test the reasonableness of our NTG estimates from the Supply-side Study, we also compared them to:

- NTG ratios derived from our 2010 Impact Analysis study
- NTG ratios derived from responses to the 2009/2010 HVAC/lighting market actor surveys where we had asked the companies what percentage of their measures sold/installed would have been energy-efficient in the absence of Focus on Energy.

Table 1-16 shows this comparison for high-performance T8s and high-bay fluorescents. It shows that the Model C NTG estimates (third column) are higher than the NTG estimates derived from the 2010 Focus BP Impact Analysis report (second column). Since the NTG estimates from the Focus BP Impact Analysis report account for free ridership but not spillover, we would expect the Model C results to be somewhat higher, which is the case. However, the NTG estimates from the supplier-reported estimates, which in theory should include spillover, were lower. The reason for this is unclear.

**Table 1-16. NTG Based on Comparison with Illinois and Based on Wisconsin Supplier Reported Sales without Focus**

Energy Type (Measure)	NTG as (1- FR) from 2010 Focus BP Impact Analysis Report	NTG Based on Comparison with Illinois	NTG based on WI Supplier-reported Decline in Absence of Focus
		NTG Using WI Estimate of FR for Illinois Model C	
High Performance T8	60%	87%	36%
High-bay fluorescents	60%	93%	61%

**1.3 SUMMARY**

We believe the preponderance of the evidence supports the estimates for Calendar Year 2009 UAS presented in this report. Our reasons for believing the UAS estimates include:

- 1. The UAS estimates are for market effects that were predicted and explained by the Focus BP program theory and the in-depth interviews with program implementers.** Before we began our market actor surveys, we examined the Focus BP program theory and interviewed the Focus BP implementers so they could elaborate on the program interventions (e.g., the HVAC and Lighting Channel Initiatives) and discuss for which types of energy-efficient measures they thought we might find evidence of market effects. As shown in this report, we were not able to find evidence for all the market effects they suggested might exist. However, all the measures for which we provided UAS estimates were measures for which the Focus BP program made a credible case for significant market intervention whether by supply-side initiatives (e.g., the Lighting Channel Initiative) or by the sheer volume of rebates (e.g., the high-bay fluorescents).
- 2. The measures for which we provided UAS estimates were measures for which there was strong evidence for program attribution.** We asked the Wisconsin HVAC and lighting market actors who had estimated the market penetration of certain energy-efficient measures what that penetration would have been in the absence of the Focus on Energy program. For all the measures for which we provided UAS estimates the market actors predicted a significant drop in market penetration absent Focus.<sup>4</sup> Now when we asked market actors for causes of change in the mix of their HVAC or lighting products, they often mentioned other factors besides rebate programs—such as increased interest in energy efficiency, building codes, product quality improvements, and declines in product prices. However, some of these other factors—such as increased interest in energy efficiency, increases in consumer education, and even declines in product prices, could be direct or indirect effects of the Focus on Energy program. A number of lighting and HVAC market actor talked about how the changes in their use of energy-efficient measures was due to a “synergy” of different factors such as the rebates, changes of building codes, reductions in product prices, and more educated consumers.

---

<sup>4</sup> Although as explained in the following paragraph, the implied NTG ratios from these predicted drops was lower than the NTG ratios calculated from the UAS estimates.

3. **The predicted UAS numbers seem reasonable when compared to the end-user self-reported NTG ratios.** Most of the NTG estimates derived from the UAS models seemed reasonable when compared to the NTG ratios calculated from the end-user self-reported free ridership rates from the most recent Focus BP impact analysis.<sup>5</sup> Their magnitudes are in line with what one would expect from the boost in program attribution that would occur when spillover effects are added in. However, when we calculated the implied NTG ratios from the market actor’s predicted declines in the market penetration of the energy-efficient measure in the absence of the program we come out with lower NTG ratios than was predicted by the UAS model.
4. **There was evidence that the “contamination” of the Illinois baseline by the Illinois rebate programs was very limited.** Only 54 percent of the Illinois HVAC companies claimed awareness of the Illinois HVAC rebate programs and of the aware companies only 16–18 percent of them said that they had participated in a project rebated by the Illinois programs. Awareness of the Illinois lighting rebates was higher but only about half of the aware Illinois lighting companies had participated in a rebated project. Only 25 percent of Illinois lighting companies featured lighting rebates in their promotions compared to 75 percent of Wisconsin lighting companies. In addition, the size of the gaps between Wisconsin-reported market penetration of energy-efficient measures and the Illinois-reported levels of market penetration remained similar to what we had found in the 2008 Channel Study. If the Illinois rebate programs had achieved real traction then we would have expected these gaps to have narrowed.
5. **Possible exogenous (non-program) influences on the differences in energy efficiency market penetration between Wisconsin and Illinois.** While the influence of the Illinois rebate programs on the Illinois markets appear limited, it is possible that other—non-program—factors might explain the differences in energy efficiency between the Wisconsin and Illinois HVAC and lighting markets. This report discusses how the 2008 changes in the Wisconsin building code may have influenced trends in the sales of high-efficiency RTUs, dual-enthalpy economizers, and energy-recovery ventilators. The report also notes that in August 2009 Illinois also adopted more energy-efficient building codes.

In terms of energy prices, there were differences between Wisconsin and Illinois in terms of average prices for a given sector (e.g., commercial, industrial) but the mid-point price for the commercial and industrial sector were similar. For example, the average December 2009 electricity price for Wisconsin commercial customers was 9.1 cents/kWh and the average electricity price for Wisconsin industrial customers

---

<sup>5</sup> The two measures we thought produced less reliable estimates were for RTUs and boiler tune-ups. In the former case, we think the issue is the difficulty of market actors making estimates of energy efficiency penetration that may be a small percentage of their overall business. In addition, the HVAC free-ridership estimates that were taken from the Focus BP impact analysis to serve as a proxy for Illinois free-ridership rates for RTUs were for a greater variety of measures (e.g., booster coils, chiller optimization controls, furnaces, ventilation projects) than just RTUs. In the latter case, this may be due to the different “binary model” used to estimate UAS for this measures which uses a scaling mechanism (the estimated number of boilers in Wisconsin vs. Illinois) that may not be as reliable as scaling mechanism used for the other measures.

was 6.4 cents/kWh for a commercial/industrial mid-point of 7.8 cents per kWh.<sup>6</sup> In comparison, the average December 2009 electricity price for Illinois commercial customers was 7.9 cents/kWh and the average electricity price for Illinois industrial customers was 7.0 cents/kWh for a commercial/industrial mid-point of 7.5 cents per kWh.

Another possible source of exogenous influences on energy efficiency would be underlying differences between the Wisconsin and Illinois HVAC/lighting market actors and end users in terms of firmographics or attitudes towards energy efficiency. Here the evidence of differences is more problematic because in theory the best way to determine whether Illinois is an appropriate proxy for the natural energy efficiency penetration in Wisconsin would be to compare Illinois to a Wisconsin that had not seen the effects of Focus on Energy. While we did ask the Wisconsin HVAC/lighting market actors to hypothesize what the energy-efficiency of their sales and services would have been in the absence of the Focus program, we did not ask similar questions how their firmographics or attitudes towards energy efficiency might have changed without Focus.

Therefore, when we discuss differences between Wisconsin and Illinois in terms of contractor/distributor firmographics or market actor or end user attitudes towards energy efficiency, it is difficult to determine whether these differences were or were not effects of Focus on Energy. For example, the report observes how the Wisconsin HVAC and lighting market actors offered a greater diversity of services than their Illinois counterparts and were more likely to name the customer as an influential participant in the HVAC/lighting specification process. Similarly, the Wisconsin lighting companies were more than twice as likely as the Illinois lighting companies to say that their end users and contractors do not raise concerns about energy-efficient lighting. Are these differences evidence that Illinois is not an appropriate baseline? Or are these differences simply evidence that the Focus on Energy program has had transformative effects on the Wisconsin HVAC and lighting markets? The answer is not entirely clear.<sup>7</sup>

---

<sup>6</sup> U.S. Energy Information Administration, *Electric Power Monthly*, [http://www.eia.doe.gov/cneaf/electricity/epm/table5\\_6\\_a.html](http://www.eia.doe.gov/cneaf/electricity/epm/table5_6_a.html).

<sup>7</sup> For example, it could be argued that the fact that the Wisconsin companies reported a greater diversity of services might be simply be an effect that, on average, they are more likely to be serving rural customers than their Illinois counterparts. Areas of greater population density such as Chicago are more likely to be able to support HVAC or lighting companies that have more limited or specialized services. In contrast, such specialization would be less economically viable in rural areas.



## 2. INTRODUCTION

---

The main objective of this supply-side research was to try to identify “market effects” that the Wisconsin Focus on Energy Business Programs may be producing in the Wisconsin lighting and heating ventilation and air conditioning (HVAC) markets. This supply-side research was recommended by the PSCW staff as a follow-up to the 2008 Focus BP Channel Study. For the purpose of this research, we adopted the following definition of market effects that appears in the California market effects protocols:

“A change in the structure of a market or the behavior of participants in a market that is reflective of an increase in the adoption of energy efficient products, services, or practices and is causally related to market intervention(s).”

As we outlined in the research plan for this task, we used the following information sources to search for possible market effects in the Wisconsin lighting and HVAC markets. These sources included:

- In-depth interviews with Focus BP implementers and PSCW staff
- Interviews with lighting and HVAC market actors in Wisconsin and Illinois
- An analysis of the Focus BP tracking data
- The 2008 Focus BP Channel Study.<sup>8</sup>

To reach our conclusions and to calculate our estimates of untracked attributable savings (UAS) for Focus BP lighting and HVAC market effects, we used a preponderance of the qualitative and quantitative evidence. One important component of this was a quasi-experimental methodology for estimating UAS using Illinois as a comparison state. This methodology used data from the 2008 Focus BP Channel Study along with data collected from the 2009/2010 round of market actor interviews. All these methods are identified in California protocols for market effects evaluation as meeting an enhanced level of rigor.<sup>9</sup>

---

<sup>8</sup> Ryan Barry, Mimi Goldberg, Mitch Rosenberg, Joshua Horton and Karen Rothkin, KEMA Inc., *Focus on Energy Evaluation: Business Programs Channel Studies—Fiscal Year 2008*, Final Report, January 17, 2009.

<sup>9</sup> The California evaluation protocols (TecMarket Works Team. *California Energy Efficiency Evaluation Protocols: Technical, Methodological, and Reporting Requirements for Evaluation Professionals*. San Francisco: California Public Utilities Commission, April 2006) read, “In some cases, it is best to use a “preponderance of evidence” approach to assess the attribution of market effects. In this approach the analyst relies on triangulation from multiple data sources to draw conclusions about the presence and attribution of market effects. This approach is accomplished by interviewing and surveying knowledgeable market actors. Program staff, utility staff and trade allies provide useful information for understanding the context of sales and counts of behavior. Over time, these views provide much of the information needed to draw conclusions about attribution and sustainability. Systematic sampling is very important to ensure that bias is minimized.” The California protocols also mention as one important component of the enhanced level of rigor: “Quasi-experimental or experimental design with comparison groups using a representative sample of market actors surveyed or interviewed to provide self-reports on perceived changes in the market, attribution and the sustainability of those changes.”

### 3. METHODOLOGY

---

This section describes our methodology for refining the scope of our research and identifying potential market effects.

#### 3.1 THE 2008 CHANNEL STUDY

This Supply-side Study builds upon findings from the 2008 Focus BP Channel Study. The 2008 Channel Study, which was also conducted by KEMA, provided baseline estimates for the Focus on Energy BP market effect contract metrics and investigated other potential indicators of program market effects. The Focus BP contract metrics are contractual requirements for the program administrator. The contract metrics have included both operational metrics that can be tracked by the program and verified by evaluation and market effects metrics. The program administrator focused on four specific technologies within its Channel Initiatives. The channels and selected technologies are shown in Table 3-1.

**Table 3-1. Contract Metric Channel Technologies**

Channel	Technology
Lighting	High bay fluorescent lighting systems
BP HVAC	High efficiency rooftop units
Rotary	VFD controlled compressed air systems
	VFD controlled industrial pumps and fans

The primary purpose of the 2008 Channel Study was to collect the baseline data needed for later verifying whether Focus BP was meeting its market effects goals. However, the study also had an important secondary goal of assessing whether Focus BP might be having sizable additional program effects on the market that were not already being captured by the program tracking and current evaluation activities.

The 2008 Focus BP Channel Study conducted interviews with Wisconsin lighting contractors, HVAC distributors, and industrial end users to collect information on the market penetration of energy-efficient technologies. To provide a basis for comparison, they conducted similar surveys with Illinois lighting contractors, HVAC distributors, and industrial end users. At the time these interviews were conducted (May–June 2008) Illinois did not have active utility rebate programs. So, Illinois functioned as a proxy for the “natural” penetration of energy-efficient technologies in the absence of such programs. Table 3-2 shows some key results from the 2008 Channel Study.

**Table 3-2. Key Results from the 2008 Channel Study**

Energy-efficient Lighting Technology	Responses of Wisconsin and Illinois Lighting Contractors to 2008 Focus BP Channel Study
High-bay fluorescents	Wisconsin contractors were more likely (69 percent of projects) than Illinois contractors (51 percent) to say that they recommended fluorescents rather than HIDs for high-bay lighting projects in the past 12 months. However, the difference was not statistically significant.
	In past 12 months Wisconsin contractors were more likely (72 percent of projects) than Illinois contractors (28 percent) to say they installed fluorescents rather than HIDs in high-bay lighting projects. The difference was statistically significant.
High-performance T8s	Wisconsin contractors said they recommended/specified high performance T8s for 60 percent of their projects in the past 12 months and Illinois contractors said they recommended/specified them for 58 percent of their projects in this time period. The difference was not statistically significant.
	Wisconsin contractors said they installed high performance T8s in 60 percent of their projects and Illinois contractors said they installed them in 68 percent of their projects. The difference was not statistically significant.
T5s	Wisconsin contractors said they recommended/specified T5s for 20 percent of their projects in the past 12 months and Illinois contractors said they recommended/specified them for 32 percent of their projects in this time period. The difference was not statistically significant.
	Wisconsin contractors said they installed T5s in 14 percent of their projects and Illinois contractors said they installed them in 41 percent of their projects. The difference was statistically significant.
Occupancy controls	Wisconsin contractors said they recommended/specified occupancy controls for 61 percent of their projects in the past 12 months and Illinois contractors said they recommended/specified them for 21 percent of their projects in this time period. The difference was statistically significant.
	Wisconsin contractors said they installed occupancy controls in 69 percent of their projects and Illinois contractors said they installed them in 22 percent of their projects. The difference was statistically significant.
Automatic daylighting controls	Wisconsin contractors said they recommended/specified automatic daylighting controls for 15 percent of their projects in the past 12 months and Illinois contractors said they recommended/specified them for 16 percent of their projects in this time period. The difference was not statistically significant.
	Wisconsin contractors said they installed automatic daylighting controls in 19 percent of their projects and Illinois contractors said they installed them in 14 percent of their projects. The difference was not statistically significant.

Note: Red shading indicates Wisconsin had a statistically significant (at least 90% confidence level) greater share of recommendations/specifications or installations of the technology than Illinois. Orange indicates a nearly statistically significant (at least 80% confidence level) greater Wisconsin share. Uncolored indicates no statistically significant differences between Illinois and Wisconsin. Blue indicates Illinois had a statistically significant greater share of recommendations/specifications or installations of the technology than Wisconsin.

The authors of the 2008 Channel Study concluded that these and other findings “support the existence of market effects and therefore KEMA advises the PSCW to pursue supplemental supply-side research.”

### 3.2 THE SUPPLY-SIDE STUDY

This study expands the scope of the 2008 Channel Study in a number of ways:

- **Identifying the causes of differences between Wisconsin and Illinois energy efficiency activities.** The 2008 Channel Study surveys each only had a few questions that explored possible causes of the energy efficiency practices and these questions mostly focused on the possible influence of Focus BP.<sup>10</sup> For the Supply-side Study we chose to expand the market actor surveys to include open-ended questions about causes of energy efficiency sales and practices that were asked before we explored possible Focus attribution. In these surveys we also explored Focus BP attribution in more detail than we had in the 2008 Channel Study. Finally, in the in-depth interviews we asked program implementers to explain any causal links they claimed between Focus BP activities and market effects.
- **Quantifying untracked attributable savings (UAS).** Although this had not originally been part of the project scope in the Detailed Evaluation Plan (DEP)<sup>11</sup>, after the DEP had been finalized in April 2009, there has been some dialogue between the PSCW staff, the Focus BP evaluation team, and WECC about the nature and scope of the Supply-side Study. One issue raised in this discussion was the desire to try to estimate quantitative energy savings from any market effects that were attributed to Focus BP. So this study has attempted to do this using both data collected from the 2008 Channel Study as well as from the 2009/2010 market actor surveys.
- **Expanding the number of energy-efficient measures.** The 2008 Channel Study concentrated most of its attention on energy-efficient measures that were part of the contract metrics. For example, in the HVAC sector the market actor survey focused mostly on rooftop air-conditioning units (RTUs) because the Focus BP contract metrics were based on this measure. For the Supply-side Study we expanded the number of measures that suppliers were asked about.
- **Expanding the range of market actors.** For the HVAC and lighting sectors, the 2008 Channel Study interviewed lighting contractors and HVAC distributors. In the

---

<sup>10</sup> These questions included: “5.7 If Focus on Energy had not operated its programs, do you think the share of [NAME OF TECHNOLOGY a – c] would be lower, higher, or about the same as it actually is now?,” and “5.8 Finally, on a scale of 1 to 10, where 1 is no influence and 10 is a great deal of influence, how much influence do you think Focus on Energy programs have had on the market share high efficiency packaged HVAC units in your market area?” The industrial end users were asked if they had participated in programs other than Focus on Energy that promote energy efficient technologies for businesses. If so, then they were asked: “4.18 “On a scale of 1 to 10, where 1 is not at all important and 10 is very important, how important were these programs in your firm’s decision to install VFDs?”

<sup>11</sup> The Focus on Energy Evaluation Team. *State of Wisconsin Public Service Commission of Wisconsin, Focus on Energy Evaluation, Evaluation Calendar Year 2009, Detailed Evaluation Plan*. April 21, 2009.

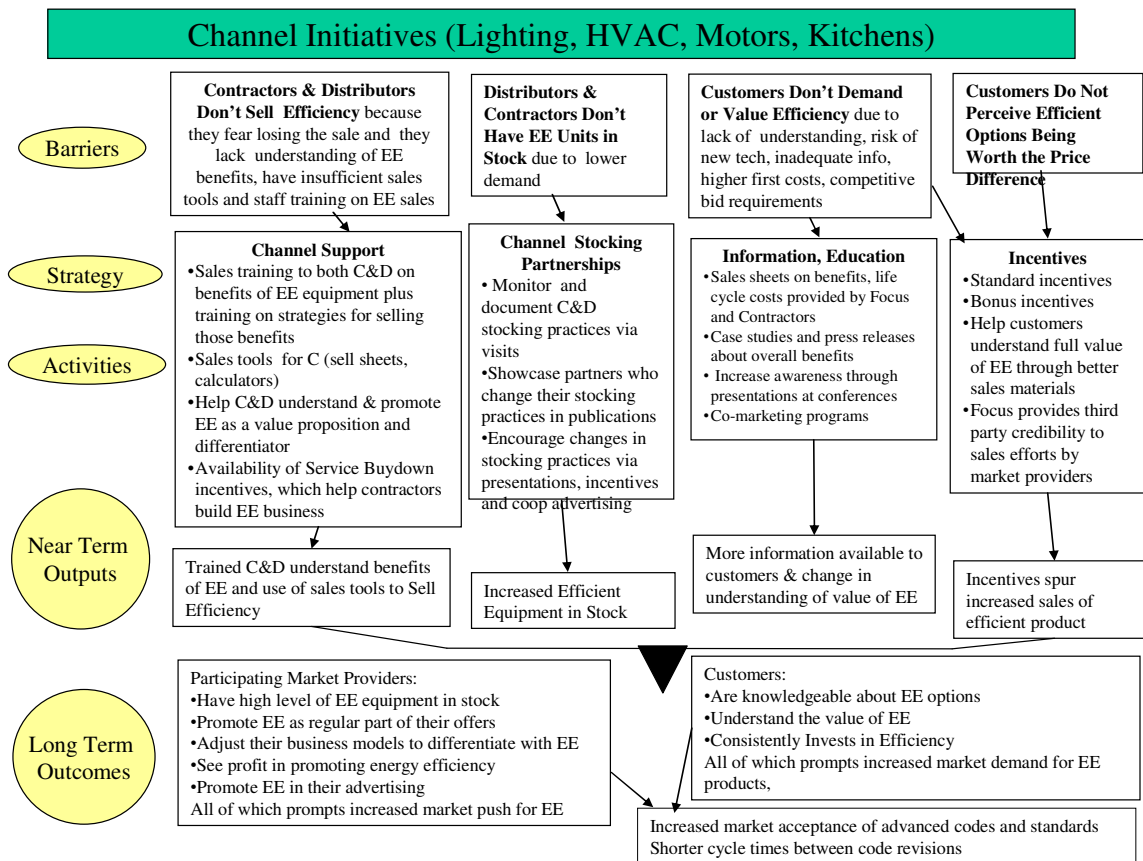
Supply-side Study we interviewed lighting contractors, lighting distributors, HVAC contractors, and HVAC distributors.

- **Expanding the data sources.** While the 2008 Channel Study relied primarily on market actor surveys for its findings, the Supply-side Study used these as well as in-depth interviews with program implementers and PSCW staff as well as an examination of the Focus BP tracking data.

### 3.2.1 The program theory

In August 2009 the Focus BP implementers issued the program theory for Focus BP. Figure 3-1 shows the portion of the program theory which dealt with the Focus BP Channel Initiatives—the parts of Focus BP that the implementation staff said was most likely to be producing market effects.

**Figure 3-1. Focus BP Program Theory, Channel Initiatives**



This program theory helped evaluators gain a general, high-level understanding of how the Focus BP implementers thought they may be transforming the marketplace. The program theory identified which activities (e.g., training, providing sales tools, providing case studies) that Focus BP might be changing market actor behavior. The program theory also helped evaluators narrow the scope of market actor types that we should target for our market actor surveys. For example, the program theory indicated that the Channel Initiatives focused most

of its attention on contractors and distributors and did not mention other market actor types such as manufacturers or architects.

While the program theory was helpful in understanding the high-level vision of the Focus BP as to how they might be producing market effects, it had some limitations, as outlined in an August 2009 memorandum to the PSCW staff.<sup>12</sup> Some of these limitations included:

- **One size fits all program theory.** The program theory slide shown in Figure 3-1 implied that the lighting, HVAC, motor, and kitchen channels all had the same program theory and there was no attempt to differentiate theory based on end use.
- **No identification of specific measures that might be good candidates for spillover savings.** Previous communications with Focus BP implementers indicated that they wanted evaluators to look more broadly for market effects than just the measures specified in the Focus BP Contract Metrics (e.g., high-bay fluorescents, RTUs). Yet the Focus BP program theory did not identify any specific measures that might be good candidates for spillover savings.
- **Limited identification of market actors.** The Focus BP program theory contained only highly vague references to contractors and distributors with no differentiation by end use.
- **No identification of which market actors are receiving which program activities.** Although the program theory listed the types of activities (e.g., training, providing sales tools, providing case studies) that might be changing market actor behavior, it did not explain which market actors in which Channels were recipients of which program activities.

On August 28, 2009, there was a meeting between PSCW staff, the evaluation team, and Focus BP implementers to discuss the program theory and the draft Supply-side Study evaluation plan. At this meeting, it was agreed that while the development of the program theory had been a useful first step, in-depth interviews with Focus BP implementers were still needed for the evaluators to gain additional details about how Focus BP might be producing market effects.

#### 3.2.2 The in-depth interviews

In September 2009, KEMA conducted in-depth interviews with 13 implementers of Focus BP as well as two members of the PSCW staff that oversee the programs. The program implementer interviews included:

- Three managers of the Lighting and HVAC Channel Initiatives
- Two representatives of the Agriculture Sector Program
- Two representatives of the Commercial Sector Program
- Two representatives of the Industrial Sector Program

---

<sup>12</sup>Christopher Dyson, Ryan Barry, Erika Morgan. *Preliminary, High-Level Comments on the Focus BP Program Theory*. Memorandum sent to Oscar Bloch and Carol Stemrich of the Public Service Commission of Wisconsin, August 27, 2009.

- Two representatives of the Schools and Government Sector
- Two high-level managers of Focus BP.

Topics covered by the interviews included:

- **The role and responsibilities** of the interviewee
- **Program delivery information.** How the particular Channel or Sector program is delivered including which types of customer or market actors are targeted and what types of program assistance is provided to them
- **Market effects.** Interviewees were asked whether they had seen any evidence of market effects in the lighting or HVAC markets. To minimize semantic confusion, interviewees were provided a definition of market effects upfront. Interviewers first asked them about any market effects they might have seen. Later in the interview, they were asked specifically if they thought the Lighting or HVAC Channel Initiatives had produced any market effects. If interviewees thought that they had seen market effects they were then asked:
  - What market effects they had seen (including which end users or market actors were impacted, what changes in awareness/behavior, what equipment types, and the approximate time period over which the effects occurred)
  - What was their basis (e.g., evidence) for believing that these market effects were occurring
  - What role Focus BP played in helping to bring about these market effects
  - What other factors besides Focus BP might have contributed to these market effects
  - How sustainable they thought these market effects might be in the absence of the program incentives or assistance.
- **The effects of particular Focus BP initiatives.** Interviewers asked them what effects the Focus BP T-12 bounty promotions, high-bay promotions, and tripling of incentives for the RTUs had on the lighting and HVAC markets.
- **The effectiveness of the Lighting and HVAC Channel Initiatives.** Interviewees were asked to rate the effectiveness of the Lighting and HVAC Channel initiatives on a 10-point scale and make recommendations on how these Channel Initiatives could be improved.

#### 3.2.3 The market actor surveys

Based on the Focus BP program theory and the information received from the in-depth interviews, we decided to target our surveys at the following market actors.

- HVAC contractors
- HVAC distributors
- Lighting contractors
- Lighting distributors.

As noted, this represents an expansion in the range of market actors since the 2008 Channel Study only interviewed lighting contractors and HVAC distributors.

We used Dun & Bradstreet's (D&B's) Selectory™ commercial database to pull the sample frames for the different market actor types in Wisconsin and Illinois. We used line-of-business descriptions in Selectory™ to filter out a few companies that did not offer the HVAC or lighting services that we were interested in.<sup>13</sup> We then stratified the remaining company by company size based on company revenue information. Table 3-3 through Table 3-6 show the sample dispositions for the HVAC and lighting contractors/distributors. Because the average completed survey was over one half hour long, we had some mid-survey terminations. We chose to use the data from these partial completes in our analysis.

**Table 3-3. HVAC Contractor Sample Disposition**

State	Strata	Percentage of Total D&B Revenue	Number of Establishments	Target Completes	Number of Interviews
Wisconsin	Less than \$600,000 in annual revenue	22%	354	6	6
	\$600,000 to \$2.3 million	25%	65	6	9
	Over \$2.3 million to \$6.6 million	27%	20	6	5
	over \$6.6 million	25%	6	4	4
	<b>Total</b>	<b>99%</b>	<b>445</b>	<b>22</b>	<b>24</b>
Illinois	Less than \$600,000 in annual revenue	23%	391	8	3
	\$600,000 to less than \$2.3 million	24%	61	7	5
	\$2.3 million to less than \$8 million	28%	20	7	6
	\$8 million or more	25%	7	5	2
	<b>Total</b>	<b>100%</b>	<b>479</b>	<b>27</b>	<b>16</b>

Note: One of the Wisconsin interviews and one of the Illinois interviews were partial.

<sup>13</sup> In addition to using the Selectory data for pulling our sample frames, we also used these data for populating company employee counts when the respondents to our market actor surveys was unwilling or unable to provide these employee counts. We also used the Selectory data as a "reality check" on the employee count or annual revenue figures that we collected from the market actor surveys.



Table 3-4. HVAC Distributor Sample Disposition

State	Strata	Percentage of Total D&B Revenue	Number of Establishments	Target Completes	Number of Interviews
Wisconsin	Less than \$3 million in annual revenue	18%	118	7	7
	\$3 million to \$12 million	22%	20	7	6
	Over \$15 million to \$18 million	20%	10	6	4
	Over \$18 million to \$21 million	20%	5	4	3
	Over \$21 million	19%	4	3	1
	<b>Total</b>	<b>99%</b>	<b>157</b>	<b>27</b>	<b>21</b>
Illinois	Less than \$3 million in annual revenue	16%	337	7	5
	\$3 million to \$7.5 million	16%	66	6	7
	Over \$7.5 million to \$26 million	16%	23	6	8
	Over \$26 million to \$100 million	17%	10	5	3
	\$100 million or more	35%	3	3	2
	<b>Total</b>	<b>100%</b>	<b>439</b>	<b>27</b>	<b>25</b>

Note: One of the Wisconsin interviews and three of the Illinois interviews were partial.

Table 3-5. Lighting Contractor Sample Distribution

State	Strata	Percentage of Total D&B Revenue	Number of Establishments	Target Completes	Number of Interviews
Wisconsin	Less than \$4 million in annual revenue	32%	658	5	5
	\$4 million to less than \$25 million	34%	71	5	5
	\$25 million or more	34%	18	5	5
	<b>Total</b>	<b>100%</b>	<b>747</b>	<b>15</b>	<b>15</b>
Illinois	Less than \$2 million in annual revenue	31%	1170	6	3
	\$2 million to less than \$7.5 million	34%	92	6	5
	\$7.5 million or more	35%	19	7	3
	<b>Total</b>	<b>100%</b>	<b>1281</b>	<b>19</b>	<b>11</b>

Note: One of the Illinois interviews was partial.

Table 3-6. Lighting Distributor Sample Distribution

State	Strata	Percentage of Total D&B Revenue	Number of Establishments	Target Completes	Number of Interviews
Wisconsin	Less than \$2 million in annual revenue	7%	280	8	8
	\$2 million to less than \$5 million	8%	57	7	6
	\$5 million to less than \$10 million	15%	46	9	6
	\$10 million to less than \$20 million	14%	21	8	2
	\$20 million or more	56%	18	10	2
	<b>Total</b>	<b>100%</b>	<b>422</b>	<b>42</b>	<b>24</b>
Illinois	Less than \$2 million in annual revenue	6%	615	6	2
	\$2 million to less than \$5 million	7%	112	6	3
	\$5 million to less than \$10 million	10%	80	6	8
	\$10 million to less than \$20 million	15%	54	10	7
	\$20 million or more	62%	40	20	5
	<b>Total</b>	<b>100%</b>	<b>901</b>	<b>48</b>	<b>25</b>

Note: Two of the Wisconsin interviews and three of the Illinois interviews were partial.

Topics covered in the HVAC and lighting market actor surveys included:

- **Company size, services.** The relative size of the companies and the types of services they offer
- **The HVAC/lighting specification process.** Which market actors play a role in specifying lighting or HVAC for new construction or retrofit projects
- **Cross-state market activity.** The frequency with which market actors serve both the Wisconsin and Illinois HVAC/lighting markets
- **Attitudes towards energy efficiency**
  - How important energy efficiency is for their own company
  - How important energy efficiency is for their contractors and customers.
- **Current energy efficiency practices**
  - The frequency with which they specify, sell, install, and stock energy-efficient HVAC/lighting products
  - What percentage of their inventory is devoted to energy-efficient HVAC/lighting products
  - How they promote energy-efficient HVAC/lighting products.
- **Retrospective energy efficiency practices/attitudes.** For some of the questions about energy-efficient sales/services and energy-efficient attitudes, we not only asked them for current information but also how their responses would have been different one year previously or three years previously.
- **Causes of energy efficiency trends.** If market actors said that their current energy-efficient sales/services or energy-efficient attitudes were different from an earlier period, we asked them what factors had caused these changes.

- **Awareness of, involvement with HVAC/lighting rebate programs.** We asked the market actors whether they are even aware of these programs, to what extent they have been involved in projects that received program rebates, whether they have featured program rebates in their promotions, and whether they have received program trainings.
- **Barriers to energy efficiency**
  - Factors that prevent them selling more energy-efficient HVAC/lighting products
  - Concerns that contractors, customers raise about energy-efficient products
  - What effects the current economic downturn has had on their sales.
- **Program attribution.** For both the Wisconsin and Illinois HVAC/lighting companies we asked a number of questions about program attribution including:
  - How important the rebate programs (e.g., Focus on Energy or ComEd/Ameren) have been in their company’s efforts to promote energy-efficient HVAC/lighting
  - What their percentage of energy-efficient sales/installations of [measure X] would have been in the absence of the programs
  - What their percentage of energy-efficient sales/installations of [measure X] would be if the programs went away
  - Whether they participated in any other HVAC/lighting rebate programs and, if so, how important these programs were for their company’s efforts to promote energy-efficient HVAC/lighting.
- **Clarification questions.** These include questions such as how distributors know whether their equipment is being rebated or what sorts of guidelines the interviewees are using to determine whether a T8 system is a high performance system.

We circulated the market actor interview guides to the PSCW staff and Focus BP implementers for review and comment before fielding the study.

We determined which energy-efficient measures to focus on in the surveys—e.g., which measures received their own battery of questions—based on information from the in-depth interviews, from the 2008 Channel Study, from the Focus BP rebate application forms, and from our examination of the Focus BP tracking data. The measures we chose to focus on included:

- HVAC
  - High-efficiency modulating boilers
  - Boiler controls
  - Boiler tune-ups
  - High-efficiency packaged RTUs
  - RTUs with dual-enthalpy economizers
  - RTUs with CO<sub>2</sub> sensors and DCV systems
  - RTUs with VSDs specified for system motors
  - RTU tune-ups.

- Lighting
  - High-bay lighting (both high-bay fluorescents and pulse-start metal halides)
  - High-performance T8s
  - Lighting occupancy controls.

Due to concerns about survey length and respondent fatigue, we could not ask about all these measures with the same level of detail. For example, the retrospective energy efficiency practice/attitude and program attribution questions (described above) were only asked for the measures we deemed most important based on information from the in-depth interviews, 2008 Channel Study, and the Focus BP tracking data.

It should be noted that we also asked the HVAC contractors whether they installed certain types of less-common HVAC equipment such as energy recovery ventilators, infrared heaters, and steam traps. This kind of information was useful for trying to verify some of the market indicators even though it did not allow us to estimate untracked attributable savings (UAS) for these measures.

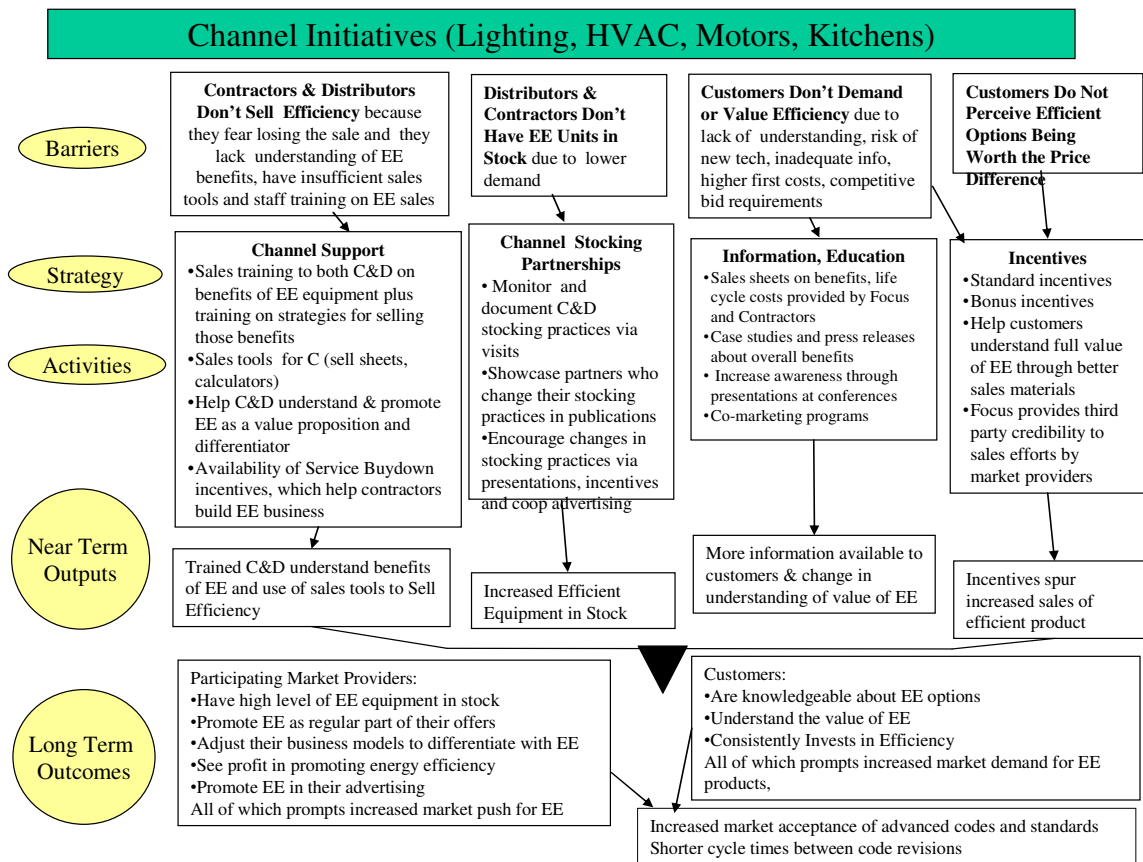
We began the market actor surveys in December 2009 and finished them in February 2010.

4. FINDINGS

4.1 HYPOTHESIZED MARKET EFFECTS FROM THE PROGRAM THEORY AND PROGRAM IMPLEMENTER INTERVIEWS

As discussed in the methodology section, the Focus BP implementers provided us with their theories as to what market effects they might be creating in the HVAC and lighting markets and how these effects might be produced. These theories came—in a very high-level form—from the Focus BP program theory (Figure 4-1) and in more detailed elaborations from the in-depth interviews.

Figure 4-1. Focus BP Program Theory, Channel Initiatives



In the in-depth interviews with program implementers, we asked them about possible market effects in the HVAC and lighting markets. The following sections summarize their responses as to the possible market effects indicators they thought we should look for, as well as the program strategies/interventions they thought were producing these effects.

i. The HVAC Market

Table 4-1 summarizes the HVAC market effect indicators that the program implementers mentioned in the in-depth interviews. It shows that most of the indicators were related to a high market share of energy-efficient equipment or a high percentage of HVAC companies

offering new or less-common HVAC technologies. Other market indicators such as the stocking of energy-efficient equipment, the use of energy efficiency in promotions, and general awareness of energy efficiency benefits were cited less often. The table shows that the Focus BP market interventions that were credited with contributing to these market effects included Focus BP incentives as well as various ways to educate HVAC contractors.

**Table 4-1. Theoretical HVAC Market Effects from the In-depth Interviews with Program Implementers**

Targeted Market Actors	Program’s Market Interventions	Market Effect Indicators
Contractors, distributors, electricians, end users	<ul style="list-style-type: none"> <li>• Incentives:                             <ul style="list-style-type: none"> <li>– Standard Focus BP incentive offerings</li> <li>– Special incentive promotions (e.g., tripling of RTU incentives in 2007)</li> <li>– Changing of incentive rules (e.g., allowing larger boilers to qualify for prescriptive rebates instead of custom rebates).</li> </ul> </li> <li>• Education:                             <ul style="list-style-type: none"> <li>– Educating HVAC companies about how to talk about energy efficiency (e.g., that an infrared heater or new boiler may be smaller but it’s more energy-efficient)</li> <li>– Educating HVAC companies about the benefits of offering higher-end HVAC controls that provide energy efficiency, not just programmability</li> <li>– Educating HVAC companies that they should consider a VFD for any large fan or pump they install</li> <li>– Educating HVAC companies and end users about making ventilation systems more energy efficient (e.g., DDC systems in gyms auditoriums)</li> <li>– Educating HVAC companies about how to overcome customer concerns about higher first cost for EE equipment through calculating value of incentives and energy savings</li> <li>– Offering training courses such as industrial ventilation</li> <li>– Co-presenting EE products and discussing their benefits with distributors of those products.</li> </ul> </li> <li>• Focus BP’s Retro-commissioning and Building Tune-up programs.</li> </ul>	<ul style="list-style-type: none"> <li>• High Wisconsin market share of high-efficiency HVAC products including:                             <ul style="list-style-type: none"> <li>– High-efficiency RTUs</li> <li>– HVAC controls</li> <li>– High-efficiency boilers</li> <li>– High-efficiency chillers</li> <li>– Condensing boilers</li> <li>– Boiler controls</li> <li>– Boiler/chiller tuneups.</li> </ul> </li> <li>• High percentage of Wisconsin vendors offering newer or less-common HVAC technologies such as:                             <ul style="list-style-type: none"> <li>– ERVs</li> <li>– Infrared heaters</li> <li>– Ventilation equipment with VSDs</li> <li>– PTHPs</li> <li>– Boiler controls</li> <li>– Steam traps.</li> </ul> </li> <li>• Great availability of high-efficiency boilers in stock among Wisconsin HVAC companies</li> <li>• Increased awareness of the availability and benefits of high-efficiency HVAC products in general among Wisconsin HVAC companies</li> <li>• More Wisconsin vendors asking Focus on Energy about energy-efficient equipment</li> <li>• More Wisconsin distributors mentioning EE products in their promotional materials</li> <li>• More contractor bids requiring that equipment be “Focus-eligible.”</li> </ul>

ii. *The Lighting Market*

Table 4-2 summarizes the lighting market effect indicators that the program implementers mentioned in the in-depth interviews. In addition to market penetration, stocking and vendor attitudinal indicators, the program implementers also mentioned more vendors adopting Focus BP analytical tools and more end users calling Focus BP about energy-efficient lighting products. The table shows that the Focus BP market interventions that were credited with contributing to these market effects included Focus BP incentives; product information, technical assistance, and training for vendors; marketing and outreach for vendors; and outreach to end users.

**Table 4-2. Theoretical Lighting Market Effects from the In-depth Interviews with Program Implementers**

Targeted Market Actors/End Users	Program’s Market Interventions	Implementer-reported Market Effect Indicators
<p>Contractors, distributors, manufacturers, end users</p>	<ul style="list-style-type: none"> <li>• <b>Incentives.</b> Including not only standard incentives but also special promotions (e.g., T12 bounty, high-bay promotion). Also the program requires that incentive-eligible products meet clear and mandatory specifications. Implementers say that has led to the distributors allocating more shelf space to Focus BP-qualifying models.”</li> <li>• <b>Product information and training for vendors.</b> The program provides vendors with technical information the high-efficiency products in the form of “Best Practice” sheets; staff training; e-mail alerts of incentive availability/changes often with telephone follow up, and “roll out” meetings to announce product and/or incentive changes, conducted by the program for vendors and associations.</li> <li>• <b>Vendor marketing support.</b> The program provides materials designed to assist lighting vendors in selling energy-efficient products, including product sell sheets, fact sheets, and co-branded “co-op” or shared advertising. The program also participates in dealer “open houses” to showcase new products and lend objective support to the vendors’ claims.</li> <li>• <b>Outreach to vendors.</b> The Lighting Channel Initiative reaches out to trade allies through trade associations, business groups, and industry councils, and conferences as well as through informal contacts and relationships. The program also hosts technical training and sponsors other collaborative venues for trade allies (e.g., Lighting Advisory Group).</li> <li>• <b>Reviewing new EE lighting equipment.</b></li> <li>• <b>Technical assistance to customers.</b> This includes project design support, savings calculations; 3rd-party validation of vendor claims, and objective dispelling of myths (e.g., “T-8s don’t start in cold weather,” or “CFLs contribute to stray voltage”).</li> <li>• <b>End user outreach.</b> The program conducts advertising and active outreach to prospective end users, both directly and through/with vendors. The program also supports “energy teams” created by large end users.</li> </ul>	<ul style="list-style-type: none"> <li>• High market share of high-efficiency lighting products among Wisconsin companies including high-bay fluorescents, high-performance T8s, and lighting controls</li> <li>• Higher inventory levels of EE lighting products among Wisconsin distributors and retailers compared to those in neighboring states</li> <li>• Higher EE lighting sales volume overall in Wisconsin compared to neighboring states</li> <li>• Increase in the number of Wisconsin lighting vendors that stock EE lighting products</li> <li>• Some Wisconsin lighting vendors adopting Focus BP analytic/calculation tools and/or practices (e.g., distributor US Lamp has used “Whole Building Lighting” analysis with its customers)</li> <li>• Increased number of vendors that participate in Focus BP-directed activities such as the Lighting Advisory Council</li> <li>• Some Wisconsin distributors only stocking lighting equipment that is eligible for Focus BP rebates</li> <li>• Higher awareness among Wisconsin lighting companies of EE lighting technologies and their benefits</li> <li>• Increased number of calls from Wisconsin end users asking about EE lighting technologies.</li> </ul>



In addition to these more generic market effects indicators, some of the Focus BP Sector Program interviewees also mentioned lighting market effects that were particular to their own sectors. Table 4-3 summarizes these sector-specific market effects.

**Table 4-3. Sector-specific Theoretical Market Effects from the In-depth Interviews with Program Implementers**

Targeted Market Actors/ End Users	Program’s Market Interventions	Implementer-reported Market Effect Indicators
<ul style="list-style-type: none"> <li>• Dairy equipment dealers</li> <li>• Utility Rewire programs</li> <li>• Ag Extension dairy experts</li> <li>• Lighting contractors</li> <li>• Dairy farms</li> </ul>	<ul style="list-style-type: none"> <li>• Lighting incentives</li> <li>• “Ride-alongs” with vendors visiting farms</li> <li>• Technical assistance</li> <li>• Fact sheets and case studies for vendors and end users</li> </ul>	<ul style="list-style-type: none"> <li>• Wider, improved application of Long-Day Lighting (LDL)</li> </ul>
<ul style="list-style-type: none"> <li>• Lighting manufacturers</li> <li>• Lighting distributors</li> <li>• Ag equipment dealers</li> <li>• Ag end users including dairy operations, grain/ grain dryers, greenhouses</li> </ul>	<ul style="list-style-type: none"> <li>• Other outreach to farmers and vendors such as trade shows, trade press ads, and open houses.</li> </ul>	<ul style="list-style-type: none"> <li>• Wider availability of EE lighting that meets “Damp &amp; Dusty” specifications</li> </ul>
<ul style="list-style-type: none"> <li>• School facilities managers</li> <li>• Municipal finance managers</li> <li>• Lighting contractors</li> <li>• Lighting distributors</li> </ul>	<ul style="list-style-type: none"> <li>• Lighting incentives</li> <li>• Technical assistance</li> <li>• Fact sheets and case studies for vendors and end users</li> <li>• Considerable time spent developing long-term relationships with contacts in finite pool of educational/ municipal entities</li> </ul>	<ul style="list-style-type: none"> <li>• High penetration of gyms with HBL</li> <li>• HBL becoming standard practice in gyms.</li> </ul>

## 4.2 COMPARING THE CURRENT WISCONSIN AND ILLINOIS HVAC AND LIGHTING MARKETS

### 4.2.1 Introduction

This section compares the current Wisconsin and Illinois HVAC and lighting markets on a number of characteristics and practices. These include:

- **Company size, services.** The relative size of the companies and the types of services they offer
- **The HVAC/lighting specification process.** Which market actors play a role in specifying HVAC/lighting for new construction or retrofit projects
- **Cross-state market activity.** The frequency with which market actors serve both the Wisconsin and Illinois HVAC/lighting markets

- **Awareness of, involvement with HVAC/lighting rebate programs.** Whether they are even aware of these programs, to what extent they have been involved in projects that received program rebates, whether they have featured program rebates in their promotions, and whether they have received program trainings.
- **Barriers to energy efficiency:**
  - Factors that prevent them selling more energy-efficient products
  - Concerns that contractors, customers raise about energy-efficient products
  - What effects the current economic downturn has had on their sales.

It is important to point out that two other important comparisons for the Wisconsin and Illinois HVAC and lighting markets—comparisons of their energy-efficient practices and their attitudes towards energy efficiency—are not discussed in this section. This is because they are discussed in the subsequent section, which examines whether the market actor survey evidence supports the potential market effects identified in the in-depth interviews.

Most of the information in this section comes from the 2009/2010 interviews with Wisconsin and Illinois market actors. The in-depth interviews with implementers of the Focus BP Channel and Sector programs also provided us with some information on how the Wisconsin HVAC markets work.

#### **4.2.2 Comparing the Wisconsin and Illinois HVAC markets**

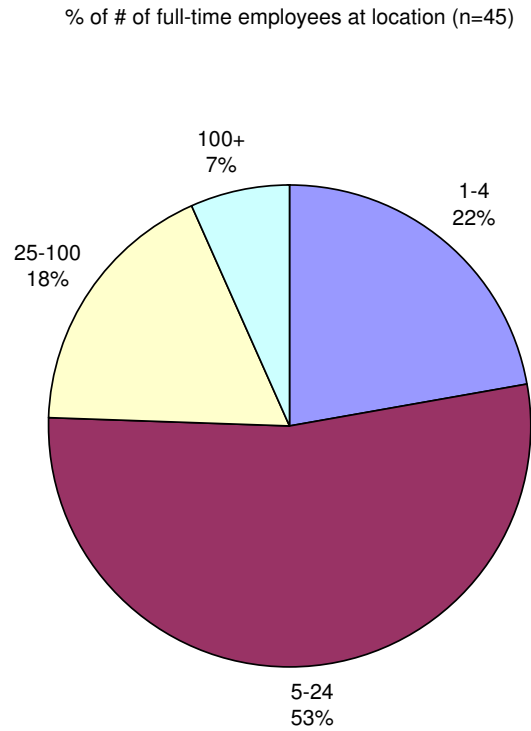
##### *A. COMPANY SIZE AND SERVICES*

This subsection compares the Wisconsin and Illinois HVAC companies as to their relative size; the services they offer; how their projects or revenue are allocated among new construction, major remodeling/retrofit, and maintenance; and what types of equipment they install.

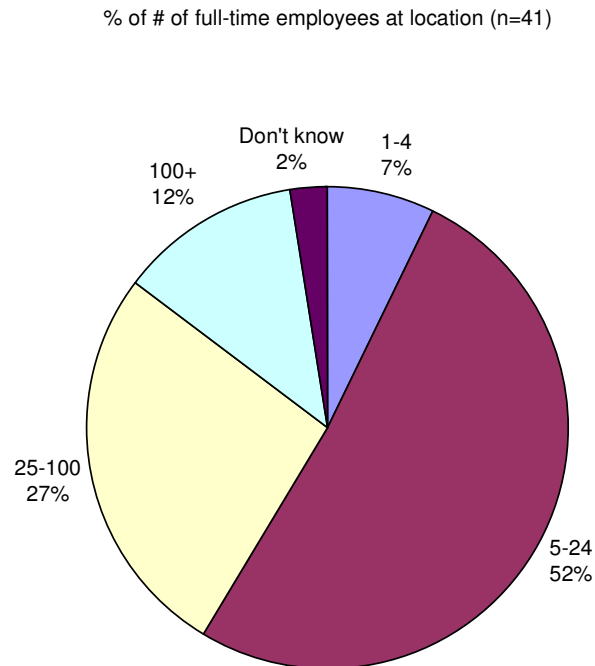
##### *i. Company Size*

We asked the Wisconsin and Illinois HVAC companies how many full-time employees work at their locations. Figure 4-2 and Figure 4-3 show their responses broken down by employment size categories. Although only a quarter of the Wisconsin respondents had 25-or-greater number of full-time employees—compared to 39 percent for the Illinois respondents—the average number of full-time employees was actually higher for Wisconsin (68) than Illinois (41). This was due to the presence of a single, very large HVAC company in the Wisconsin sample. Since the large majority of HVAC companies responding to the survey were able to provide an estimate of the number of full-time employees at their location, we chose to use that as an indicator of company size.

**Figure 4-2. Number of Full-time Employees at Location: Wisconsin HVAC Companies**



**Figure 4-3. Number of Full-time Employees at Location: Illinois HVAC Companies**

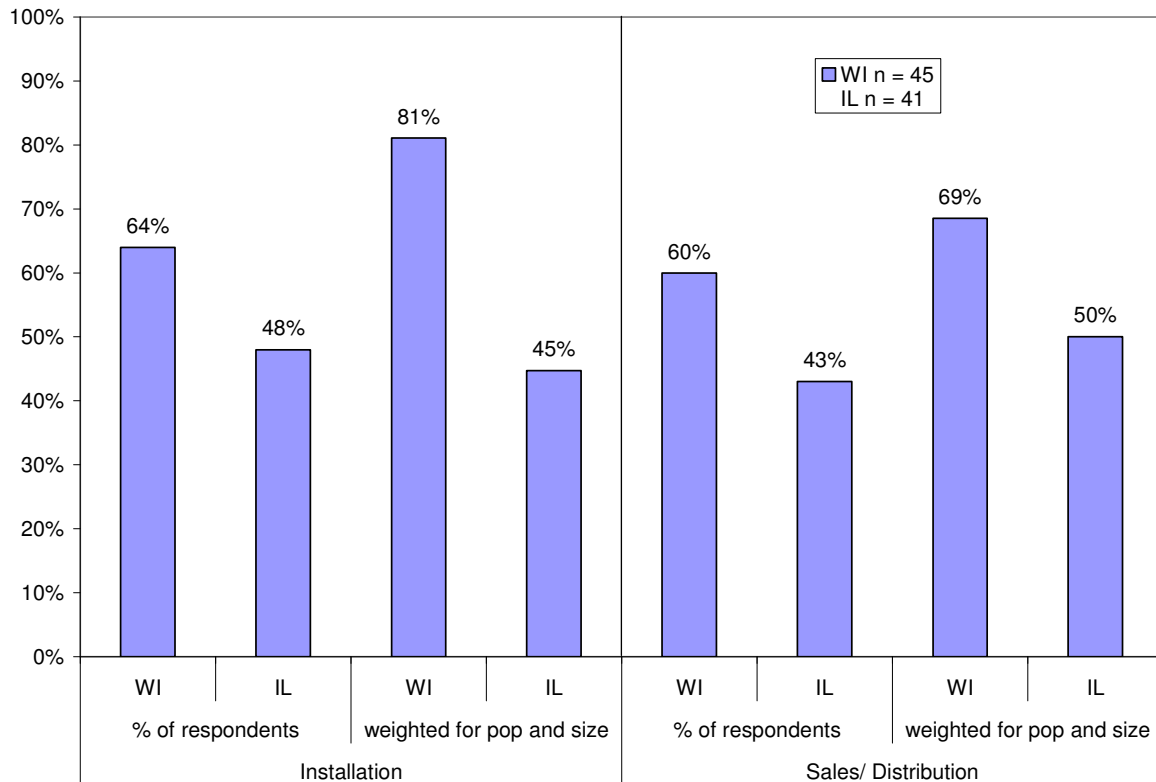


We also asked the respondents for a rough estimate of their company’s annual revenue. Only 25 of the 45 Wisconsin HVAC companies and only 24 of the 41 Illinois HVAC companies provided these estimates. The average annual revenue estimate for the Wisconsin respondents was \$1.0 million and the average estimate for the Illinois respondents was \$1.8 million. However, the D&B Selectory™ service also provided us with company revenue information.

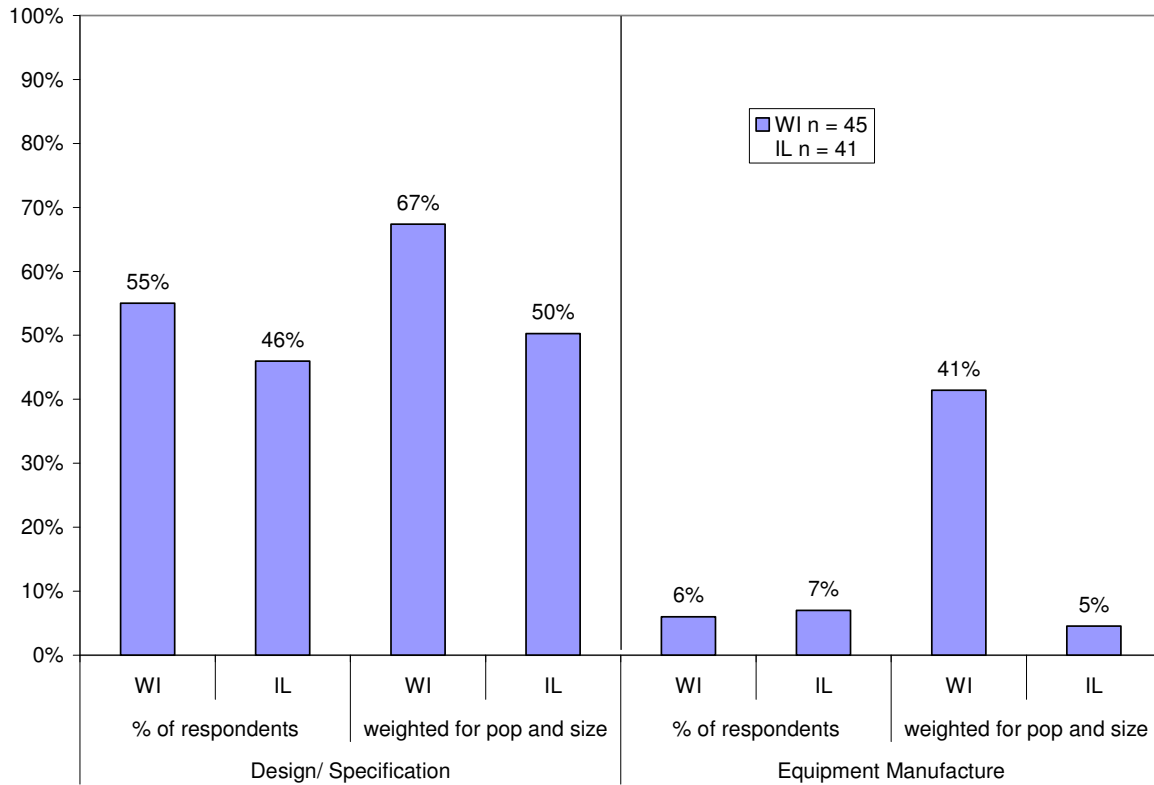
ii. *Services Offered, Project Mix*

We asked the respondents which HVAC services they offered. Figure 4-4 and Figure 4-5 shows the percentages of Wisconsin and Illinois HVAC companies that offered installation, sales/distribution, design/specification, and equipment manufacture services. The charts show that the Wisconsin companies were overall more diversified in their service offerings than their Illinois counterparts. We also asked the Wisconsin and Illinois HVAC companies whether they design or install C&I HVAC control systems. Because some program implementers in the in-depth interviews hypothesized that a higher percentage of Wisconsin HVAC companies were designing/installing HVAC control systems, we will show the Wisconsin vs. Illinois comparison for these measures in the market effects section.

**Figure 4-4. Percentage of Wisconsin and Illinois HVAC Companies Offering HVAC Installation, Sales/Distribution Services**

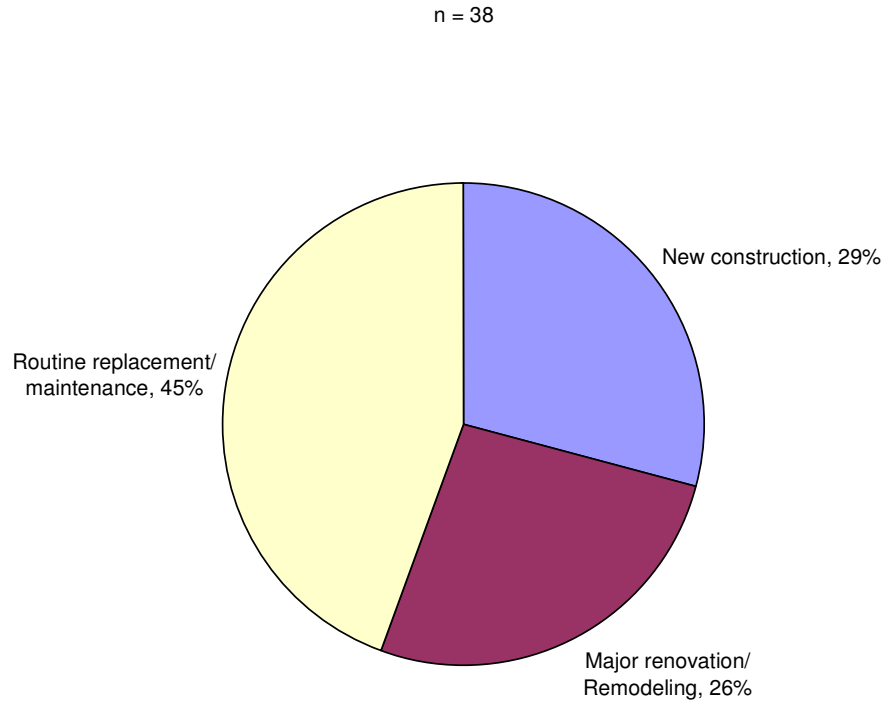


**Figure 4-5. Percentage of Wisconsin and Illinois HVAC Companies Offering HVAC Specification, Manufacture Services**



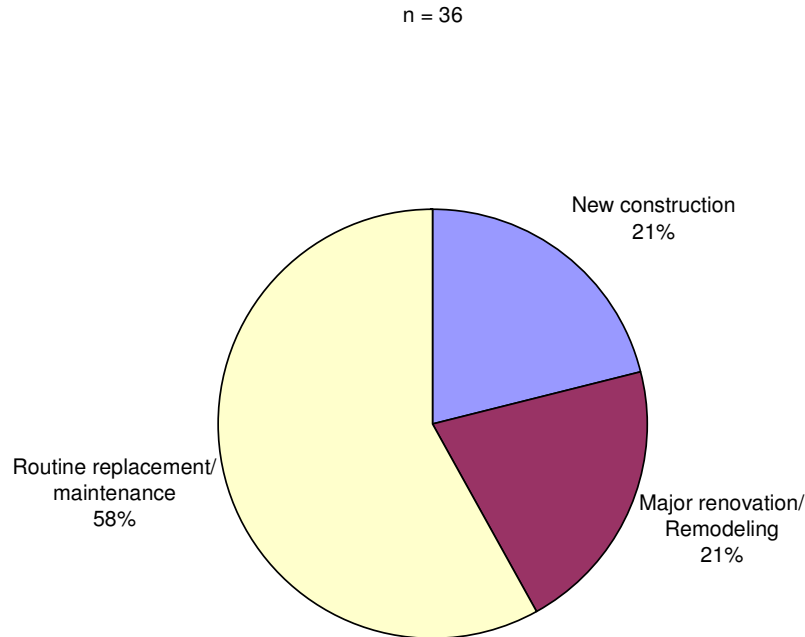
Another way to categorize HVAC market services is to look at the percentage of a company’s work that is spent on new construction projects, major renovations/remodelings, or the routine replacement or maintenance of existing HVAC equipment. Figure 4-6 and Figure 4-7 show that the both the Wisconsin and Illinois companies reported that the routine replacement or maintenance of existing HVAC equipment accounted for the largest share of their sales. However, many respondents commented about how the current economic downturn has severely curtailed their new construction opportunities, so it is not clear how typical these project distributions are.

**Figure 4-6. The Average Project Mix of Wisconsin HVAC Companies**



Note: Based on the weighted average responses.

**Figure 4-7. The Average Project Mix of Illinois HVAC Companies**



Note: Based on the weighted average responses. The average percentages for each of these project categories added up to only 95 percent so each category was scaled up so that the total would equal 100 percent.

We asked the HVAC distributors how they knew what kinds of HVAC projects the equipment they sold was being used for. They cited a variety of different ways including:

- **Understanding patterns among market sectors.** E.g., supermarket jobs tend to be remodels, biotechnology jobs tend to be new construction
- **Interaction with the contractors.** E.g., “certain contractors tend to do certain jobs”
- **Internal classification systems.** E.g., “usually we have job site tags that will tell us what type of business it's being installed at”
- **Involvement with the installations**
- **The actual design specifications for the job**
- **Economic trends.** e.g., “It's been brutal this year, 90% [new construction] is a typical year.”

*iii. Equipment Installed*

We asked the respondents whether they sold/installed various types of HVAC equipment. Figure 4-8 compares the Wisconsin and Illinois HVAC companies as to the percentages that install furnaces and boilers. The fully-weighted results show a slightly higher percentage of Illinois HVAC companies (90 percent vs. 84 percent) reporting that they sell/install furnaces although this difference was not statistically significant. A higher percentage of Wisconsin

HVAC companies reported selling/installing boilers and this difference was statistically significant for the fully-weighted responses.

**Figure 4-8. Percentage of Wisconsin and Illinois HVAC Companies Selling/Installing Furnaces, Boilers**

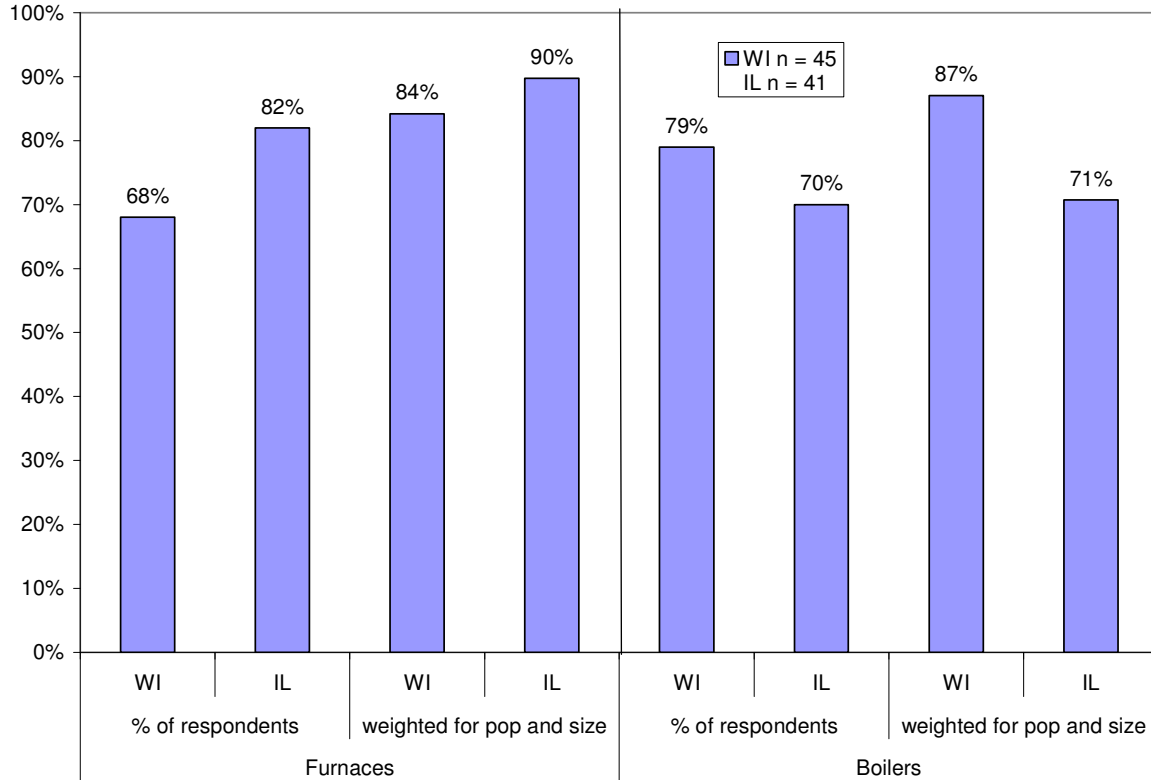
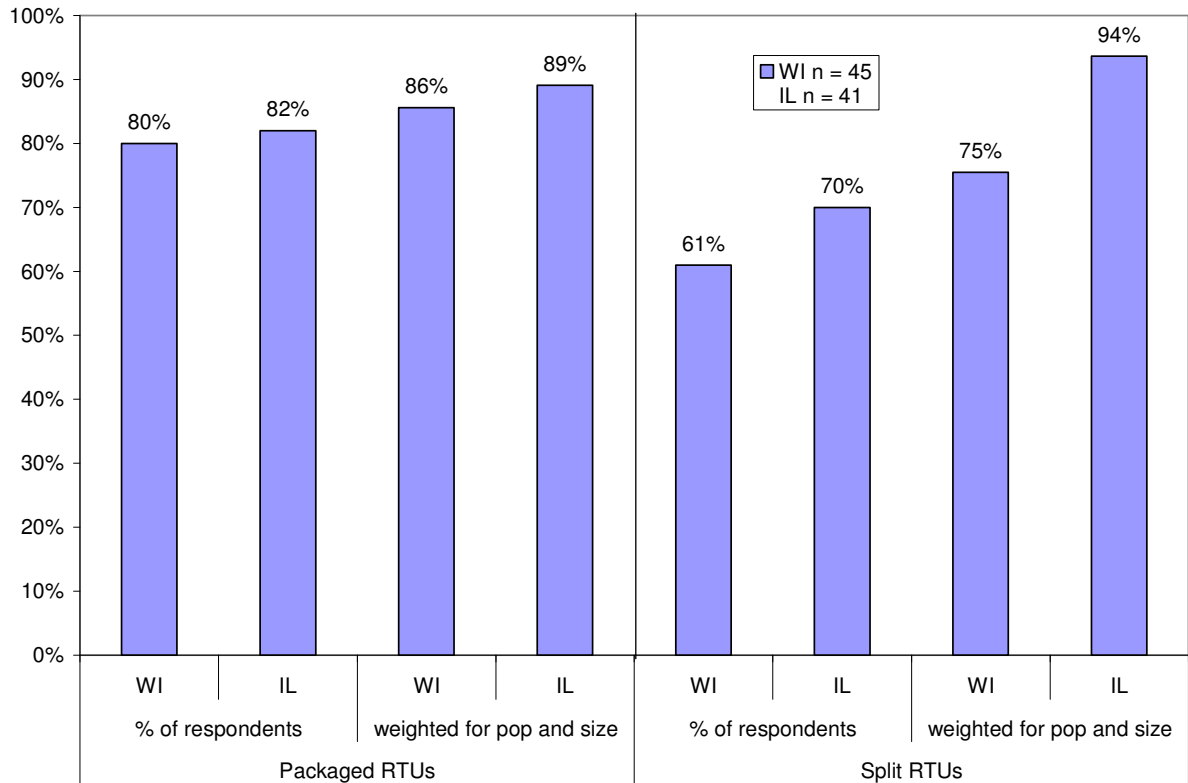


Figure 4-9 shows the frequencies with which Wisconsin and Illinois companies reported selling/installing packaged and split-system rooftop air-conditioning units (RTUs). The Wisconsin and Illinois reported selling/installing the packaged RTUs with about equal frequency. However, for the fully-weighted responses, a statistically higher percentage of Illinois companies reported selling/installing the split systems than their Wisconsin counterparts.

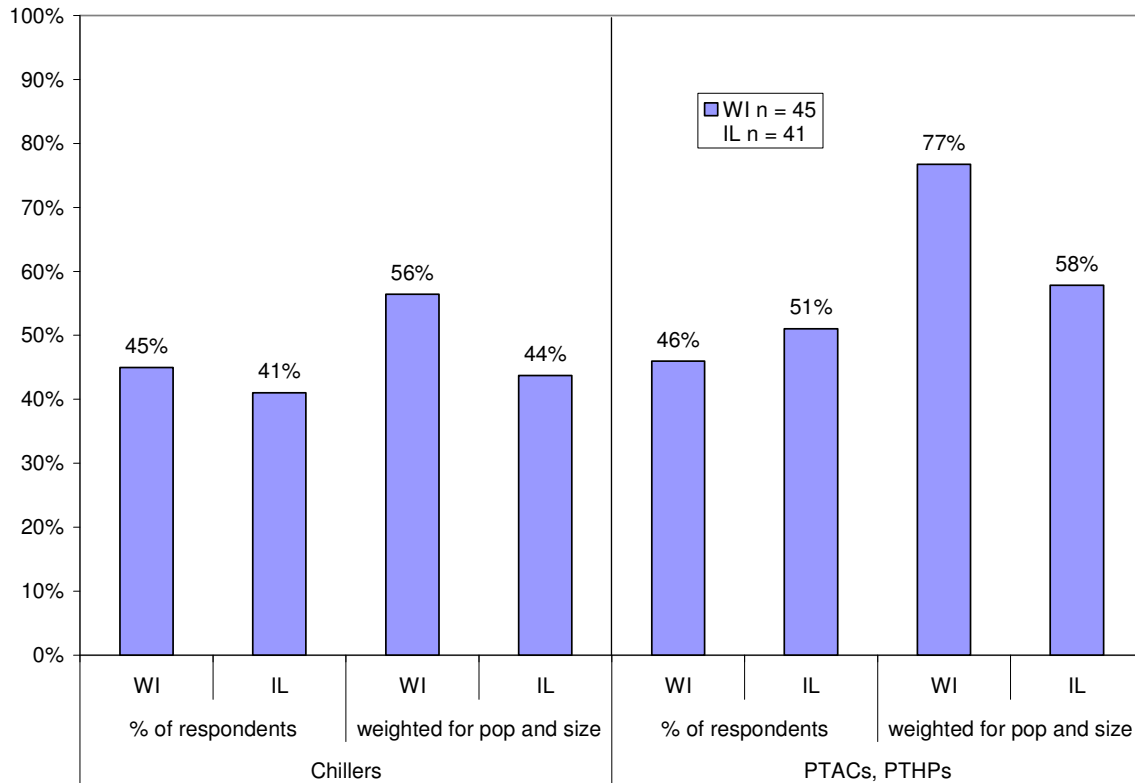


**Figure 4-9. Percentage of Wisconsin and Illinois HVAC Companies Selling Packaged or Split-System RTUs**



We asked the HVAC companies whether they sold/installed chillers, packaged terminal air conditioners (PTACs), packaged terminal heat pumps (PTHPs). Figure 4-10 shows their responses. A slightly higher percentage of Wisconsin companies reported selling/installing chillers but this difference was not statistically significant. However, in the fully-weighted responses the Wisconsin companies were more likely to claim to install PTACs and PTHPs and this difference was statistically different.

**Figure 4-10. Percentage of Wisconsin and Illinois HVAC Companies Selling Chillers, PTACs/PTHPs**



We also asked the Wisconsin and Illinois HVAC companies whether they install less-common HVAC equipment such as infrared heaters, energy heat and recovery ventilators (ERVs), and steam traps. Because some of the program implementers in the in-depth interviews hypothesized that a higher percentage of Wisconsin HVAC companies were installing these measures, we will show the Wisconsin vs. Illinois comparisons for these measures in the market effects section.

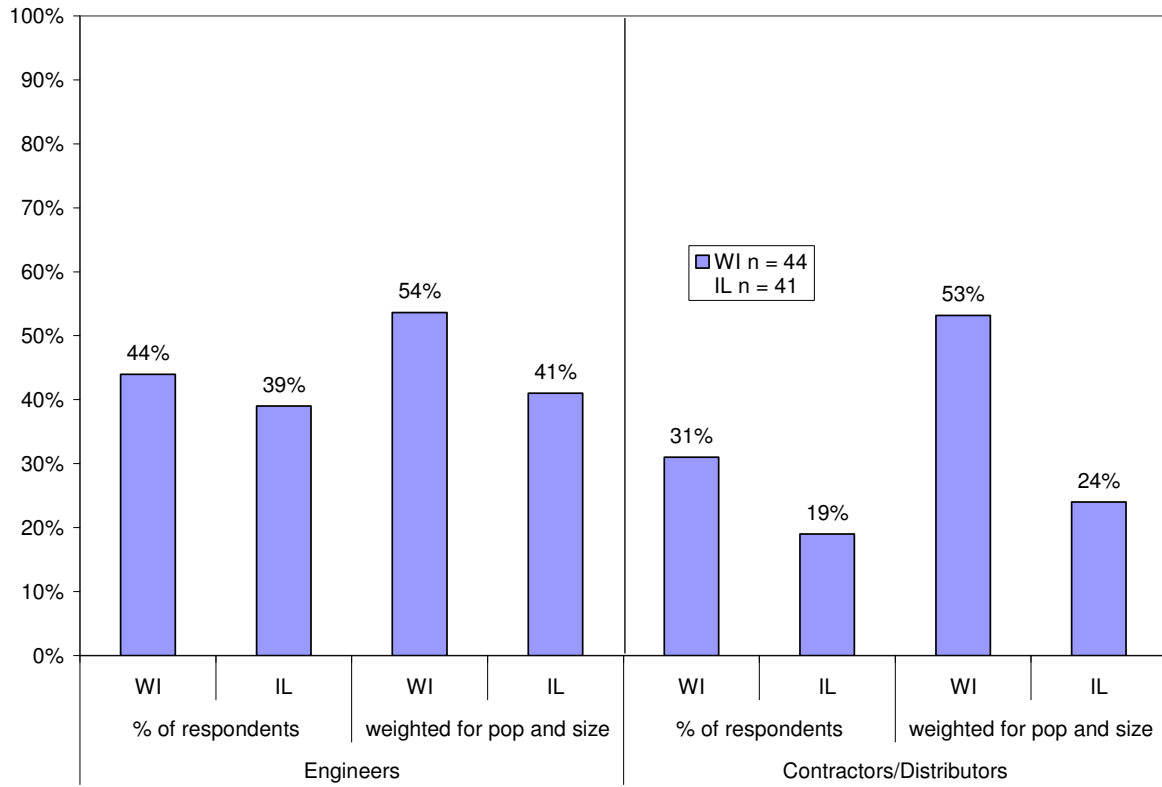
**B. HVAC SPECIFICATION PROCESS**

To increase the percentage of energy-efficient equipment in the HVAC market, it is important to know which market actors are most influential in the specification of the HVAC equipment. We asked the HVAC distributors and contractors, separately for both new construction and major remodeling/retrofit projects, “In these types of projects which participants in the process are typically most influential in deciding which types of HVAC equipment gets specified?”

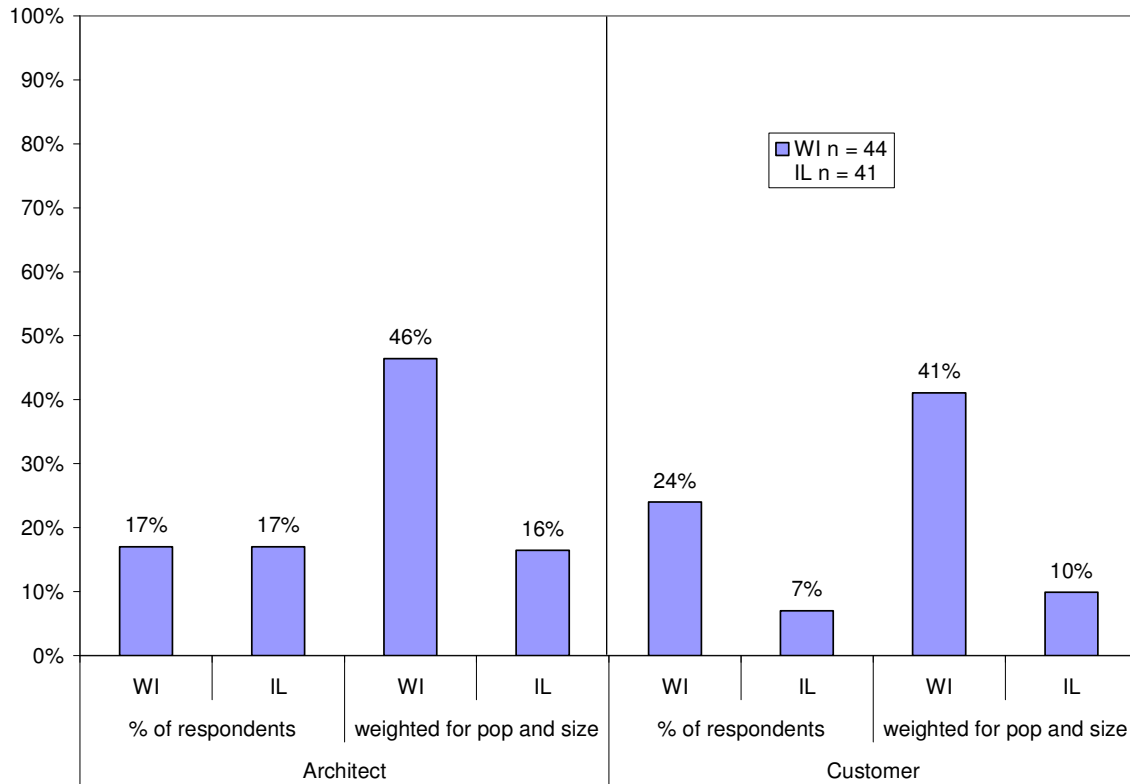
*i. New Construction*

Figure 4-11 and Figure 4-12 compare the responses of the Wisconsin and Illinois respondents as to the frequency with which they named design engineers, contractors/distributors, architects, or customers as influential in deciding which types of HVAC equipment get specified. They show that a much higher percentage of Wisconsin respondents said that the contractors/distributors and customers were influential.

**Figure 4-11. Percentage of Wisconsin and Illinois HVAC Companies Citing Design Engineers, Contractors/Distributors as Influential Participants in the New Construction HVAC Equipment Specification Process**



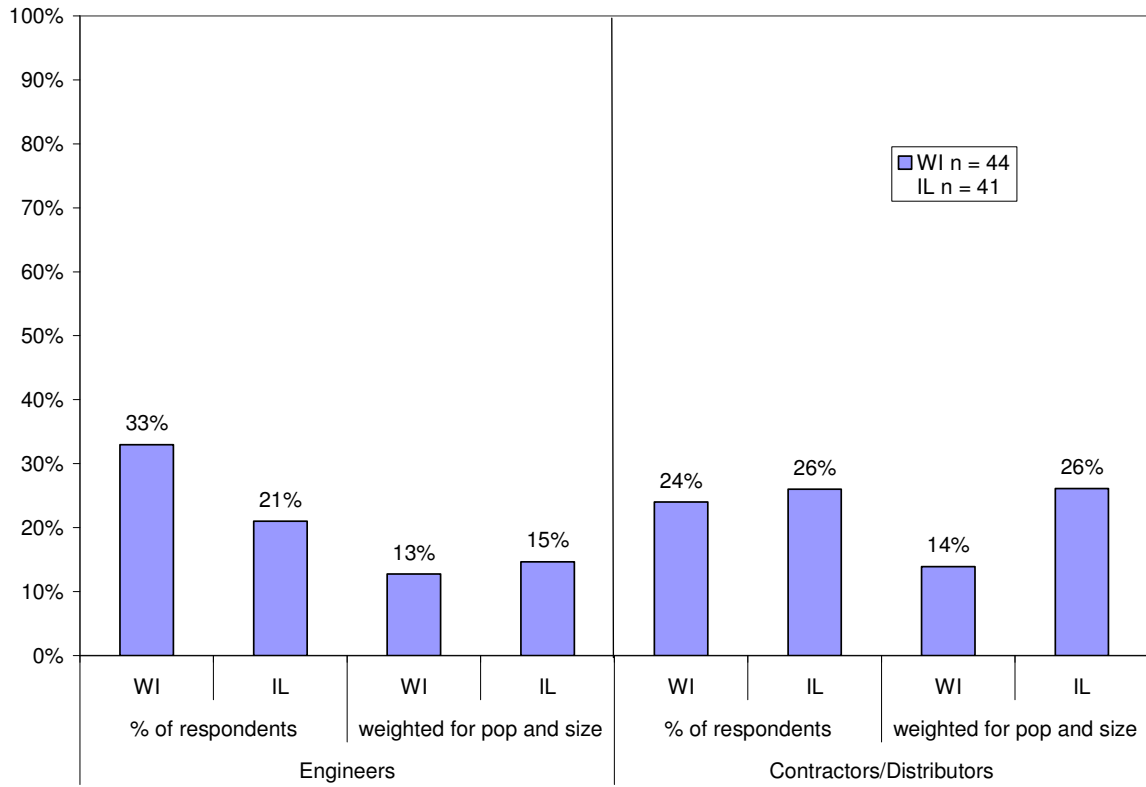
**Figure 4-12. Percentage of Wisconsin and Illinois HVAC Companies Citing Architects, Customers as Influential Participants in the New Construction HVAC Equipment Specification Process**



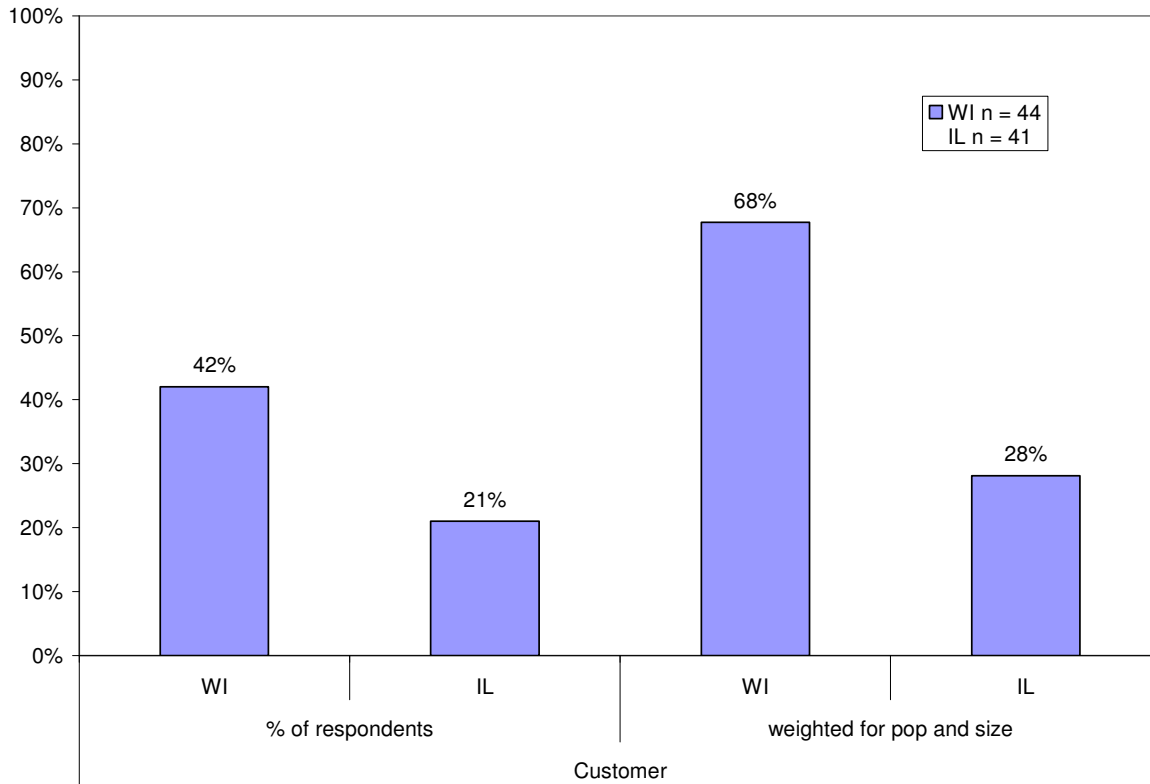
ii. *Major Remodeling/ Retrofit*

Figure 4-13 and Figure 4-14 show the responses of the HVAC companies for the most influential market actors in the process of specifying HVAC equipment for major remodeling/retrofit projects. The only significant difference between the Wisconsin and Illinois HVAC companies was that the Wisconsin companies were much more likely to cite customers as influential players.

**Figure 4-13. Percentage of Wisconsin and Illinois HVAC Companies Citing Design Engineers, Contractors/Distributors as Influential Participants in the Major Remodeling/Retrofit HVAC Equipment Specification Process**



**Figure 4-14. Percentage of Wisconsin and Illinois HVAC Companies Citing Customers as Influential Participants in the Major Remodeling/Retrofit HVAC Equipment Specification Process**



**C. CROSS-STATE MARKET ACTIVITY**

One issue of interest in assessing HVAC market effects is the geographic scope of the distributors and contractors. For example, if Wisconsin HVAC distributors and contractors do a lot of business in Illinois, then it is possible that any effects that Focus on Energy might be having on their practices might be spilling over into Illinois. While this cross-fertilization would inherently be a positive development, if it were significant in scale then it could complicate the quasi-experimental model used to measure the untracked attributable savings. This is because the Focus on Energy program would essentially be increasing the energy efficient equipment penetration in Illinois that we are using as a baseline.

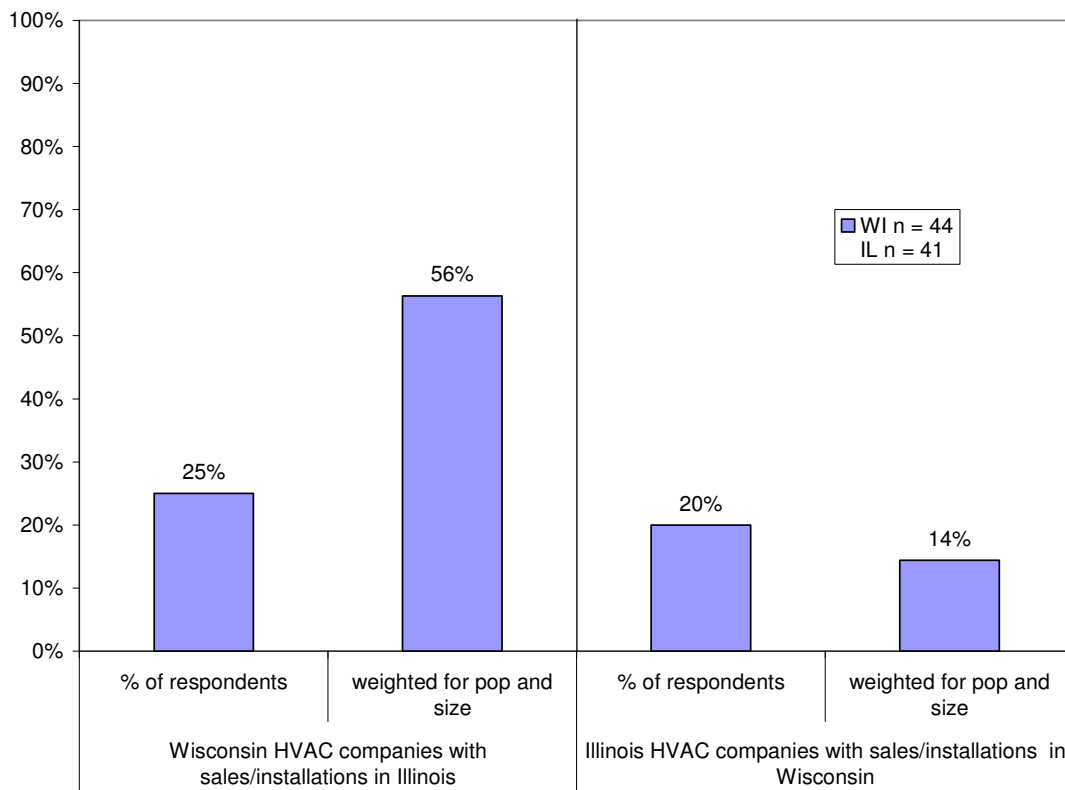
Of course it is possible that the effects could be happening in the opposite direction—e.g., the Illinois HVAC rebate programs could be influencing Illinois market actors to adopt more energy-efficient practices that they carry over to their Wisconsin installations/sales. However, because the Illinois HVAC rebate programs are relatively new we would expect these effects to be much less significant.

We asked the Wisconsin HVAC contractors/distributors whether they have installations/sales in Illinois and asked the converse question of the Illinois contractors/distributors. Figure 4-15 shows that a quarter of the Wisconsin HVAC companies said that they have sales/installations in Illinois and a fifth of the Illinois HVAC companies say they have sales in

Wisconsin. However, the fully-weighted results show that the Wisconsin companies were larger on average.

To get at the relative magnitude of these cross-states sales, we also asked those who reported sales/installations in both states, “If there was a pie chart with two slices and one slice was the quantity of your Illinois commercial/industrial HVAC projects/sales and the other slice was the quantity of your Wisconsin commercial/industrial HVAC projects/sales, what would be the relative size of these two slices, in percentage terms?” On average, the HVAC companies from Wisconsin reported that their Illinois sales accounted for 17 percent of their total sales. On average, the HVAC companies from Illinois reported that their Wisconsin sales accounted for 23 percent of their total sales.

**Figure 4-15. Cross-State Sales/Installations for Wisconsin/Illinois HVAC Companies**



**D. AWARENESS OF AND INVOLVEMENT WITH HVAC REBATE PROGRAMS**

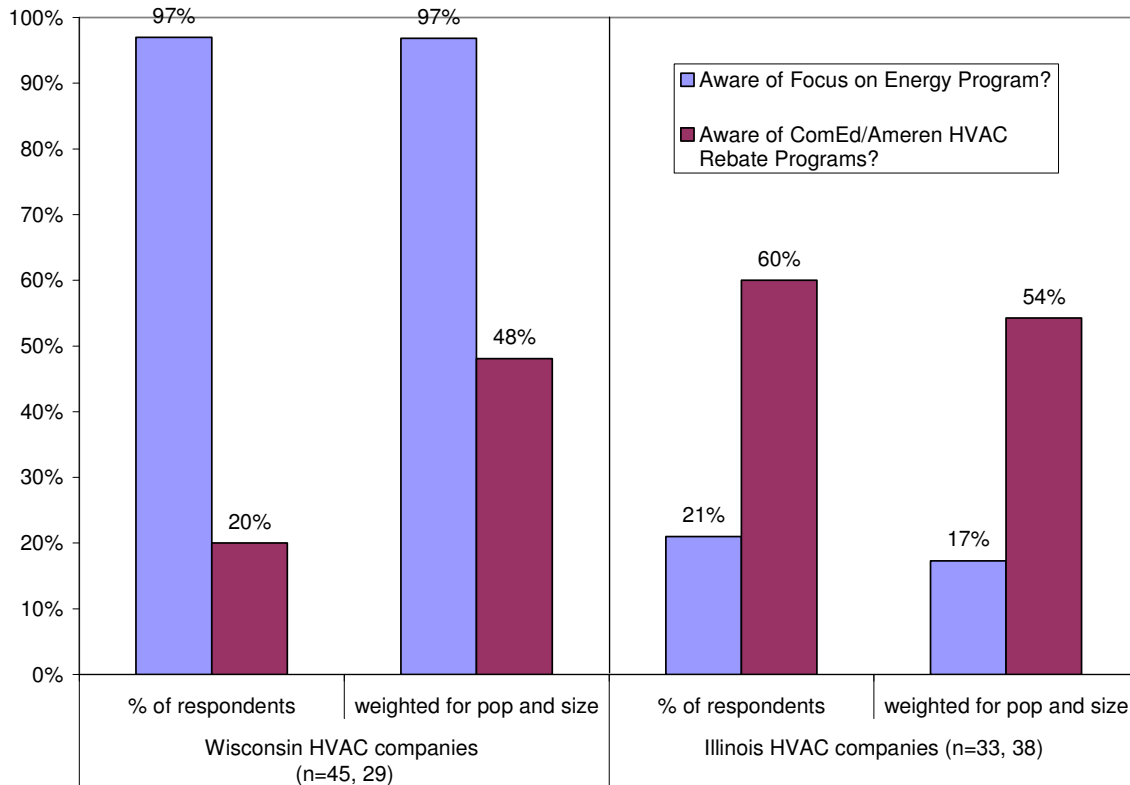
This section compares the Wisconsin and Illinois HVAC companies as to their awareness of and involvement with the state or utility HVAC rebate programs that are active in their states.

*i. Awareness of the Rebate Programs*

We asked the Wisconsin and Illinois HVAC companies whether they were aware of the Focus on Energy program as well as the Illinois HVAC rebate programs. Figure 4-16 shows that nearly all the Wisconsin HVAC companies said that they were aware of the Focus on Energy

program but only slightly over half of the Illinois HVAC companies claimed awareness of the Illinois HVAC rebate programs. Levels of awareness of the programs across the border were similar in both states although the Wisconsin companies that were aware of the Illinois programs tended to be larger than the Illinois companies that were aware of Focus on Energy.

**Figure 4-16. Awareness of the Rebate Programs Wisconsin vs. Illinois**



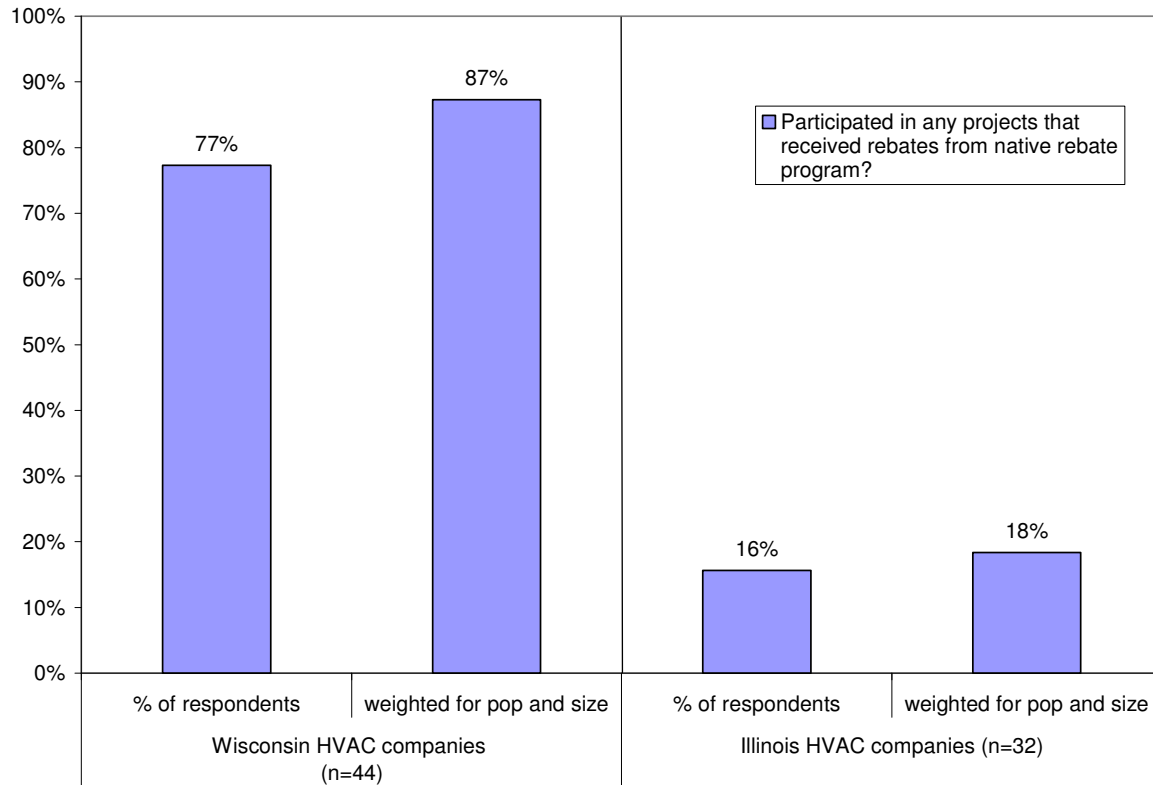
*ii. Involvement with the Rebate Programs*

The HVAC contractors who said they were aware of the HVAC rebate programs in their states were asked about their level of involvement with the program. We asked whether they had participated in any projects that received financial incentives from their “native” energy efficiency program (Focus on Energy for the Wisconsin companies, the ComEd/Ameren rebate programs for the Illinois companies), whether they had received trainings from such programs, and whether they had featured the programs in any of their promotional or sales communication efforts.

Figure 4-17 shows that over three quarters of the Wisconsin HVAC companies had participated in at least one project that had received a rebate from their native program while less than a fifth of the Illinois companies had. It is important to note that these questions were only asked of those who said that they were aware of their native rebate programs. So, when the unaware companies are accounted for, the percentage of Illinois HVAC companies involved in their rebate programs will be even lower.

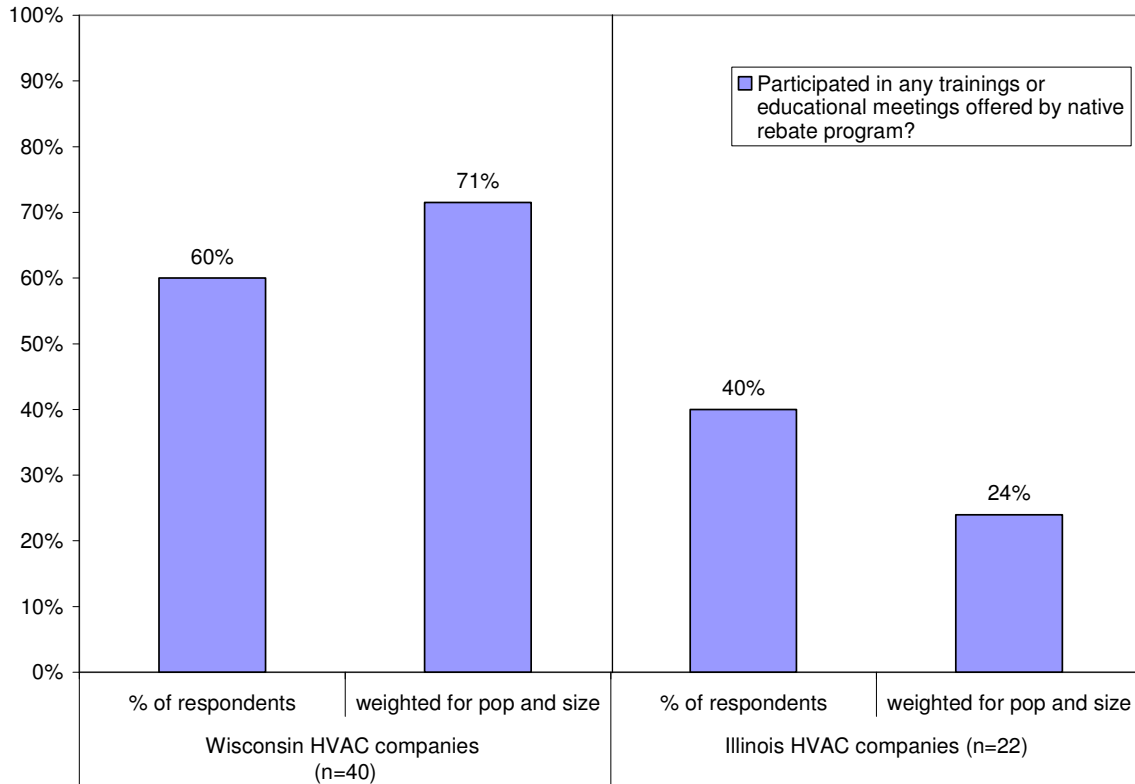


**Figure 4-17. Participation in Projects that Received Rebates from Native HVAC Rebate Programs Wisconsin vs. Illinois**



The Wisconsin HVAC companies were also more likely than their Illinois counterparts to say that they had participated in program trainings or educational meetings offered by their native rebate programs (Figure 4-18).

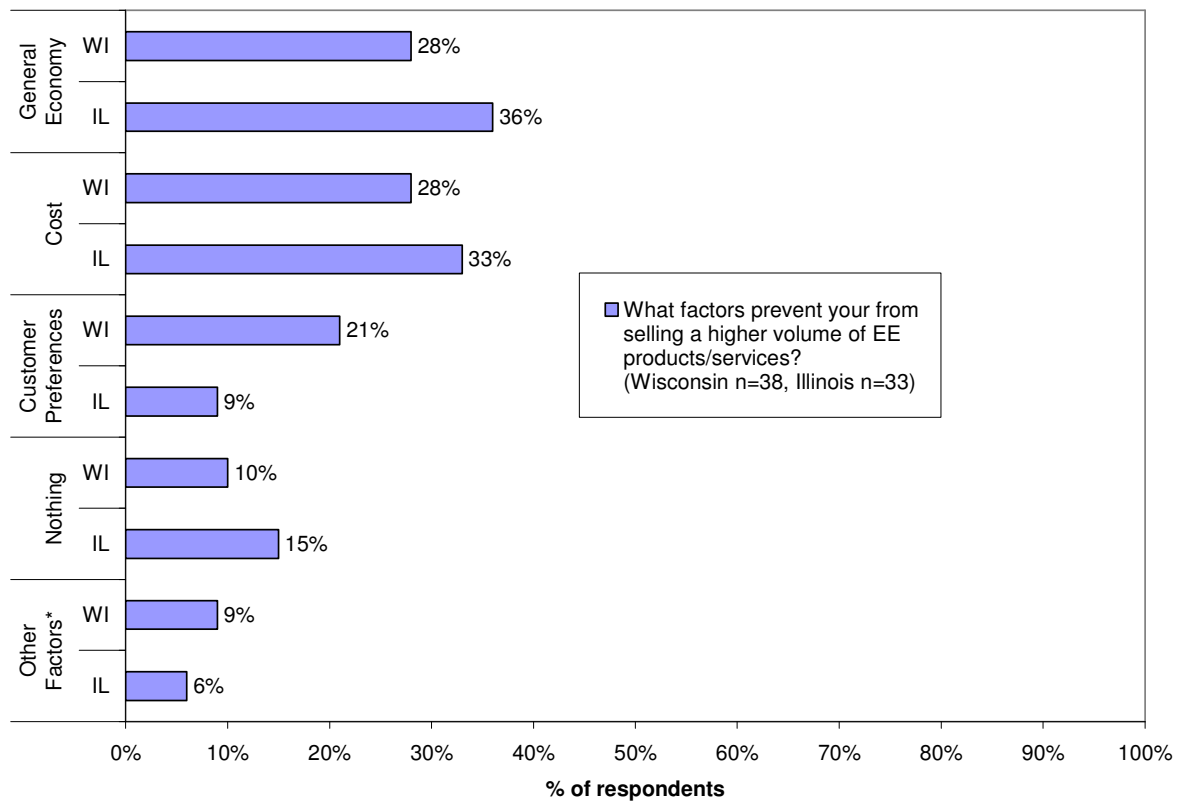
**Figure 4-18. Percentage of HVAC Companies Participating in Trainings/Educational Meetings Offered by Native Rebate Programs Wisconsin vs. Illinois**



**E. BARRIERS TO ENERGY EFFICIENCY**

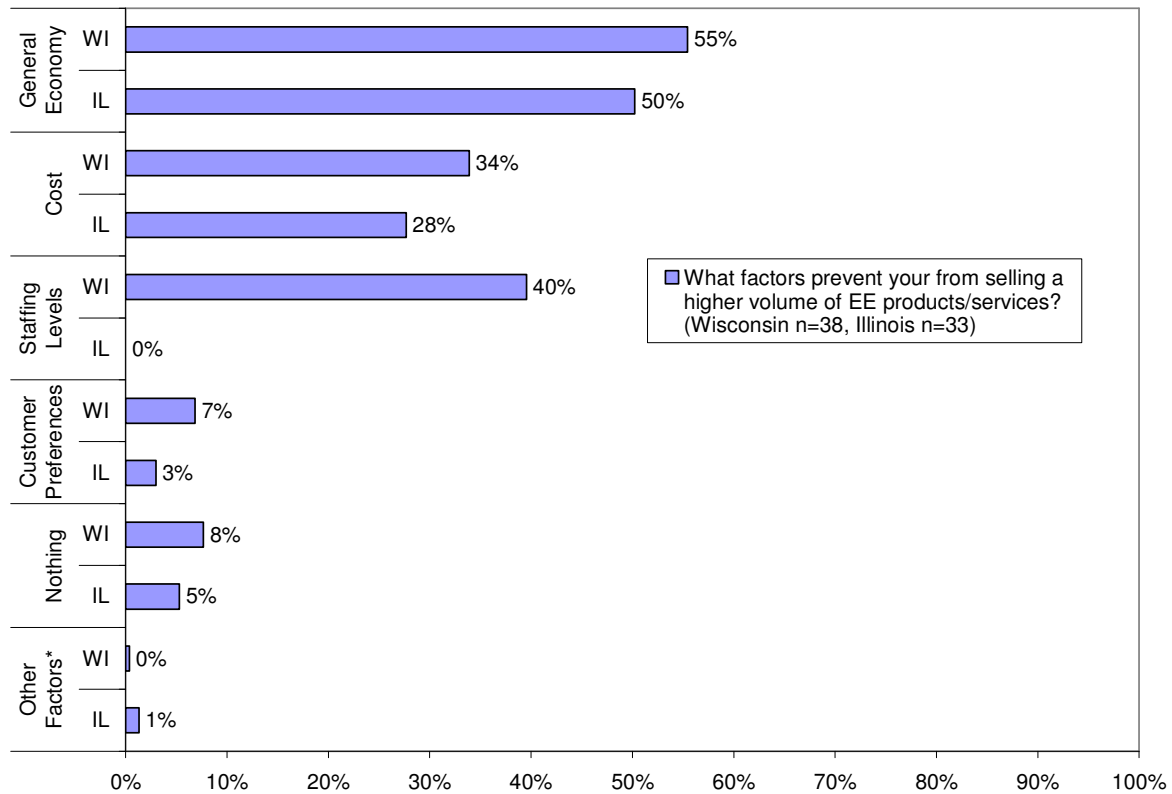
We asked the HVAC companies what factors prevent them from selling a higher volume of energy-efficient equipment/services than they currently are. With a couple of exceptions (staffing levels and customer preferences) the Wisconsin and Illinois HVAC companies cited the barriers with similar frequency (Figure 4-19 – percentage of respondents, Figure 4-20 – fully weighted). For both groups, the poor economy and higher equipment costs were the two most-cited barriers.

**Figure 4-19. Factors That Prevent Higher Sales of EE HVAC Equipment/Services Wisconsin vs. Illinois (Percentage of Respondents)**



\*Other factors included the company’s own staffing levels, concerns with the rebate programs (e.g., inadequate funding, claims that they are rebating the wrong measures), and manufacturers not always making equipment that meets the required efficiency levels.

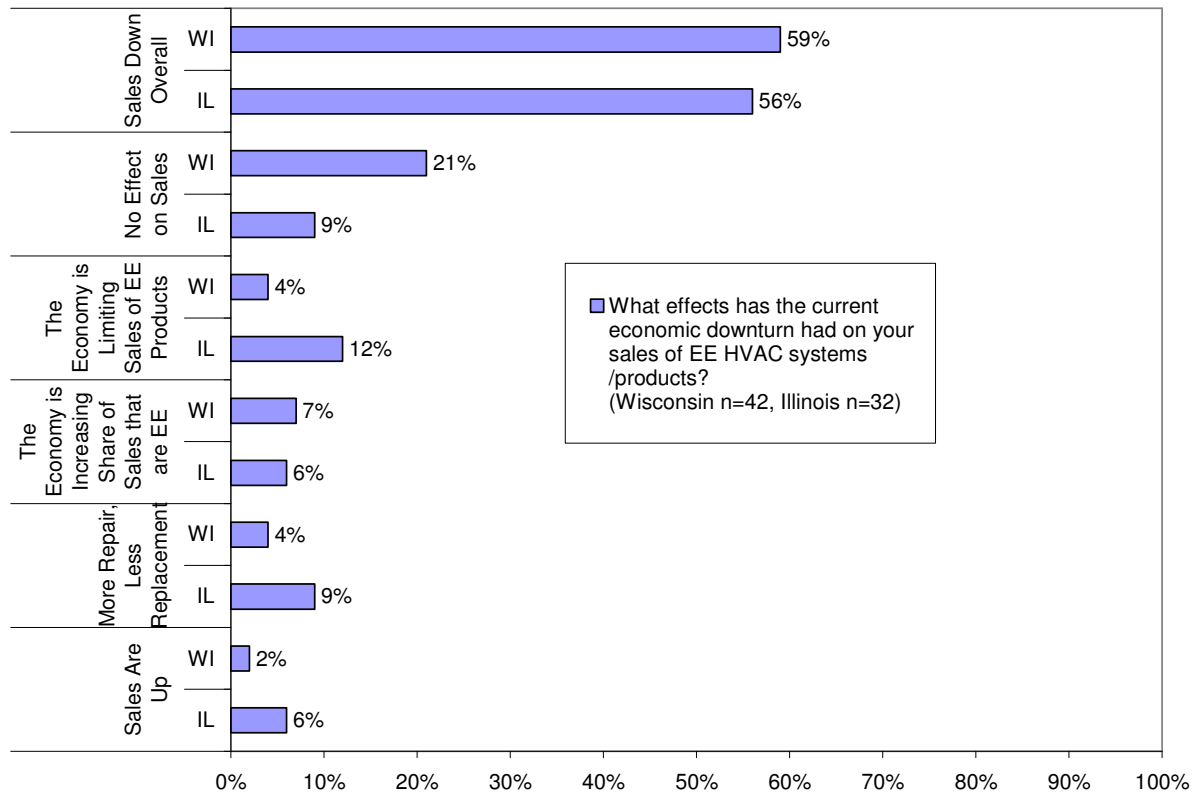
**Figure 4-20. Factors That Prevent Higher Sales of EE Equipment/Services Wisconsin vs. Illinois (Fully-weighted Responses)**



\*Other factors included concerns with the rebate programs (e.g., inadequate funding, claims that they are rebating the wrong measures) and manufacturers not always making equipment that meets the required efficiency levels.

Finally, we asked the HVAC companies what effects the current economic downturn has had on their sales of energy-efficient products and systems. Slightly over half of both the Wisconsin and Illinois HVAC companies said that their sales are down overall due to the poor economy (Figure 4-21). However, a higher percentage of the Wisconsin companies said that economic conditions have had no effect on their sales and the Illinois companies were more likely to say that the economy was limiting their sales of energy-efficient products.

**Figure 4-21. The Effects of the Economic Downturn Wisconsin vs. Illinois (the Percentage of Respondents)**



### 4.2.3 Characterizing and comparing the Wisconsin and Illinois lighting markets

This section compares the Wisconsin and Illinois lighting market on a number of characteristics including company size and services; the lighting specification process; cross-state market activity, awareness of and involvement with lighting rebate programs; and barriers to energy efficiency.

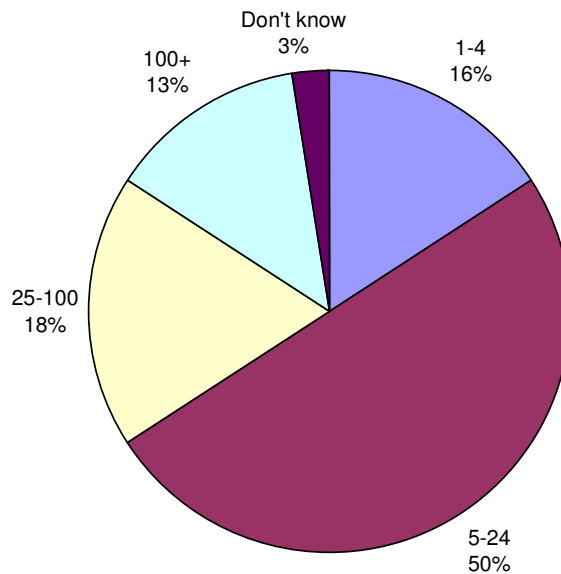
#### A. COMPANY SIZE AND SERVICES

##### i. Company Size

We asked the Wisconsin and Illinois lighting companies how many full-time employees work at their locations. Figure 4-22 and Figure 4-23 show their responses broken down by employment size categories. The biggest differences were that the Wisconsin sample had more companies in the 100+ employment category while Illinois had more in the 25–100 employment category. The average number of employees was 41 for Wisconsin and 30 for Illinois. Since the large majority of lighting companies responding to the survey were able to provide an estimate of the number of full-time employees at their location, we chose to use that as an indicator of company size.

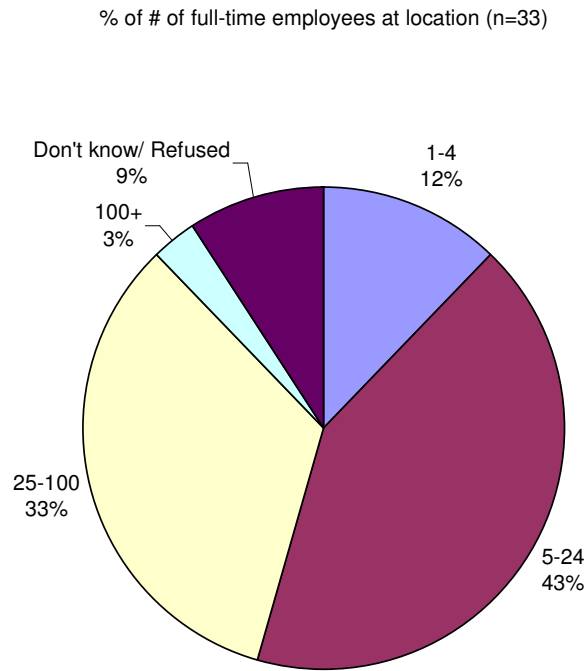
**Figure 4-22. Number of Full-time Employees at Location  
Wisconsin Lighting Companies**

% of # of full-time employees at location (n=38)



We asked the lighting companies for a rough estimate of their company's annual revenue. Only 20 of the 39 Wisconsin lighting companies and only 23 of the 34 Illinois lighting companies provided these estimates. The average annual revenue estimate for the Wisconsin respondents was \$317.7 million and the average estimate for the Illinois respondents was \$429.7 million. However, these averages were greatly increased by the presence of a few large lighting companies and the median annual revenue figures were much lower than this. The D&B Selectory™ service also provided us with company revenue information.

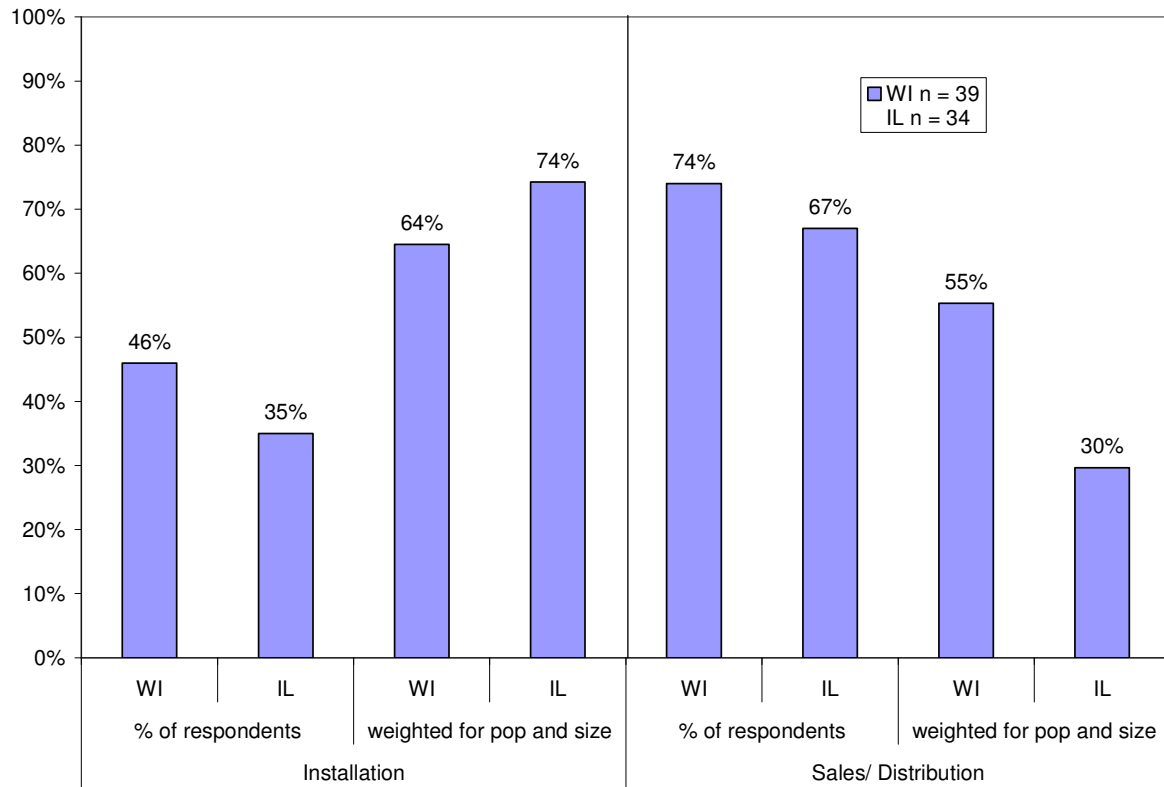
**Figure 4-23. Number of Full-time Employees at Location  
Illinois Lighting Companies**



ii. *Services Offered, Project Mix*

We asked the Wisconsin and Illinois lighting companies which services they offered. Figure 4-24 and Figure 4-25 show the percentages of these companies that reported offering installation, sales/distribution, design/specification, and equipment manufacture services. As was the case for HVAC, the Wisconsin lighting companies were overall more diversified in their service offerings than their Illinois counterparts. Based on the fully-weighted data the Wisconsin companies were significantly more likely to offer distribution and design/specification services. This diversification—especially the broader range of Wisconsin companies doing lighting specification—should make it easier for the Focus BP Lighting Channel Initiative to produce market effects. The percentage of companies reporting the manufacture of lighting products was low in both states.

**Figure 4-24. Percentage of Wisconsin and Illinois Lighting Companies Offering Lighting Installation, Sales/Distribution Services**





**Figure 4-25. Percentage of Wisconsin and Illinois Lighting Companies Offering Lighting Design/Specification, Manufacture Services**

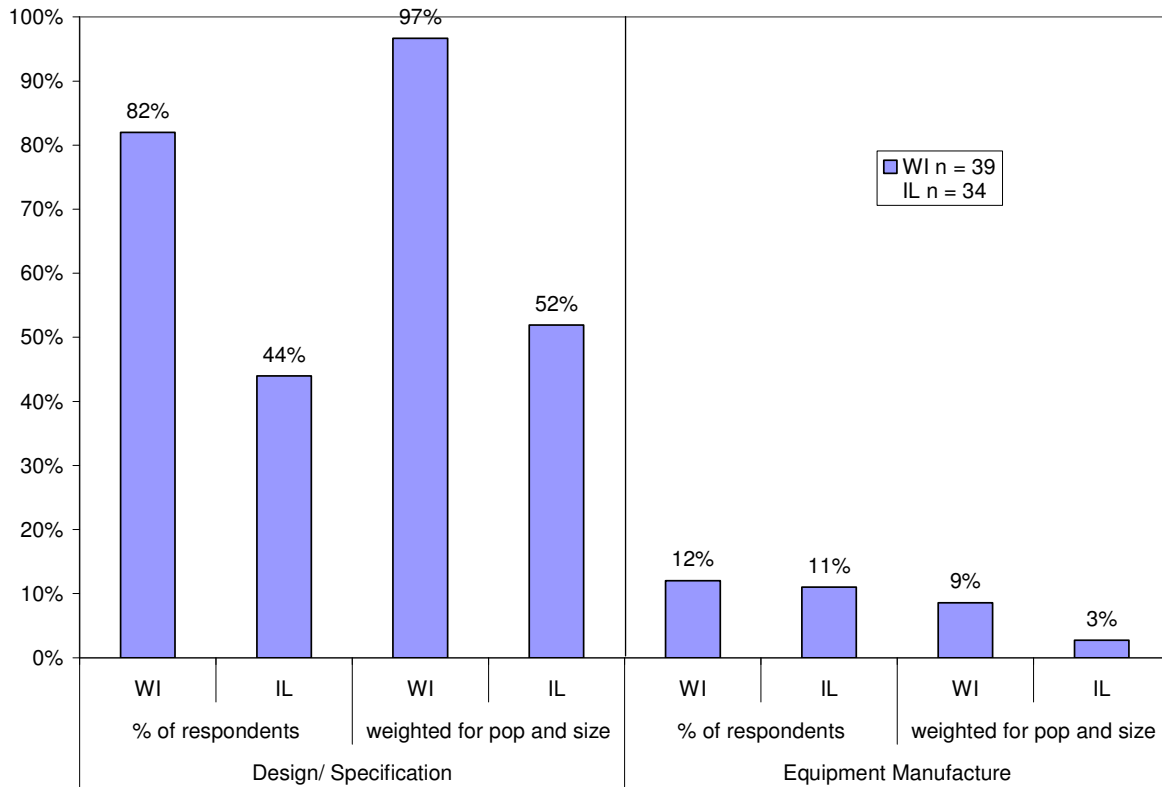
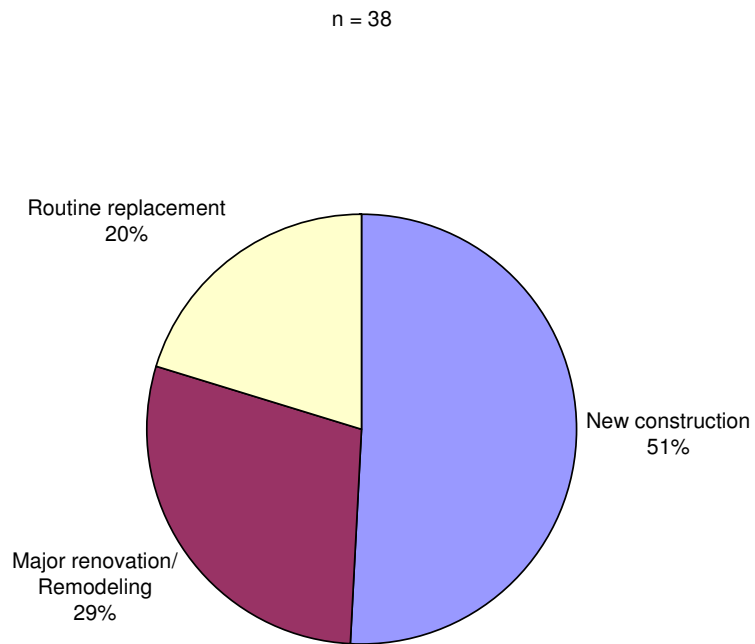


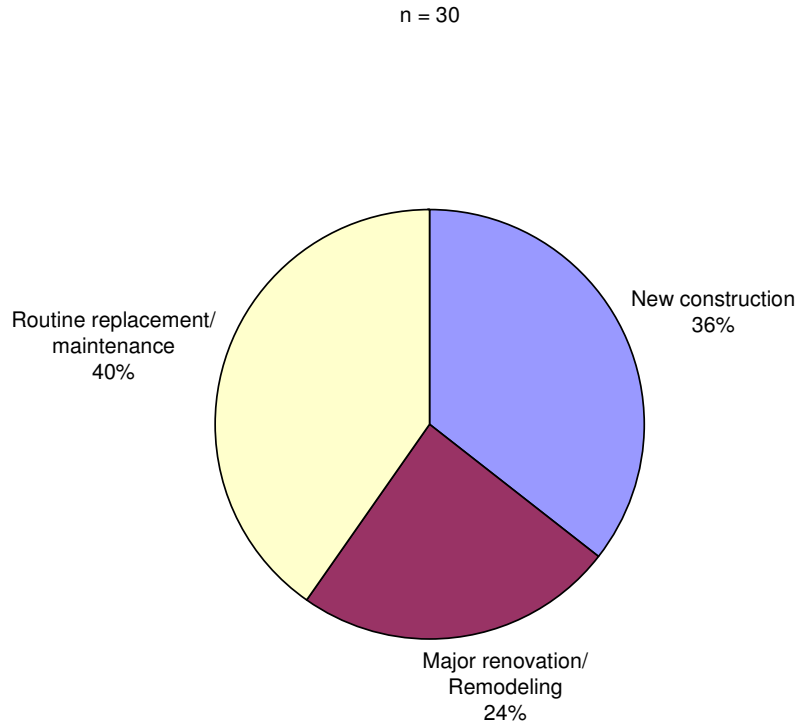
Figure 4-26 and Figure 4-27 show what the Wisconsin and Illinois lighting companies reported to be the percentage of their sales going towards new construction projects, major renovations/remodelings, or the routine replacement of lighting equipment. The Wisconsin companies reported a higher percentage of lighting work from new construction than the Illinois companies did. Yet as discussed previously in the HVAC section, it is likely that the current economic downturn has limited new construction opportunities, so it is not clear how typical these project distributions are.

**Figure 4-26. The Average Project Mix of Wisconsin Lighting Companies**



Note: Based on the weighted average responses.

**Figure 4-27. The Average Project Mix of Illinois Lighting Companies**



Note: Based on the weighted average responses.

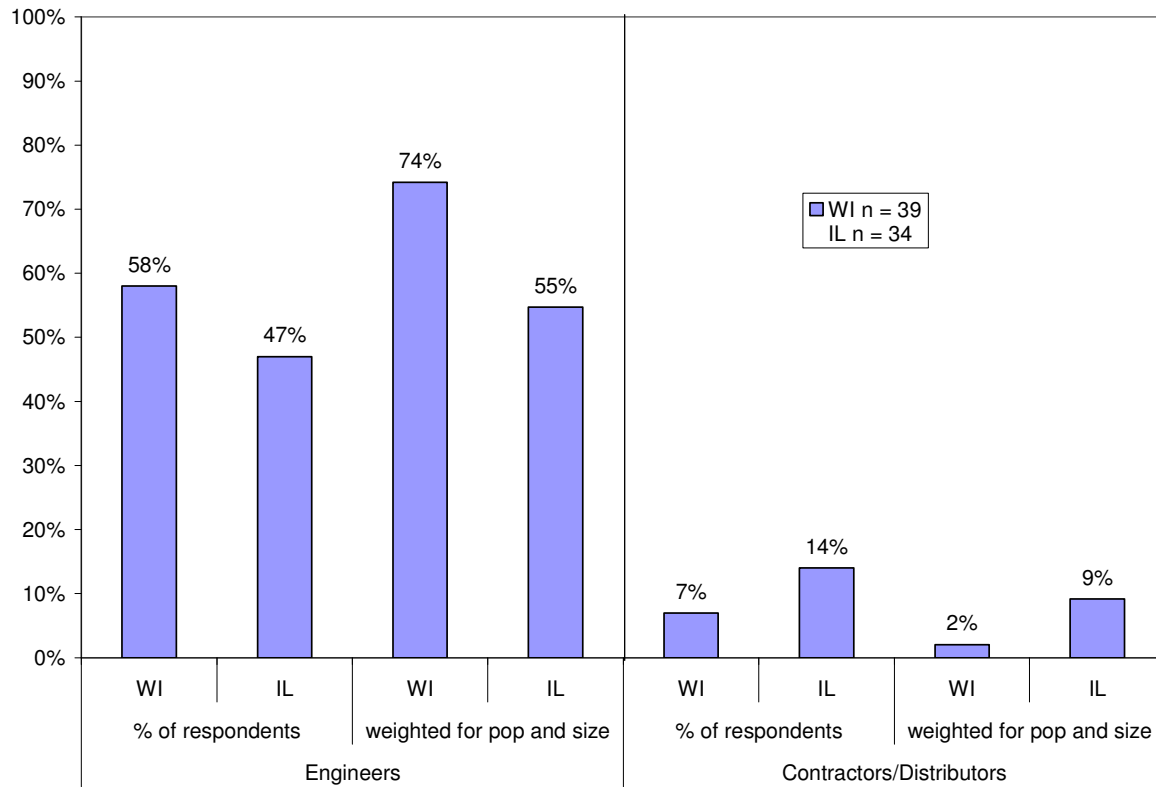
#### B. LIGHTING SPECIFICATION PROCESS

We asked the Wisconsin and Illinois lighting contractors, separately for both new construction and major remodeling/retrofit projects, “In these types of projects which participants in the process are typically most influential in deciding which types of lighting gets specified?”

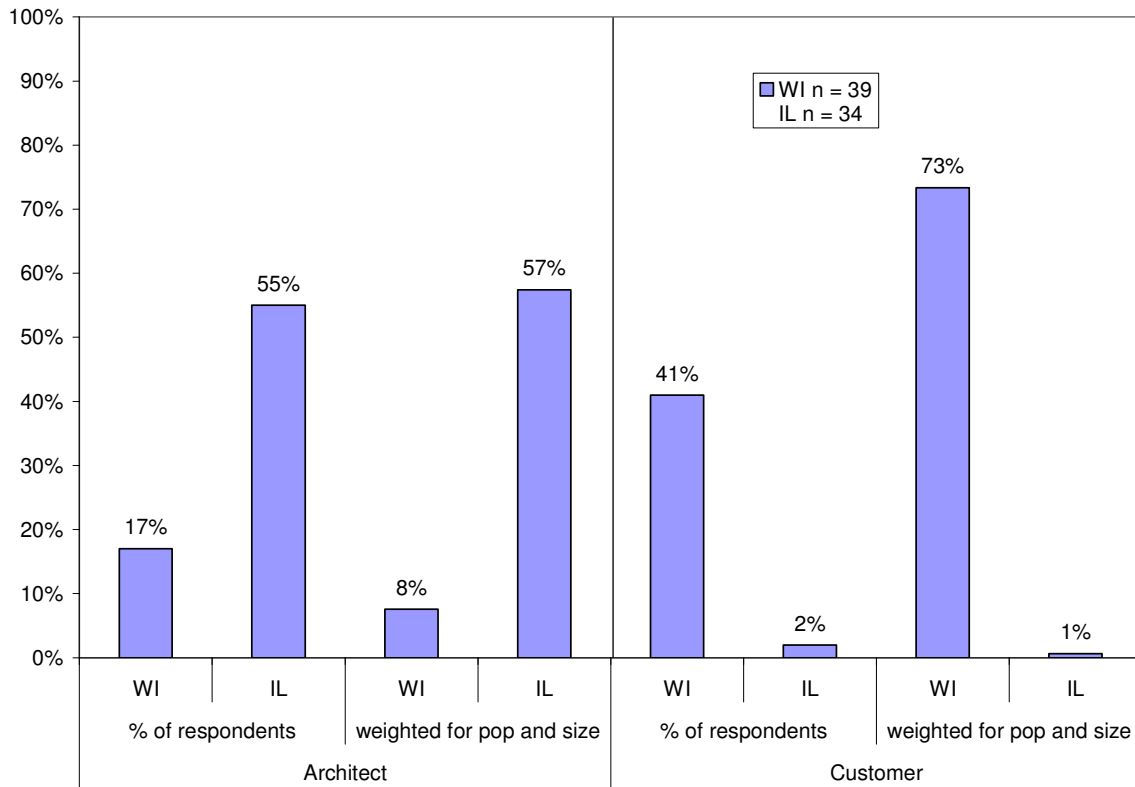
##### i. New Construction

Figure 4-28 and Figure 4-29 compare the responses of the Wisconsin and Illinois lighting contractors as to the frequency with which they named design engineers, contractors/distributors, architects, or customers as influential in deciding which types of lighting equipment are specified. There were some interesting differences between the two states. The Wisconsin lighting companies were much more likely than the Illinois lighting companies were to say that engineers and customers were influential in new construction specification. The Illinois companies were much more likely to cite architects. The greater involvement of Wisconsin customers in new construction lighting specification may be an indicator of a more transformed lighting market. For example, in the in-depth interviews some program implementers cited anecdotal evidence that some end users now require Focus BP-eligible lighting as a minimum requirement on their new construction bid sheets.

**Figure 4-28. Percentage of Wisconsin and Illinois Lighting Companies Citing Engineers, Contractors/Distributors as Influential Participants in the New Construction Lighting Process**



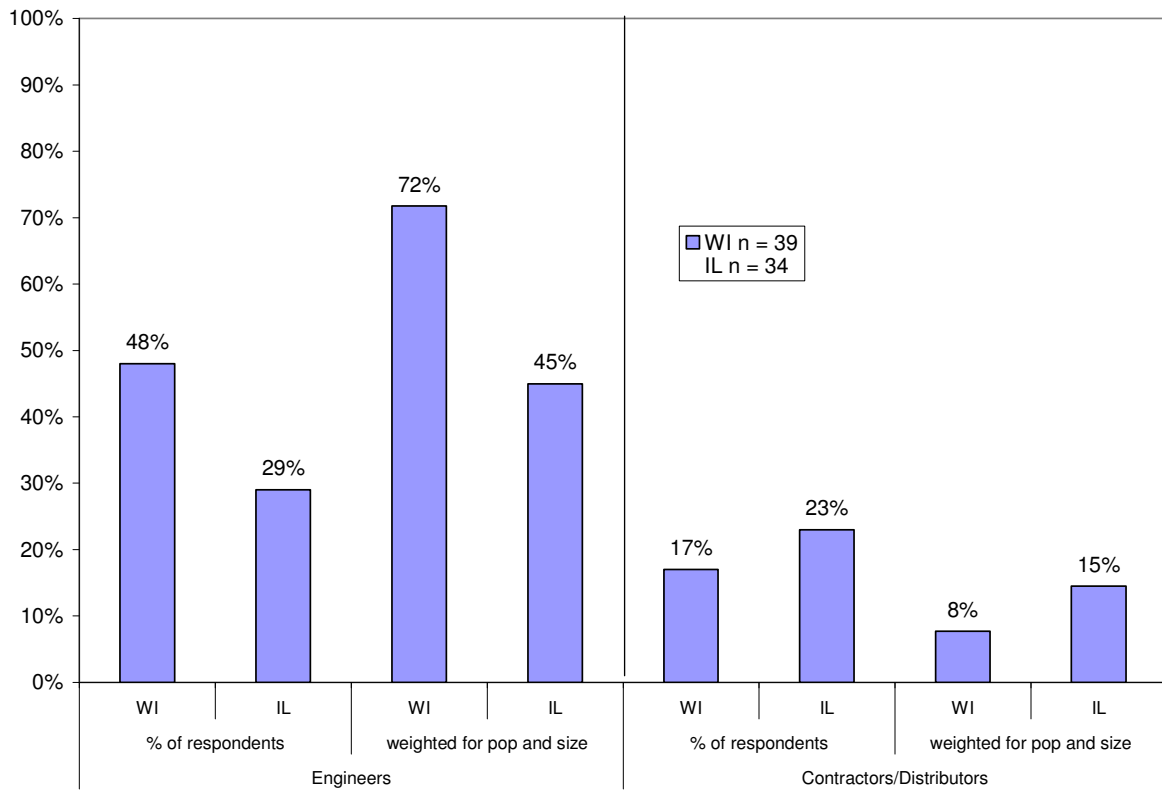
**Figure 4-29. Percentage of Wisconsin and Illinois Lighting Companies Citing Architects, Customers as Influential Participants in the New Construction Lighting Specification Process**



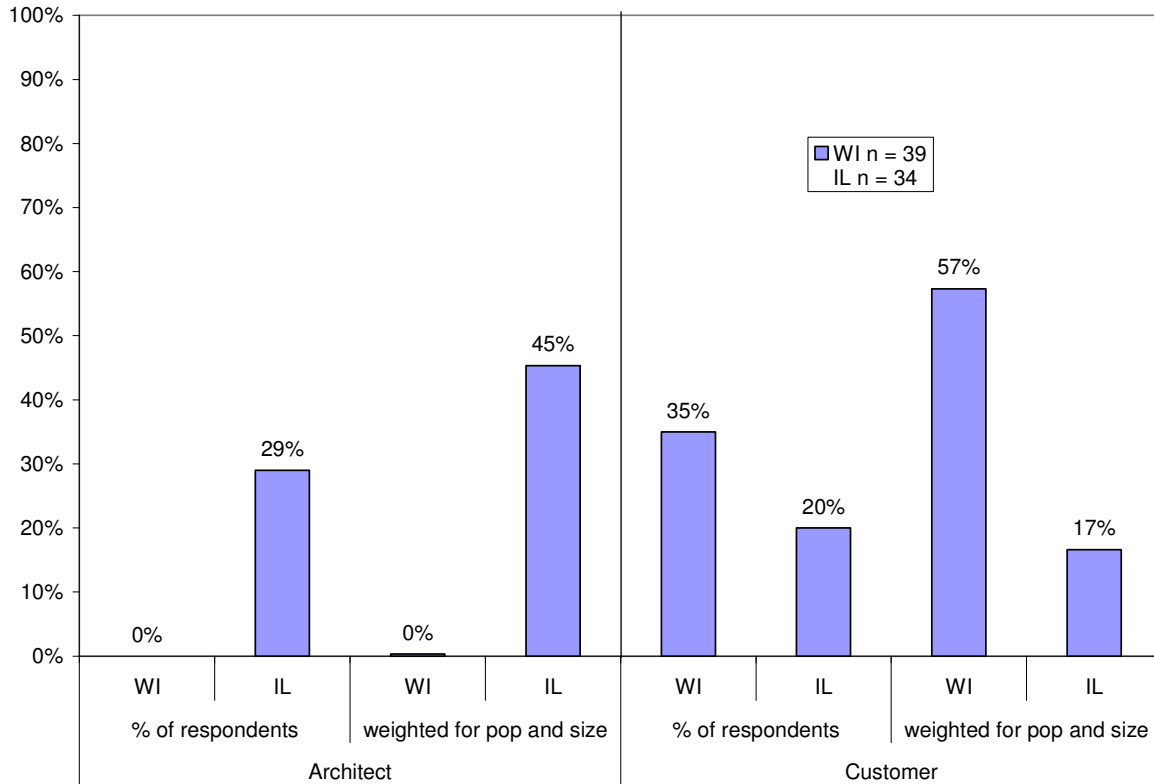
ii. Major Retrofit/Remodeling

Figure 4-30 and Figure 4-31 show those market actors the Wisconsin and Illinois lighting companies identified as most influential in the process of specifying lighting for major remodeling/retrofit projects. Once again, the Wisconsin companies were more likely to name design engineers and customers as influential players than the Illinois companies were. A number of Illinois companies named architects although none of the Wisconsin respondents did.

**Figure 4-30. Percentage of Wisconsin and Illinois Lighting Companies Citing Engineers, Contractors/Distributors as Influential Participants in the Major Remodeling/Retrofit Lighting Specification Process**



**Figure 4-31. Percentage of Wisconsin and Illinois Lighting Companies Citing Architects, Customers as Influential Participants in the Major Remodeling/Retrofit Lighting Specification Process**

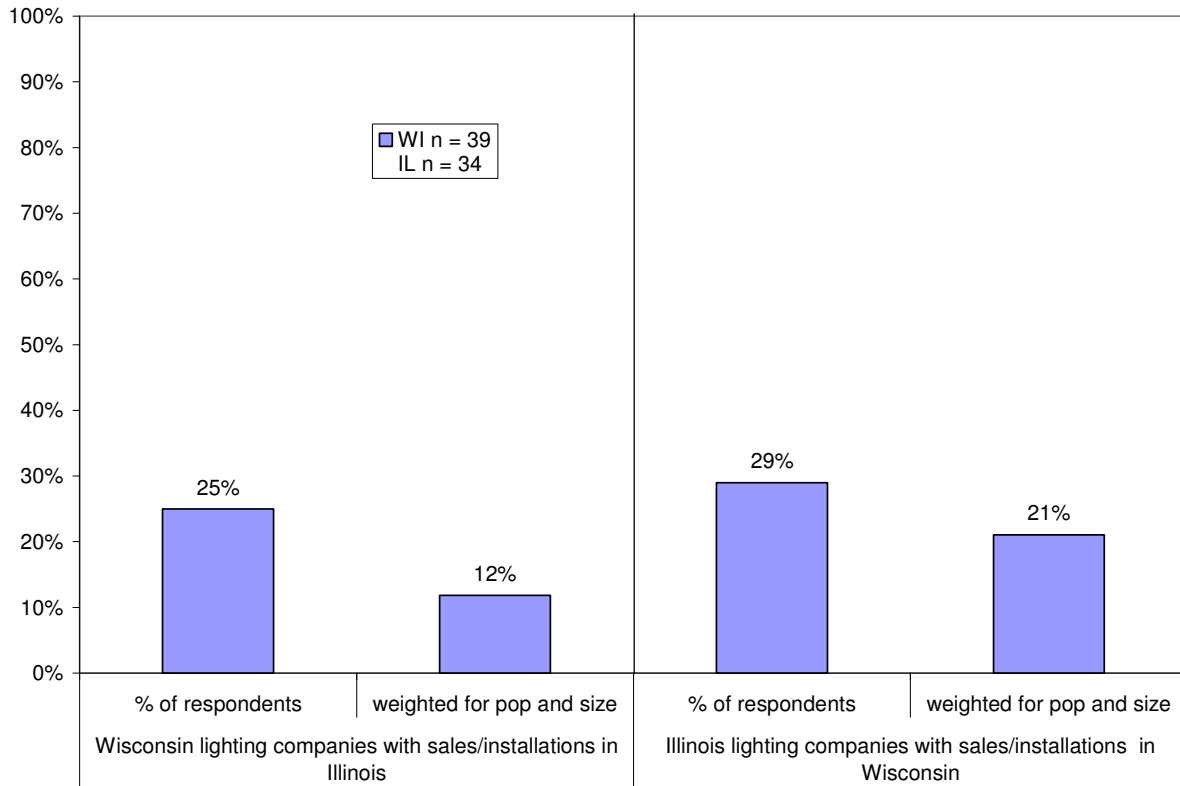


**C. CROSS-STATE MARKET ACTIVITY**

As discussed in the HVAC section, the cross-border activities of Wisconsin and Illinois are of interest not only for understanding market dynamics but also because of their implications for this evaluation. Any influences that Focus BP might be having on Wisconsin companies may be spilling over to Illinois. While this cross-fertilization would inherently be a positive development, if it were significant in scale then it could complicate the quasi-experimental model used to measure the untracked attributable savings. This is because the Focus on Energy program would essentially be increasing the energy-efficient equipment penetration in Illinois, which we are using as a baseline. Of course, it is possible that the effects could be happening in the opposite direction; e.g., the Illinois lighting rebate programs could be influencing Illinois market actors to adopt more energy-efficient practices that they carry over to their Wisconsin installations/sales. However, we would expect these effects to be much less significant due to the very short tenure of the Illinois programs.

We asked the Wisconsin lighting companies whether they have installations/sales in Illinois and asked the converse question of the Illinois companies. Figure 4-32 shows that about a quarter of the Wisconsin and Illinois respondents reported sales across the border.

**Figure 4-32. Cross-State Sales/Installations for Wisconsin/Illinois Lighting Companies**



We also asked the lighting companies who reported sales/installations in both states, “If there was a pie chart with two slices and one slice was the quantity of your Illinois commercial/industrial lighting projects/sales and the other slice was the quantity of your Wisconsin commercial/industrial lighting projects/sales, what would be the relative size of these two slices, in percentage terms?” On average, the lighting companies from Wisconsin reported that their Illinois sales accounted for 27 percent of their total sales. On average, the lighting companies from Illinois reported that their Wisconsin sales accounted for 31 percent of their total sales.

**D. AWARENESS OF, INVOLVEMENT WITH LIGHTING REBATE PROGRAMS**

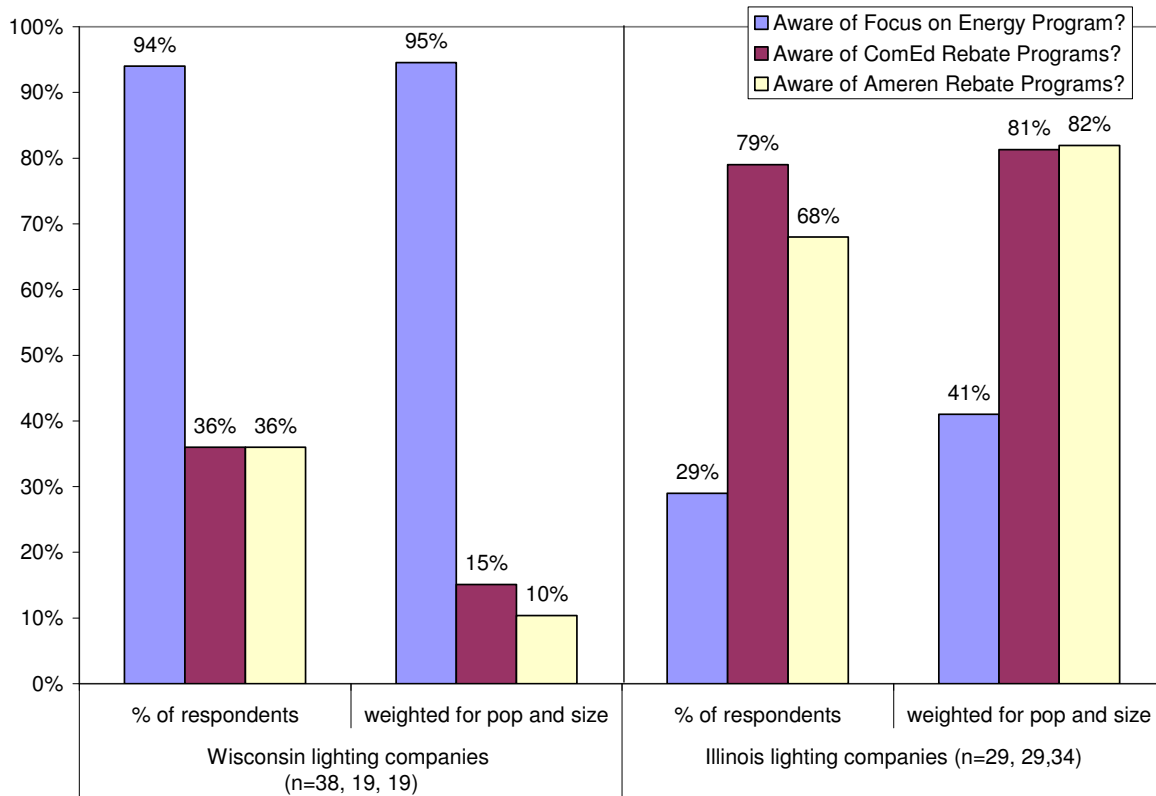
This section compares the Wisconsin and Illinois lighting companies as to their awareness of and involvement with the state or utility lighting rebate programs that are active in their states.

**i. Awareness of the Rebate Programs**

The Wisconsin and Illinois lighting companies were asked whether they were aware of the Focus on Energy program as well as the Illinois lighting rebate programs. Figure 4-33 shows that nearly all the Wisconsin lighting companies said that they were aware of the Focus on Energy program. Awareness of the Illinois rebate programs was slightly lower among the Illinois companies. A similar percentage of respondents in both states were aware of the rebate programs across the border.



**Figure 4-33. Awareness of Lighting Rebate Programs**

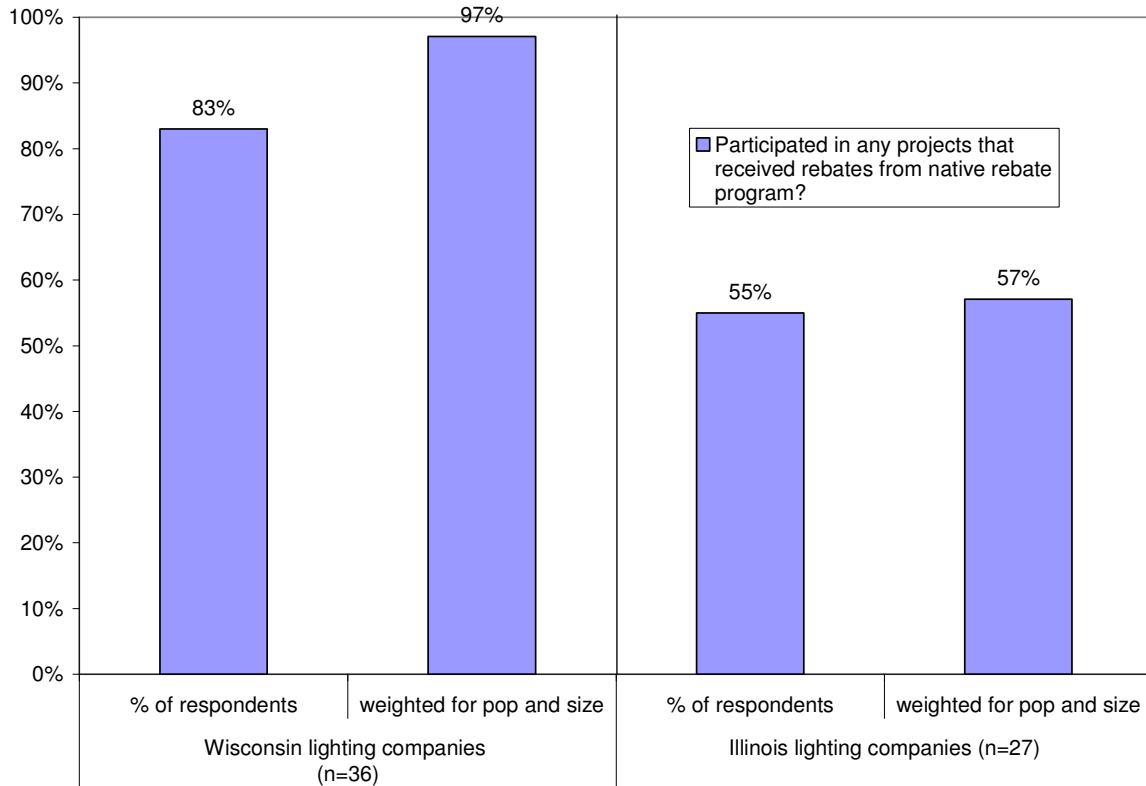


*ii. Involvement with the Rebate Programs*

We asked the lighting contractors who said they were aware of the lighting rebate programs in their states whether they had participated in any projects that received financial incentives from these programs. Figure 4-34 shows that a large majority of the Wisconsin lighting companies reported participating in at least one project that had received a rebate from Focus on Energy. Slightly more than half of the Illinois lighting companies reported receiving ComEd or Ameren rebates for at least some of their projects.<sup>14</sup>

<sup>14</sup> It should be pointed out, however, that these questions were only asked of those who said that they were aware of their native rebate programs. A higher percentage of Illinois lighting companies were unaware of the ComEd/Ameren programs than Wisconsin lighting companies were unaware of the ComEd/Ameren programs.

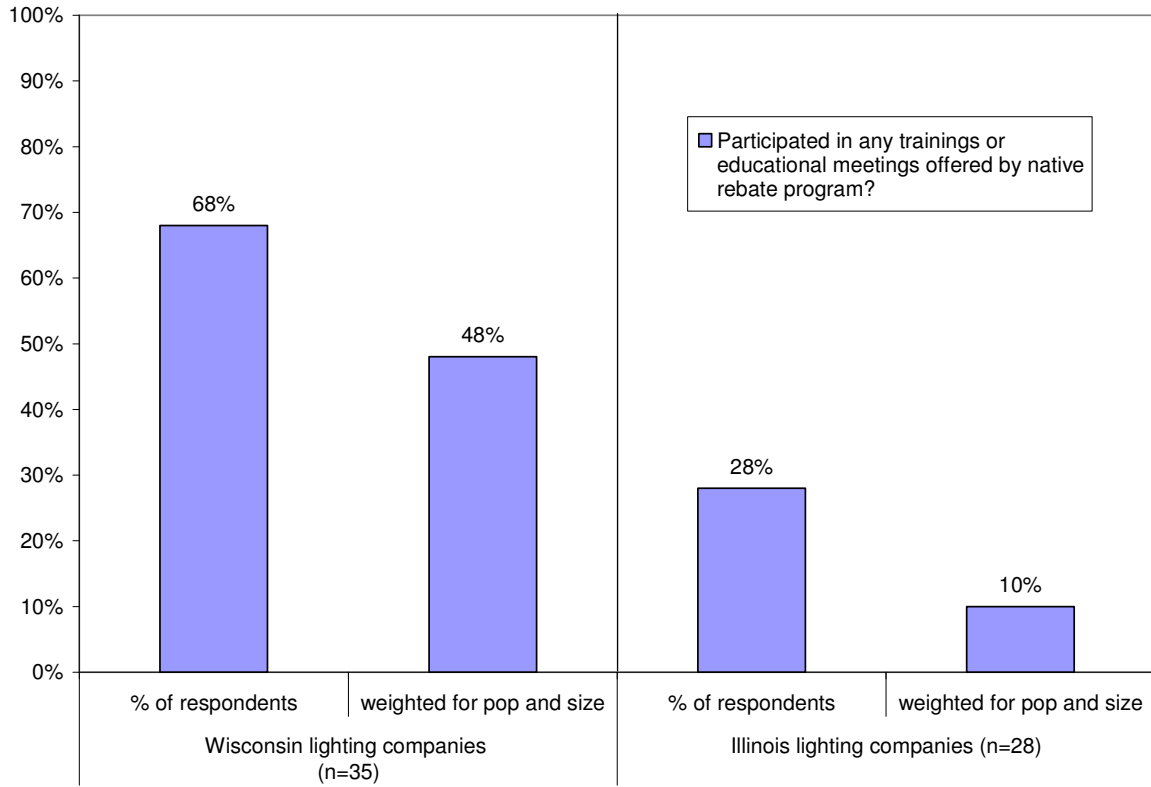
**Figure 4-34. Percentage of Lighting Companies Participating in Projects That Received Rebates from Native Rebate Programs Wisconsin vs. Illinois**



Note: For Wisconsin companies the native rebate program was Focus on Energy, for Illinois companies they were the ComEd/Ameren rebate programs.

We also asked the lighting companies whether they had participated in any trainings or educational meetings offered by their native rebate programs. Over two thirds of the Wisconsin companies said they had while only a little more than a quarter of the Illinois lighting companies said they had (Figure 4-35).

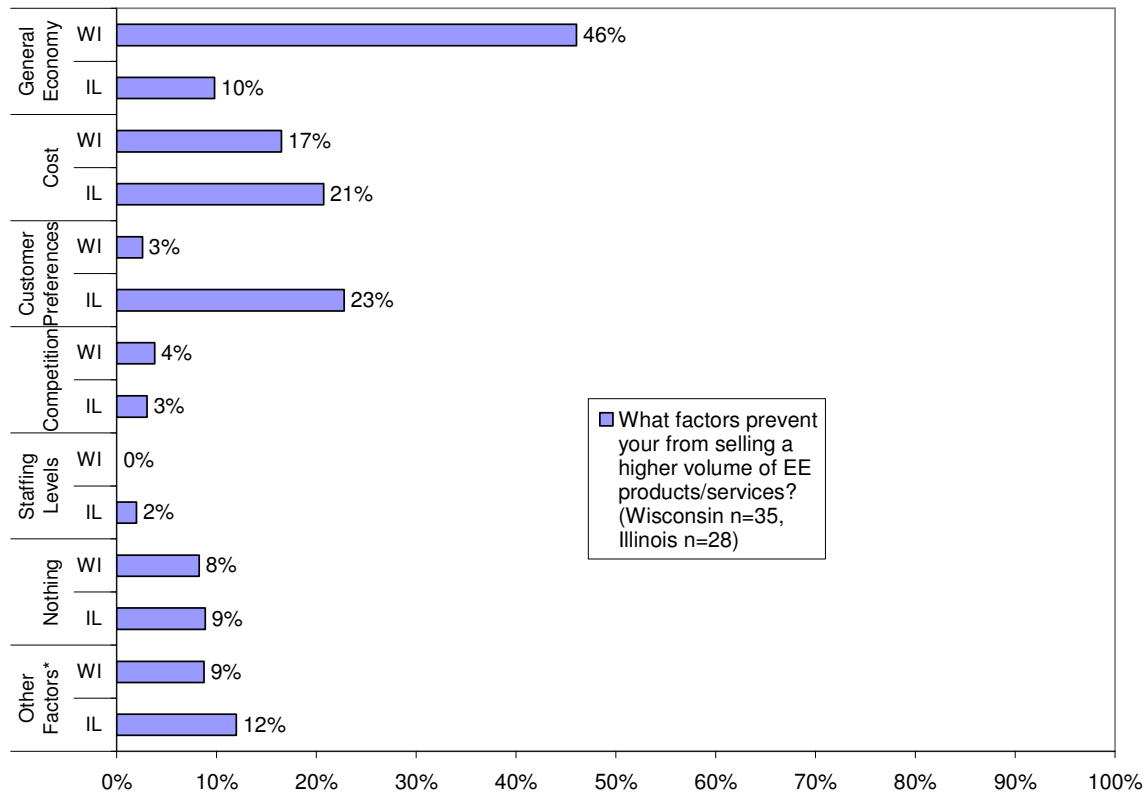
**Figure 4-35. Percentage of Lighting Companies Participating in Trainings/Educational Meetings Offered by Native Rebate Programs Wisconsin vs. Illinois**



**E. BARRIERS TO ENERGY EFFICIENCY**

We asked the Wisconsin and Illinois lighting companies what factors prevent them from selling a higher volume of energy-efficient equipment/services than they currently are. Figure 4-36 shows that the Wisconsin companies were much more likely to cite the state of the general economy as a barrier. The Illinois companies were more likely to point to customer preferences.

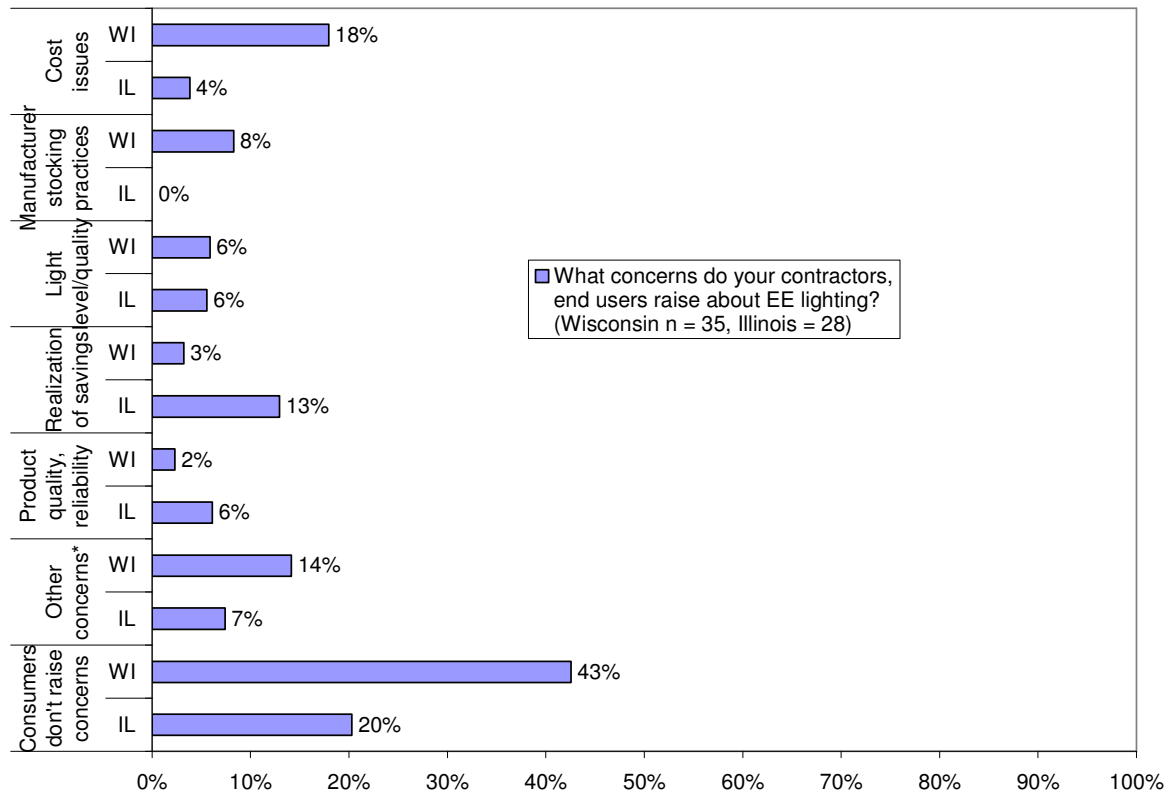
**Figure 4-36. Factors That Prevent Higher Sales of EE Lighting Wisconsin vs. Illinois**



Note: \*Other factors included the need for more customer education, customers waiting on new technologies, Focus on Energy promoting the wrong products, issues with manufacturers, site restrictions, energy efficiency not a priority, and rebate programs being insufficient.

The lighting companies were also asked what sorts of concerns that end users or contractors might raise about energy-efficient lighting. The Wisconsin companies were more than twice as likely to say that end users and contractors do not raise concerns, which might be another indicator that the Wisconsin lighting market is being transformed. The lighting companies did mention a wide range of concerns (Figure 4-37). The Wisconsin lighting companies were more likely to mention cost issues as barriers and the Illinois companies were more likely to mention consumer concerns about realizing the promised energy savings.

**Figure 4-37. Concerns That End Users/ Contractors Might Raise about EE Lighting Wisconsin vs. Illinois**



Note: \*Other concerns included lack of familiarity with new technologies, re-lamping requirements, product availability issues, and confusion about the rebates.

### 4.3 ASSESSMENT OF HYPOTHESIZED MARKET EFFECTS

#### 4.3.1 The HVAC market

This section compares the market effects that the Focus BP program implementers hypothesized about in the in-depth interviews with the evidence collected from the surveys of HVAC and lighting market actors.

##### A. HIGH-EFFICIENCY BOILERS, BOILER TUNE-UPS, BOILER CONTROLS

###### i. Hypothesized market effects

In the in-depth interviews, the program implementers identified a number of possible market effects for boilers and boiler maintenance procedures in Wisconsin. These included:

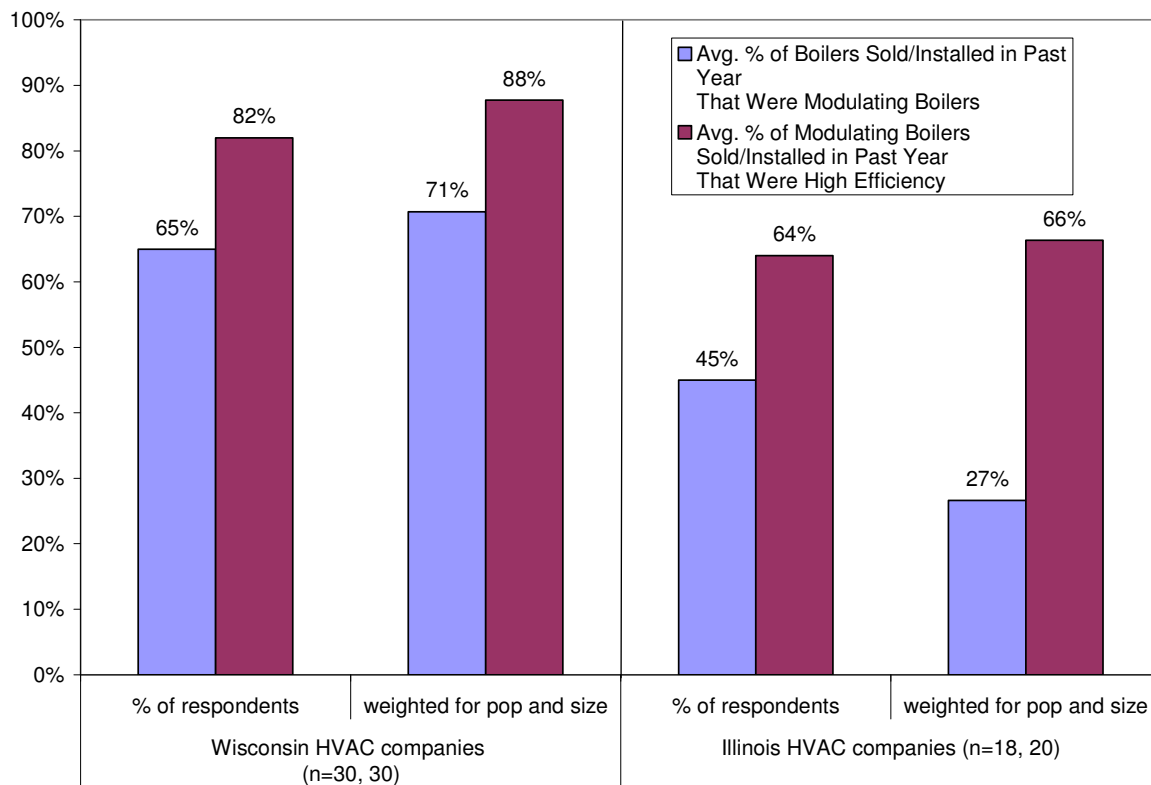
- A high market penetration of:
  - High-efficiency boilers
  - Condensing boilers

- Boiler controls
- Boiler tune-ups.
- A high percentage of vendors offering boiler controls
- A great availability of high-efficiency boilers in stock.

ii. *Evidence from the market actor surveys for market penetration of high-efficiency boilers*

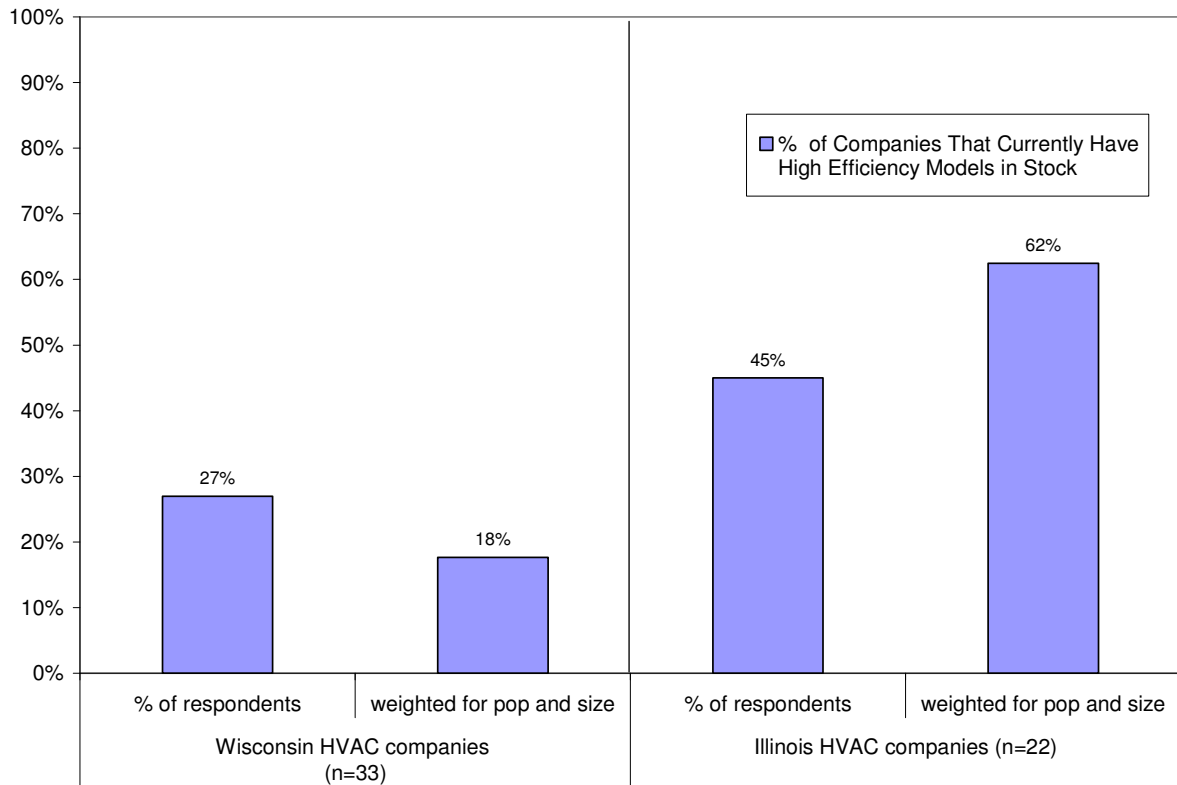
We asked the HVAC companies in both states who sold boilers what percentage of the boilers they sold/installed in the past year were modulating boilers and what percentage of these modulating boilers were high efficiency. We defined high efficiency as having Annual Fuel Utilization Efficiency (AFUE) ratings of 90 percent or greater for boilers less than 300,000 BTUs/hr. and having thermal efficiencies of 85 percent for boilers 300,000 BTUs/hr or larger. Figure 4-38 shows that the Wisconsin HVAC companies were more likely to say that they sold modulating boilers and that they sold high-efficiency modulating boilers. In terms of the percentage of boilers sold that were high efficiency, the fully-weighted Wisconsin estimate (88 percent) was statistically different than the Illinois estimate (66 percent) at the 90 percent confidence level.

**Figure 4-38. High-Efficiency Boiler Sales  
Wisconsin vs. Illinois**



We also asked the Wisconsin and Illinois HVAC contractors whether they currently had any of these high-efficiency boilers in stock. Figure 4-39 shows their responses. The Illinois respondents were more likely to say that they had high-efficiency models in stock, but this may be an outcome of their lower sales volume.

**Figure 4-39. Stocking of High-Efficiency Boilers  
Wisconsin vs. Illinois**



In addition to asking the Wisconsin and Illinois HVAC companies about their recent/current energy efficiency sales and practices, for a few of these measures we also asked them:

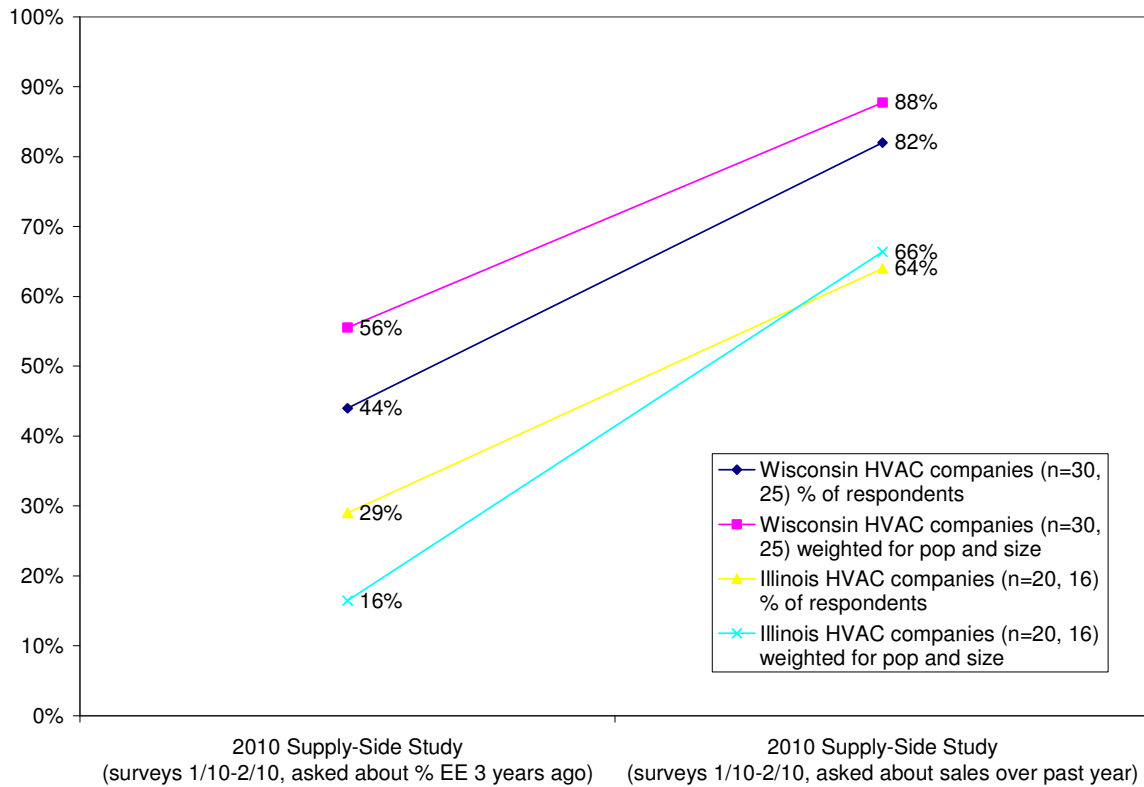
- How their recent/current sales/practices compared to what they were doing three years ago
- If there had been a change in their sales/practices and what factors might explain these changes.

It is important to note that we asked them about possible explanations for these changes before we asked any questions about possible attribution of their practices to Focus on Energy.<sup>15</sup> For some of the HVAC measures, we were also able to use information from the 2008 Channel Study as data points for our trend lines.

<sup>15</sup> Due to a request by the Public Service Commission of Wisconsin (PSCW) staff, the surveyors did not identify themselves as working on behalf of the Wisconsin Focus on Energy program, as had been

Figure 4-40 shows the trend for the market penetration of high-efficiency modulating boilers that was reported by the Wisconsin and Illinois HVAC companies. It shows that companies from both states reported their market penetration increasing with a similar margin of difference being maintained over both time periods.

**Figure 4-40. Trend for Market Penetration of High-Efficiency Modulating Boilers Wisconsin vs. Illinois**



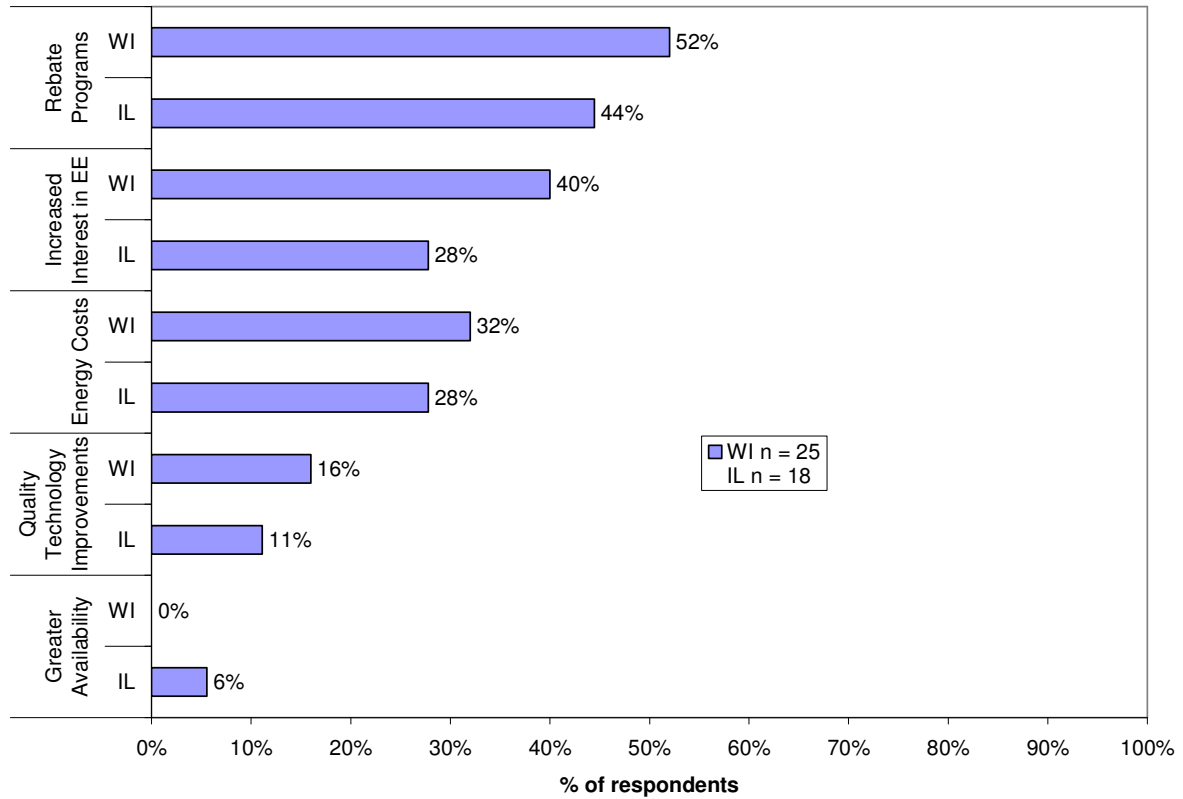
We asked the HVAC companies who had reported a change in their percentage of the high-efficiency modulating boilers what factors caused these differences. Figure 4-41 shows that rebate programs were the most-cited factors for both the Wisconsin and Illinois respondents. However, a number of other factors were also cited by multiple respondents from both states including increased interest in energy efficiency, energy costs, and improvements in boiler technology/quality (Figure 4-41 and Figure 4-42). The presence of these non-rebate-program factors may help explain why the Illinois trend line in Figure 4-40 is going up even though the Illinois rebate programs have only been in effect for a year and a half.

---

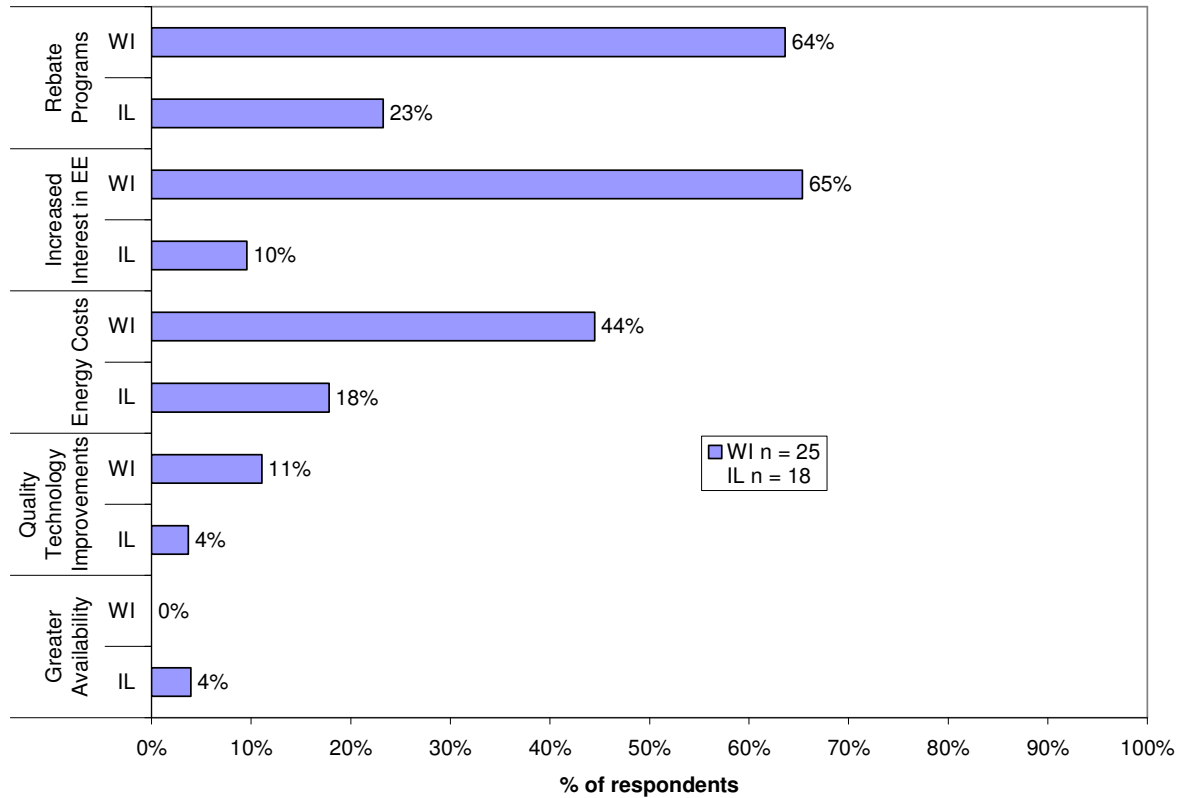
done in the 2008 channel study. The PSCW were concerned that this might bias the market actor responses. Instead, the surveyors identified themselves as “calling from KEMA Consulting on behalf of the Public Service Commission of Wisconsin.” In fact at the point of the survey when the market actors were asked about possible causes for changes in energy efficiency practices between three years ago, and the present, the only reference to Focus on Energy in the survey had been the question: “C18: Have you heard of the Wisconsin Focus on Energy program?”



**Figure 4-41. Factors Causing Trend for Market Penetration of High-Efficiency Modulating Boilers Wisconsin vs. Illinois (Percentage of Respondents)**



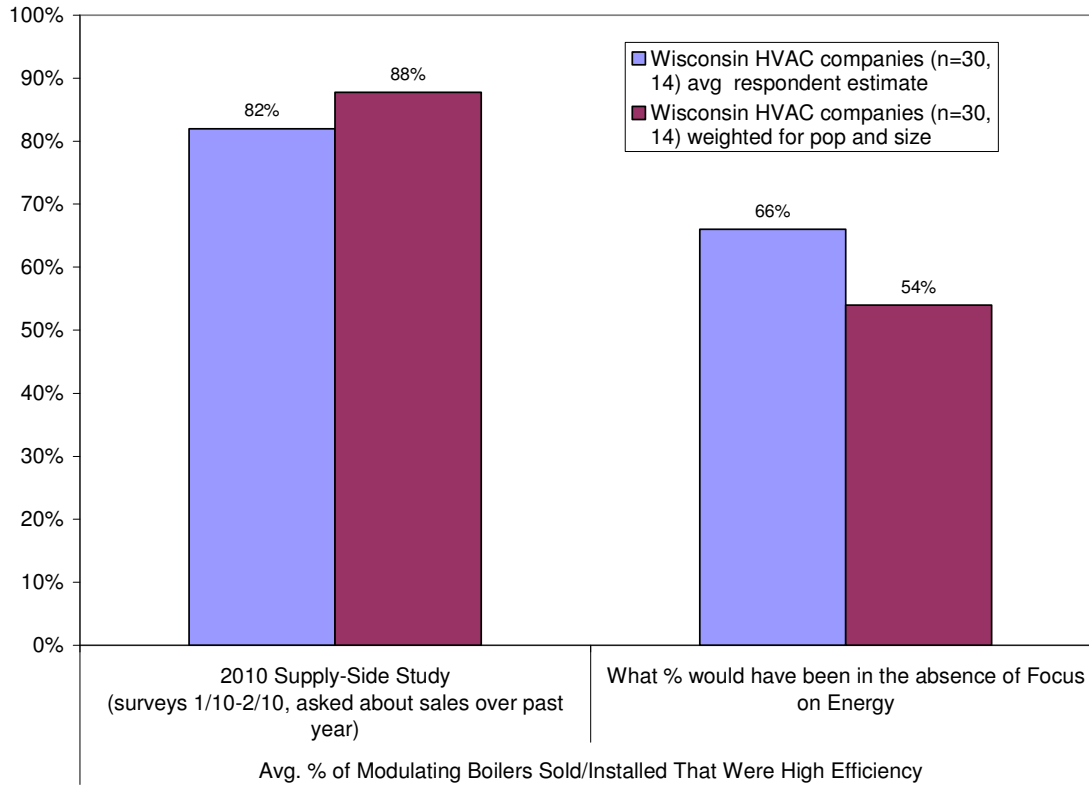
**Figure 4-42. Factors Causing Trend for Market Penetration of High-Efficiency Modulating Boilers Wisconsin vs. Illinois (Weighted for Population and Size)**



We also asked the HVAC companies who had said that they sold/installed high-efficiency modulating boilers what their percentage of these high-efficiency boilers would have been in the absence of the rebate programs.<sup>16</sup> The surveyors reminded the respondents what they had said their percentage of high-efficiency boilers sales were and then asked them to give their best estimate of what this percentage would have been if the Wisconsin Focus on Energy program had not existed. Figure 4-43 shows that the fully-weighted percentage of high efficiency dropped from 88 percent to 54 percent in the absence of the Focus program.

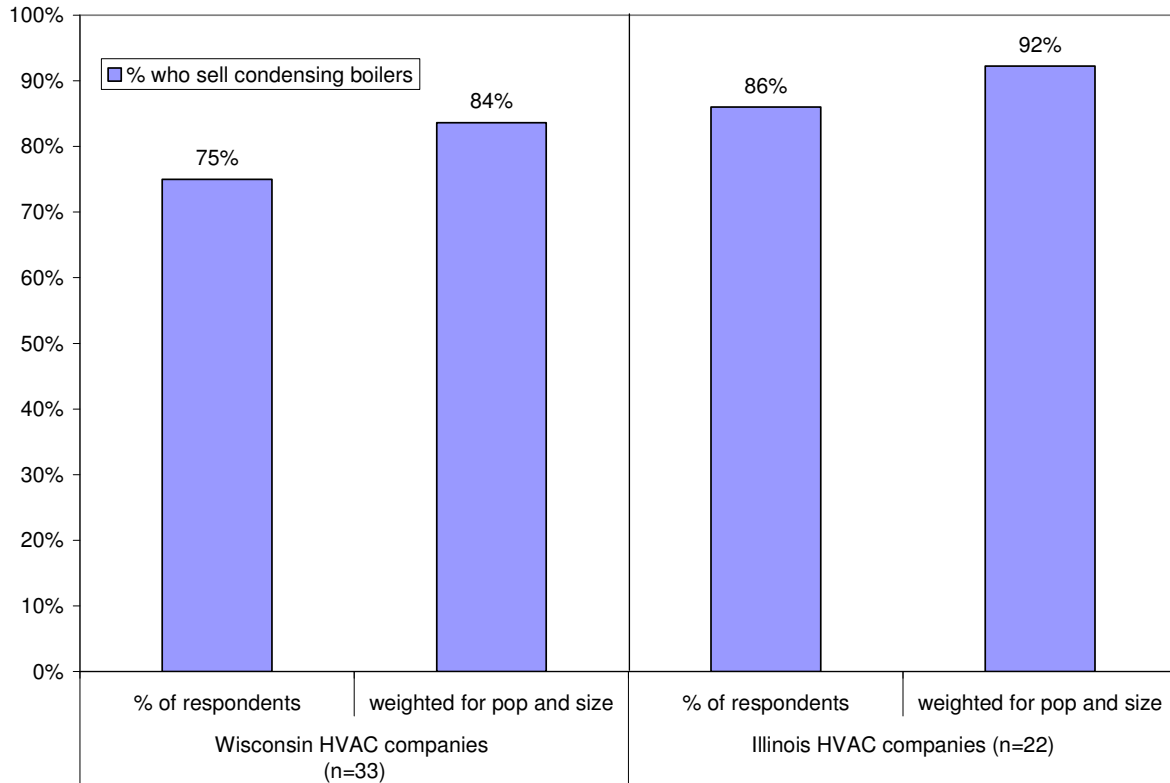
<sup>16</sup> We also asked this question of Illinois HVAC contractors but there were not enough estimates provided to warrant summarizing.

**Figure 4-43. Average Percentage of Modulating Boilers Sales that Are High Efficiency with and without the Focus on Energy Program**



As noted, one of the possible market effects indicators mentioned in the in-depth interviews was a high percentage of condensing boilers in Wisconsin. We did ask the Wisconsin and Illinois HVAC contractors whether they sold condensing boilers. Figure 4-44 shows that a slightly higher percentage of the Illinois companies reported selling condensing boilers than the Wisconsin companies, although this difference was not statistically significant.

**Figure 4-44. Percentage of HVAC Companies Selling Condensing Boilers Wisconsin vs. Illinois**

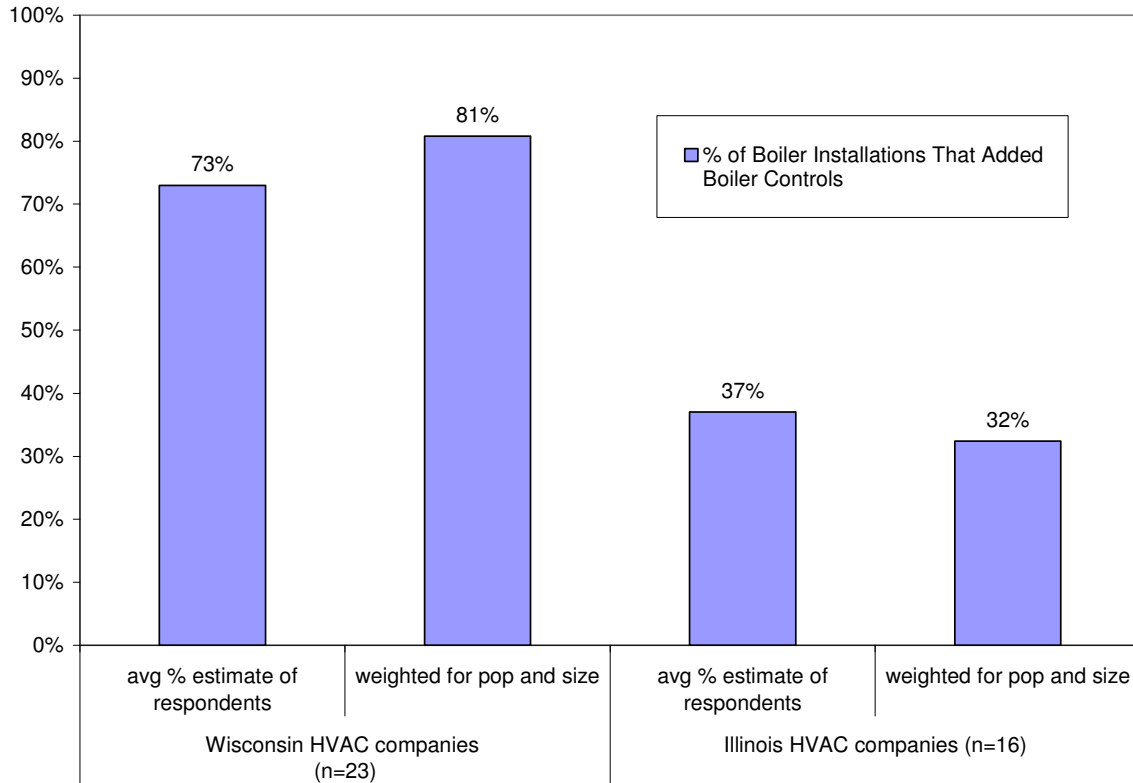


iii. *Evidence from the market actor surveys for market penetration of boiler controls, boiler tune-ups*

**Boiler controls**

In the in-depth interviews, the program implementers also mentioned a high market penetration of boiler controls in Wisconsin as another possible indicator of market effects. We asked those HVAC companies that installed boilers what percentage of the time in the past year they added controls—such as outside air reset or cutout controls boilers—to boilers that were not already equipped with controls. Figure 4-45 shows that the Wisconsin companies reported a much higher incidence of installing boiler controls.

**Figure 4-45. Percentage of Boiler Installations with Boiler Controls Wisconsin vs. Illinois**



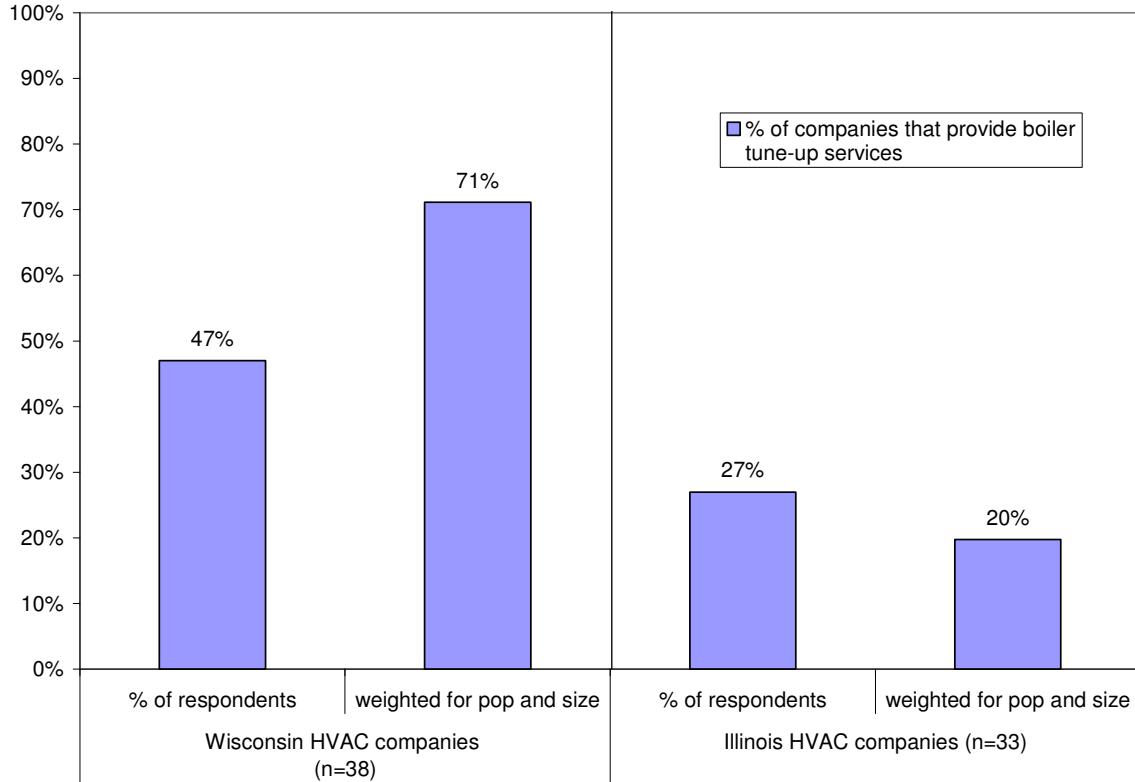
We also asked the Wisconsin and Illinois HVAC companies what their frequency of boiler control installations was three years ago. Too few of the respondents were willing or able to provide percentage estimates to merit summarization in this report.

However, six of the Wisconsin companies and eight of the Illinois companies did comment on some of the factors that were driving boiler control installations. Two of the six Wisconsin respondents reported that increasingly new boilers are coming out with controls already installed. Two of them also mentioned energy costs as a driver of boiler controls. Other drivers mentioned by the Wisconsin respondents included reductions in boiler control prices and increased customer interest. Five of the eight Illinois companies mentioned energy efficiency and concerns over energy costs as drivers of boiler controls. They also cited reductions in boiler control prices, increased customer interest, and the fact that new boilers are coming out with controls already installed.

**Boiler tune-ups**

In the in-depth interviews, the program implementers also mentioned a high market penetration of boiler tune-ups in Wisconsin as another possible indicator of market effects. We asked the Wisconsin and Illinois companies whether they offered boiler tune-up services. Figure 4-46 showed that a much higher percentage of the Wisconsin companies reported offering this service.

**Figure 4-46. Percentage of HVAC Companies Offering Boiler Tune-Up Services Wisconsin vs. Illinois**



**B. AIR-CONDITIONING AND VENTILATION EQUIPMENT**

*i. Hypothesized market effects*

In the in-depth interviews the program implementers suggested a number of indicators of possible market effects in the air conditioning market that the evaluators should examine including:

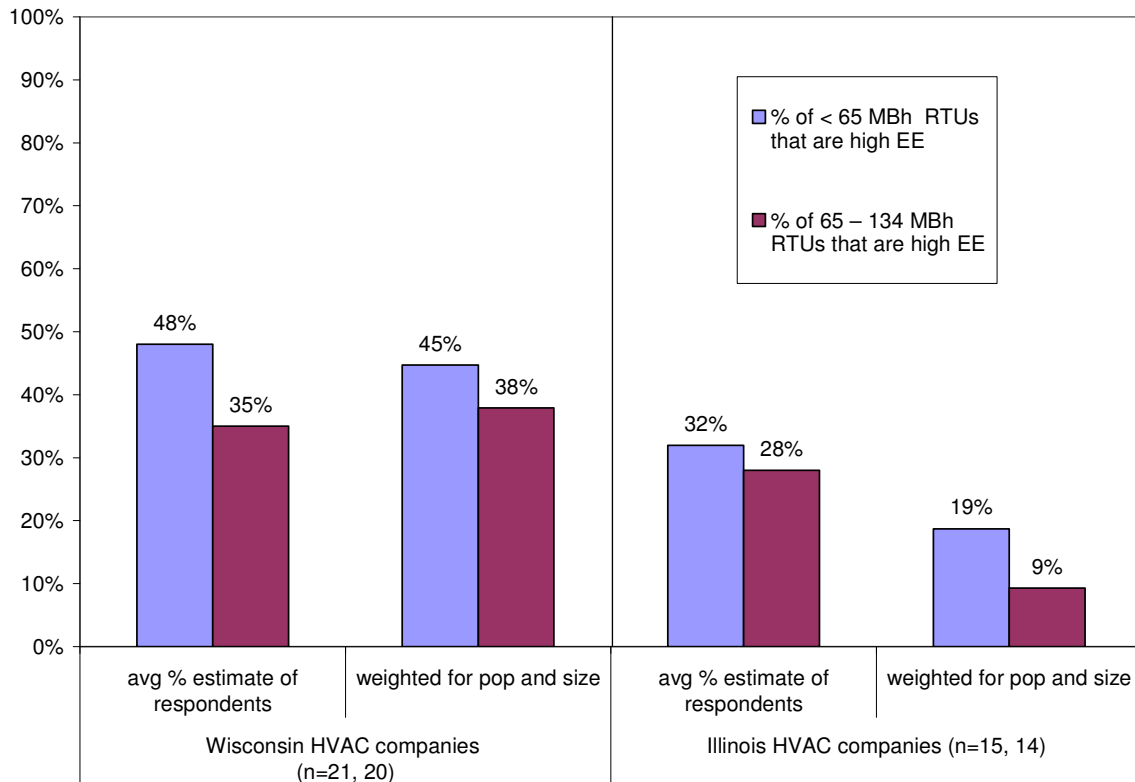
- A high Wisconsin market penetration of high-efficiency HVAC products including:
  - High-efficiency RTUs
  - HVAC controls
  - High-efficiency chillers
- A high percentage of Wisconsin vendors offering newer or less-common HVAC technologies such as:
  - HVAC equipment with VSDs
  - ERVs
  - Infrared heaters

- Steam traps
- PTHPs.

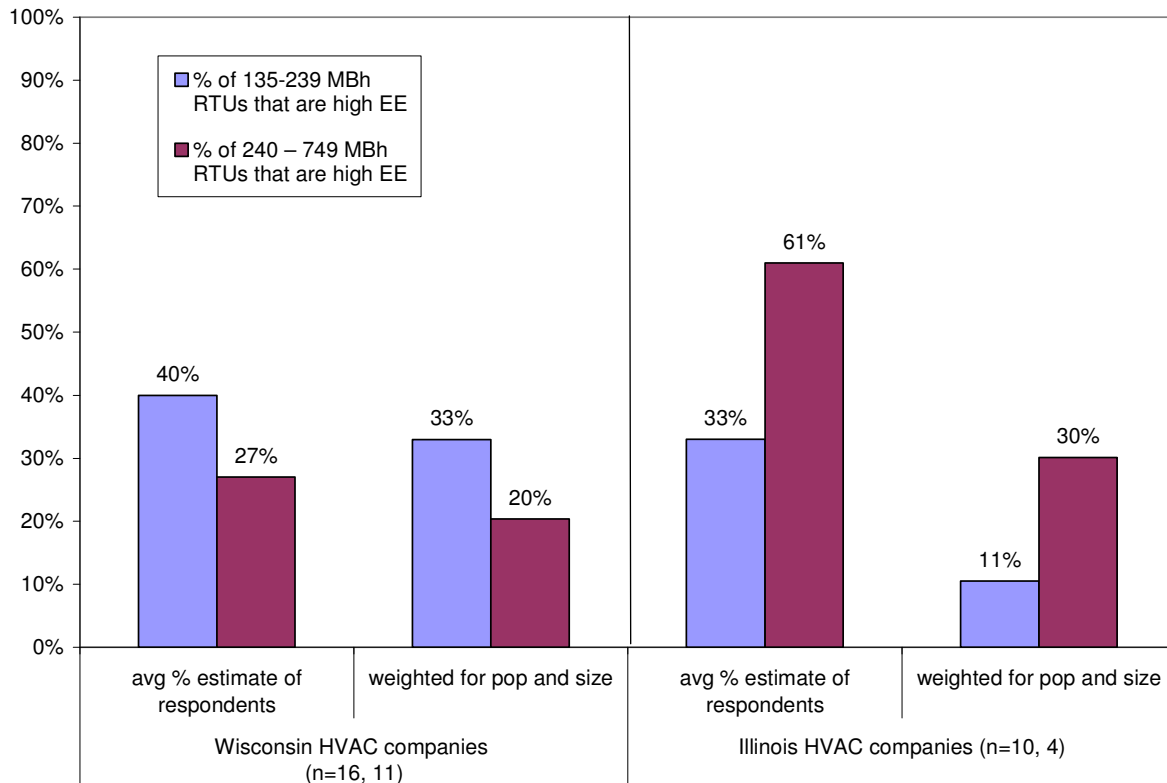
ii. Evidence from the market actor surveys of high-efficiency RTUs

We asked the Wisconsin and Illinois HVAC companies who sold packaged or unitary rooftop air conditioning units (RTUs) what percentage of the RTUs they sold were high efficiency. We defined high efficiency (based on EER ratings) for each RTU size category. Figure 4-47 and Figure 4-48 show their responses. The Wisconsin HVAC companies reported a statistically significant higher percentage of high-efficiency sales/installations for all RTU size classes except the largest one (240 MBh or higher). However, in this case, the Illinois estimate is less reliable because of the very small sample size.

**Figure 4-47. Percentage of Small- to Medium-Sized RTU Sales that Were High Efficiency Wisconsin vs. Illinois**



**Figure 4-48. Percentage of Medium to Large RTU Sales That Were High Efficiency Wisconsin vs. Illinois**



We also looked at the trends for the penetration of high-efficiency equipment in the market for packaged RTUs in Wisconsin and Illinois (Figure 4-49, Figure 4-50, Figure 4-51). In this case, the older data points are different than those used for the high-efficiency boiler trend line—they are from the 2008 Channel Study rather than the retrospective question from the 2010 Supply-side Study—although the time periods were very close.<sup>17</sup>

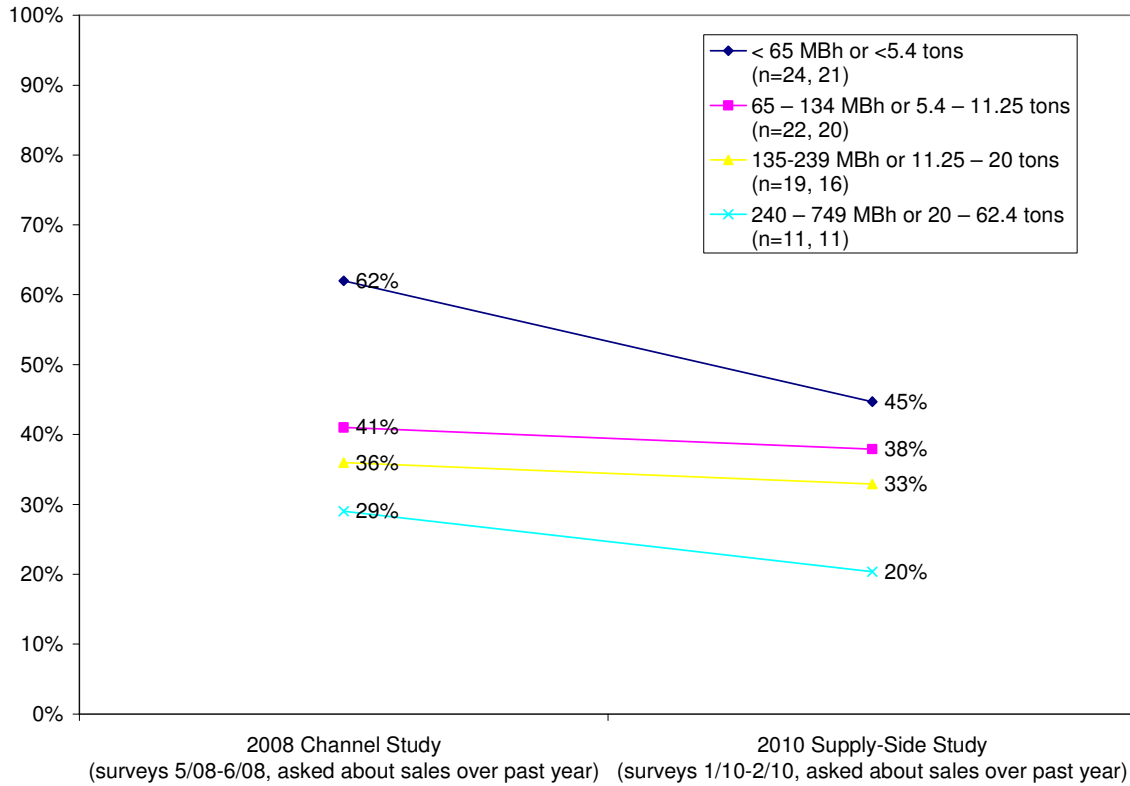
While the high-efficiency boiler trend lines for both Wisconsin and Illinois were upward, here the trend lines for both states are generally flat or even declining. The once exception—the largest RTU class for Illinois—is less reliable because of the very small sample size. Because

<sup>17</sup> The 2008 Channel Study surveys were conducted in May–June 2008 and the market actors were asked about their sales over the last 12 months (e.g., beginning May 2007). The 2010 Supply-side Study HVAC surveys were conducted in January–February 2010 and the market actors were asked about high efficiency penetration levels three years ago—or January–February 2007. The 2008 Channel Study did not ask about boilers so we could not include this data point in the boiler trend line. The 2010 Supply-side Study did ask HVAC companies about the percentage of their RTU sales that were high efficiency three years ago, but they were asked about this for their RTU sales in general and not for the size breakouts shown in Figure 4-49 and Figure 4-50.

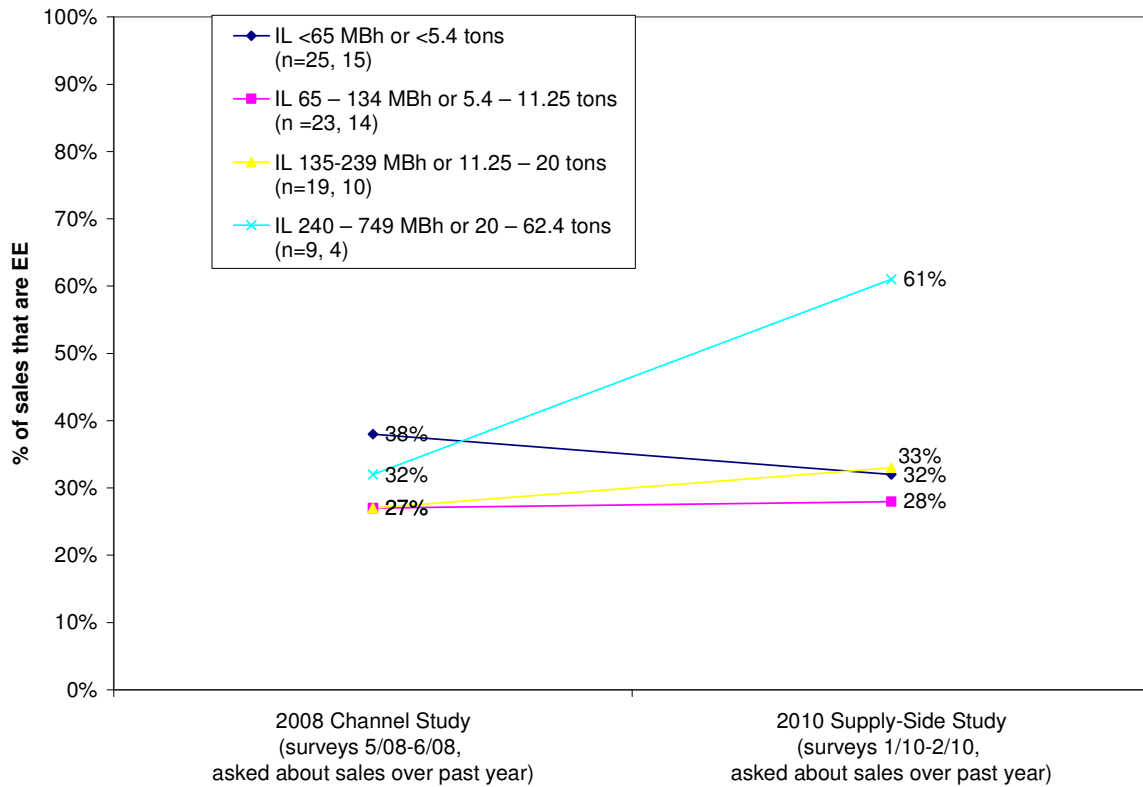


the impact of the weighting on the Illinois results is more pronounced, we present both the unweighted (Figure 4-50) and weighted (Figure 4-51) results here.

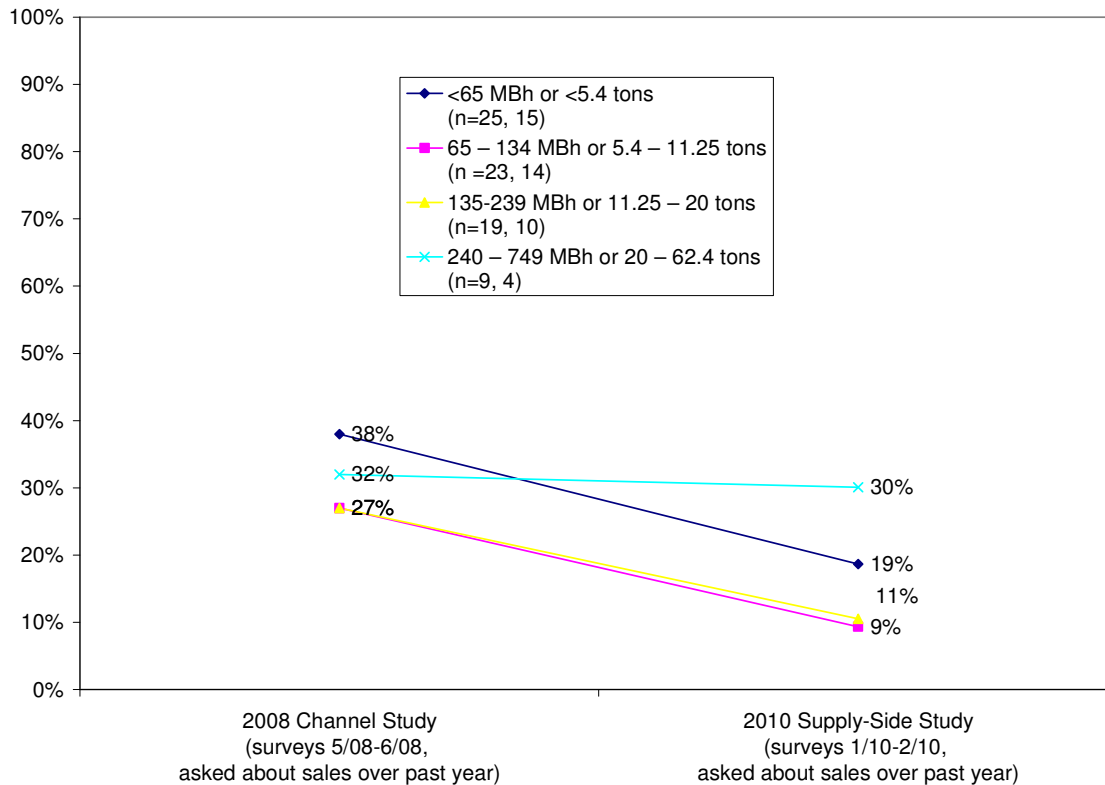
**Figure 4-49. Trend for Market Penetration of High-Efficiency Packaged RTUs Wisconsin**



**Figure 4-50. Trend for Market Penetration of High Efficiency Packaged RTUs Illinois (Average Percentage Estimate of Respondents for 2010)**



**Figure 4-51. Trend for Market Penetration of High Efficiency Packaged RTUs Illinois (Fully-Weighted Responses for 2010)**



What might account for these flat or declining trend lines for high-efficiency RTUs in Wisconsin and Illinois? There are a number of possible explanations.

- The tripling of the Focus RTU rebate followed by the increase in the minimum efficiency for Focus rebate qualification.** In Fiscal Year 2008, Focus on Energy tripled the size of the RTU rebate. Then in 2008, a change in the Wisconsin building code raised the baseline energy efficiency for RTUs. Once the baseline efficiency was increased, Focus on Energy had to increase the minimum efficiency needed to qualify for its RTU rebates. This made the qualifying equipment more expensive and harder to obtain. This tripling of the RTUs incentive before the building code change followed by the raising of the Focus qualifying efficiency threshold could help explain the decline in Wisconsin small RTU efficiency penetration as seen in Figure 4-49.

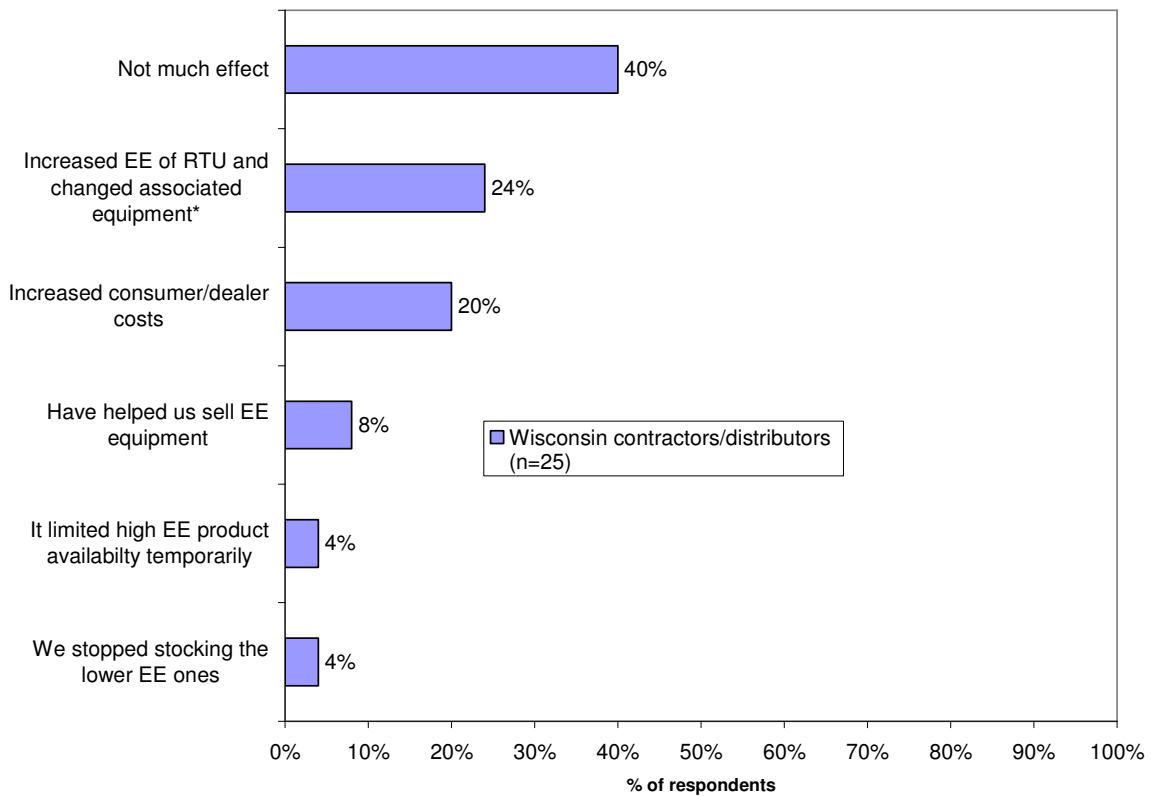
Statements by some of the market actors and program implementers supported this theory.

- “Focus requires such high efficiency ratings on rooftop units that very few manufacturers make models that go up that high,” said one Wisconsin HVAC company.
- “The challenges in [the HVAC] market is to go from code-required minimum to that next step,” said one Focus implementer. “It used to be that step was like this [illustrating a short interval] here’s code-required efficiency level, here’s what

[Focus on Energy] wants it to be, and the savings was substantial. The challenge now is that line moved to here [illustrating a large interval]. And the cost differential, here it used to be \$400, this is \$1,000.”

- “I think any traction we got from a result of increasing the incentives may have been reduced due to the program standards being raised,” said one Focus program implementer.
- **The Wisconsin building code change by itself (rather than the changes in Focus incentives or requirements).**
  - Some interviewees thought the Wisconsin building code change has reduced the availability and increased the costs of RTUs:
    - “In Wisconsin, our energy codes are higher than most states around us,” said one program implementer. “As a result, the minimum efficiency of rooftop equipment that you can put on a job is substantially higher than in other states. There are manufacturers who can't meet, that can barely meet code, they can't meet the requirements to go higher. So we ran into shortages from manufacturers that can't get equipment to meet everything from every vendor...you run into product availability problems. I've had jobs where it's taken four manufacturers to find a product that would fit, and that's tough.”
    - *When asked what effect the Wisconsin building code changes had on their RTU sales, 20 percent of Wisconsin HVAC contractors said that it had increased equipment costs for themselves or their customers.* Figure 4-52 shows the full range of response. It should be noted that the response “not much effect” generally meant that the respondents said that they and the Wisconsin HVAC market had been prepared for the Wisconsin code changes well in advance so there was not much disruption when the code changes went into effect.
  - Some Focus program implementers questioned whether the Focus RTU incentives were large enough to influence purchaser behavior even after they had been tripled. “They're just not big enough to actually make a budget happen,” one Focus implementer said. “Our [RTU] incentives were too low to do anything and the market actors wouldn't pay attention to us because our incentive was a joke,” said another program implementer. “When the incentive's 5% of the project cost, it's tough to prove that incentive had any influence over it.”

**Figure 4-52. The Effects of the 2008 Wisconsin Building Code Changes on RTU Sales According to Wisconsin HVAC Companies**



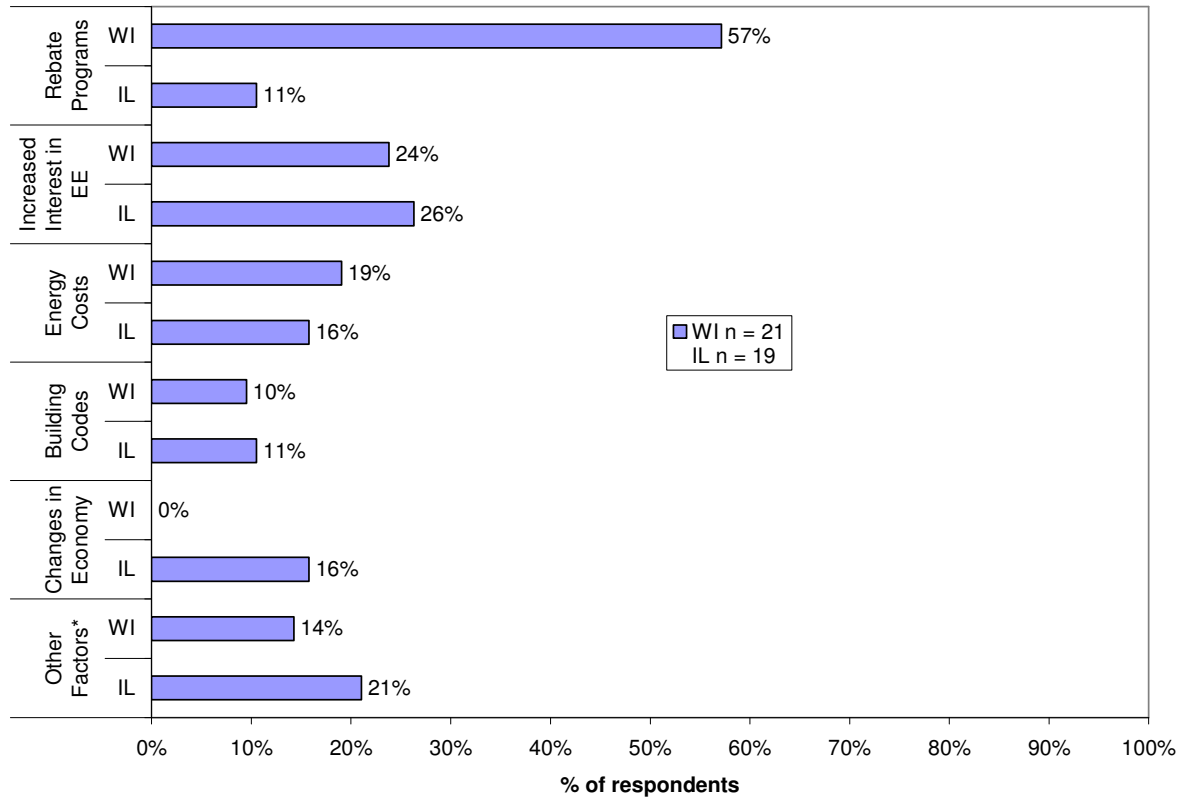
Note: \*Changes mentioned included increasing the efficiency of pumps, increasing the efficiency of heat exchangers, more economizers, switching to new refrigerants, and changing the outside dampers.

We asked the Wisconsin and Illinois HVAC companies who had reported a change in their percentage of high-efficiency RTU sales from three years ago what factors caused these differences. Figure 4-53 (percentage of respondents) and Figure 4-54 (fully-weighted data) show their responses. Over half of the Wisconsin respondents mentioned rebate programs as an explanatory factor. However, when the responses were fully weighted “increased interest in energy efficiency” and “energy costs” became more important factors for the Wisconsin respondents. The Illinois respondents were much more likely to point to changes in the economy.

It should be pointed out that, like Wisconsin, Illinois has also recently adopted a more energy-efficient building code statewide. In August 2009, the Illinois governor signed into law the Energy Efficient Building Act that adopts the Illinois Energy Conservation Code, which became effective on January 29, 2010. The new statewide code incorporates the 2009 IECC for residential buildings and privately funded commercial buildings and ASHRAE 90.1-2007 for publicly funded commercial buildings.<sup>18</sup>

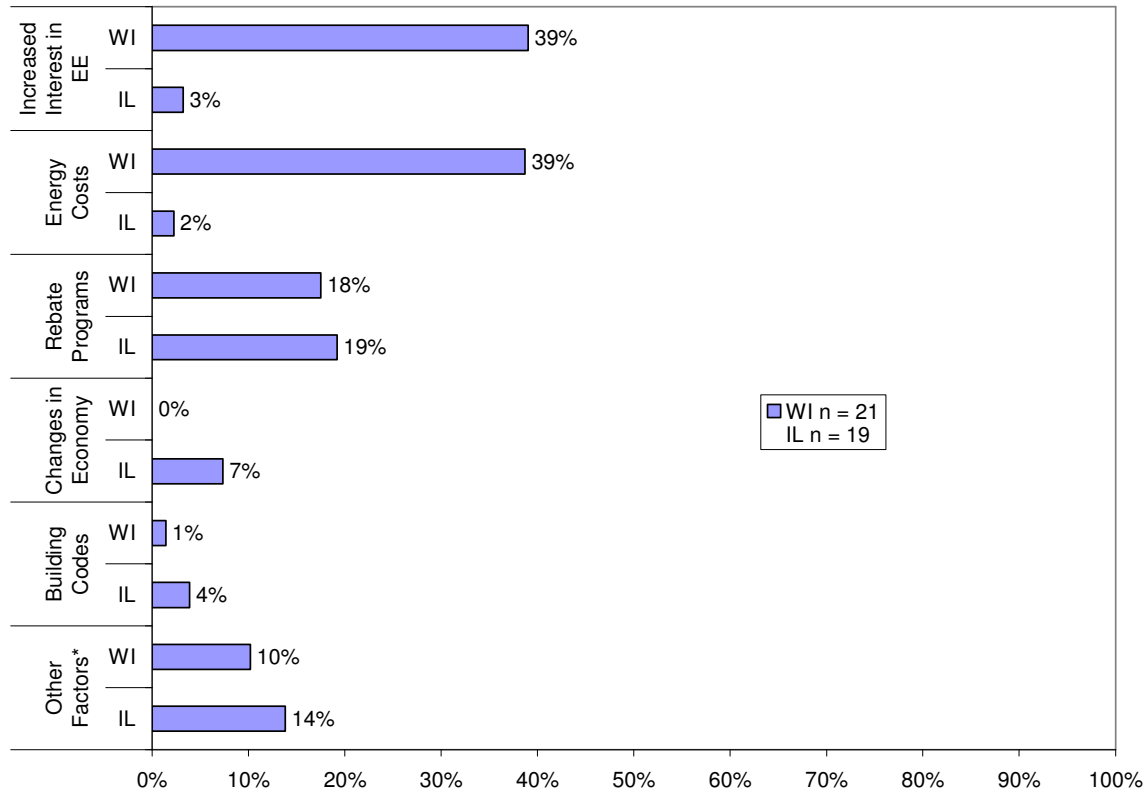
<sup>18</sup> Building Codes Assistance Project: <http://bcap-energy.org/node/66>

**Figure 4-53. Factors Causing Trend for Market Penetration of High-Efficiency Packaged Rooftop Units Wisconsin vs. Illinois (Percentage of Respondents)**



Note: \*Other factors included greater availability, product costs dropped, etc.

**Figure 4-54. Factors Causing Trend for Market Penetration of High Efficiency Packaged Rooftop Units Wisconsin vs. Illinois (Fully-weighted Responses)**

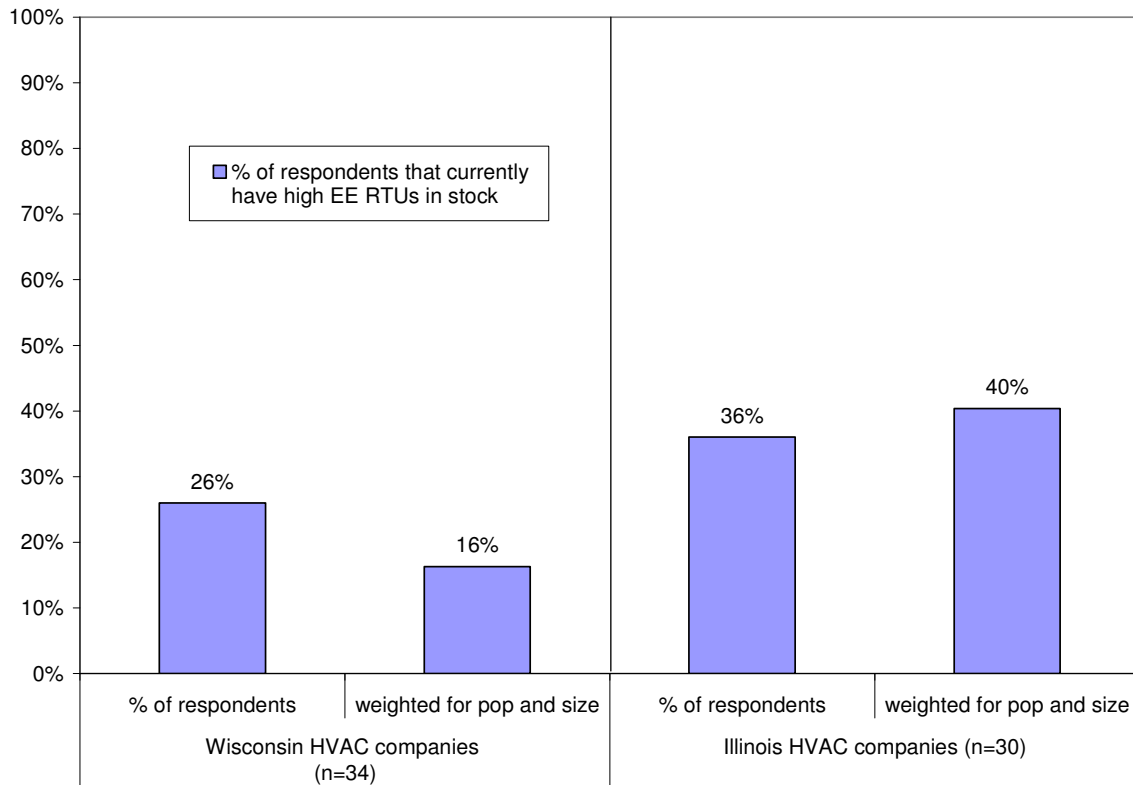


Note: \*Other factors included greater availability, product costs dropped, etc.

Another consideration in interpreting all this survey data concerning the market penetration of energy-efficient RTUs is how energy-efficient equipment is being defined by the respondents. To assure consistency and continuity with the findings from the 2008 Focus Channel Study, we used the same definition of energy-efficient RTUs that had been used in 2008 survey. Even though we defined what we considered energy-efficient in the survey questions, it is possible that in light of the new Wisconsin building codes, some respondents may no longer consider such equipment to be energy efficient.

In addition to asking about the energy-efficiency ratings of their RTUs, we asked the HVAC companies whether they have high-efficiency RTUs in stock. The Illinois companies were more likely to say that they had high-efficiency RTUs in stock (Figure 4-55). However, as noted above, this may simply be an effect of lower demand for the high-efficiency models in the state.

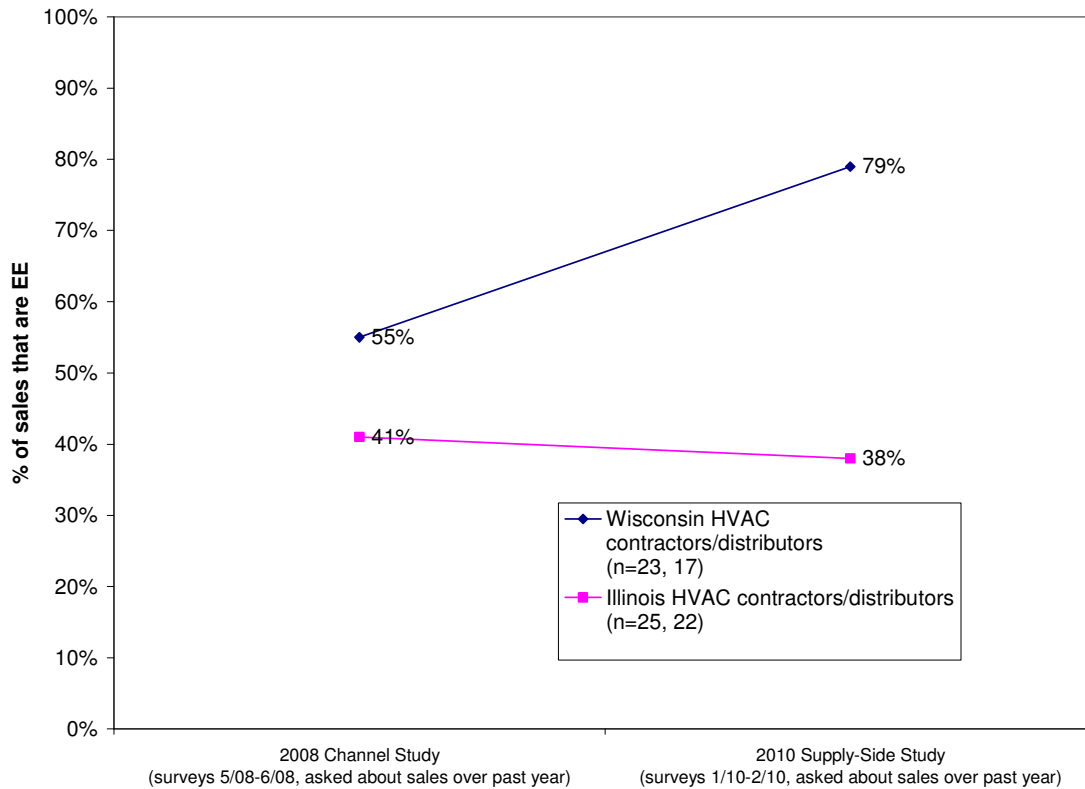
**Figure 4-55. Percentage of HVAC Companies that have High EE RTUs in Stock  
Wisconsin vs. Illinois**



While the sales trend for generic high-efficiency RTUs in Wisconsin has been flat or declining over the last year and a half, this has not been the case for RTUs that were fitted with dual enthalpy economizers. Figure 4-56 shows that Wisconsin HVAC companies reported a higher percentage of economizers installed in 2010 than they did in 2008. In contrast, the Illinois trend line is slightly declining. Although we did not ask the HVAC companies to explain their economizer sales trend, one likely explanation is the new Wisconsin building code adopted in 2008. This code requires economizers on all split cooling systems and groundwater source cooling systems greater than 54,000 Btu/h and all other cooling systems greater than 33,000 Btu/h. Although the building code does not require these economizers to be dual enthalpy economizers, we would expect the dual enthalpy systems to gain a certain percentage of this new business, especially with Focus rebates available.



**Figure 4-56. Trend for Market Penetration of Rooftop Air-conditioners Installed with Dual Enthalpy Economizers**

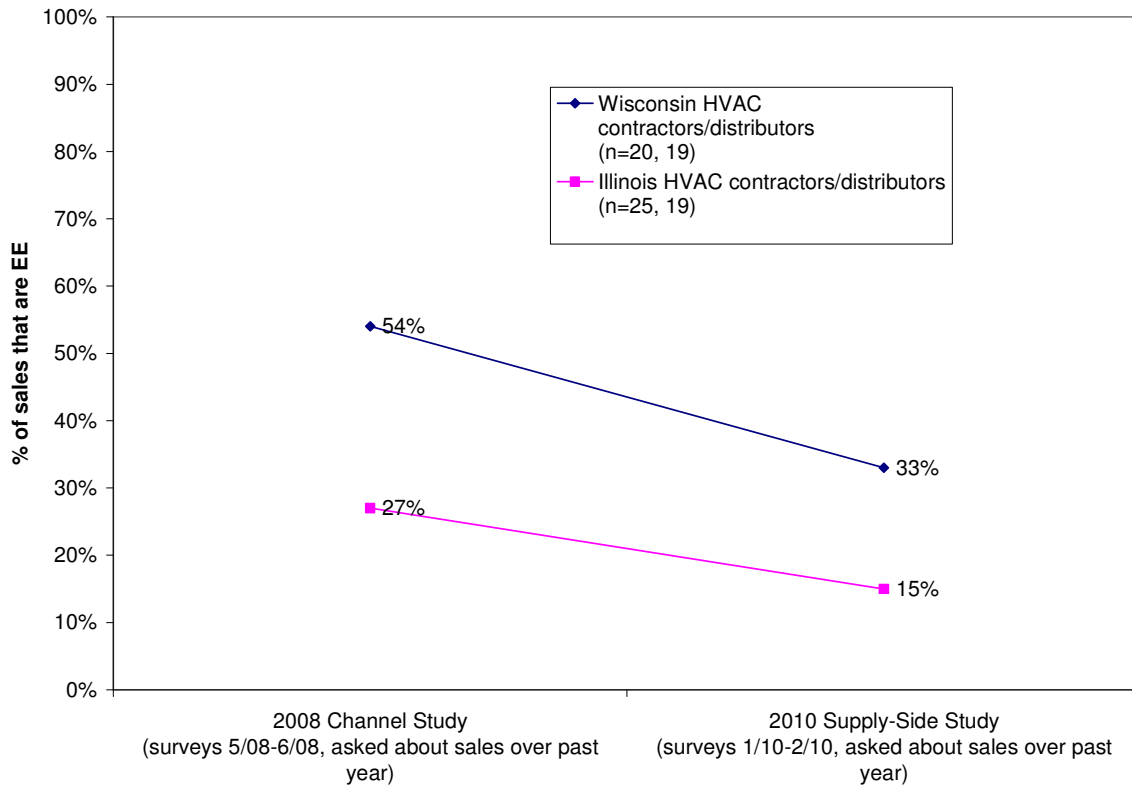


In contrast, the trend in Wisconsin for RTUs installed with CO<sub>2</sub> sensors and demand-control ventilation (DCV) is downward (Figure 4-57). We did not ask the HVAC companies to explain their sales trends for this technology. However, it is possible that in Wisconsin the new state building code requirements for economizers may be affecting the market for DCV systems. Although DCV systems and economizers are not incompatible, product literature suggests that energy savings may be less if DCV systems are installed in buildings that already have economizers installed.<sup>19</sup> The literature also note that ASHRAE Standard 62, which was first adopted in 2004 and updated in 2007, has minimum required ventilation rates. Therefore as more local building codes adopt Standard 62, this may reduce potential energy savings from DCV systems.<sup>20</sup>

<sup>19</sup> “Demand-Controlled Ventilation Using CO<sub>2</sub> Sensors,” Federal Technology Alert, Federal Energy Management Program, March 2004. [http://www1.eere.energy.gov/femp/pdfs/fta\\_co2.pdf](http://www1.eere.energy.gov/femp/pdfs/fta_co2.pdf).

<sup>20</sup> “HVAC: Demand-Controlled Ventilation,” 2006 E Source Companies.

**Figure 4-57. Trend for Market Penetration of Rooftop Air-Conditioners Installed with CO<sub>2</sub> Sensors and Demand Control Ventilation Systems**



*iii. Evidence from the market actor surveys of other HVAC market effects indicators*

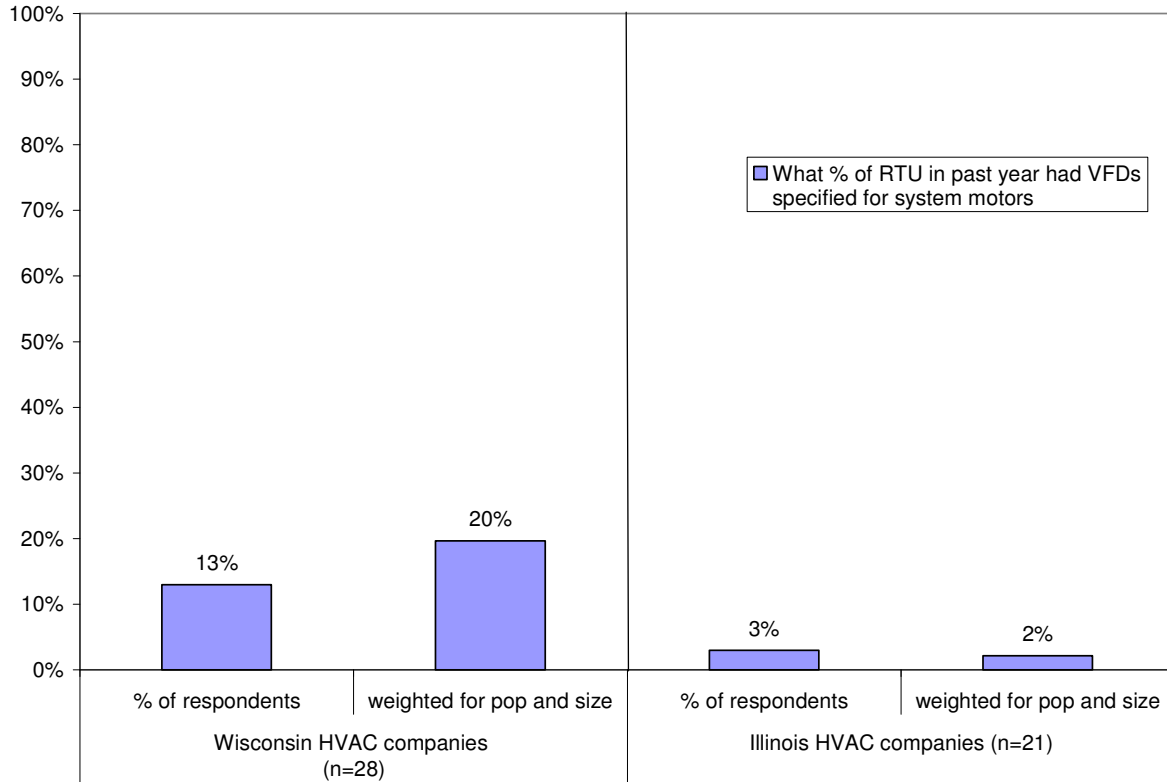
In addition to high-efficiency RTUs, some of the market effects indicators mentioned by the program implementers included:

- A high Wisconsin market penetration of HVAC controls
- A high percentage of Wisconsin vendors offering newer or less-common HVAC technologies such as:
  - HVAC equipment with variable frequency drives (VFDs)
  - Energy Recovery Ventilators (ERVs)
  - Infrared heaters
  - Packaged Terminal Heat Pumps (PTHPs).

***HVAC equipment with VFDs***

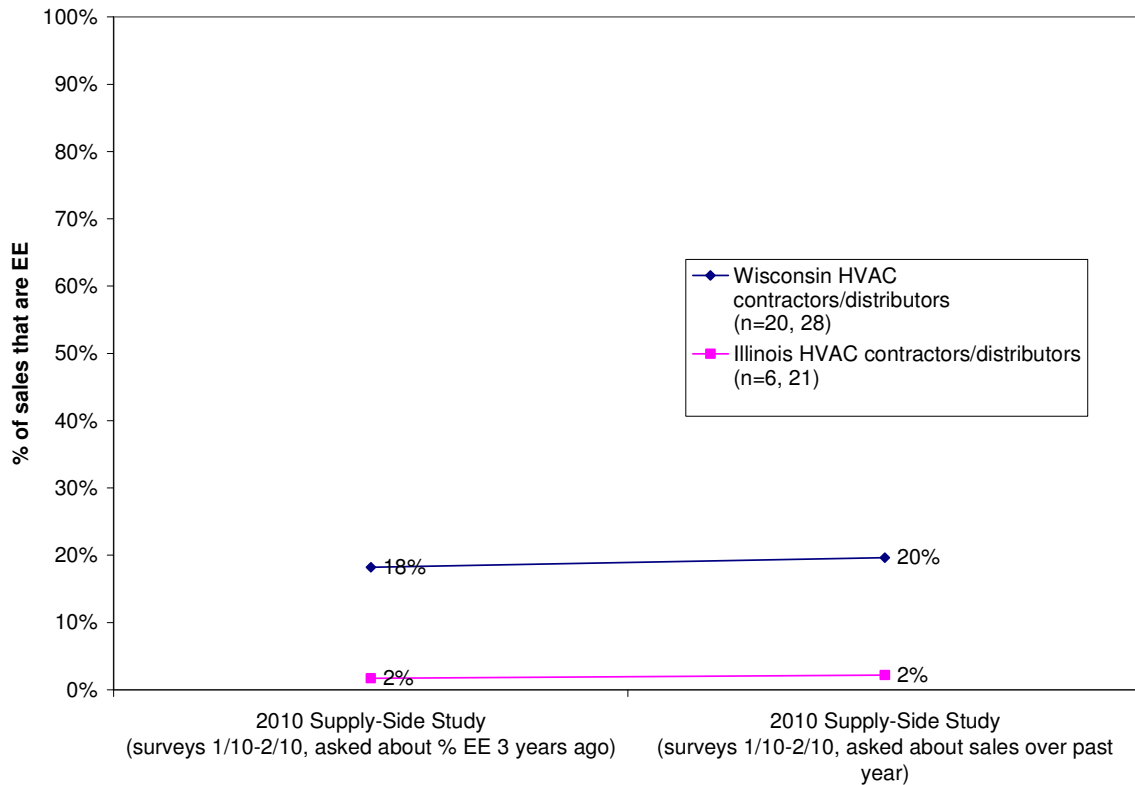
We asked the Wisconsin and Illinois HVAC companies about what percentage of the RTUs they sold/installed in the past year already had variable frequency drives (VFDs) specified for the system motors. The fully-weighted percentage (20 percent) reported by the Wisconsin HVAC companies was statistically higher than the fully-weighted percentage (2 percent) reported by the Illinois HVAC companies at the 90 percent confidence level.

**Figure 4-58. Percentage of RTUs Sold/Installed in Past Year with VFDs Already Specified for System Motors Wisconsin vs. Illinois**



We also asked the Wisconsin and Illinois HVAC contractors what this percentage of RTUs with VFDs already specified had been three years ago (this question had not been asked in the 2008 Channel Study). Figure 4-59 shows a relatively flat trend for both states although the sample size for the Illinois “three years ago” question is very small.

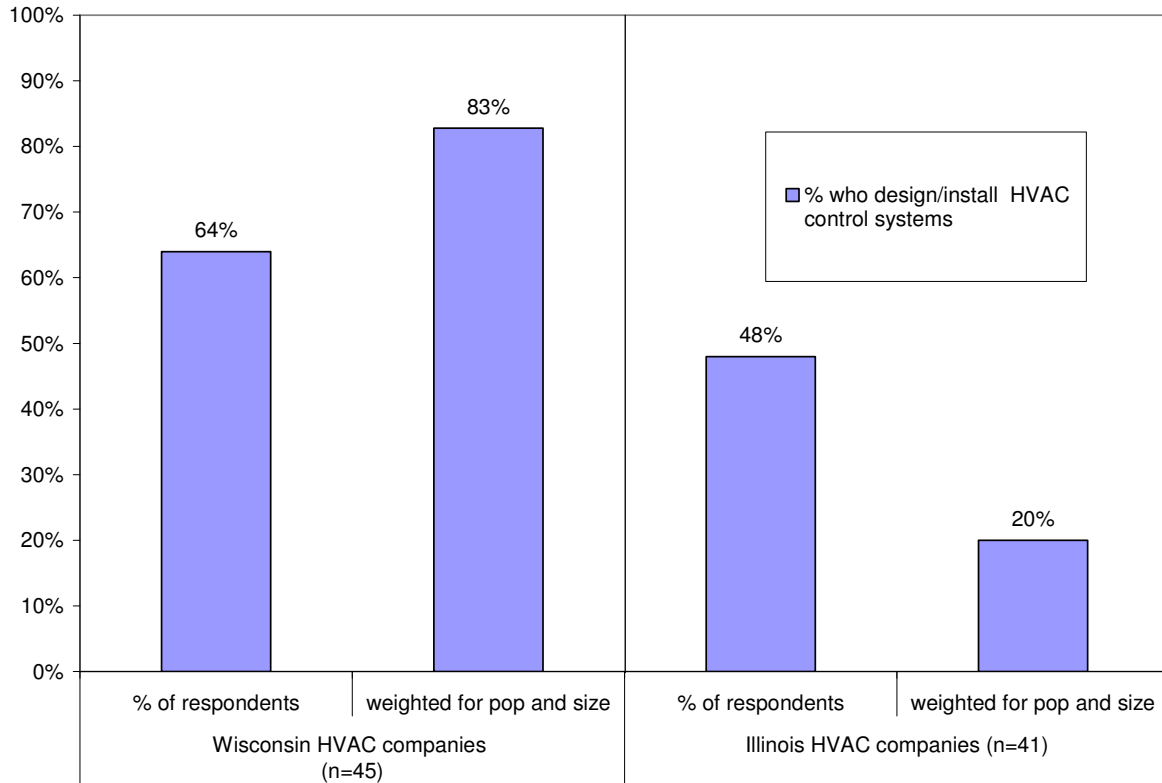
**Figure 4-59. Trend for Market Penetration of Rooftop Air-conditioners with VFDs Specified for the System Motors**



### **HVAC Control Systems**

The program implementers mentioned a high Wisconsin market penetration of HVAC controls as a possible market effects indicator. The Wisconsin and Illinois HVAC companies were asked whether they design or install commercial/industrial HVAC control systems such as energy management systems or building automation systems. Figure 4-60 shows that a much higher percentage of the Wisconsin companies reported designing or installing these control systems. Only six WI HVAC companies provided comments on what factors might be driving the market penetration of HVAC controls. Two of the six mentioned Focus rebates as a driving factor. Two others reported the economic downturn as hurting sales. Other factors mentioned included “market growth” and working with new contractors.

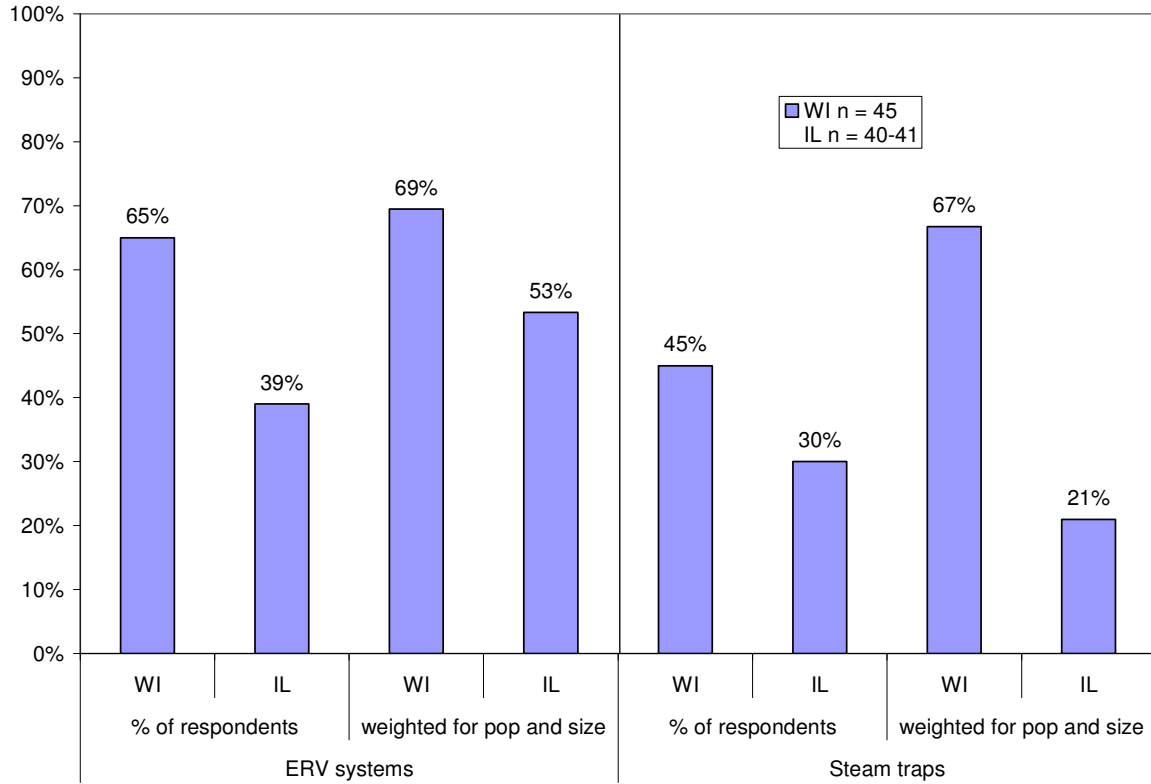
**Figure 4-60. Percentage of HVAC Companies Designing/Installing C&I HVAC Control Systems Wisconsin vs. Illinois**



**ERVs and Steam Traps**

The Focus BP program implementers mentioned a high percentage of Wisconsin vendors offering newer or less-common HVAC technologies—such as energy recovery ventilator (ERV) systems and steam traps—as other market effects indicators. We asked Wisconsin and Illinois HVAC companies whether they sold or installed such equipment. Figure 4-61 shows that a higher percentage of Wisconsin companies reported installing ERV systems and steam traps. However, the difference between the fully-weighted Wisconsin ERV estimate (69 percent) and the Illinois estimate (53 percent) was not statistically significant at the 90 percent confidence level.

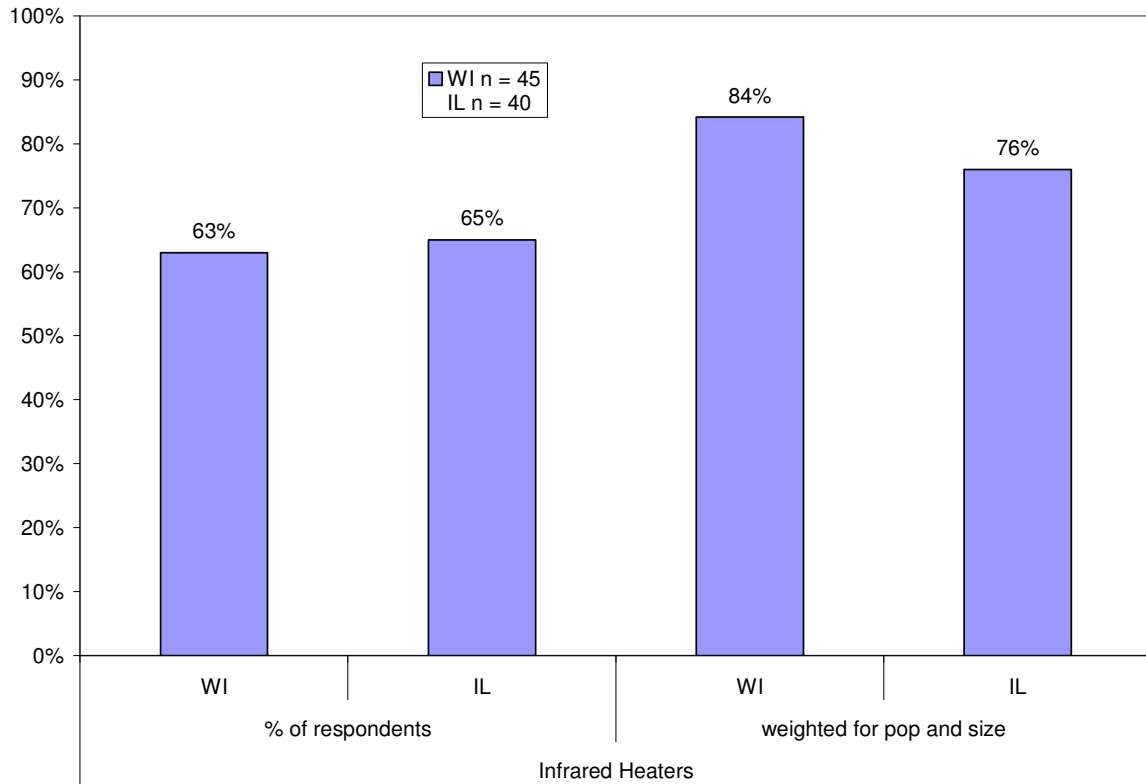
**Figure 4-61. Percentage of Wisconsin and Illinois HVAC Companies Installing/Selling ERV Systems, Steam Traps Wisconsin vs. Illinois**



**Infrared Heaters**

The Focus BP program implementers also mentioned a high percentage of Wisconsin vendors offering infrared heaters as another market effects indicator. The Wisconsin and Illinois HVAC companies were asked whether they sell or install these heaters. Figure 4-62 shows that a majority from both states said that they had. There were no statistically significant differences in the percentage of infrared heaters reported by the HVAC companies in both states.

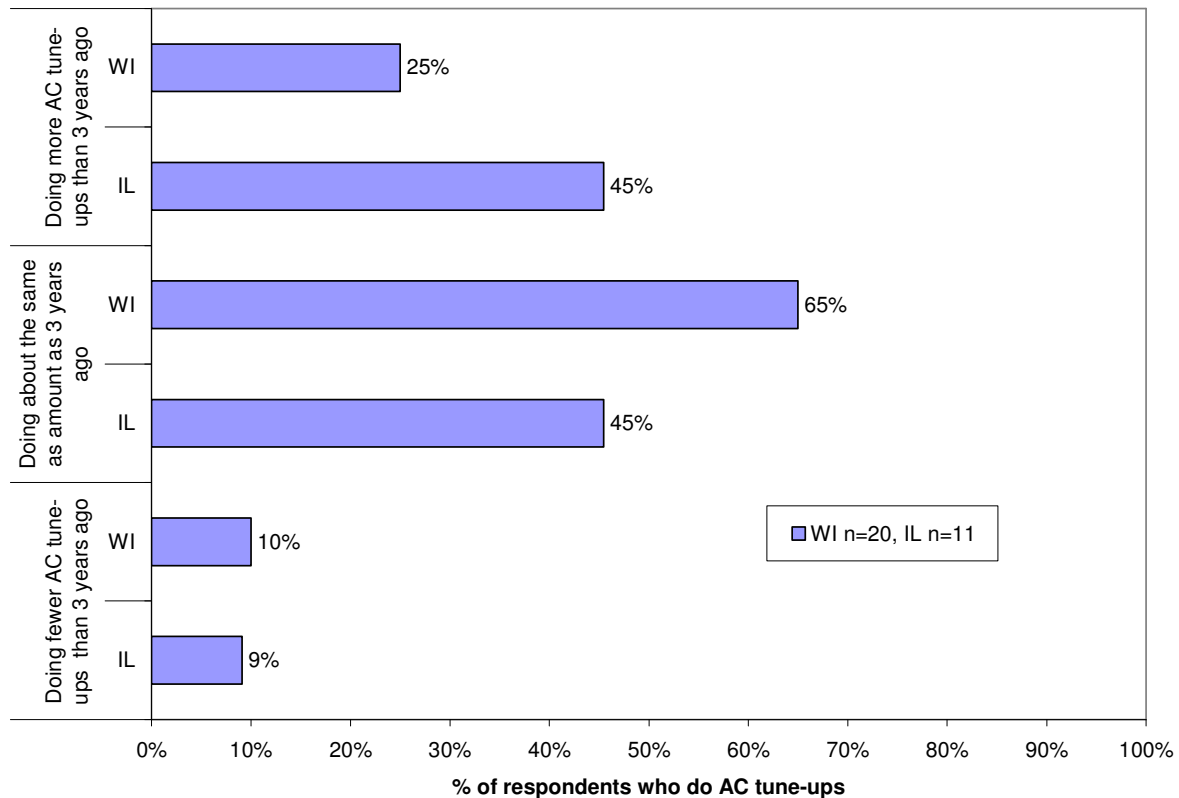
**Figure 4-62. Percentage of Wisconsin and Illinois HVAC Companies Installing/Selling Infrared Heaters Wisconsin vs. Illinois**



**HVAC Tune-ups**

Wisconsin and Illinois HVAC companies that said that they do tune-ups for RTUs were asked whether they were providing more rooftop AC tune-ups, fewer tune-ups, or about the same amount as they were three years ago. Nearly half (45 percent) of the Illinois companies that do these tune-ups said that they were doing more than they had three years ago (Figure 4-63). In contrast, only a quarter of Wisconsin companies reported they had. Of course since Focus BP has been in existence longer than three years it is possible that the lower percentage reported by the Wisconsin companies reflects the effects of Focus BP in raising the level of tune up activity in the prior period.

**Figure 4-63. Trend for Volume of Rooftop Air-conditioner Tune-Ups**

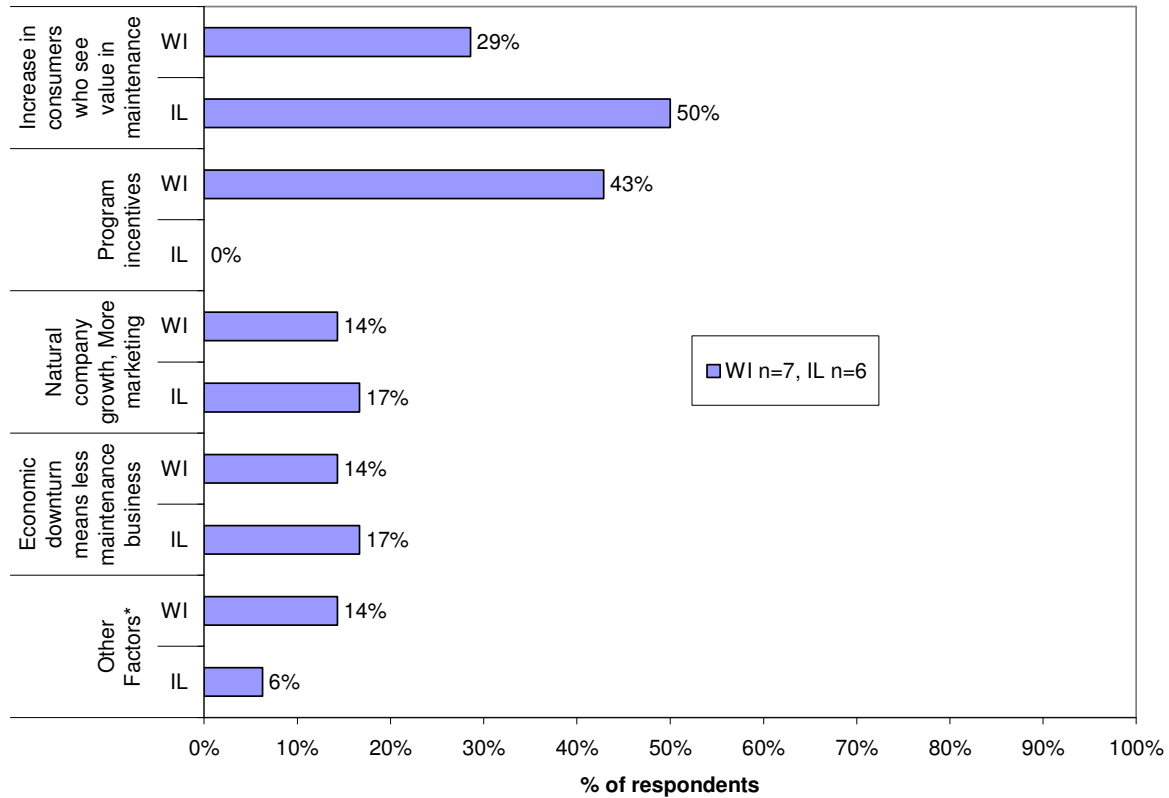


Note: The percentages represented here are the unweighted percents of respondents.

We asked the HVAC companies that said that they were doing more or fewer RTU tune-ups than they had been three years ago, what factors might be causing the differences in the frequency. Half of the Illinois respondents (Figure 4-64) said that it was simply due to more customers realizing the energy-saving and equipment life benefits of maintenance. The factor that was most cited by the Wisconsin respondents was the availability of program rebates.



**Figure 4-64. Factors Causing Trend for RTU Tune-ups**



Note: The percentages represented here are the unweighted percents of respondents.

**C. ATTITUDES OF HVAC COMPANIES TOWARDS ENERGY EFFICIENCY**

*i. Hypothesized market effects*

In the in-depth interviews, the program implementers identified a couple of possible market effects in Wisconsin concerning the attitude of HVAC contractors towards energy efficiency.

- Increased awareness of the availability and benefits of high-efficiency HVAC products in general
- More distributors mentioning EE products in their promotional materials.

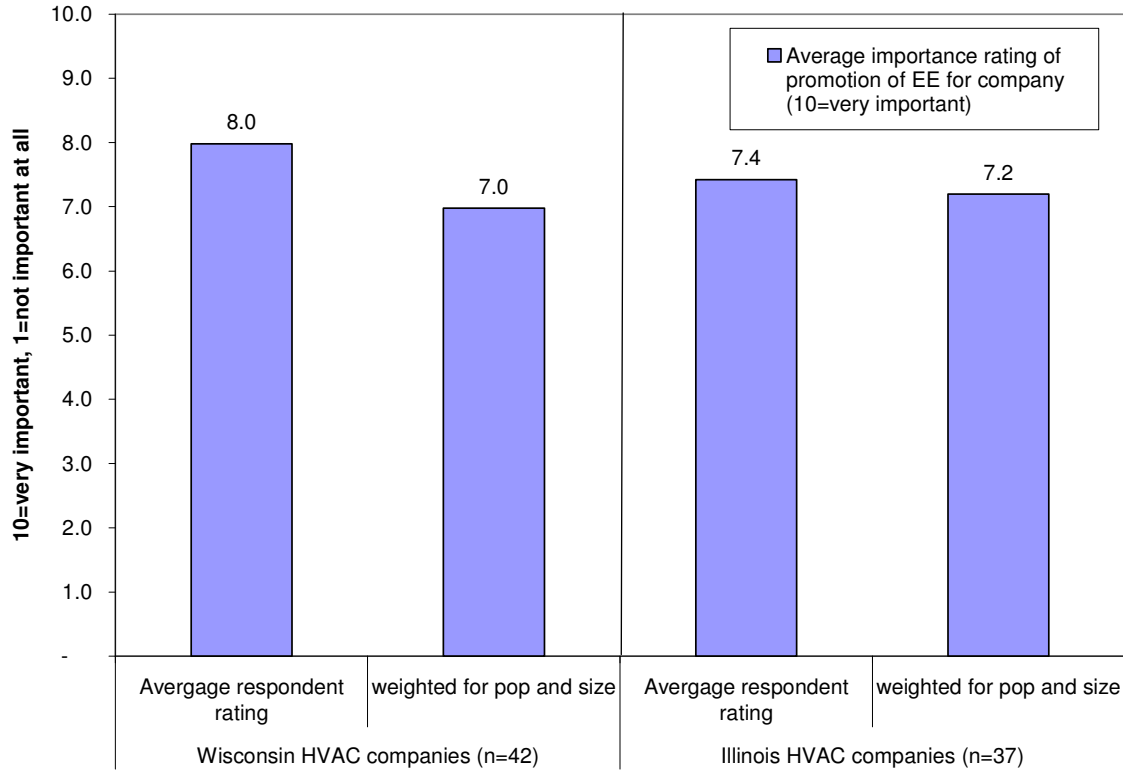
*ii. Evidence from the market actor surveys of greater importance of energy efficiency among Wisconsin HVAC companies*

We were interested in finding out whether there was a difference between the Illinois and Wisconsin companies in terms of:

- How important energy efficiency was for their own companies
- How much their commercial and industrial customers valued various characteristics of their HVAC equipment.

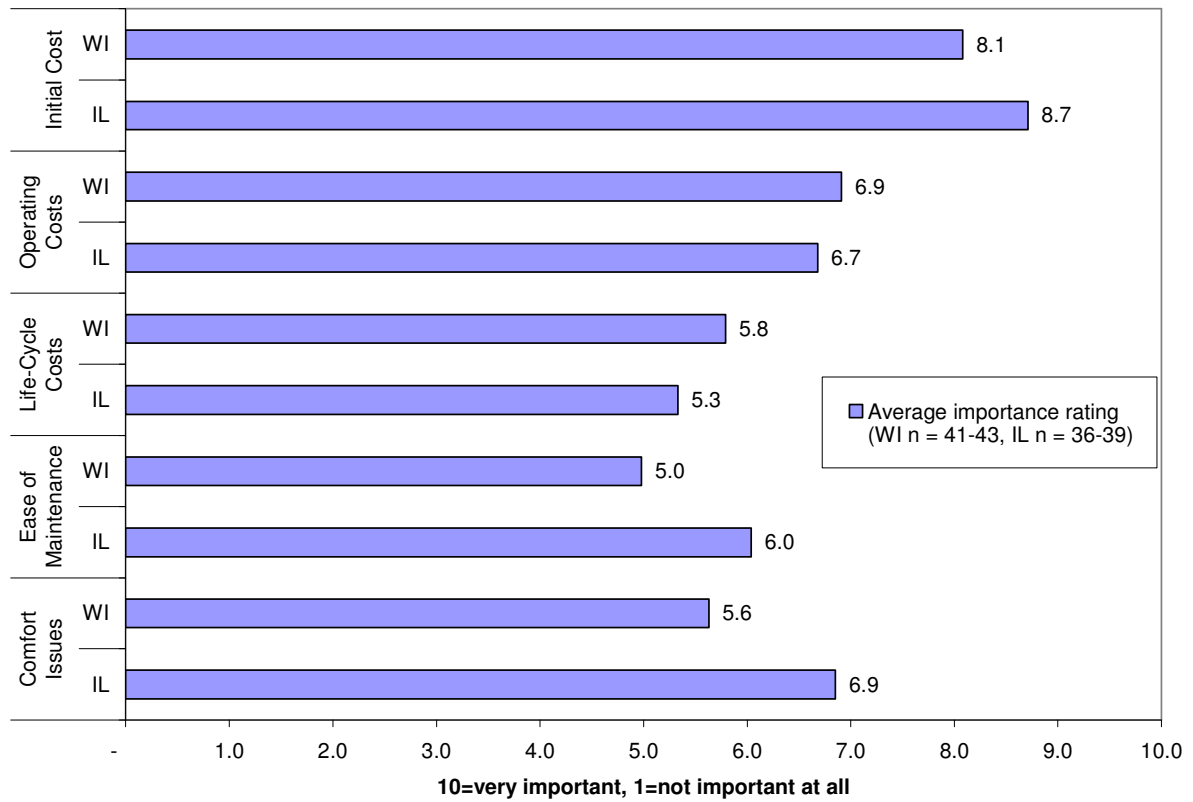
We asked both the Wisconsin and Illinois HVAC companies how important the promotion of energy efficiency was for their companies. They were told to use a 10-point scale where 10 equaled “very important” and 1 equaled “not important at all.” Figure 4-65 shows that the Wisconsin respondents gave a slightly higher rating than their Illinois counterparts did but that this difference went away when the data was fully weighted.

**Figure 4-65. The Importance of Promotion of EE for HVAC Companies Wisconsin vs. Illinois**

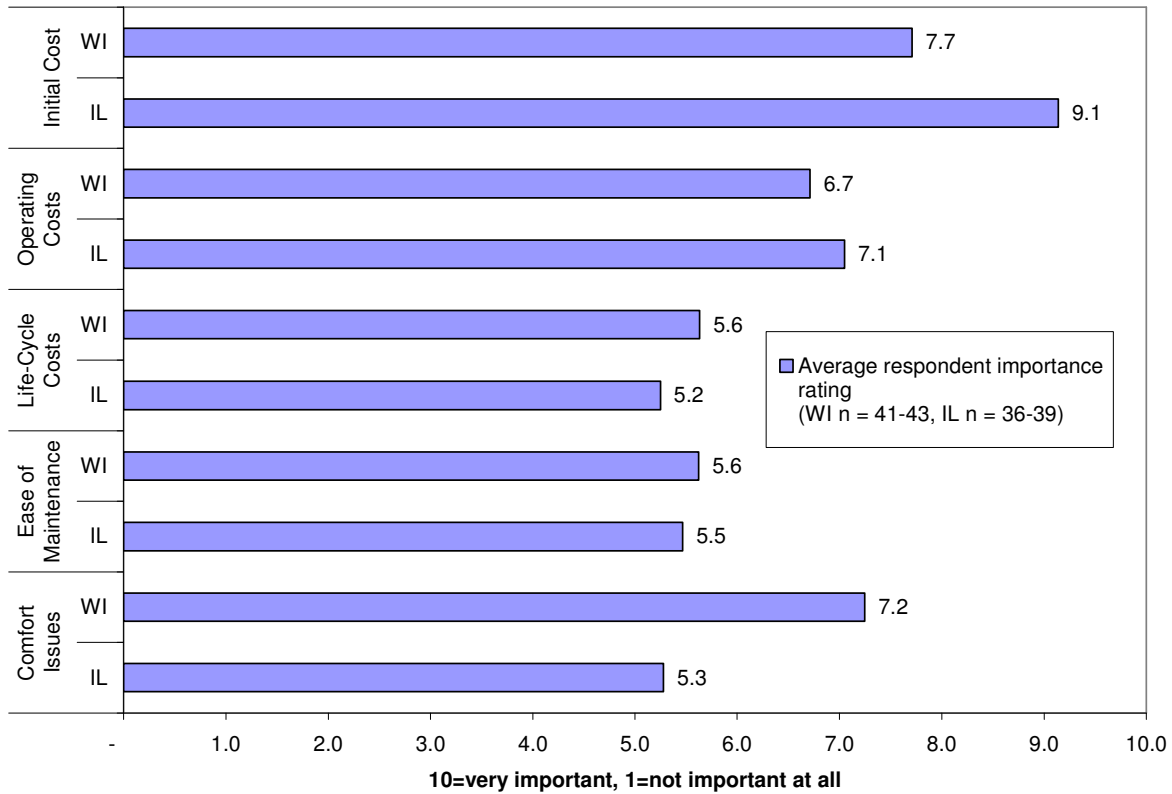


We also asked the HVAC companies from both states to rate how important various characteristics of HVAC equipment was for their commercial and industrial customers. Once again, they were told to use a 10-point scale where 10 equaled “very important” and 1 equaled “not important at all.” Figure 4-66 (unweighted average ratings) and Figure 4-67 (weighted average ratings) show their responses. The average ratings were generally similar across the two states except that the Illinois companies gave a higher rating for initial cost. For the equipment characteristics that were most closely associated with energy efficiency—operating costs and life-cycle costs—there were no statistically significant differences between the Wisconsin and Illinois ratings. However, the fact that the Illinois HVAC companies thought that their customers valued first cost more might be interpreted as a barrier to energy efficiency in the state.

**Figure 4-66. How HVAC Companies Think Their C&I Customers Value Various HVAC Equipment Characteristics Wisconsin vs. Illinois (Average Respondent Ratings)**



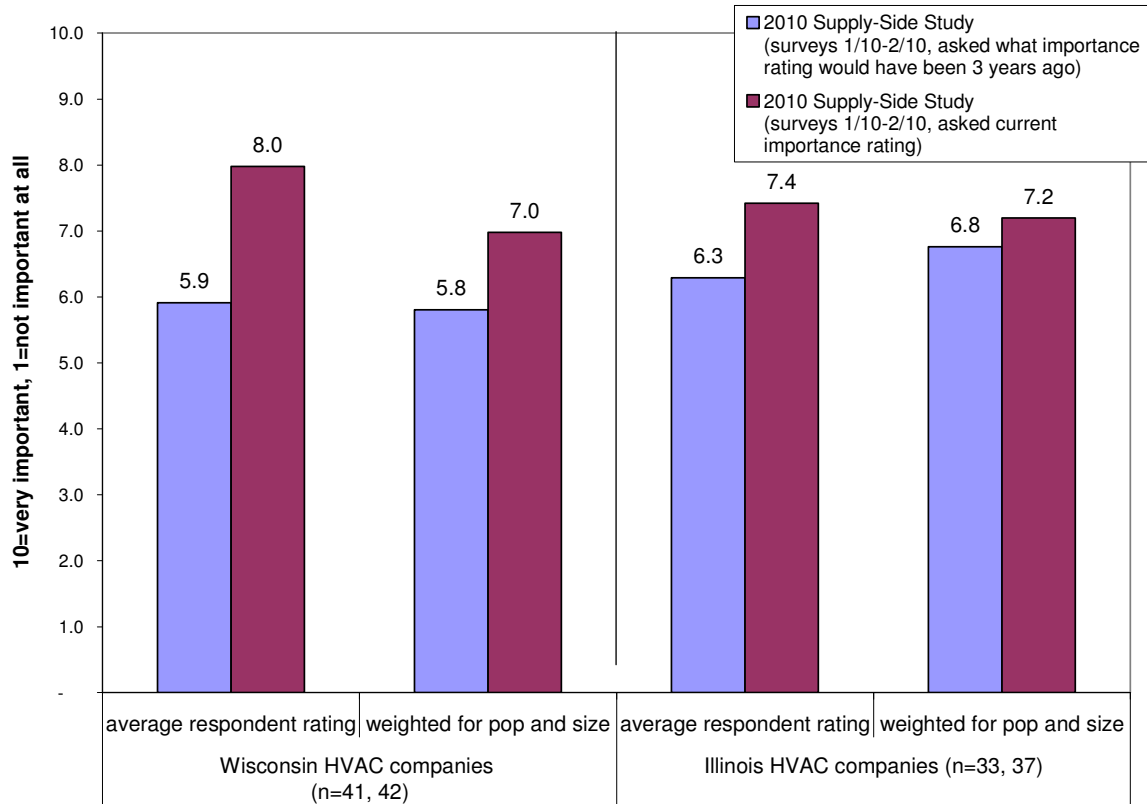
**Figure 4-67. How HVAC Companies Think Their C&I Customers Value Various HVAC Equipment Characteristics Wisconsin vs. Illinois (Weighted Average Respondent Ratings)**



We also examined whether the importance of energy efficiency changed for HVAC companies and their customers over time. As noted, we asked both the Wisconsin and Illinois HVAC companies how important the promotion of energy efficiency was for their companies. They were told to use a 10-point scale where 10 equaled “very important” and 1 equaled “not important at all.” We then asked them what their importance rating would have been three years ago. Finally, if they said that their importance rating had increased since three years ago, we asked why. Both the unweighted and weighted results in Figure 4-68 shows the Wisconsin HVAC companies reported a larger increase in the importance of energy efficiency for their companies than their Illinois counterparts did.<sup>21</sup>

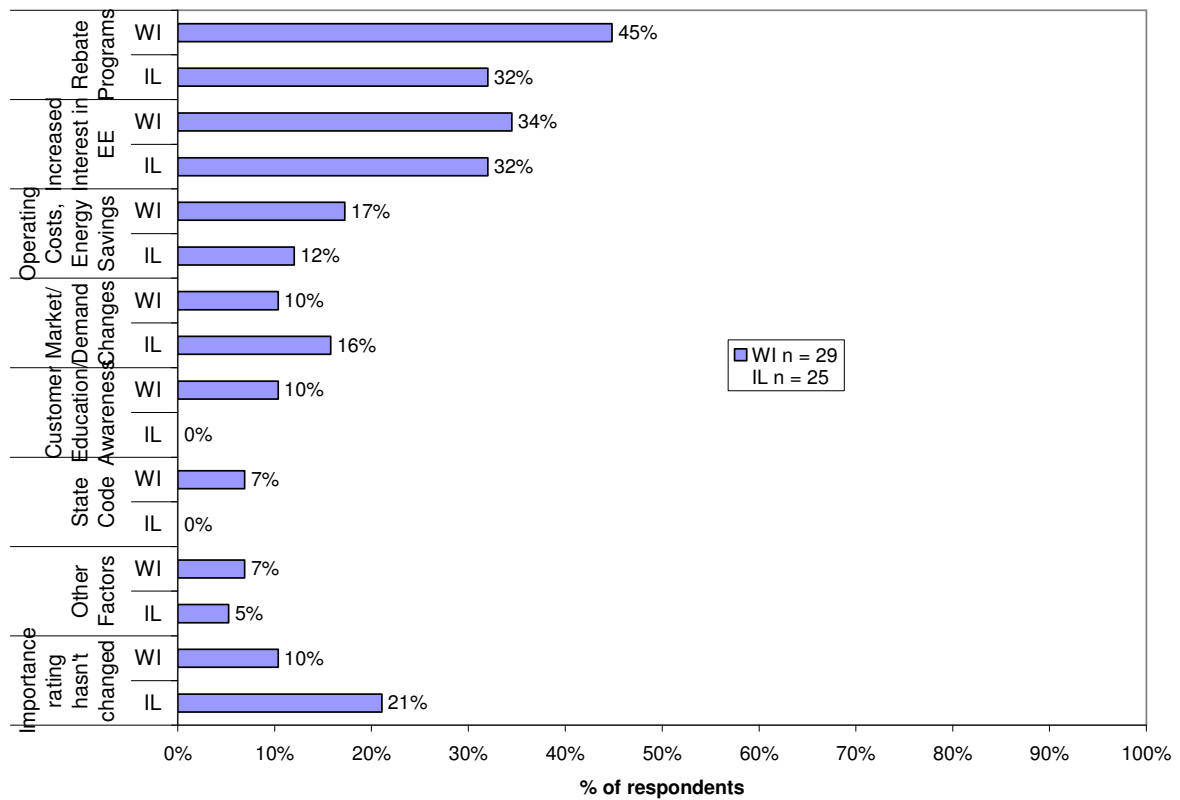
<sup>21</sup> The 2008 Channel Study used the same importance scale but asked HVAC distributors a slightly different question, “How important is the offer of energy-efficient equipment in maintaining your firm’s competitive position. The average Wisconsin rating was 9.1 (n=25) and the average Illinois rating was 7.5 (n=26).

**Figure 4-68. Trend for the Importance of EE Promotion for HVAC Companies Wisconsin vs. Illinois**

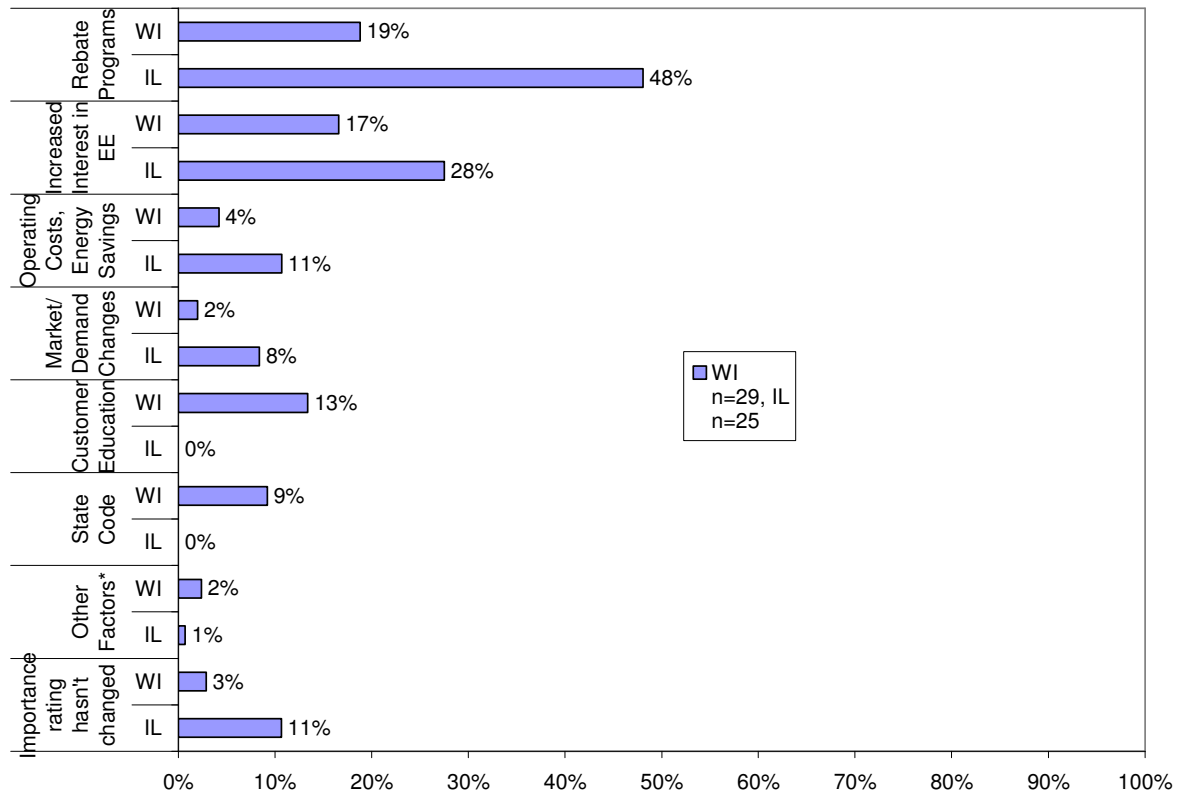


We asked those HVAC companies whose importance rating had increased over time, “What caused energy-efficient HVAC systems to become more important for your company over the last three years?” Nearly half (45%) of the Wisconsin respondents and nearly a third (32 percent) of the Illinois respondents cited rebate programs (Figure 4-69). About a third of each also mentioned increased interest in energy efficiency. When the responses were weighted (Figure 4-70), rebate programs and increased interest in energy efficiency still were the most-cited factors in both states, but the larger size of some of the Illinois companies caused their percentages to increase in comparison to Wisconsin.

**Figure 4-69. Factors Causing Trend for Importance of EE for HVAC Companies Wisconsin vs. Illinois (Percentage of Respondents)**

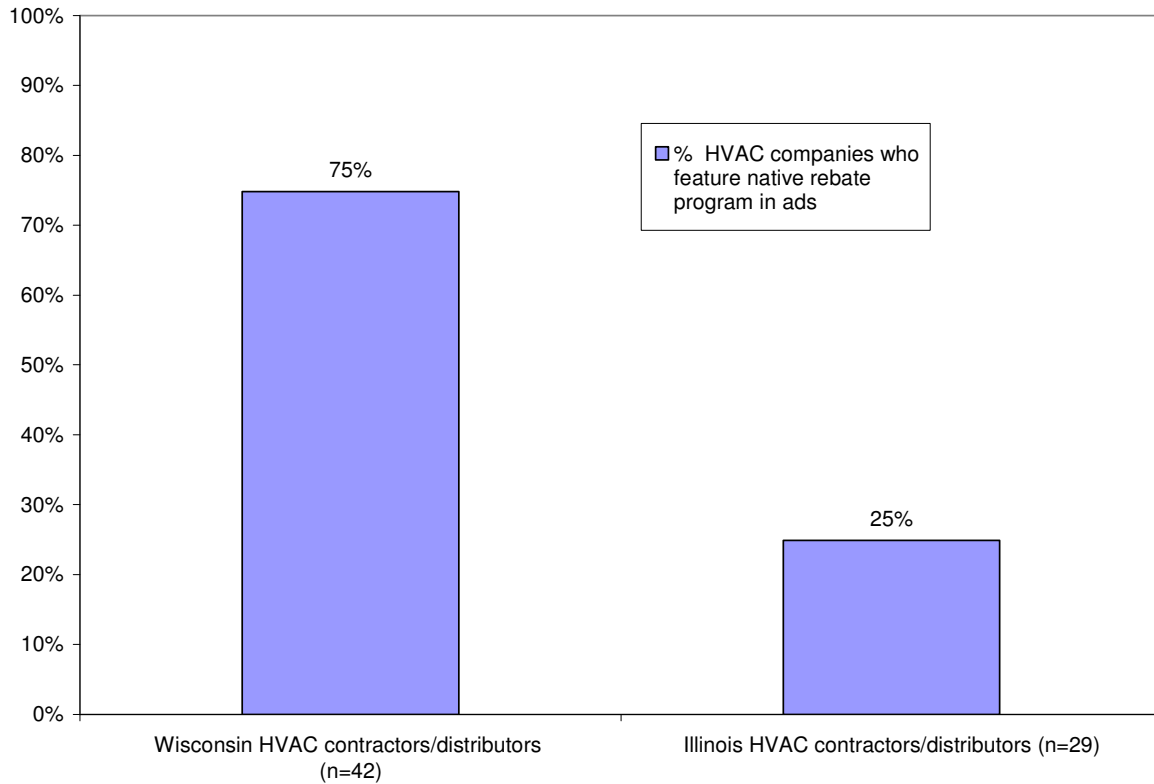


**Figure 4-70. Factors Causing Trend for Importance of EE for HVAC Companies Wisconsin vs. Illinois (Weighted Responses)**



Another possible indicator of attitudes towards energy efficiency is the percentage of HVAC companies that feature their native rebate programs in their promotional materials. Figure 4-71 shows that the Wisconsin companies were three times more likely to be featuring Focus on Energy in their advertisements than the Illinois companies were to be featuring their own HVAC rebate programs.

**Figure 4-71. Whether HVAC Companies Featured Their Native HVAC Rebate Programs in their Marketing Materials Wisconsin vs. Illinois**



Note: These results are based on the fully-weighted data. Respondents who were not aware of their native rebate programs were not asked this question, but were coded in as if they had said “no” to this question. This was done to allow a fairer comparison between Wisconsin and Illinois (since Wisconsin HVAC companies were more aware of Focus on Energy than the Illinois HVAC companies were of their own rebate programs, leaving out the program-unaware respondents would have made the Illinois percentage artificially high).

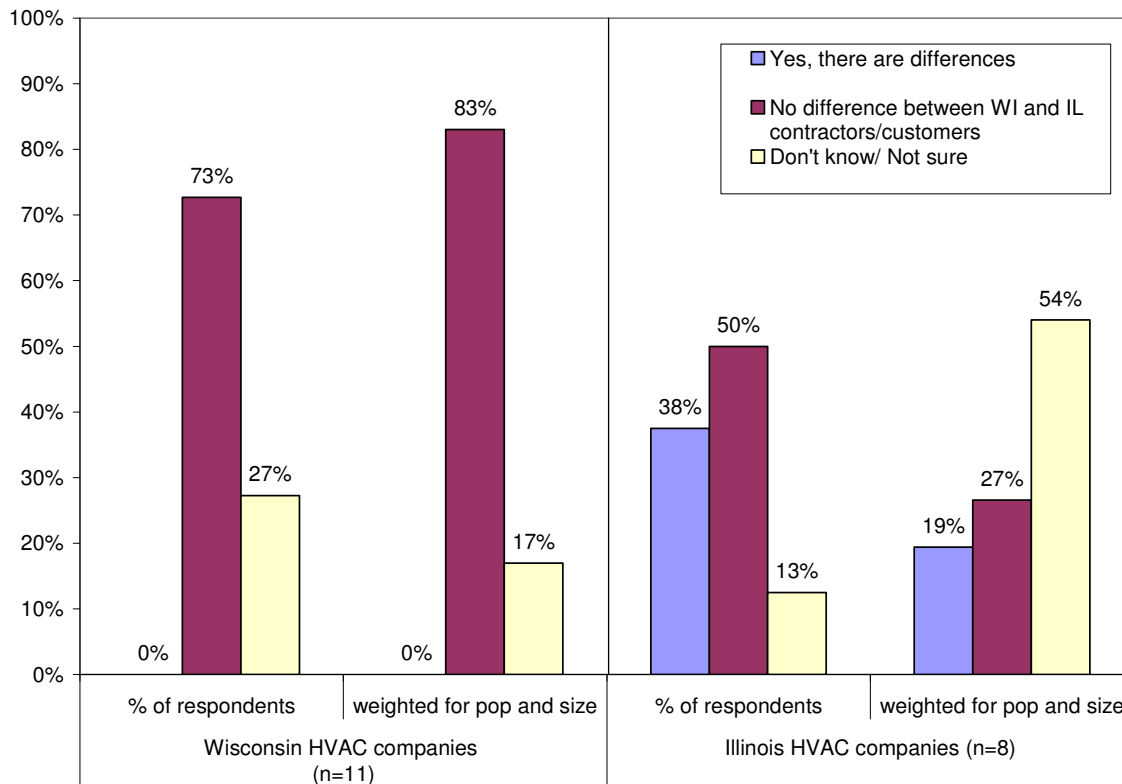
Finally, we asked the HVAC contractors who served both the Wisconsin and Illinois markets whether there were differences between their Wisconsin contractors or customers and their Illinois contractors or customers in terms of how frequently they specified or asked for energy-efficient HVAC systems and products. Figure 4-72 shows that none of the Wisconsin HVAC companies said that there were differences and only a small percentage of the Illinois companies said that there were.<sup>22</sup>

<sup>22</sup> The three Illinois HVAC companies that said there was a difference between their Wisconsin and Illinois contractors/customers all indicated that their Wisconsin customers were more interested in energy-efficient equipment. One respondent explicitly credited Focus on Energy and said that even though Wisconsin only accounts for 10–15 percent of his company’s total sales, his company sold more 90%+ AFUE furnaces in Wisconsin than in all of Illinois. A second respondent said that Wisconsin building codes were more energy-efficient than Illinois’ codes and this was a factor in their non-replacement sales of energy-efficient HVAC equipment. A third respondent reported that there



Although the samples sizes were small, these responses were consistent with those from the larger HVAC company sample, discussed above, concerning how much their customers valued various characteristics of HVAC equipment. Those responses showed that for the equipment characteristics that were most closely associated with energy efficiency—operating costs and life-cycle costs—there were no statistically significant differences between the Wisconsin and Illinois value ratings.

**Figure 4-72. Whether HVAC Contractors Who Served Both the Wisconsin and Illinois Markets Thought There Were Differences between Wisconsin and Illinois Contractors/Customers as to How Frequently They Specified/Asked for EE HVAC Equipment**



These findings are somewhat surprising considering all the other evidence presented in this section showing that Wisconsin HVAC companies sell more energy-efficient equipment and offer more energy efficiency services. There are a number of possible explanations for this. First, the Illinois HVAC companies said that their customers valued first cost more than the Wisconsin HVAC companies said that their customers did. Since energy-efficient equipment is usually more expensive, this could explain why Illinois customers are buying less energy-efficient equipment. Second, while we asked the HVAC companies what they thought their customers valued in HVAC equipment, we did not ask the customers themselves. It is possible that the Wisconsin customers do value energy efficiency more than their distributors and contractors are giving them credit for. Finally, it is possible that the drive towards greater

were rural areas in Wisconsin that had a higher regard for energy efficiency while there was less demand for energy-efficient equipment in the state's urban areas.

energy efficiency in Wisconsin is more supplier-driven than end-user-driven for the particular energy efficiency measures discussed in this report.<sup>23</sup> Although Focus BP does work with end users through the Sector Programs, the HVAC and Lighting Channel Initiatives focus mostly on influencing supply-side actors to change their behavior.

#### 4.3.2 The lighting market

This section compares the lighting market effects that the Focus BP program implementers hypothesized about in the in-depth interviews with the evidence collected from the surveys of lighting market actors.

##### *i. Hypothesized market effects*

In the in-depth interviews, the interviewees mentioned a number of indicators of possible market effects in the Wisconsin lighting market including:

- A high Wisconsin market share of high-efficiency lighting products including high-bay fluorescents, high-performance T8s, and lighting controls
- Higher distributor and retailer inventory levels of energy-efficient lighting products in Wisconsin than in neighboring states
- Higher sales of energy-efficient lighting compared to neighboring states
- Increase in the number of lighting vendors that stock energy-efficient lighting products
- Some vendors adopting Focus BP analytic/calculation tools and/or practices (e.g., distributor US Lamp has used “Whole Building Lighting” analysis with its customers)
- Increased numbers of vendors participating in Focus-BP-directed activities such as the Lighting Advisory Council
- Some distributors only stocking lighting equipment that is eligible for Focus BP rebates
- Higher vendor awareness of energy-efficient lighting technologies and their benefits
- Increased number of calls from end users asking about energy-efficient lighting technologies.

##### *ii. Evidence from the market actor surveys of greater market penetration of energy-efficient lighting in Wisconsin*

This section summarizes the evidence from the lighting market actor surveys of the market effects indicators mentioned in the in-depth interviews. The section discusses this evidence separately for high-bay fluorescents, high-performance T8s, and lighting controls.

---

<sup>23</sup> Still another possible explanation would be that, given the small sample, this is a reflection of where in the marketplace these providers sell. For example these providers might be positioned as low-cost providers who market to a subset of the total market which has a bias towards price.

### High-bay Fluorescents

We asked the Wisconsin and Illinois market actors who sold lighting for high-bay applications what percentage of the time were they selling high-bay fluorescents. Figure 4-73 shows that the Wisconsin lighting companies reported a much higher frequency of installing fluorescents in high bay applications than the Illinois companies did. The difference was most pronounced when the responses were fully weighted.

**Figure 4-73. Percentage of Time That Lighting Companies Were Installing Fluorescents in High-bay Applications Wisconsin vs. Illinois**

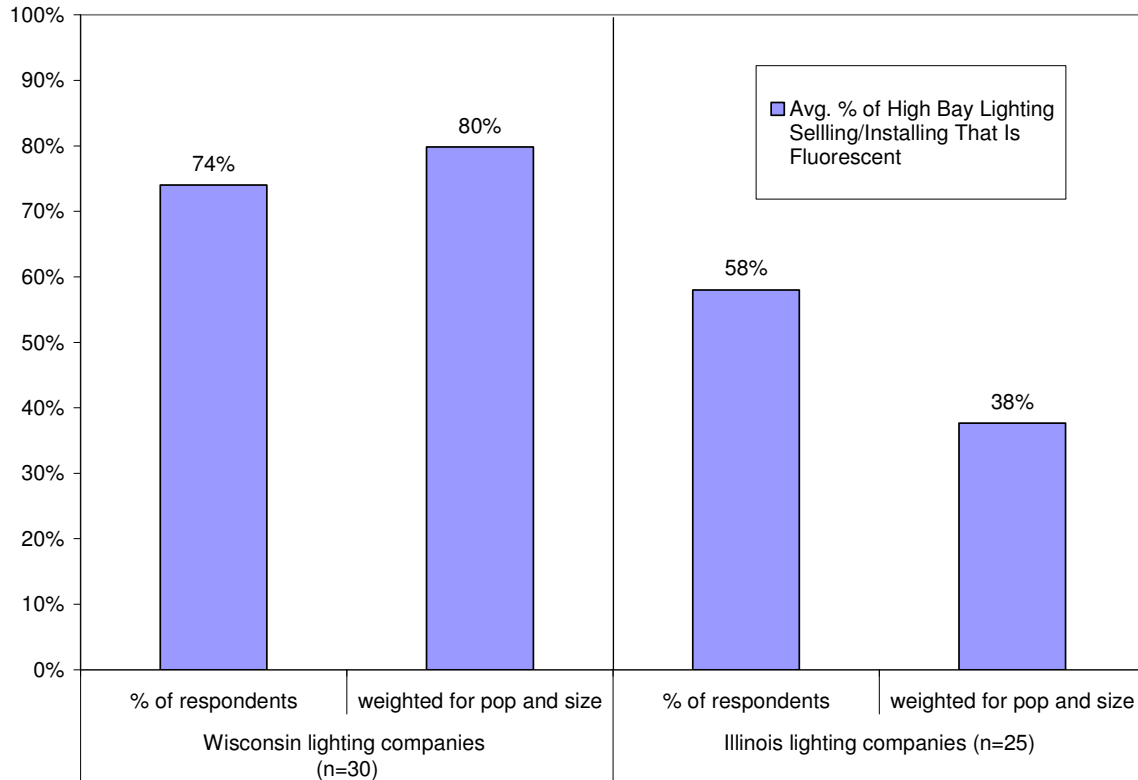
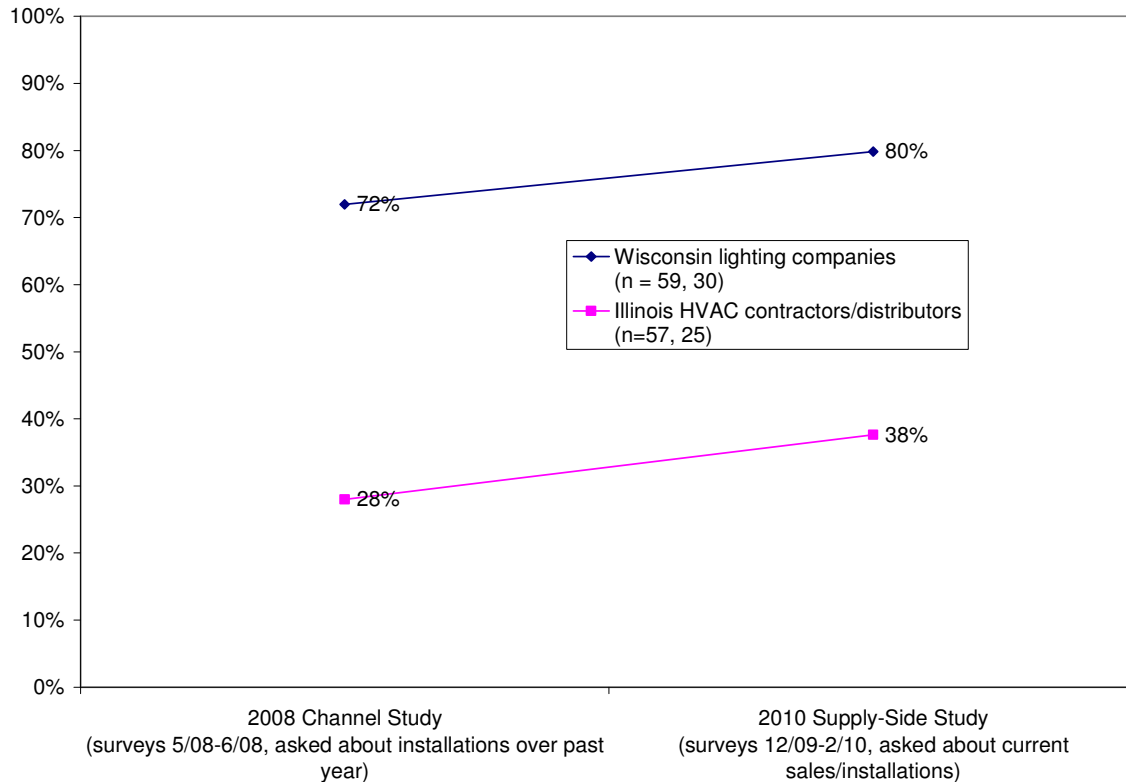


Figure 4-74 shows the weighted average percentage of high-bay sales/installations that were reported installed in Wisconsin and Illinois from both 2009–2010 lighting company surveys for the Supply Side Study and the 2008 surveys from the 2008 Focus Channel Study. The chart shows that reported sales/installations of the high-bay fluorescents have increased in both Wisconsin and Illinois over the past year and a half with the gap between the two states remaining of similar size.

**Figure 4-74. Trend for Market Penetration of Fluorescents in High-Bay Lighting Applications Wisconsin vs. Illinois**

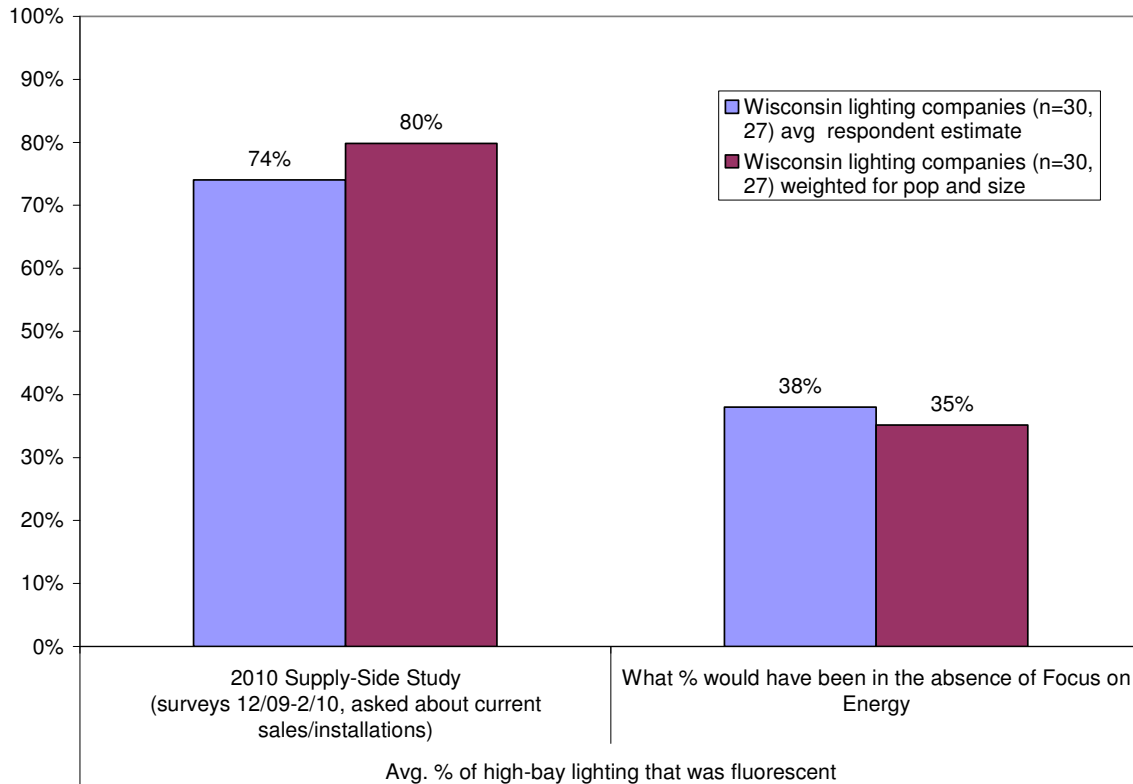


In the 2009/2010 survey, we also asked the lighting companies how the percentage of fluorescents they were selling/installing one year ago and three years ago compared to what they were selling/installing now. Most of the respondents did not provide estimates of the percentage of fluorescents in high-bay applications in these previous periods but instead commented on general trends in their lighting product mix for high-bay applications. For example, 84 percent of the Wisconsin lighting companies (n=30, fully-weighted response) said that their current percentage of fluorescents installed/sold in high-bay applications was different than it was three years ago. In explaining these different mixes, many lighting contractors indicated that three years ago, 50–100 percent of their high-bay lighting was metal halide lighting and one even recalled installing high-pressure sodium lighting. In addition, some of the Wisconsin respondents reported that induction lighting now accounted for a small, but growing percentage of their high-bay sales/installations.

To get a sense of how important the Focus on Energy program was to the market penetration of the high-bay fluorescents in Wisconsin, we asked the Wisconsin lighting contractors to estimate what their percentage of high-bay lighting that were fluorescents would have been in the absence of the Focus program. Figure 4-75 shows that the Wisconsin lighting companies claimed that the market penetration of the high-bay fluorescents would have dropped significantly in the absence of the Focus program. When asked for their reasons, most pointed to the effect of the rebates. They noted that while some customers could afford the high-bay fluorescents without the incentives, many could not. One Wisconsin respondent

even said that he did not think that the high-bay fluorescents “would be out of the box without the help of Focus.”

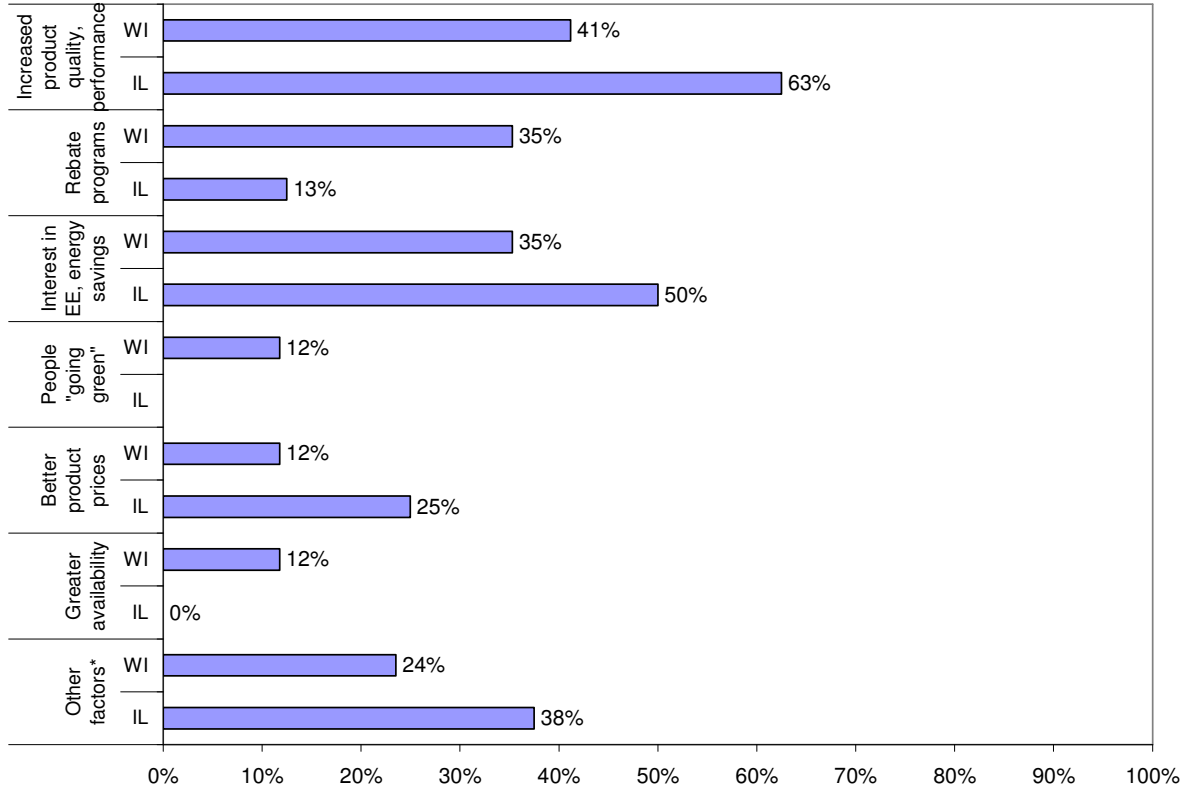
**Figure 4-75. Average Percentage of High-bay Lighting That Is Fluorescent With and Without the Focus on Energy Program**



Yet earlier in the survey, we asked those who reported changes in their mix of high-bay lighting specifications—with most reporting an increase in the share of high-bay fluorescent specification—what factors caused these changes. Figure 4-76 shows that while rebate programs were one of the more important factors for the Wisconsin respondents, they cited improvements in product quality/performance even more often. For the Illinois lighting companies this was the most-cited factor. Many of these lighting companies said that the ability of high-bay fluorescents to turn on instantly and their greater compatibility with occupancy sensors has made them preferable to metal halides. Others pointed to better color rendering and light quality as attractive features. Focus BP implementers said that the program has tried to emphasize the introduction of high-quality lighting products. They theorized that the fact that the Wisconsin companies expressed lesser concern about product quality/performance than their Illinois counterparts might be a market effect of these efforts.

Some of the respondents pointed out that some of these factors are synergistic. For example, one lighting contractor said, “First state codes went into effect that set a ceiling on watts per square foot making these lamps more ideal. Second my sources became cheaper and the lamps were easier to get.” Others pointed to the combination of the technology improvements for the high-bay fluorescents (e.g., the instant on/off) and the increased interest in energy efficiency.

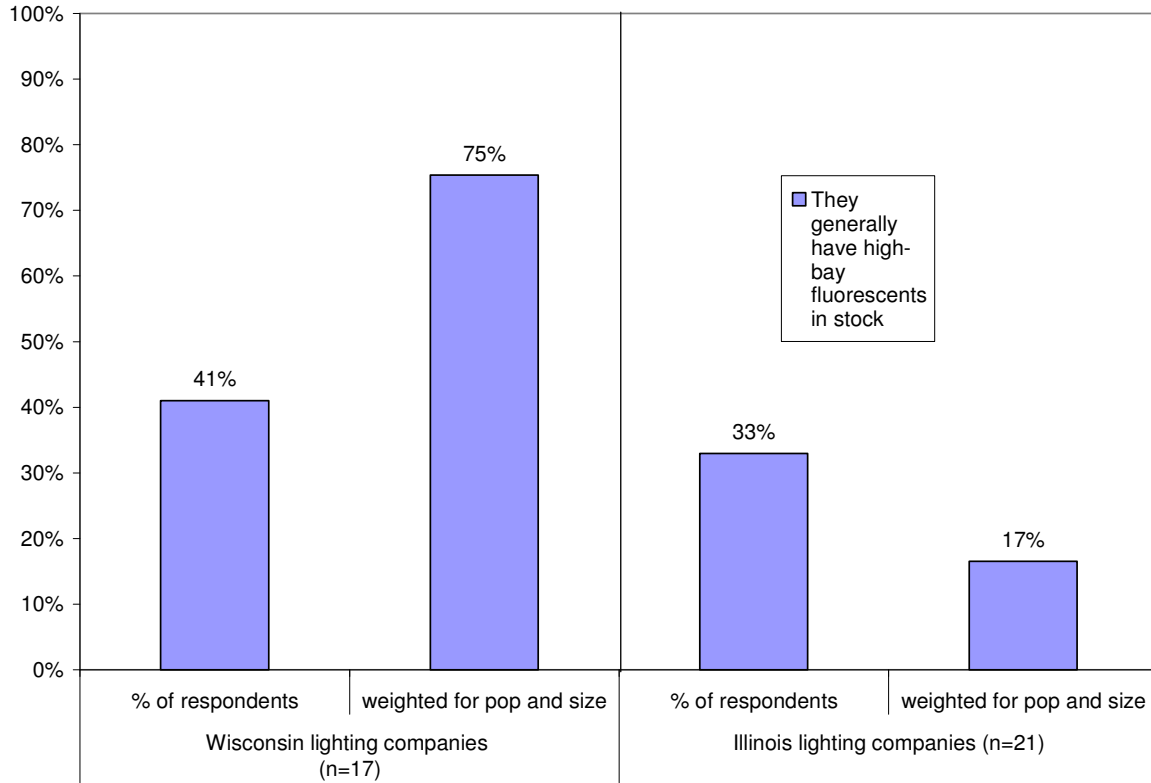
**Figure 4-76. Factors Causing Changes in Mix of Lighting Specified for High-bay Applications**



Note: The percentages represented here are the unweighted percentage of respondents.

Another market effects indicator mentioned by the program implementers included higher distributor and retailer inventory levels of energy-efficient lighting products in Wisconsin than in neighboring states. The Wisconsin and Illinois lighting contractors were asked, “When you get an order for high-bay fluorescents do you generally have the equipment in stock, or do you need to order it?” Figure 4-77 shows that a slightly higher percentage of the Wisconsin respondents reported having high-bay fluorescents in stock than the Illinois companies did, but this difference widened considerably when the response data was fully weighted.

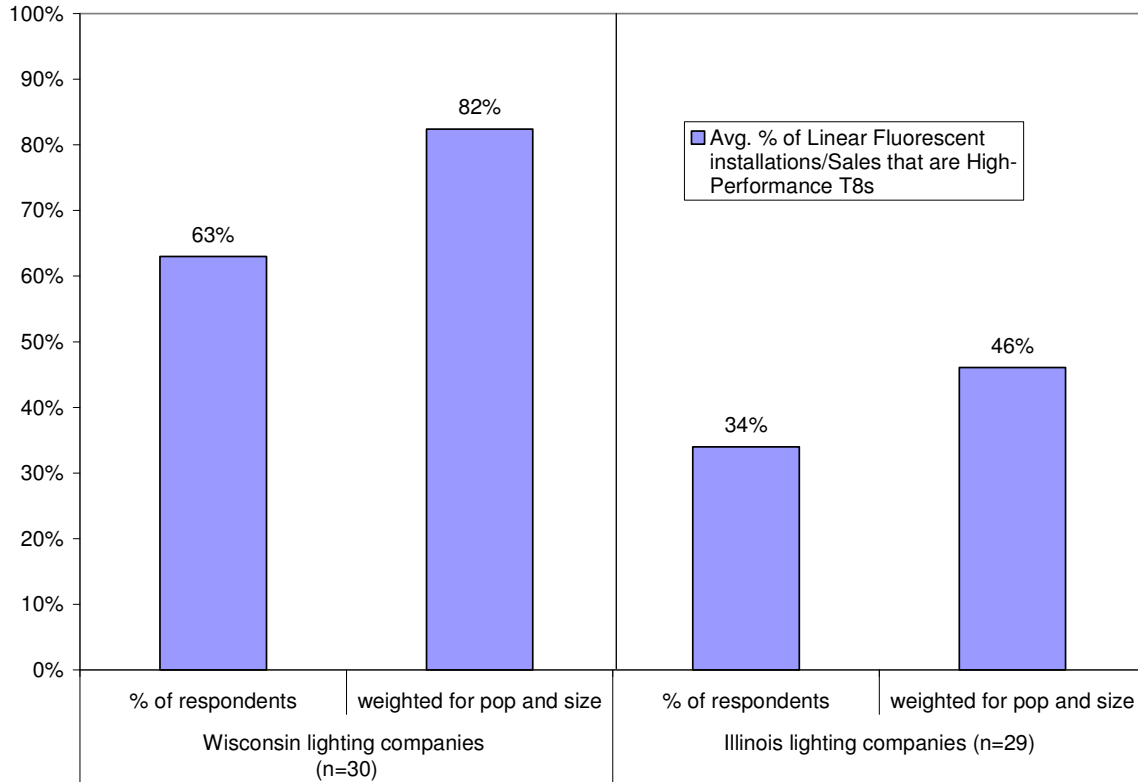
**Figure 4-77. Whether Lighting Companies Generally Had High-bay Fluorescents in Stock**



### High-performance T8s

We asked the Wisconsin and Illinois lighting companies about what percentage of the time they were installing/selling high-performance T8 lighting when they were selling/installing linear fluorescent lighting. Figure 4-78 shows that the Wisconsin lighting companies reported almost twice as high a market penetration of high-performance T8s as the Illinois lighting companies did.

**Figure 4-78. Percentage of Time that Lighting Companies Were Selling/Installing High-Performance T8 Lighting When Selling/Installing Linear Fluorescent Lighting Wisconsin vs. Illinois**



We also compared the market penetrations for high-performance T8s reported by the lighting companies in 2009/2010 with those reported by lighting companies in 2008 in response to the 2008 Focus BP Channel Study.<sup>24</sup> Figure 4-79 shows that while the Wisconsin lighting companies reported a higher percentage of high-performance T8s in 2009/2010 than they did in 2008, the Illinois lighting companies actually reported a much lower percentage.

At first glance, this did not seem to make any sense since the introduction of lighting rebate programs in Illinois in late 2008 would presumably have increased the market penetration of the high-performance T8s. However, this was actually an outcome that was predicted by one of the Focus BP program implementers before the 2009/2010 Supply-side Study even began. She theorized that the introduction of the Illinois lighting rebate programs might have the

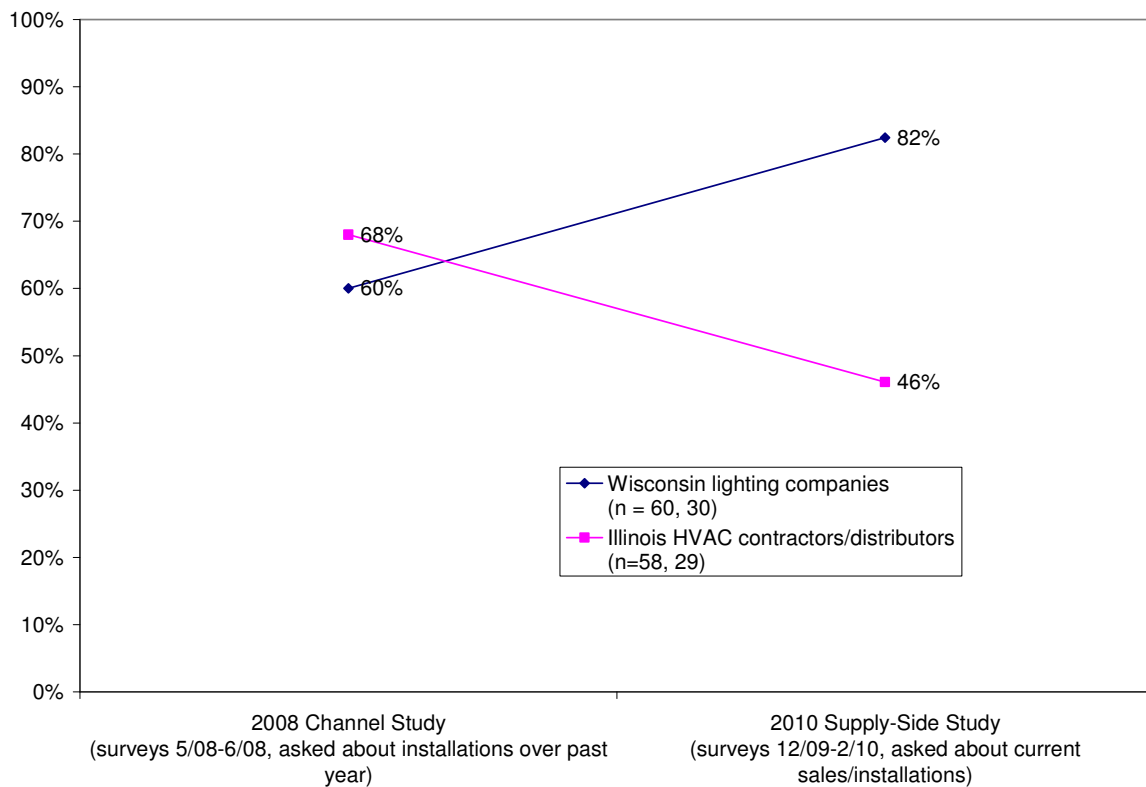
<sup>24</sup> In the 2009/2010 survey, we also asked lighting companies whether the percentage of high-performance T8s they currently sell is different than it was one year ago and three years ago. However, there were not enough quantitative estimates of measure penetration to include these responses in the trend line. A general summary of the quantitative and qualitative responses is that in the past the lighting companies were selling fewer high-performance T8s and T5s than they are selling now. In terms of three years ago, many lighting companies reported installing either all standard T8s or a mix of T8s and T12s.



effect of educating the Illinois lighting companies on what types of T8 lighting actually qualified as high performance.

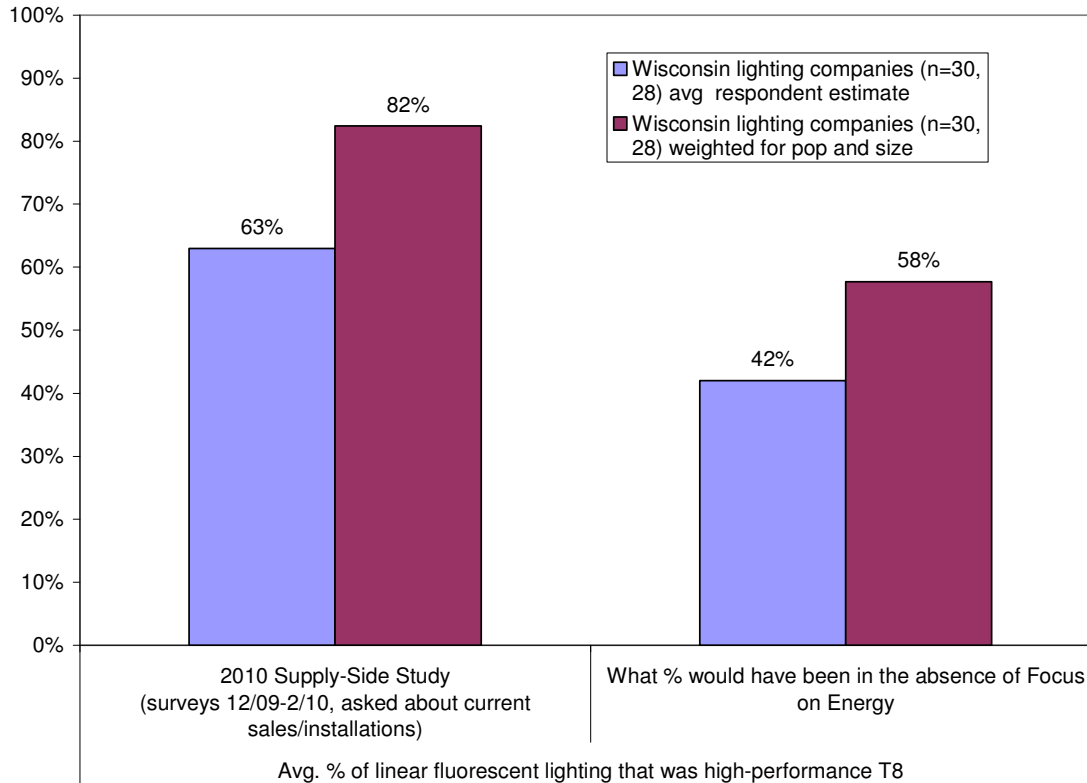
If this theory is true, then the market penetration of high-performance T8s in Illinois did not actually decline between 2008 and 2009/2010 but rather the Illinois companies' 2008 estimate of market penetration was artificially high due to an inaccurate understanding of what constituted a high-performance T8. Since Focus on Energy has been rebating high-performance T8s for many years and educating market actors about what types of lighting qualified for these rebates, one would not expect the same impact in Wisconsin between 2008 and 2009/10.

**Figure 4-79. Trends for Market Penetration of High-Performance T8 Lighting Wisconsin vs. Illinois**



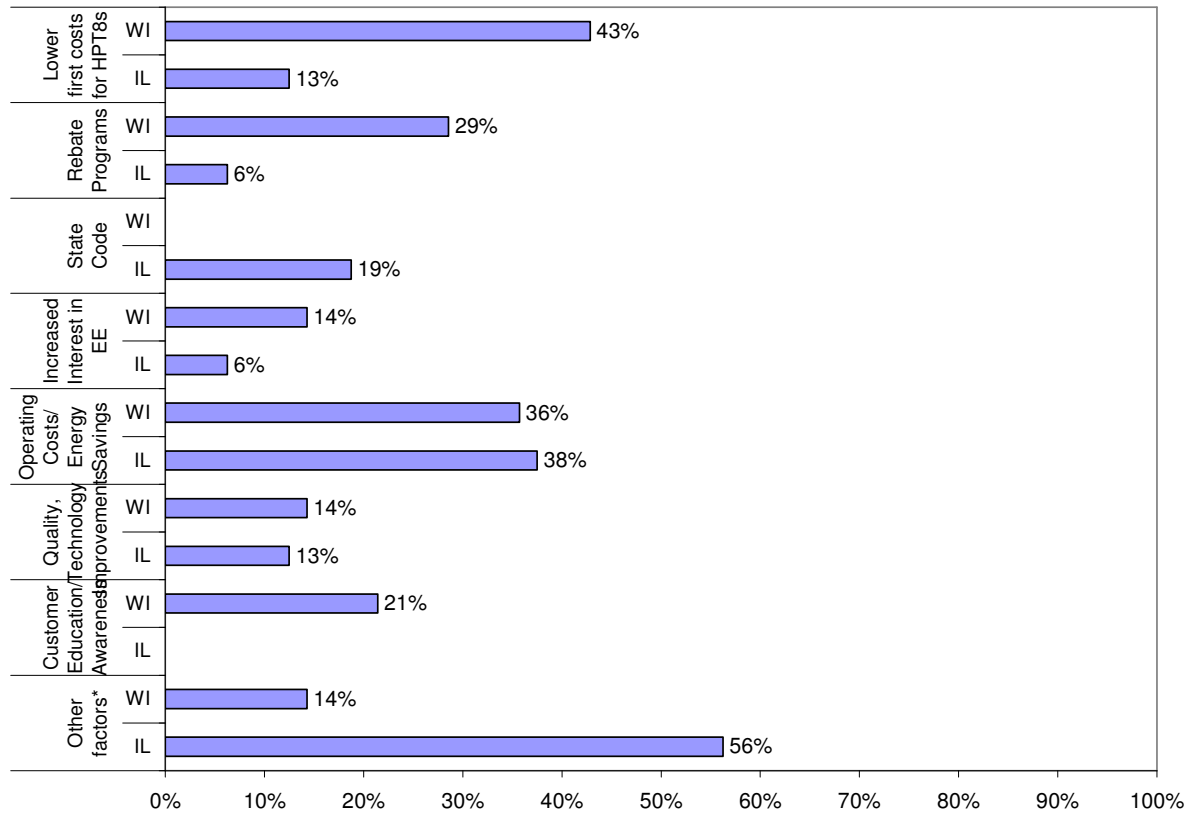
To understand the importance of the Focus on Energy program as to the Wisconsin market penetration of high-performance T8 lighting, we asked the Wisconsin lighting contractors to estimate what their percentage of linear fluorescents that were high-performance T8s would have been in the absence of the Focus program. Figure 4-80 shows that the Wisconsin lighting companies claimed that the market penetration of the high-performance T8s would have dropped significantly, although the drop was not as sharp as that estimated for the high-bay fluorescents.

**Figure 4-80. Average Percentage of Linear Fluorescents That Are High-performance T8s With and Without the Focus on Energy Program**



Earlier in the survey, we asked the Wisconsin and Illinois lighting companies what caused their changes in the mix of their linear fluorescents from prior periods. Figure 4-81 shows that the Wisconsin companies cited a wider range of factors besides the rebate programs in their changes (the large majority of Wisconsin respondents said that their usage of high-performance T8s had increased from prior periods). For example, the most-cited factor was that high-performance T8s were coming down in price and were even approaching prices for standard T8s. It should be noted that some of these other factors cited by the Wisconsin respondents such as customer education/awareness, increased interest in energy efficiency, and even the lower first cost for the high-performance T8s could be effects of the Focus on Energy program.

**Figure 4-81. Factors Causing Trend for Changes in Usage of High-performance T8s**

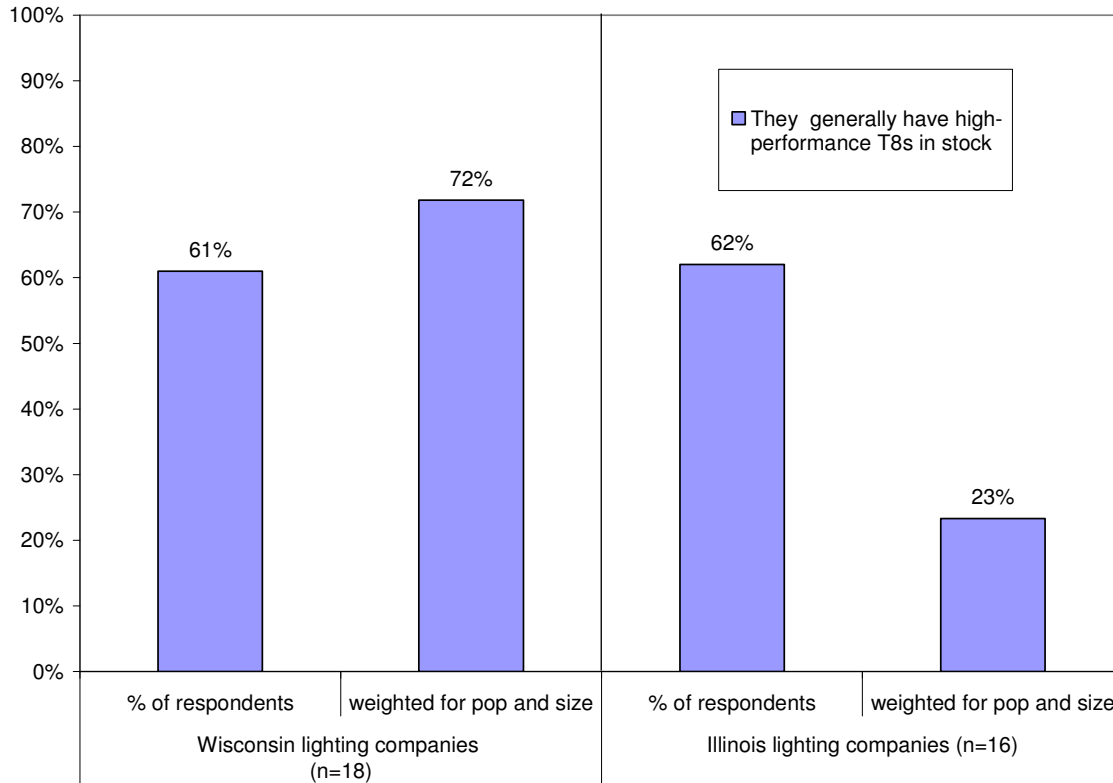


Note: 14 Wisconsin companies and 16 Illinois companies who experienced changes in their high-performance T8s usage identified factors. The total exceeds 100% because respondents were allowed to name multiple factors.

\*Other factors included light quality and performance, product availability, and the fact that for the older T12 technologies it was difficult to find replacement magnetic ballasts, etc.

As noted, higher distributor and retailer inventory levels of energy-efficient lighting products in Wisconsin than in neighboring states was another market effects indicator suggested by the Focus BP implementers. The Wisconsin and Illinois lighting contractors were asked, “When you get an order for high-performance T8s, do you generally have the equipment in stock, or do you need to order it?” Figure 4-82 shows that a nearly equal percentage of Wisconsin and Illinois respondents said that they have high-performance T8s in stock, but these percentages changed significantly when the data was fully weighted.

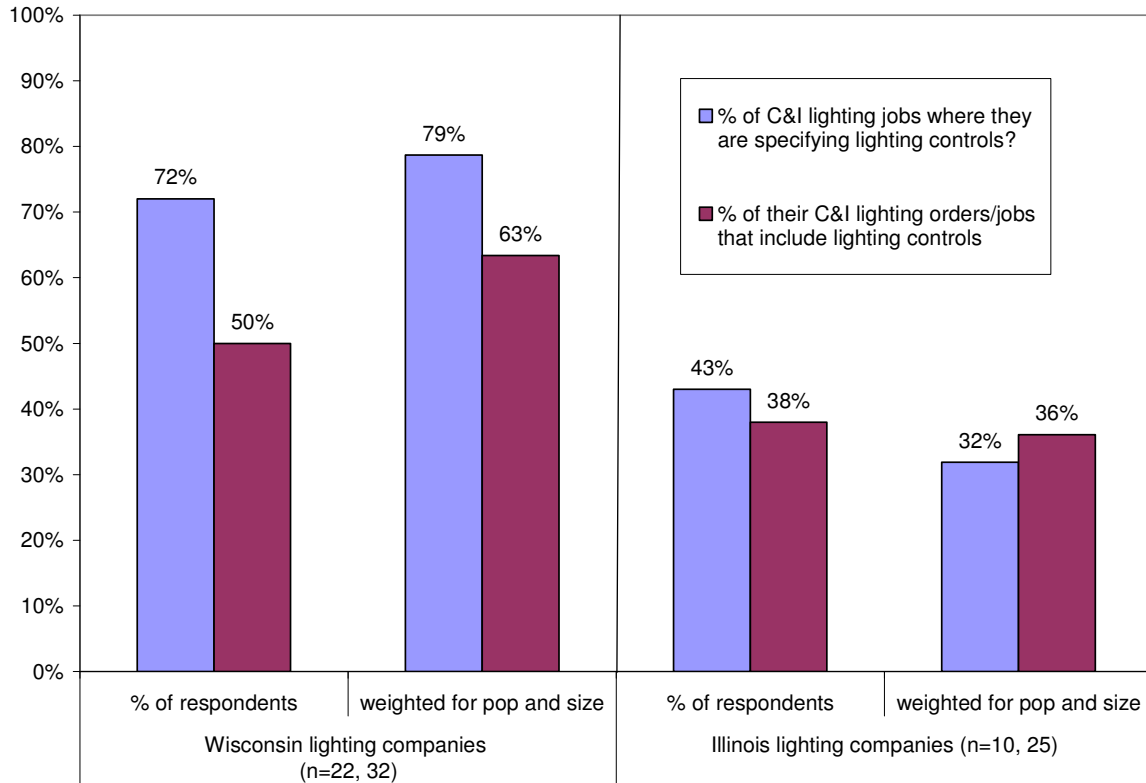
**Figure 4-82. Whether Lighting Companies Generally Had High-Performance T8s in Stock Wisconsin vs. Illinois**



**Lighting Controls**

The Wisconsin and Illinois companies that said that they offered lighting specification services were asked to estimate in what percentage of their commercial/industrial lighting jobs were they specifying occupancy controls. All the lighting companies were also asked to estimate what percentage of their commercial/industrial lighting job/orders had occupancy controls included. Figure 4-83 shows that the Wisconsin lighting companies were more likely to say that lighting controls were part of the jobs they specified and the jobs/orders they installed/sold.

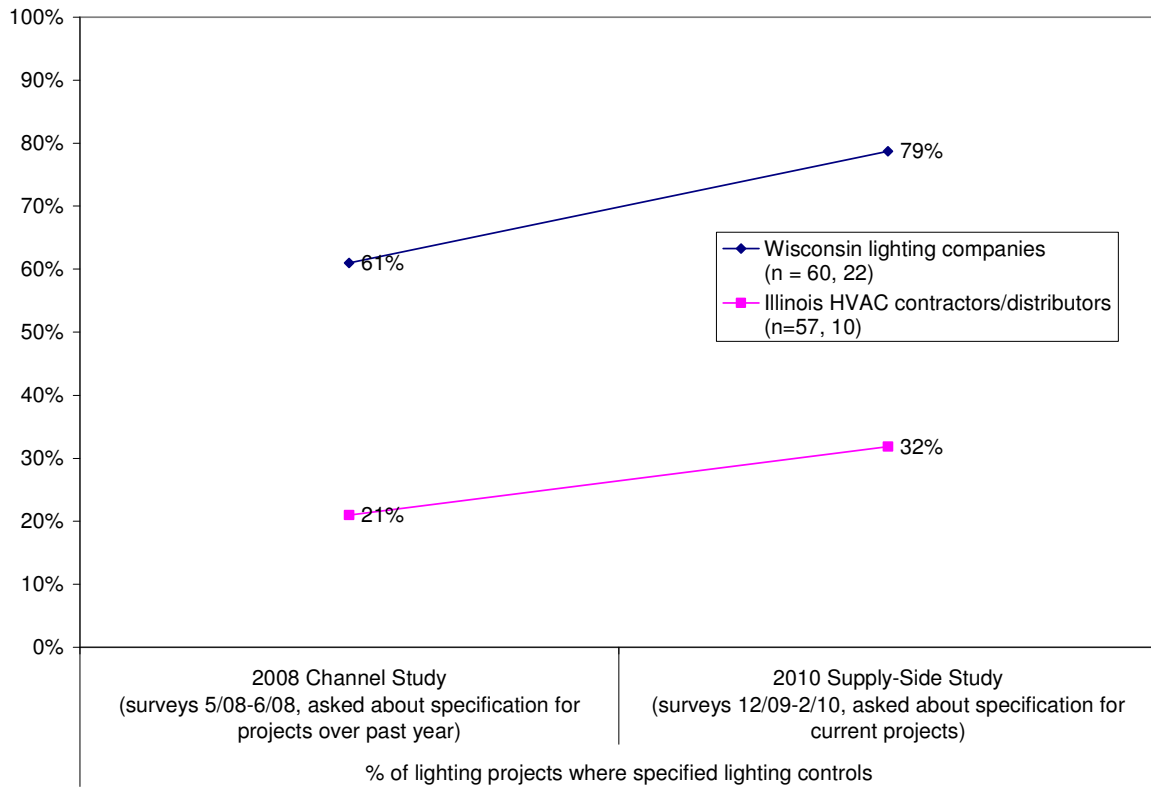
**Figure 4-83. Percentage of Jobs/Orders Where Lighting Controls Were Specified Wisconsin vs. Illinois**



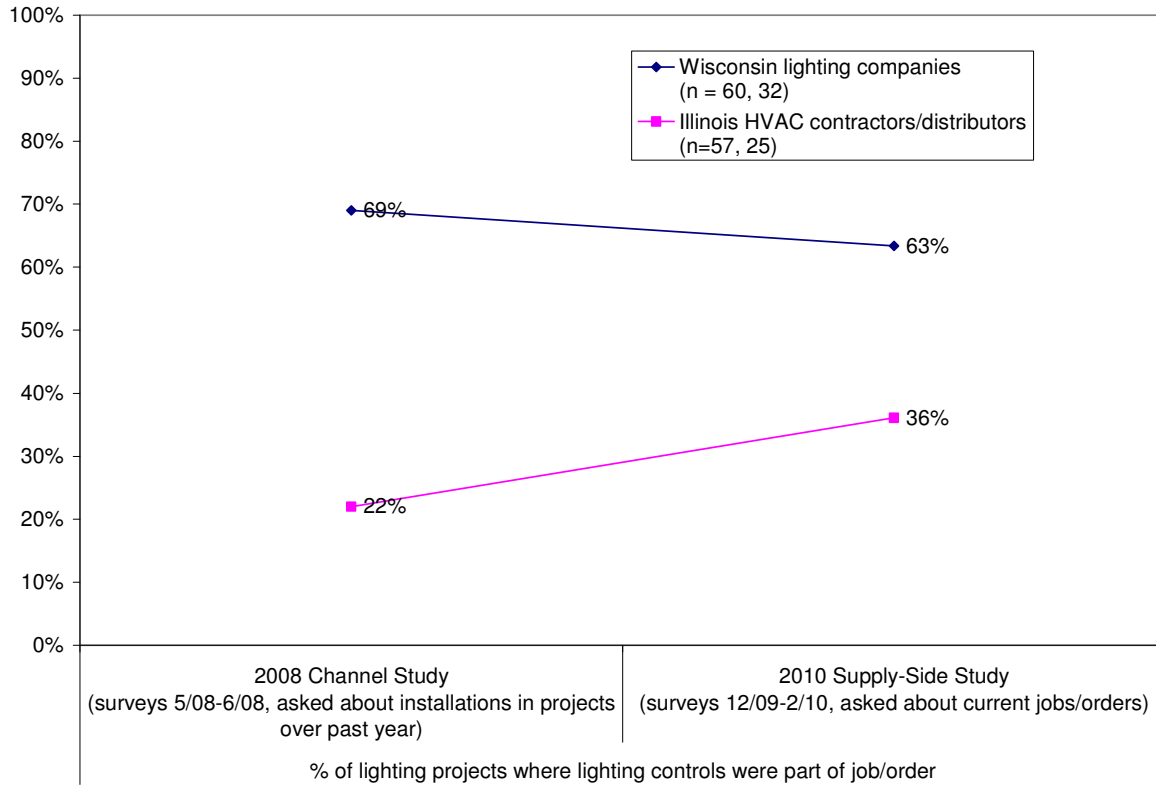
Note: All differences between the Wisconsin and Illinois estimates are statistically significant except the unweighted (percentage of respondents) estimates of the percentage of C&I lighting orders where lighting controls were part of the package.

Figure 4-84 and Figure 4-85 show the trends for both the specification and the sale/installation of lighting occupancy controls as estimated by Wisconsin and Illinois lighting companies. The figures show a fairly large gap between Wisconsin and Illinois in the frequency with which these lighting controls are specified or installed/sold, although the gap is narrowing in the second comparison.

**Figure 4-84. Trends for Specification of Lighting Occupancy Controls  
Wisconsin vs. Illinois**

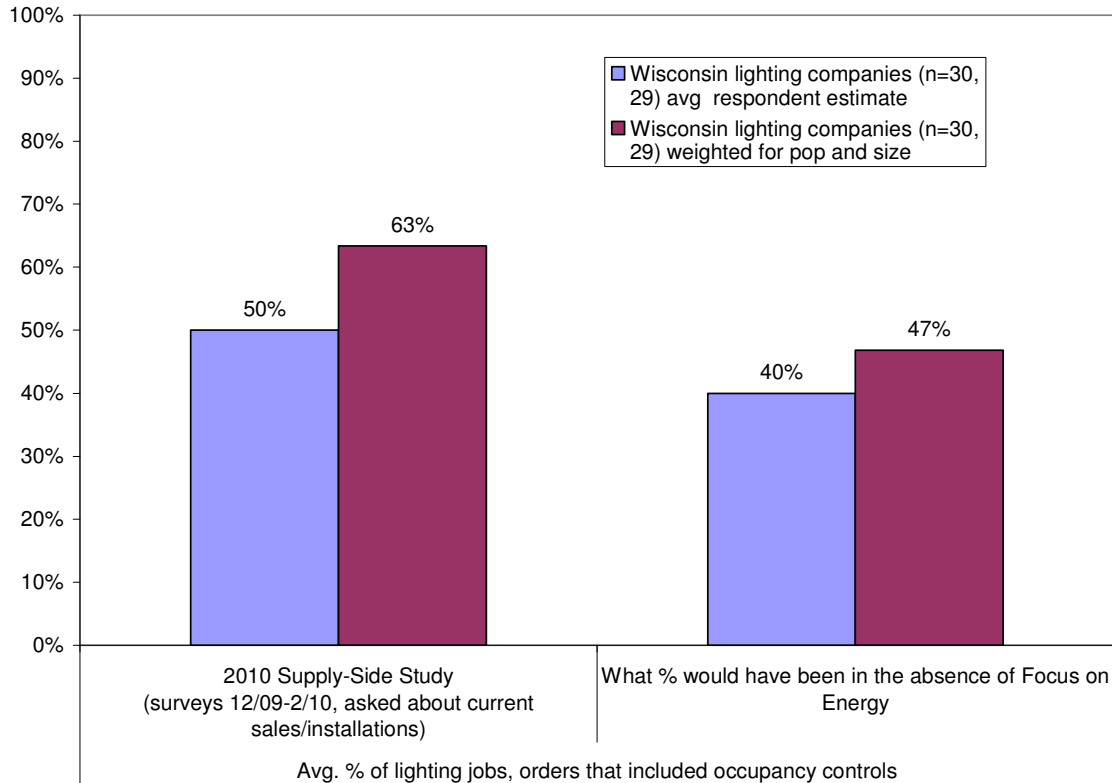


**Figure 4-85. Trends for Sales/Installation of Lighting Occupancy Controls Wisconsin vs. Illinois**



Finally, as we did for the other lighting measures, we asked Wisconsin lighting companies to estimate what their percentage of projects/orders with occupancy controls would have been in the absence of the Focus program. Figure 4-86 shows their responses. The companies projected decreases for this measure that were less than what they had projected for the other lighting measures.

**Figure 4-86. Average Percentage of Projects/Orders That Include Occupancy Controls With and Without the Focus on Energy Program**



#### 4.4 ESTIMATING UNTRACKED ATTRIBUTABLE SAVINGS

One of the major objectives of this Supply-side Study was to produce an estimate of untracked attributable savings (UAS)—energy savings that were attributable to Focus BP, but which were not currently being tracked and claimed by the program. The UAS includes both participant and nonparticipant spillover (sometimes referred to as “free drivership”).

The net savings reported in the most recent impact report is the portion of tracked or in-program savings that is attributable to Focus. The tracked attributable savings is the gross tracked savings adjusted for free riders. Combining the tracked attributable savings with the untracked attributable savings gives total program-attributable savings. The ratio of total program-attributable savings to total gross tracked savings is the overall net-to-gross (NTG) ratio. This overall NTG ratio accounts for free ridership, participant spillover, and nonparticipant spillover or free drivership.

This section describes our estimate of UAS and overall NTG for the Calendar Year (CY) 2009 Focus BP and our methodology for developing this estimate.

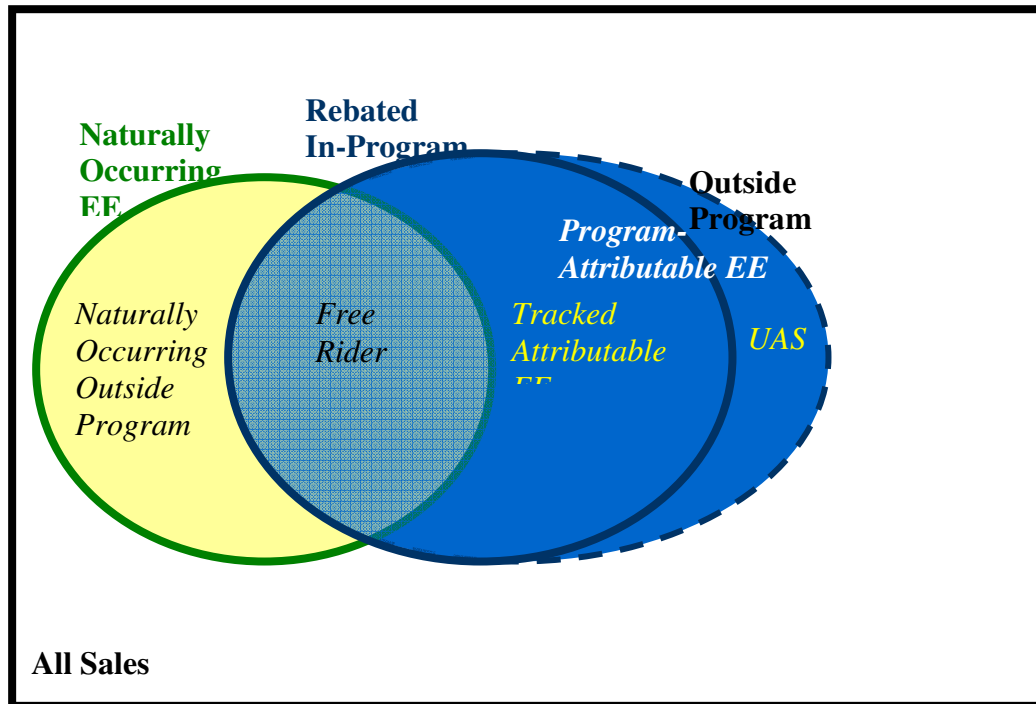
##### 4.4.1 Methodology based on sales share

The relationship between the components of in-program and non-program sales of energy-efficient (EE) equipment is illustrated in Figure 4-87 below. The baseline of interest is the



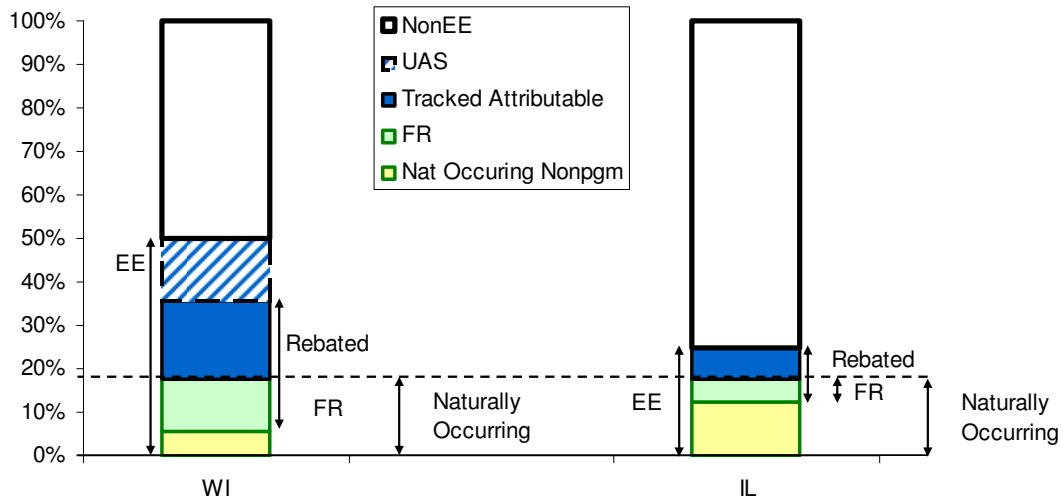
naturally occurring EE sales. Naturally occurring sales that receive rebates are free riders. The remainder are naturally-occurring sales outside the program. The portion of rebated- or in-program EE sales that are not free riders are program-attributable. Additional program-attributable EE sales occur outside the program. These are the untracked attributable savings (UAS).

Figure 4-87. Market Components of Energy-Efficient Sales



This classification is the basis for the baseline and UAS estimation, illustrated in Figure 4-88.

Figure 4-88. Illustration of UAS Estimation



From the supplier interviews, we obtained estimates for each state (Wisconsin, Illinois) of:

- The fraction of sales that are energy-efficient,  $F_{EE}$
- The fraction  $P$  of energy-efficient sales that are rebated by the program.

We made two key assumptions:

1. For Illinois, given the early stage of the program, untracked attributable EE sales are negligible.
2. The naturally occurring EE sales share in Illinois is the same as the naturally occurring sales share in Wisconsin.

With these assumptions, we are able to estimate baseline sales that would have occurred without the program. As the Illinois program matures and the assumption of negligible effects outside the program becomes less justified, the methods used here will no longer be applicable. Essentially, to use the Illinois results to estimate a baseline for Wisconsin will beg the question in Illinois that this analysis is intended to answer for Wisconsin.

#### A. ILLINOIS BASELINE

With the first assumption, we calculate the naturally occurring EE sales share in Illinois  $F_{NI}$  as the difference between the total EE sales share  $F_{EEI}$  and the tracked attributable savings share—that is, the rebated non-free-rider share. The rebated share is the total EE sales share times the proportion of EE sales that are rebated:

##### **Assume**

$$UAS = 0.$$

##### **Calculate**

[Naturally occurring share]

$$= [\text{Total EE share}] - [\text{Tracked Attributable}]$$

$$= [\text{Total EE share}] - [\text{Total EE share}] \times [\text{Proportion Rebated}] \times [1-FR]$$

$$F_{NI} = F_{EEI} - F_{EEI} P_I (1-FR_I).$$

At this time, the free rider rate for the Illinois program is not available. We perform the calculations above using the most recent Wisconsin free ridership estimate. As outer bounds on the estimates, we also perform the calculations assuming zero free ridership and assuming 100 percent free ridership for Illinois. This calculation can be updated when the Illinois program free rider rates become available.

#### B. WISCONSIN UAS SHARE

The UAS share is the fraction of all sales that are untracked program-attributable units. We calculate the Wisconsin UAS share as the total energy-efficient share less the tracked attributable savings share and the naturally occurring savings share. We use the naturally occurring share calculated for Illinois as the naturally occurring share in Wisconsin.

##### **Assume**

$$\text{Naturally occurring savings share } F_{NW} = \text{IL Naturally occurring sales share } F_{NI}$$

##### **Calculate**

[UAS share]

$$= [\text{Total EE share}] - [\text{Tracked Attributable share}] - [\text{Naturally occurring share}]$$

$$= [\text{Total EE share}] - [\text{Total EE share}] \times [\text{Proportion Rebated}] \times [1-FR] - [\text{Naturally Occurring Share}]$$

$$F_{UASW} = F_{EEW} - F_{EEW} P_W (1-FR_W) - F_{NI}.$$

### C. WISCONSIN OVERALL NTG RATIO

We can also calculate the overall net-to-gross ratio (accounting for both free ridership and UAS) as the ratio of total program-attributable sales to gross tracked sales:

$$[\text{Total Attributable EE share}] = [\text{Total EE share}] - [\text{Naturally occurring share}]$$

$$[\text{NTG}] = [\text{Total Attributable EE share}] / [\text{Total Gross Tracked}]$$

$$= [\text{Total Attributable EE share}] / ([\text{Total EE share}] \times [\text{Proportion Rebated}])$$

$$\text{NTG} = (F_{\text{EEW}} - F_{\text{NI}}) / (F_{\text{EEW}} P_{\text{W}})$$

### D. WISCONSIN UAS AS PERCENT OF TRACKED SAVINGS

The UAS share calculated above is the fraction of all sales that are untracked program-attributable units. To look at this share relative to program activity we calculate the ratio of the UAS share to the share of all sales that are energy-efficient and in the program.

$$[\text{UAS percent of gross}] = [\text{UAS Share}] / ([\text{EE share}] \times [\text{Proportion Rebated}])$$

$$\text{UAS/Gross ratio} = F_{\text{UASW}} / (F_{\text{EEW}} P_{\text{W}}).$$

### E. WISCONSIN UAS IN ENERGY UNITS

We calculate the energy savings associated with the UAS share by applying the to the UAS share to the total estimated EE sales. Total EE sales energy savings in the state is calculated by dividing gross tracked savings by the survey-based proportion of EE sales that receive rebates:

$$[\text{Total Statewide Savings}] = [\text{Gross tracked savings}] / [\text{Proportion Rebated}]$$

$$\text{UAS} = [\text{Total Statewide Savings}] \times [\text{UAS share}]$$

$$\text{UAS} = [\text{Gross tracked savings}]_{\text{W}} / P_{\text{W}} \times F_{\text{UASW}} = [\text{Gross tracked savings}]_{\text{W}} \times F_{\text{UASW}} / P_{\text{W}}$$

### F. SUMMARY OF INPUTS

The inputs used in the UAS estimation described above are summarized in the table below.

**Table 4-4. Variables and Data Sources  
for Estimating Untracked Attributable Savings for New Equipment**

Variable Description	Variables for Wisconsin	Variable for Non-Wisconsin Comparison State (Illinois)	Data Source
Fraction of category sales that are energy-efficient (EE)	$F_{EEW}$	$F_{EEI}$	Based on market actor surveys
Fraction of EE sales that are rebated through the program	$P_W$	$P_I$	Based on market actor surveys
Number of EE units in Focus tracking database	$N_W$	[not needed]	Based on tracking data
Free-ridership rate	$FR_W$	$FR_I$	Zero, one or estimated in WI Impact Analysis

As described above, we performed this calculation with three assumptions for the currently unknown free ridership levels for Illinois.

1. **That there is no free ridership in the Illinois rebate program: everyone who got a rebated piece of energy-efficient equipment would not otherwise have bought that energy-efficient equipment.** In this scenario, the "natural" energy efficiency penetration is all the energy efficiency equipment that did not receive rebates. This is the most generous baseline for Wisconsin as far as calculating UAS.
2. **That there is 100 percent free ridership in Illinois rebate program: everyone who got a rebated piece of EE equipment would have bought it anyway.** In this case, the "natural" energy efficiency penetration is the rebated energy-efficient equipment plus the non-rebated energy-efficient equipment. This is the least generous baseline for Wisconsin in terms of calculating UAS.
3. **That the free ridership rate in Illinois is similar to what it is in Wisconsin.** In this case, the "natural" energy efficiency penetration is the non-rebated energy-efficient equipment plus the quantity of rebated energy-efficient equipment multiplied by the free ridership rates from the recent Focus BP Impact Analysis report.<sup>25</sup> We used the Wisconsin free ridership rates as proxies for the Illinois free ridership rates because the latter are currently not available. We would be willing to revise or revisit our calculations using the actual Illinois free ridership rates once they become available.

As noted, the first two assumptions provide outer bounds on possible estimates. We do not consider either to be likely.

#### 4.4.2 Methodology based on supplier self-reported program effects

The supplier surveys also provide another basis for estimating the overall program-attributable sales. The suppliers report their estimate of how much of their energy-efficient sales would not have occurred if Focus had never existed. This estimate is essentially their

<sup>25</sup> The Focus on Energy Evaluation Team. *State of Wisconsin Public Service Commission of Wisconsin, Focus on Energy Evaluation, Business Programs Impact Evaluation Report, Last Three Quarters of the 18-month Contract Period and First Three Quarters of Calendar Year 2009. Draft* March 3, 2010.

estimate of the fraction of their total energy-efficient sales that is attributable to the program. Dividing by the fraction of energy-efficient sales that is rebated gives the ratio of total attributable sales to rebated units, which is overall NTG. Thus from the supplier-reported percent decline  $D$  absent Focus, we have the alternative NTG estimate:

$$\text{NTG} = F_{\text{EEW}} * D_{\text{W}}/P_{\text{W}}.$$

#### 4.4.3 Methodology for “binary” measures

The UAS estimation methodology described above is applicable only to equipment for which there are standard and energy-efficiency technologies with equivalent function, within a larger measure category. Examples include fluorescent lamps in high-bay applications that might otherwise use less efficient technologies or RTUs with a certain EER rating. For such equipment, it is meaningful to assess the level of market adoption in terms of the shares of the category sales that are the energy-efficient technology.

Yet some energy efficiency measures, such as boiler or air-conditioner tune-ups, involve an addition or adjustments to existing equipment, rather than a high-efficiency versus standard efficiency choice within a particular category of new equipment. We refer to such measures as “binary.” That is, rather than choose an efficiency level within a category, a customer chooses whether or not to apply this measure.

For such measures, the sales share approach above does not apply. For these measures, we used an alternative “binary method” described in Appendix A. The method for binary measures is similar to the sales share method described above. However, rather than estimating a baseline sales share, we calculate a baseline ratio of adoption of the energy efficient measure to some measure of overall market size for the relevant equipment. Identifying a relevant measure of market size for these measures and obtaining data on it is challenging. For this reason, we consider the UAS analysis for binary measures to be less reliable than that for the incremental efficiency measures addressed via market share analysis.

#### 4.4.4 The estimated untracked attributable savings for CY09

Before showing our estimates of untracked attributable savings (UAS) for Calendar Year 2009, it is important to explain why we calculated UAS for some energy-efficient measures that Focus BP promotes and not for others. As explained earlier in the report, the measures that we chose to focus on in the market actor surveys were measures that were identified by the Focus BP implementers as having the potential for market effects. More particularly, they were measures that were identified as such by more than one program implementer during the in-depth interview process.

Even after using this criteria to pare down the list of measures to a manageable number, we were concerned that if we tried to collect all the possible inputs important for our analysis (not just for our UAS calculations, but for all the other analysis in this report) for every measure on our list, it would lead to respondent fatigue among the market actors. In fact, as mentioned earlier, there were a number of mid-survey terminations despite our attempts to minimize the length of the surveys. Therefore, we chose to collect the complete data necessary for UAS calculations only for those measures that had been identified by Focus BP implementers as being most likely to produce market effects. For some of the other measures mentioned by the program implementers—for example infrared heaters, or ERVs, or boiler controls—we

collected enough information to allow comparisons between Wisconsin and Illinois on market penetration but not all the information needed for UAS calculations.

Table 4-5 shows the key inputs for UAS calculations. The energy consumption information comes from the Focus BP tracking databases and is gross savings. The fractions rebated and the fractions energy-efficient for both Wisconsin and Illinois come from the 2009/2010 market actor surveys. The free-ridership rates come from the 2010 Focus BP impact analysis.

**Table 4-5. Key Inputs for the UAS Calculations**

Energy Type (EE Measure)	Gross Tracked Energy/ Demand Savings from CY09 Focus BP Tracking Database	Fraction of EE Measures Rebated Wisconsin from Supplier Surveys	Fraction EE Wisconsin from Supplier Surveys	Fraction of EE Measures Rebated Illinois from Supplier Surveys	Fraction EE Illinois from Supplier Surveys	Free-ridership Rates from 2010 Focus BP Impact Analysis Report
<b>kWh</b>						
Boiler Tune-ups	0					
High Performance T8	10,625,229	66%	82%	39%	46%	40%
High-bay fluorescents	141,126,197	73%	80%	46%	35%	40%
Modulating HW Boilers	0	81%	88%	12%	66%	11%
Rooftop AC	346,844	33%	19%	14%	2%	23%
<b>kW</b>						
Boiler Tune-ups	0					
High Performance T8	2,274	66%	82%	39%	46%	39%
High-bay fluorescents	29,554	73%	80%	46%	35%	39%
Modulating HW Boilers	0	81%	88%	12%	66%	0%
Rooftop AC	509	33%	19%	14%	2%	60%
<b>Therms</b>						
Boiler Tune-ups	7,154,384					67%
High Performance T8	0	66%	82%	39%	46%	100%
High bay fluorescents	0	73%	80%	46%	35%	100%
Modulating HW Boilers	47,238	81%	88%	12%	66%	67%
Rooftop AC	0	33%	19%	14%	2%	56%

Table 4-6 shows the outputs from the models described above. Model A and Model B are not realistic scenarios but are essentially the ceiling (Model A) and the floor (Model B) for defining the range of potential UAS. Model C and the Binary Method produce the UAS estimates that we believe are most appropriate for Focus BP for CY 2009.

Table 4-6. Total Program Attributable Savings from the UAS Models

Energy Type (Measure)	Gross Tracked Energy/ Demand Savings from CY09 Focus BP Tracking Database	Total Untracked Attributable Savings			Binary Method
		Model A	Model B	Model C	
		Using 0% Free-ridership in Illinois (Ceiling)	Using 100% Free-ridership in Illinois (Floor)	Using Wisconsin Estimate of Free-ridership for Illinois	
<b>kWh</b>					
Boiler Tuneups	0				
High Performance T8	10,625,229	4,296,919	761,928	2,868,783	
High bay fluorescents	141,126,197	63,586,871	24,483,082	47,788,940	
Modulating HW Boilers	0				
Rooftop AC	346,844	694,629	678,232	690,874	
<b>kW</b>					
Boiler Tuneups	0				
High Performance T8	2,274	892	136	596	
High-bay fluorescents	29,554	12,962	4,773	9,751	
Modulating HW Boilers	0				
Rooftop AC	509	1,218	1,194	1,204	
<b>Therms</b>					
Boiler Tuneups	7,154,384				-931,192
High Performance T8	0				
High-bay fluorescents	0				
Modulating HW Boilers	47,238	3,937	-1,476	326	
Rooftop AC	0				

As described above, these UAS models can be used to calculate the net-to-gross (NTG) ratios for a given measure. Table 4-7 shows the net-to-gross ratios derived from these UAS models.



Table 4-7. Net-to-Gross Ratios from the UAS Models

Energy Type (Measure)	Gross Tracked Energy/ Demand Savings from CY09 Focus BP Tracking Database	Focus BP Net to Gross Ratios			Binary Method
		Model A	Model B	Model C	
		Using 0% Free-ridership in Illinois (Ceiling)	Using 100% Free-ridership in Illinois (Floor)	Using Wisconsin Estimate of Free-ridership for Illinois	
<b>kWh</b>					
Boiler Tuneups	0				
High Performance T8	10,625,229	100%	67%	87%	
High bay fluorescents	141,126,197	105%	77%	93%	
Modulating HW Boilers	0				
Rooftop AC	346,844	277%	273%	276%	
<b>kW</b>					
Boiler Tuneups	0				
High Performance T8	2,274	100%	67%	87%	
High-bay fluorescents	29,554	105%	77%	93%	
Modulating HW Boilers	0	0	0	0	
Rooftop AC	509	277%	273%	276%	
<b>Therms</b>					
Boiler Tuneups	7,154,384				20%
High Performance T8	0	0	0	0	
High-bay fluorescents	0	0	0	0	
Modulating HW Boilers	47,238	42%	30%	34%	
Rooftop AC	0	0	0	0	

Comparing the NTG ratios produced by Model C to the NTG ratio calculated for the 2010 Focus BP impact analysis can be one way to assess whether the outputs from Model C seem realistic. Table 4-8 makes this comparison. It shows that for the high-performance T8s, high-bay fluorescents, and modulating hot-water boilers Model C produces NTG ratios that are slightly higher than the NTG ratio derived from the 2010 Focus BP impact analysis. This is what one would expect from a spillover-type analysis. The NTG estimates for the rooftop ACs are the only outputs from Model C that do not appear realistic.

**Table 4-8. Comparing NTG Ratios from the UAS Model to NTG Ratio Derived from the 2010 Focus BP Impact Analysis Report**

<b>Energy Type (EE Measure)</b>	<b>Gross Tracked Energy/ Demand Savings from CY09 Focus BP Tracking Database</b>	<b>NTG Estimates from This Supply-side Study (Model C – Using WI Estimate of Free Ridership for Illinois)</b>	<b>NTG Estimates from the Binary Method</b>	<b>Attribution (1-FR) from 2010 Focus BP Impact Analysis Report</b>
<b>kWh</b>				
Boiler Tuneups	0			
High Performance T8	10,625,229	87%		60%
High-bay fluorescents	141,126,197	93%		60%
Modulating HW Boilers	0	-		
Rooftop AC	346,844	276%		77%
<b>kW</b>				
Boiler Tuneups	0			
High Performance T8	2,274	87%		61%
High-bay fluorescents	29,554	94%		61%
Modulating HW Boilers	0	-		
Rooftop AC	509	274%		38%
<b>Therms</b>				
Boiler Tuneups	7,154,384		20%	33%
High Performance T8	0	-		
High-bay fluorescents	0	-		
Modulating HW Boilers	47,238	34%		33%
Rooftop AC	0	-		

Another way to test the credibility of the predicted UAS is to compare the corresponding overall NTG with the NTG estimate based on what market actors said would be the decline in market penetration for an energy-efficient measure in the absence of the Focus on Energy program. Table 4-9 does this for the two measures with UAS estimates that are most directly comparable—high performance T8s and high-bay fluorescents. For both measures, the NTG based on Wisconsin suppliers' reported decline absent Focus is less than the estimate based on comparison with Illinois suppliers. For high-performance T8s the estimate based on Wisconsin suppliers is less than the estimate from the 2010 impact report.

**Table 4-9. NTG Based on Comparison with Illinois and Based on Wisconsin Supplier Reported Sales without Focus**

Energy Type (Measure)	Gross Tracked Energy/ Demand Savings from CY09 Focus BP Tracking Database	Fraction of EE Sales Rebated Ff	EE Sales Share FeeW	Decline in EE Market Penetration in Absence of Focus per Supplier Surveys D	NTG as (1- FR) from 2010 Focus BP Impact Analysis Report	NTG Based on Comparison with Illinois	NTG based on WI Supplier-Reported Decline in Absence of Focus
						NTG Using WI Estimate of FR for Illinois Model C	
High Performance T8	10,625,229	66%	82%	29%	60%	87%	36%
High-bay fluorescents	141,126,197	73%	80%	56%	60%	93%	61%

Finally, Table 4-10 combines the UAS estimates and NTG estimates from Model C and the binary method into a single table. The shaded cells indicate the estimates that we believe are most reliable.

**Table 4-10. Summary Estimates of Untracked Attributable Savings and Net-to-Gross Ratios from the Supply-side Study**

Energy Type (EE Measure)	Untracked Attributable Savings (UAS) from this Supply-side Study*	Net-to-Gross (NTG) Estimates from this Supply-side Study*
<b>kWh</b>		
Boiler Tuneups	0	
High Performance T8	2,868,783	87%
High-bay fluorescents	47,788,940	93%
Modulating HW Boilers	0	-
Rooftop AC	690,874	276%
<b>kW</b>		
Boiler Tuneups	0	
High Performance T8	596	87%
High-bay fluorescents	9,751	94%
Modulating HW Boilers	0	-
Rooftop AC	1,204	274%
<b>Therms</b>		
Boiler Tuneups	-931,192	
High Performance T8	0	-
High-bay fluorescents	0	-
Modulating HW Boilers	326	34%
Rooftop AC	0	-

Note: \*As discussed above, all the UAS estimates are based on Model C except boiler tuneups, which is based on the binary methods. The shaded cells indicate the estimates that we believe are more reliable.

## 5. SUMMARY AND CONCLUSIONS

---

We believe the preponderance of the evidence supports the estimates for Calendar Year 2009 untracked attributable savings (UAS) presented in this report. Our reasons for believing the UAS estimates include:

1. **The UAS estimates are for market effects that were predicted and explained by the Focus BP program theory and the in-depth interviews with program implementers.** Before we began our market actor surveys, we examined the Focus BP program theory and interviewed the Focus BP implementers so they could elaborate on the program interventions (e.g., the HVAC and Lighting Channel Initiatives) and discuss for which types of energy-efficient measures they thought we might find evidence of market effects. As shown in this report, we were not able to find evidence for all the market effects they suggested might exist. However, all the measures for which we provided UAS estimates were measures for which the Focus BP program made a credible case for significant market intervention whether by supply-side initiatives (e.g., the Lighting Channel Initiative) or by the sheer volume of rebates (e.g., the high-bay fluorescents).
2. **The measures for which we provided UAS estimates were measures for which there was strong evidence for program attribution.** We asked the Wisconsin HVAC and lighting market actors who had estimated the market penetration of certain energy-efficient measures what that penetration would have been in the absence of the Focus on Energy program. For all the measures for which we provided UAS estimates, the market actors predicted a significant drop in market penetration absent Focus. Now when we asked market actors for causes of change in the mix of their HVAC or lighting products, they often mentioned other factors besides rebate programs—such as increased interest in energy efficiency, building codes, product quality improvements, and declines in product prices. However, some of these other factors—such as increased interest in energy efficiency, increases in consumer education, and even declines in product prices, could be direct or indirect effects of the Focus on Energy program. A number of lighting and HVAC market actor talked about how the changes in their use of energy-efficient measures was due to a “synergy” of different factors such as the rebates, changes of building codes, reductions in product prices, and more educated consumers.
3. **The predicted UAS numbers seem reasonable when compared to the end-user self-reported NTG ratios.** Most of the NTG estimates derived from the UAS models seemed reasonable when compared to the NTG ratios calculated from the end-user self-reported free ridership rates from the most recent Focus BP impact analysis.<sup>26</sup>

---

<sup>26</sup> The two measures we thought produced less reliable estimates were for RTUs and boiler tune-ups. In the former case, we think the issue is the difficulty of market actors making estimates of energy efficiency penetration that may be a small percentage of their overall business. In addition, the HVAC free-ridership estimates that were taken from the Focus BP impact analysis to serve as a proxy for Illinois free-ridership rates for RTUs were for a greater variety of measures (e.g., booster coils, chiller optimization controls, furnaces, ventilation projects) than just RTUs. In the latter case (boiler tuneups), the lesser reliability is due to the different “binary model” used to estimate UAS for this measures which uses a scaling mechanism (the estimated number of boilers in Wisconsin vs. Illinois) that may not be as reliable as scaling mechanism used for the other measures.

Their magnitudes are in line with what one would expect from the boost in program attribution that would occur when spillover effects are added in. However, when we calculated the implied NTG ratios from the market actor's predicted declines in the market penetration of the energy-efficient measure in the absence of the program we come out with lower NTG ratios than was predicted by the UAS model.

4. **There was evidence that the “contamination” of the Illinois baseline by the Illinois rebate programs was very limited.** Only 54 percent of the Illinois HVAC companies claimed awareness of the Illinois HVAC rebate programs and of the aware companies, only 16–18 percent of them said that they had participated in a project rebated by the Illinois programs. Awareness of the Illinois lighting rebates was higher but only about half of the aware Illinois lighting companies had participated in a rebated project. Only 25 percent of Illinois lighting companies featured lighting rebates in their promotions compared to 75 percent of Wisconsin lighting companies. In addition, the size of the gaps between Wisconsin-reported market penetration of energy-efficient measures and the Illinois-reported levels of market penetration remained similar to what we had found in the 2008 Channel Study. If the Illinois rebate programs had achieved real traction then we would have expected these gaps to have narrowed.
5. **Possible exogenous (non-program) influences on the differences in energy efficiency market penetration between Wisconsin and Illinois.** While the influence of the Illinois rebate programs on the Illinois markets appear limited, it is possible that other—non-program—factors might explain the differences in energy efficiency between the Wisconsin and Illinois HVAC and lighting markets. This report discusses how the 2008 changes in the Wisconsin building code may have influenced trends in the sales of high-efficiency RTUs, dual-enthalpy economizers, and energy-recovery ventilators. The report also notes that in August 2009, Illinois also adopted more energy-efficient building codes.

In terms of energy prices, there were differences between Wisconsin and Illinois in terms of average prices for a given sector (e.g. commercial, industrial) but the mid-point price for the commercial and industrial sector were similar. For example, the average December 2009 electricity price for Wisconsin commercial customers was 9.1 cents/kWh and the average electricity price for Wisconsin industrial customers was 6.4 cents/kWh for a commercial/industrial mid-point of 7.8 cents per kWh.<sup>27</sup> In comparison, the average December 2009 electricity price for Illinois commercial customers was 7.9 cents/kWh and the average electricity price for Illinois industrial customers was 7.0 cents/kWh for a commercial/industrial mid-point of 7.5 cents per kWh.

Another possible source of exogenous influences on energy efficiency would be underlying differences between the Wisconsin and Illinois HVAC/lighting market actors and end users in terms of firmographics or attitudes towards energy efficiency. Here the evidence of differences is more problematic because in theory the best way to determine whether Illinois is an appropriate proxy for the natural energy efficiency penetration in Wisconsin would be to compare Illinois to a Wisconsin that had not

---

<sup>27</sup> U.S. Energy Information Administration, *Electric Power Monthly*, [http://www.eia.doe.gov/cneaf/electricity/epm/table5\\_6\\_a.html](http://www.eia.doe.gov/cneaf/electricity/epm/table5_6_a.html).

seen the effects of Focus on Energy. While we did ask the Wisconsin HVAC/lighting market actors to hypothesize what the energy-efficiency of their sales and services would have been in the absence of the Focus program, we did not ask similar questions how their firmographics or attitudes towards energy efficiency might have changed without Focus.

Therefore, when we discuss differences between Wisconsin and Illinois in terms of contractor/distributor firmographics or market actor or end user attitudes towards energy efficiency, it is difficult to determine whether these differences were or were not effects of Focus on Energy. For example, the report observes how the Wisconsin HVAC and lighting market actors offered a greater diversity of services than their Illinois counterparts and were more likely to name the customer as an influential participant in the HVAC/lighting specification process. Similarly, the Wisconsin lighting companies were more than twice as likely as the Illinois lighting companies to say that their end users and contractors do not raise concerns about energy-efficient lighting. Are these differences evidence that Illinois is not an appropriate baseline? Or are these differences simply evidence that the Focus on Energy program has had transformative effects on the Wisconsin HVAC and lighting markets? The answer is not entirely clear.<sup>28</sup>

---

<sup>28</sup> For example, it could be argued that the fact that the Wisconsin companies reported a greater diversity of services might be simply be an effect that, on average, they are more likely to be serving rural customers than their Illinois counterparts. Areas of greater population density such as Chicago are more likely to be able to support HVAC or lighting companies that have more limited or specialized services. In contrast, such specialization would be less economically viable in rural areas.

## APPENDIX A: METHODOLOGY

### A.1 SPILLOVER CALCULATION METHODOLOGY

This section describes the quasi-experimental approach used to calculate untracked attributable savings (UAS) for identified market effects of the Focus on Energy Business Programs. The approach uses Illinois as a comparison state to approximate the penetration of the selected energy efficient technology that would have occurred if the Focus on Energy Business Programs did not exist. Since the completion of the 2008 Channel Studies, Illinois has initiated non-residential energy efficiency programs that promote some of the measures included in this report's investigation of Focus market effects. Methods have been employed to remove the effect of the energy efficiency programs in Illinois that promote these technologies.

Separate approaches were developed for measures relating to new equipment purchase and/or installation, and measures relating to maintenance and controls.

#### A.1.1 New equipment

Table A-1 shows the variables and data sources used for estimating UAS for new equipment.

**Table A-1. Variables and Data Sources  
for Estimating Untracked Attributable Savings for New Equipment**

Variable Description	Variables for Wisconsin	Variable for Non-Wisconsin Comparison State (Illinois)	Data Source
Fraction of category sales that are energy-efficient (EE)	Feew	Feen	Based on market actor surveys
Fraction of EE sales that are rebated through Focus	Ff	Fn	Based on market actor surveys
Number of EE units in Focus tracking database	Nf	0	Based on tracking data
Total category sales (e.g., high-bay fixtures)	Tw	Tn	Calculated from other inputs
Free-ridership Rate (0, 1, or Est. from Impact Analysis)	FRw	FRn	Zero, one or estimated in Wisconsin Impact Analysis

Estimates of fractions that are based on the market actor surveys were estimated using the same ratio estimation technique used for the 2008 Channel Studies. This method is described in Section A.1.3. This approach gives a balanced aggregate picture of energy-efficient market share and rebated sales activity in each state.

First, for each type of new equipment, we calculated the total category sales, Tw, from (1.) the number of units in the tracking database, Nf, (2.) the market-share weighted estimate of the fraction of Wisconsin category sales that are energy-efficient, Feew, and (3.) the market-share weighted estimate of the fraction of Wisconsin category sales that are rebated by Focus, Ff. This is the total number of energy efficient units sold in Wisconsin in CY09.

$$Tw = (Nf/Ff)/Feew.$$

Next, we modeled what the Wisconsin sales of the energy-efficient technology would be if Focus BP did not exist. For this, we used the comparison state (Illinois) as a proxy. The natural rate of energy-efficient sales in Illinois is

$$\text{Energy-efficient Illinois market share fraction} = \text{Feen} * (1 - \text{Fn} * \text{NTGn})$$

The natural rate of energy-efficient sales in Illinois is therefore defined as Total category sales in Wisconsin times the natural energy-efficient market share fraction in Illinois.

$$T_{w_0} = T_w * \text{Feen} * (1 - \text{Fn} * \text{NTGn})$$

We assume  $\text{NTGn} = 1 - \text{FRn}$  because the program is too new to have appreciable spillover/market effects. Baseline sales in Wisconsin is thus total sales times the Illinois fraction efficient,  $\text{Feen}$ , times the fraction that are not rebated in Illinois,  $(1 - \text{Fn})$ , adding back in the fraction in Illinois that received a rebate but would have purchased anyway,  $(1 - \text{FRn})$ . That is, free riders are considered to be naturally occurring installations.

$$T_{w_0} = T_w * \text{Feen} * [1 - \text{Fn} * (1 - \text{FRn})]$$

Total energy-efficient sales attributable to the program  $T_{w_A}$  is the difference between total category sales in Wisconsin,  $T_w$ , and the counterfactual sales without the program,  $T_{w_0}$ .

$$T_{w_A} = T_w - T_{w_0} = (N_f / F_f) * (1 - \text{Feen} / \text{Feew}) * [1 - \text{Fn} * (1 - \text{FRn})]$$

This is total sales attributable to Focus. We performed this calculation with three assumptions for  $\text{FRn}$  because we do not know the free ridership levels for Illinois.

1. Zero free ridership in Illinois
2. 100% free ridership in Illinois
3. Free ridership in Illinois equals that measured in Wisconsin.<sup>29</sup>

Spillover is then calculated by subtracting the amount already credited to Focus. The untracked energy-efficient Wisconsin sales attributable to Focus, or spillover, is then the energy-efficient Wisconsin sales attributable to Focus minus the number of rebated energy-efficient units. This simplifies to

$$\text{Spillover} = T_{w_A} - N_f * (1 - \text{FRw})$$

Net-to-gross (NTG) is similarly defined as the ratio of Total Attributable Sales to Total Rebated Sales

$$\text{NTG} = T_{w_A} / N_f$$

---

<sup>29</sup> The Focus on Energy Evaluation Team. *State of Wisconsin Public Service Commission of Wisconsin, Focus on Energy Evaluation, Business Programs Impact Evaluation Report, Last Three Quarters of the 18-month Contract Period and First Three Quarters of Calendar Year 2009. Draft* March 3, 2010.



### A.1.2 Maintenance and control systems (binary measures)

The same methodology does not apply to binary measures such as tune-ups and control systems, where the analysis requires another way to distinguish the population receiving the measure from those eligible. Table A-2 shows the variables and data sources used for estimating UAS for maintenance and control systems.

**Table A-2. Variables and Data Sources for Estimating Untracked Attributable Savings for Maintenance and Controls**

Variable Description	Variables for Wisconsin	Variable for Non-Wisconsin Comparison State	Data Source
Market size	Mw	Mn	Surveys or other sources
Number of measures implemented (tuneups done, controls installed)	Cw	Cn	Based on market actor surveys
Fraction of measures implemented that are rebated	Ff	Fn	Based on market actor surveys
Number of efficient units rebated	Nf	Nn ≈ 0	Based on tracking data
Free-ridership rate (0, 1, or Est. from impact analysis)	FRw	FRn	Zero, one or estimated in Wisconsin impact analysis

The total number of measures implemented, Cw and Cn, are determined from the surveys. Estimates of the fraction of measures that received rebates (Ff, Fn) were estimated using a same ratio estimation technique used for new equipment and described in Section A.1.3. This gives a balanced aggregate picture of rebate activity across the whole state. Estimates of statewide total quantities are adjusted to account for the market share of firms that do not perform the measure, and therefore did not complete the relevant section of the survey. This modification is discussed in Section A.1.3.

First, for each measure, we calculated the market-share weighted estimate of the total number of measures implemented in Wisconsin and Illinois, Cw and Cn.

Second, we calculated the number of tune-ups in Illinois that are attributable to their energy efficiency programs. As it is a new program, we assume there is no spillover in Illinois. If there are a significant number of rebates in Illinois, this is equal to

$$T_{NA} = N_n \times (1 - FR_n)^{30}$$

The baseline number of measures that would be implemented without the Illinois programs is thus:

$$C_{n0} = C_n - N_n \times (1 - FR_n)$$

---

<sup>30</sup> This factor is negligible in this study, both because the number of rebated units in CY09 was quite small, and because survey respondents in Illinois indicated that baseline purchases of energy-efficient equipment is quite high due to high energy costs, and that free-ridership is also quite high, even for a new program.

And the rate of measure implementation absent the Illinois programs is

$$qn_0 = Cn_0/Mn = (Cn - Nn \times (1-FRn))/Mn$$

Next, we model the rate of maintenance and control measures that would be seen in Wisconsin absent the Focus on Energy programs using the analogous baseline rate of measures in the comparison state

$$qw_0 = qn_0$$

Then the estimated number of measures in Wisconsin absent the Wisconsin program is

$$\begin{aligned} Cw_0 &= qw_0 \times Mw \\ &= Cn_0 \times Mw/Mn \\ &= (Cn - Nn \times (1-FRn)) \times Mw/Mn \end{aligned}$$

Then as in the calculation for purchases, we define Net-to-Gross and Spillover as

$$\begin{aligned} NTG_w &= (Cw - Cw_0)/Nf \\ Spillover_w &= [NTG_w - (1-FRw)] \times Nf \\ &= Cw - Cw_0 - (1-FRw) \times Nf \end{aligned}$$

Note that in Wisconsin, where the programs are mature, unlike in Illinois, we do not want to assume that spillover is zero; it is a quantity to be estimated.

### A.1.3 Ratio estimation approach

Similar to the 2008 Channel Studies, the evaluation team used a ratio estimation approach to estimating market share indicators from contractor and distributor survey results. The basic rationale for this approach is that, for a variety of reasons, there exists large variation in the annual number of projects or unit sales by establishments in a given size stratum (as defined by number of employees). An estimate of market share based simply on the average of responses given (with appropriate stratum weights) would be highly inaccurate. The ratio estimation approach introduces the number of projects completed (units sold) by the sample establishments directly into the computation of the market share indicator.

#### a. STATEWIDE TOTALS APPROACH

To estimate statewide total were used the same ratio estimator calculation used in the 2008 Channel Studies. Contractor (distributor) survey responses were weighted to reflect the number of projects (units sold) in commercial and industrial facilities completed by the sample contractor (distributor) as well as the population weight of the size stratum from which the firm was drawn. Where the questionnaire sought responses in the form of a number or percentage—for example, the portion of projects completed (units sold) in which the high efficiency alternatives were installed—survey responses were calculated using the combined ratio estimator  $\hat{R}_c$ :

$$\hat{R}_c = \frac{\sum_h \frac{N_h}{n_h} \sum_i B_{h_i} x_i}{\sum_h \frac{N_h}{n_h} \sum_i x_i},$$

Where

[for contractors]

- $i$  = sample contractor,
- $N_h$  = number of contractors in the population in sample stratum  $h$ ,
- $n_h$  = number of contractors in the sample in stratum  $h$ ,
- $B_{h_i}$  = contractor  $i$ 's response (expressed as a percentage), and
- $x_i$  = number of relevant projects contractor  $i$  completed in the evaluation period.

[for distributors]

- $i$  = sample distributor,
- $N_h$  = number of distributors in the population in sample stratum  $h$ ,
- $n_h$  = number of distributors in the sample in stratum  $h$ ,
- $B_{h_i}$  = distributor  $i$ 's response (expressed as a percentage), and
- $x_i$  = number of units distributor  $i$  sold in the evaluation period.

If the question elicited a categorical response (e.g., yes/no), a  $B_{h_i}$  was created for each possible response. For the selected response (responses if choose all that apply),  $B_{h_i} = 1$ . For the response/s not selected,  $B_{h_i} = 0$ .

The use of the combined ratio estimator supports the estimate of a standard deviation and standard error for each variable. The standard errors were used to calculate confidence intervals and in the difference of means tests.

#### *b. MODIFICATIONS FOR CURRENT ANALYSIS*

Estimates of statewide total quantities were adjusted to account for the market share of firms that do not perform the measure, and therefore did not complete the relevant section of the survey. The following describes the modified ratio estimate process.

*i. Size weighting*

$x_i$  = (respondent-reported employment at this location)

If respondent didn't report employment, use

$x_i \sim = (\text{D\&B reported employment})_i \times [(\text{avg reported empl})/(\text{avg D\&B empl})]_{\text{quadrant}(i)}$

*ii. Adjusting for ineligible*

To calculate total of any parameter Y over the population, we can use the estimator

$$Y_{\text{TOT}} = \hat{R}_c X_{\text{TOT}}$$

where

$$\hat{R}_c = \frac{\sum_h \frac{N_h}{n_h} \sum_i y_{hi}}{\sum_h \frac{N_h}{n_h} \sum_i x_{hi}}$$

$N_h$  = number of distributors or contractors in the population in sample stratum  $h$ ,

$n_h$  = number of distributors or contractors in the sample in stratum  $h$ ,

$y_{hi}$  = value of  $y$  for respondent  $i$  in stratum  $h$ , and

$x_{hi}$  = D&B employment for respondent  $i$  in stratum  $h$

$X_{\text{TOT}}$  = Total D&B employment for all contractors and distributors in all strata (for either Wisconsin or Illinois)

In this equation, include cases  $hi$  that were determined to be ineligible or out of scope based on phone screening. The D&B employment amount  $x_{hi}$  will be kept in the denominator. Set the numerator  $y_{hi}$  to 0. Include these cases in the counts  $n_h$ . By including ineligible in the ratio, we get a lower ratio than if we used only eligible cases. This is ok because we will multiply by a population total that includes ineligibles as well.

Thus, for example, if  $1/4$  of the screened cases were ineligible, the ratio estimator of  $y$  per employee will be roughly  $1/4$  lower than if we considered only eligibles. But that is ok because we would roughly need to deflate the total  $X_{\text{TOT}}$  by about  $1/4$  to represent only eligible population. Only we do not know how to deflate  $X_{\text{TOT}}$  because we do not know who is eligible and who is not. So instead, we do the deflation in the  $y/x$  ratio that multiplies the total. In other words, we are calculating the ratio of average eligible unit of  $y$  per all units of  $x$ , and multiplying by total of all units of  $x$ . We need the  $X_{\text{TOT}}$  to be the same variable as the

denominator  $x$  in the ratio  $R^c$  and we need the result to be eligible  $y$  only. This accomplishes that.

**APPENDIX B: MARKET ACTOR SURVEY INSTRUMENTS**

---

**B.1 WISCONSIN FOCUS ON ENERGY MARKET EFFECTS ASSESSMENT 2009:  
WISCONSIN LIGHTING CONTRACTOR SURVEY**

**INTRODUCTION**

C1. [IF CONTACT NAME AVAILABLE] May I speak to \_\_\_\_\_? [ONCE TARGET CONTACT IS ON THE PHONE] Hi my name is \_\_\_\_\_. I'm calling from KEMA Consulting. We are conducting a statewide study of lighting practices in Wisconsin on behalf of the Public Service Commission of Wisconsin. This research will be important for the regional development of lighting markets. Do you have a few minutes to help us with our research? All your responses will be kept confidential.

[IF CONTACT IS AVAILABLE FOR THE INTERVIEW, RECORD NAME AND PROCEED WITH THE SURVEY]

[IF CONTACT IS NOT AVAILABLE FOR THE INTERVIEW, DETERMINE BEST TIME TO CALL.]

[IF THEY ASK HOW LONG THE INTERVIEW WILL TAKE, SAY LESS THAN 15 MINUTES]

C2. [IF NO CONTACT NAME AVAILABLE] Hi my name is \_\_\_\_\_. We are conducting a statewide study of lighting practices in Wisconsin on behalf of the Public Service Commission of Wisconsin. This research will be important for the regional development of lighting markets. Who is most familiar with your company's commercial and industrial lighting installations? [ONCE APPROPRIATE PERSON IS ON THE LINE] Hi my name is \_\_\_\_\_. I'm calling from KEMA Consulting. We are conducting a statewide study of lighting practices in Wisconsin on behalf of the Public Service Commission of Wisconsin. Do you have a few minutes to help us with our research? All your responses will be kept confidential.

[IF CONTACT IS AVAILABLE FOR THE INTERVIEW, RECORD NAME AND PROCEED WITH THE SURVEY]

[IF THEY ASK HOW LONG THE INTERVIEW WILL TAKE, SAY LESS THAN 15 MINUTES]

[IF CONTACT IS NOT AVAILABLE FOR THE INTERVIEW, DETERMINE BEST TIME TO CALL.]

**COMPANY INFORMATION**

First I would like to get some background information about you and your company

C1. What is your title or position in the firm?

[RECORD RESPONSE. RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

C2. Which of the following best describes your firm? [READ LIST. ACCEPT ONLY ONE.]

- Electrical contractor? ..... 1
- Lighting contractor? or .....2
- Lighting /electrical products distributor .....3

[IF RESPONDENT SAYS NONE OF CHOICES FIT, RECORD ALTERNATIVE DESCRIPTION. RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

C3. I'm going to read you a list of possible lighting services. Please tell me which ones your company offers?...[ACCEPT MULTIPLES]

- The manufacture of commercial/industrial lighting equipment..... 1
- The sale and distribution of commercial/industrial lighting equipment .2
- The design and specification of commercial/industrial lighting .....3
- The installation of commercial/industrial lighting equipment.....4

[RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

C3A. [IF THEY MENTIONED MORE THAN ONE ACTIVITY IN C3, ELSE SKIP TO C4] Which of these activities accounts for the largest piece of your company's business?

C4. Does your company offer any other lighting services that I didn't mention?

C5. How many locations does your firm have in Wisconsin?

C6. How many full-time employees work at this location?

C8. Roughly what is your company's annual revenue? ..... [A RANGE OF ESTIMATES IS ACCEPTABLE]

C9. Approximately what percentage of your company's lighting installations occur in the following areas?

- 1. New construction ..... %
- 2. Major renovation and remodeling projects ..... %
- 3. Routine replacement or maintenance of existing lighting equipment \_\_\_\_\_ %

[INSURE THAT TOTAL AMOUNTS TO 100%. RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

C10: Approximately what percent of your commercial/industrial lighting installations are for high-bay applications?

\_\_% [RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

C12. [IF THEY SAID IN RESPONSE TO C9 THAT THEY WORK ON NEW CONSTRUCTION] You said that your company has lighting installations for new construction projects. In these types of projects, which participants in the process are typically most influential in deciding which types of lighting gets specified? [WHAT YOU'RE LOOKING TO COLLECT HERE IS TYPES OF MARKET ACTORS SUCH AS ARCHITECTS, DESIGN ENGINEERS, DISTRIBUTORS, ETC.]

C14. [IF THEY SAID IN RESPONSE TO C9 THAT THEY WORK ON MAJOR RENOVATION/REMODELING JOBS] You said that your company has lighting installations for major renovation or remodeling projects. In these types of projects, which participants in the process are typically most influential in deciding which types of lighting gets specified? [WHAT YOU'RE LOOKING TO COLLECT HERE IS TYPES OF MARKET ACTORS SUCH AS ARCHITECTS, DESIGN ENGINEERS, DISTRIBUTORS, ETC.]

C16. Do you also do commercial/industrial lighting installations in Illinois?

[IF YES, ASK C17, ELSE SKIP TO C18]

C17. I'm trying to get a sense of how large your volume of Wisconsin lighting business is compared to your Illinois business. If there was a pie chart with two slices and one slice was the quantity of your Wisconsin commercial/industrial lighting installations and the other slice was the quantity of your Illinois commercial/industrial lighting installations, what would be the relative size of these two slices, in percentage terms?

C18. Have you heard of the Wisconsin Focus on Energy program?

C19. Have you heard of the Commonwealth Edison or Ameren lighting rebate programs?

**SPECIFICATION** [ASK THE QUESTIONS IN THIS SECTION ONLY IF THEY INDICATED IN C3 THAT THEY DESIGN/SPECIFY LIGHTING EQUIPMENT]

[FYI, LIGHTING SPECIFICATION IS A JOB -- USUALLY DONE BY ARCHITECTS AND LIGHTING DESIGNERS FOR NEW CONSTRUCTION JOBS. FOR RETROFIT JOBS OTHER MARKET ACTORS SUCH AS OWNERS, DISTRIBUTORS, ETC. CAN GET INVOLVED. THE LIGHTING SPECIFIER DETERMINES WHICH TYPES OF LIGHTING WILL GO WHERE IN THE PROJECT AND THIS INFORMATION IS INCLUDED IN THE RFP FOR THE CONSTRUCTION OR RETROFIT PROJECT. OFTENTIMES THE SPECIFIER WILL NAME SPECIFIC LIGHTING BRANDS TO USE, BUT GOVT. CONTRACTS REQUIRE ACCEPTABLE ALTERNATIVES TO BE LISTED.]

Now I have a few questions about your lighting specification practices.



S1. You said earlier that your company offers lighting design and specification services? Briefly for what kinds of lighting projects or customers does your company offer these lighting design and specification services?

[RECORD RESPONSE] \_\_\_\_\_

S2. FOR EACH SALES CATEGORY (NEW CONSTRUCTION, REMODELING): Roughly speaking, for what percent of your [NEW CONSTRUCTION, REMODELING,] projects does your company specify the equipment to be installed, as opposed to an architect or engineer at another firm? [RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

a. New Construction	b. Renovation/ Remodeling
___% of projects specified by survey respondents	___% of projects specified by survey respondents

S3. [ASK ONLY IF THEY DEAL WITH HIGH-BAY LIGHTING (C10 > 0%)] When you are specifying lighting for high-bay applications in Wisconsin, about what percentage of the time are you specifying the following technologies:

High-bay fluorescent?	___%
Pulse-start metal halide?	___%
Other HID (high intensity discharge) fixtures?	___%
We don't specify high-bay lighting	

[INSURE THAT TOTAL AMOUNTS TO 100%. RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

[IF RESPONDENT SAYS SOMETHING LIKE: "IT DEPENDS ON THE BUILDING TYPE," PROBE FOR HOW THESE PROPORTIONS MIGHT CHANGE WITH THE MOST COMMON HIGH BAY APPLICATIONS (E.G. WAREHOUSES, GYMNASIUMS, BIG BOX STORES)]

S4. Are these percentages different than what you were specifying for high-bay applications one year ago?

S4A. Are these percentages different than what you were specifying for high-bay applications three years ago?

S5. [IF S4 = “YES” OR S4A = “Yes”] How so?

[TRY TO GET RESPONDENT TO ESTIMATE PERCENTAGES AS THEY DID FOR S3. IF THEY CAN'T, AT LEAST GET THEM TO TALK IN GENERALITIES ABOUT THE CHANGE IN MIX]

S6. What factors caused these differences in the types of lighting you were specifying for high bay applications?

S7. When you are specifying linear fluorescent lighting in Wisconsin, about what percent of the time are you specifying the following technologies:

High-performance T8s?	____%
Standard T8s?	____%
T5s?	____%
T12s?	____%

[INSURE THAT TOTAL AMOUNTS TO 100%. RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

S8. [IF THEY SAID THEY SPECIFY HIGH-PERFORMANCE T8s] What guidelines do you use for determining whether a given T8 system is a high-performance system? [ALLOW MULTIPLE RESPONSES.]

[ FYI, FOCUS ON ENERGY DEFINES HIGH PERFORMANCE T8 SYSTEMS AS CONTAINING HIGH LUMEN, LONG LIFE F32T8 LAMPS (MINIMUM >\_ 3100 INITIAL LUMENS, 24,000 HOUR RATED LIFE) FROM CEE HIGH PERFORMANCE T8 LIST AND EITHER OF THE FOLLOWING: A LOW BALLAST FACTOR ELECTRONIC BALLAST (<\_ .78 BALLAST FACTOR), OR APPROVED BALLAST FROM THE “CEE HIGH PERFORMANCE T8” QUALIFIED PRODUCT LIST]

1. We base it on Focus on Energy guidelines/information/website
2. We base it on CEE guidelines/information/website
3. Other guidelines/specifications/definitions [RECORD RESPONSE] \_\_\_\_\_

[RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

S9. Are these percentages [FROM S7] different than what you were specifying for linear fluorescents a year ago?

S9A. Are these percentages [FROM S7] different than what you were specifying for linear fluorescents three years ago?

[IF S9 = “YES” OR S9 = “YES”] How so?

[TRY TO GET RESPONDENT TO ESTIMATE PERCENTAGES AS THEY DID FOR S7. IF THEY CAN'T, AT LEAST GET THEM TO TALK IN GENERALITIES ABOUT THE CHANGE IN MIX]

S11. What factors caused these differences in the types of lighting you were specifying for linear fluorescents?

S12. In about what percentage of your commercial/industrial lighting jobs are you specifying occupancy controls?

\_\_\_% [RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

S13. How does that percentage compare to what your company was doing a year ago?

S13A. How does that percentage compare to what your company was doing three years ago?

S14. [IF DIFFERENCES IDENTIFIED] What factors caused these differences in the frequency with which you were specifying occupancy sensors?

S15. I'm going to name a number of characteristics about lighting equipment that customers might consider when selecting equipment. For each one I name, please rate how important they are for your commercial/industrial customers. Please use a scale from 1 to 10 where 10 is very important and 1 is not at all important. [RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

1. Initial cost of the equipment.....\_\_\_\_\_
2. Costs of operation .....\_\_\_\_\_
3. Total life cycle costs .....\_\_\_\_\_
4. Quality of light .....\_\_\_\_\_
5. Maintenance of lighting level .....\_\_\_\_\_
6. Ease of maintenance.....\_\_\_\_\_

**INSTALLATION** [ASK THE QUESTIONS IN THIS SECTION ONLY IF THEY INDICATED IN C3A THAT LIGHTING INSTALLATION IS THE BIGGEST PART OF THEIR BUSINESS]

Now I have a few questions about your lighting installation practices.

I1. [ASK ONLY IF THEY DEAL WITH HIGH-BAY LIGHTING (C10 > 0%)] When you are installing lighting for high-bay applications in Wisconsin, about what percentage of the time are you installing the following technologies:

High-bay fluorescents?	_____ %
Pulse-start metal halides?	_____ %
HID (high intensity discharge) lamps?	_____ %

[INSURE THAT TOTAL AMOUNTS TO 100%. RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

[IF RESPONDENT SAYS SOMETHING LIKE: "IT DEPENDS ON THE BUILDING TYPE," PROBE FOR HOW THESE PROPORTIONS MIGHT CHANGE WITH THE MOST COMMON HIGH BAY APPLICATIONS (E.G. WAREHOUSES, GYMNASIUMS, BIG BOX STORES)]

I2. Are these percentages different than what you were installing for high-bay applications three years ago?

[RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

I3. [IF I2 = "YES"] How so?

[TRY TO GET RESPONDENT TO ESTIMATE PERCENTAGES AS THEY DID FOR I1. IF THEY CAN'T, AT LEAST GET THEM TO TALK IN GENERALITIES ABOUT THE CHANGE IN MIX]

I4. What factors caused these differences in the types of lighting you were installing for high bay applications?

I4A. About what percentage of your company's installations of high-bay fluorescents in Wisconsin receive financial incentives from Focus on Energy?

15. When you are installing linear fluorescent lighting in replacement applications in Wisconsin, about what percent of the time are you installing the following technologies:

High-performance T8s?	_____ %
Standard T8s?	_____ %
T5s?	_____ %
T12s?	_____ %

[INSURE THAT TOTAL AMOUNTS TO 100%. RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

16. [IF THEY SAID THEY INSTALL HIGH-PERFORMANCE T8s AND PREVIOUSLY DID NOT EXPLAIN HOW THEY DETERMINE/DEFINE HIGH-PERFORMANCE T8s] What guidelines do you use for determining whether a given T8 system is a high-performance system? [ALLOW MULTIPLE RESPONSES]

[FYI, FOCUS ON ENERGY DEFINES HIGH PERFORMANCE T8 SYSTEMS AS CONTAINING HIGH LUMEN, LONG LIFE F32T8 LAMPS (MINIMUM >\_ 3100 INITIAL LUMENS, 24,000 HOUR RATED LIFE) FROM CEE HIGH PERFORMANCE T8 LIST AND EITHER OF THE FOLLOWING: A LOW BALLAST FACTOR ELECTRONIC BALLAST (<\_ .78 BALLAST FACTOR), OR APPROVED BALLAST FROM THE "CEE HIGH PERFORMANCE T8" QUALIFIED PRODUCT LIST]

1. We base it on Focus on Energy guidelines/information/website
2. We base it on CEE guidelines/information/website
3. Other guidelines/specifications/definitions [RECORD RESPONSE] \_\_\_\_\_

[RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

17. Are these percentages [FROM 15] different than what you were installing for linear fluorescents three years ago?

18. [IF 17 = "YES"] How so?

[TRY TO GET RESPONDENT TO ESTIMATE PERCENTAGES AS THEY DID FOR 15. IF THEY CAN'T, AT LEAST GET THEM TO TALK IN GENERALITIES ABOUT THE CHANGE IN MIX]

19. What factors caused these differences in the types of lighting you were installing for linear fluorescents?

19A. About what percentage of your company's installations of high-performance T8s in Wisconsin receive financial incentives from Focus on Energy?

I10. In about what percentage of your nonresidential lighting jobs in Wisconsin are you installing occupancy controls?

\_\_% [RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

I11. How does that percentage compare to what your company was doing three years ago?

I12. [IF DIFFERENCES IDENTIFIED] What factors caused these differences in the frequency with which you were installing occupancy sensors?

I13. About what percentage of the occupancy controls that you sell in Wisconsin receive financial incentives from Focus on Energy?

### **The Importance of Energy Efficiency**

My last questions concern your company's energy efficiency practices and any interactions it may have had with Focus on Energy program?

EE1. You mentioned earlier that you sell some energy-efficient lighting products. How important is the promotion of lighting that is energy-efficient for your company. Please use a 10-point scale where 10 equals very important and 1 equals not important at all.

EE2. Why do you say that?

EE3. If I had asked you that question a years ago, what would your importance rating have been?

EE3A. How about three years ago?

EE4. [IF CURRENT RATING IS GREATER THAN ONE FOR PAST PERIOD] What caused energy-efficient lighting to become more important for your company over the last three years?

EE5. What kinds of things does your company do to promote energy-efficient lighting?

EE6. What factors prevent you from selling more energy-efficient lighting products than you currently are?

EE7. What concerns, if any, do your customers – whether contractors or the end users of the lighting equipment – raise about energy-efficient lighting?

EE8. What effects, if any, has the current economic downturn had on your installations of energy-efficient lighting products?

EE9. You said earlier that you also [DO/HAVE] some lighting [WORK] in Illinois. Are there differences between your Illinois contractors or customers and your Wisconsin contractors or customers in terms of how frequently they specify or ask for energy-efficient lighting?

EE10. [IF DIFFERENCES BETWEEN Wisconsin AND Illinois ARE MENTIONED] What are these differences? [TRY TO PROBE FOR CERTAIN TYPES OF EE LIGHTING]

EE11. [IF DIFFERENCES BETWEEN Wisconsin AND Illinois ARE MENTIONED]  
What basis or evidence do you have for saying that these differences exist?

EE12. [IF DIFFERENCES BETWEEN Wisconsin AND Illinois ARE MENTIONED]  
What factors may explain these differences?

EE13. [IF DIFFERENCES BETWEEN Wisconsin AND Illinois ARE MENTIONED] Last year when we did a similar survey, we found that Illinois contractors reported a higher percentage of T5 installations than Wisconsin contractors. Can you think of any reasons why this might be?

## **INVOLVEMENT WITH FOCUS PROGRAM**

[IF THEY SAID THAT THEY WERE NOT FAMILIAR WITH FOCUS ON ENERGY IN RESPONSE TO C18, SKIP TO F21]

F2. What interaction or involvement, if any, has your company had with Focus on Energy?

F3. Have you participated in any projects that have received financial incentives from Focus on Energy?

F4. [IF THEY HAVE PARTICIPATED IN FOCUS PROJECTS] Roughly how many such projects has your company participated in during the past year?

F5. Have you or anyone else in your company participated in any training or educational meetings offered or co-sponsored by Wisconsin Focus on Energy?

F6. [IF THEY HAVE PARTICIPATED IN FOCUS TRAININGS] What training or educational meetings did you or other members of your company participate in?

F7. Is Focus on Energy mentioned or featured in any of your promotional efforts or sales communication efforts?

F8. [IF THEY HAVE MENTIONED/FEATURED FOCUS IN PROMOTIONS] How have you mentioned or featured Focus on Energy in your efforts?

F9. On a scale of 1 to 10, where 1 is not at all important and 10 is very important, how important has the Focus on Energy program been in your company's efforts to promote energy-efficient lighting equipment?

F10. Why do you give that rating?

F11. [IF NOT ALREADY EXPLAINED IN F10] In what ways has Focus on Energy helped your company promote energy-efficient lighting equipment?

F12. [ASK ONLY IF THEY PROVIDED ESTIMATES FOR HIGH BAY INSTALLATIONS IN I1]  
You mentioned earlier that about [X]% of your high-bay lighting installations are high-bay fluorescents. If the Focus on Energy program had not existed, give me your best estimate of what this percentage would have been?

F13. Why do you say this?

F14. If the Focus on Energy program went away this year, please estimate what percentage of your Wisconsin high bay installations next year would be high-bay fluorescents?

F15. [ASK ONLY IF THEY PROVIDED ESTIMATES FOR LINEAR FLUORESCENT INSTALLATIONS IN I5] You mentioned earlier that about [X]% of your Wisconsin linear fluorescent installations are high-performance T8s. If the Focus on Energy program had not existed, give me your best estimate of what this percentage would have been?

F16. Why do you say this?

F17. If the Focus on Energy program went away this year, please estimate what percentage of your Wisconsin linear fluorescent installations next year would be high performance T8s? [

F18. [ASK ONLY IF THEY PROVIDED ESTIMATES FOR LIGHTING CONTROLS IN S12] You mentioned earlier that about [X]% of your Wisconsin lighting projects including lighting controls. If the Focus on Energy program had not existed, give me your best estimate of what this percentage would have been?

F19. Why do you say this?

F20. If the Focus on Energy program went away this year, please estimate what percentage of your Wisconsin lighting projects next year would have lighting controls?

[IF THEY SAID THAT THEY WERE NOT FAMILIAR WITH FOCUS ON ENERGY IN RESPONSE TO C18, REPHRASE F21 AS "YOU SAID EARLIER THAT YOU HAD NOT HEARD OF FOCUS ON ENERGY. HAVE YOU PARTICIPATED IN ANY PROGRAMS BESIDES FOCUS ON ENERGY THAT PROMOTE ENERGY EFFICIENT LIGHTING?"]

F21. Have you participated in any programs besides Focus on Energy that promote energy efficient lighting?

F22. [IF COMPANY PARTICIPATED IN OTHER PROGRAMS] What were these programs?

F23. [IF COMPANY PARTICIPATED IN OTHER PROGRAMS] What kind of incentives or services did these other programs provide your company?

F24. [IF COMPANY PARTICIPATED IN OTHER PROGRAMS] On a scale of 1 to 10, where 1 is not at all important and 10 is very important, how important have these other programs been in your company's efforts to promote energy-efficient lighting equipment?

F25. Why do you give that rating?

THANK YOU FOR YOUR TIME AND COOPERATION.



**B.2 WISCONSIN FOCUS ON ENERGY MARKET EFFECTS ASSESSMENT – 2009:  
ILLINOIS LIGHTING DISTRIBUTOR SURVEY**

**INTRODUCTION**

C1. [IF CONTACT NAME AVAILABLE] May I speak to \_\_\_\_\_? [ONCE TARGET CONTACT IS ON THE PHONE] Hi my name is \_\_\_\_\_. I'm calling from KEMA Consulting. We are conducting a statewide study of lighting practices in Illinois on behalf of the Public Service Commission of Wisconsin. This research will be important for the regional development of lighting markets. Do you have a few minutes to help us with our research? All your responses will be kept confidential.

[IF CONTACT IS AVAILABLE FOR THE INTERVIEW, RECORD NAME AND PROCEED WITH THE SURVEY]

[IF CONTACT IS NOT AVAILABLE FOR THE INTERVIEW, DETERMINE BEST TIME TO CALL.]

[IF THEY ASK HOW LONG THE INTERVIEW WILL TAKE, SAY LESS THAN 15 MINUTES]

C2. [IF NO CONTACT NAME AVAILABLE] Hi my name is \_\_\_\_\_. We are conducting a statewide study of lighting practices in Illinois on behalf of the Public Service Commission of Wisconsin. This research will be important for the regional development of lighting markets. Who is most familiar with your company's commercial and industrial lighting sales? [ONCE APPROPRIATE PERSON IS ON THE LINE] Hi my name is \_\_\_\_\_. I'm calling from KEMA Consulting. We are conducting a statewide study of lighting practices in Illinois on behalf of the Public Service Commission of Wisconsin. Do you have a few minutes to help us with our research? All your responses will be kept confidential.

[IF CONTACT IS AVAILABLE FOR THE INTERVIEW, RECORD NAME AND PROCEED WITH THE SURVEY]

[IF THEY ASK HOW LONG THE INTERVIEW WILL TAKE, SAY LESS THAN 15 MINUTES]

[IF CONTACT IS NOT AVAILABLE FOR THE INTERVIEW, DETERMINE BEST TIME TO CALL.]

**COMPANY INFORMATION**

First I would like to get some background information about you and your company

C1. What is your title or position in the firm?

[RECORD RESPONSE. RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

C2. Which of the following best describes your firm? [READ LIST. ACCEPT ONLY ONE.]

- Electrical contractor? ..... 1
- Lighting contractor? or .....2
- Lighting /electrical products distributor .....3

[IF RESPONDENT SAYS NONE OF CHOICES FIT, RECORD ALTERNATIVE DESCRIPTION. RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

C3. I'm going to read you a list of possible lighting services. Please tell me which ones your company offers?...[ACCEPT MULTIPLES]

- The manufacture of commercial/industrial lighting equipment..... 1
- The sale and distribution of commercial/industrial lighting equipment .2
- The design and specification of commercial/industrial lighting .....3
- The installation of commercial/industrial lighting equipment.....4

[RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

C3A. [IF THEY MENTIONED MORE THAN ONE ACTIVITY IN C3, ELSE SKIP TO C4] Which of these activities accounts for the largest piece of your company's business?

C4. Does your company offer any other lighting services that I didn't mention?

C5. How many locations does your firm have in Illinois?

C6. How many full-time employees work at this location?

C8. Roughly what is your company's annual revenue? ..... [A RANGE OF ESTIMATES IS ACCEPTABLE]

C9. Approximately what percentage of your company's lighting sales occur in the following areas?

- 1. New construction ..... %
- 2. Major renovation and remodeling projects ..... %
- 3. Routine replacement or maintenance of existing lighting equipment \_\_\_\_\_ %

[INSURE THAT TOTAL AMOUNTS TO 100%. RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

C9A: [ASK ONLY IF PROVIDE % ESTIMATES FOR C9] How do you know what kinds of lighting projects the equipment you sell is being used for?

[RECORD RESPONSE] \_\_\_\_\_ [RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

C10: Approximately what percent of your commercial/industrial lighting sales are for high-bay applications?

\_\_\_% [RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

C12. [IF THEY SAID IN RESPONSE TO C9 THAT THEY WORK ON NEW CONSTRUCTION] You said that your company has lighting sales for new construction projects. In these types of projects, which participants in the process are typically most influential in deciding which types of lighting gets specified? [WHAT YOU'RE LOOKING TO COLLECT HERE IS TYPES OF MARKET ACTORS SUCH AS ARCHITECTS, DESIGN ENGINEERS, DISTRIBUTORS, ETC.]

C14. [IF THEY SAID IN RESPONSE TO C9 THAT THEY WORK ON MAJOR RENOVATION/REMODELING JOBS] You said that your company has lighting sales for major renovation or remodeling projects. In these types of projects, which participants in the process are typically most influential in deciding which types of lighting gets specified? [WHAT YOU'RE LOOKING TO COLLECT HERE IS TYPES OF MARKET ACTORS SUCH AS ARCHITECTS, DESIGN ENGINEERS, DISTRIBUTORS, ETC.]

C16. Do you have commercial/industrial lighting sales in Wisconsin?

[IF YES, ASK C17, ELSE SKIP TO C18]

C17. I'm trying to get a sense of how large your volume of Illinois lighting business is compared to your Wisconsin business. If there was a pie chart with two slices and one slice was the quantity of your Illinois commercial/industrial lighting sales and the other slice was the quantity of your Wisconsin commercial/industrial lighting sales, what would be the relative size of these two slices, in percentage terms?

C18. Have you heard of the Wisconsin Focus on Energy program?

C19. Have you heard of Commonwealth Edison (ComEd) Smart Ideas and/or Ameren's ActOnEnergy lighting rebate programs?

**SPECIFICATION** [ASK THE QUESTIONS IN THIS SECTION ONLY IF THEY INDICATED IN C3 THAT THEY DESIGN/SPECIFY LIGHTING EQUIPMENT]

[FYI, LIGHTING SPECIFICATION IS A JOB -- USUALLY DONE BY ARCHITECTS AND LIGHTING DESIGNERS FOR NEW CONSTRUCTION JOBS. FOR RETROFIT JOBS OTHER MARKET ACTORS SUCH AS OWNERS, DISTRIBUTORS, ETC. CAN GET INVOLVED. THE LIGHTING SPECIFIER DETERMINES WHICH TYPES OF LIGHTING WILL GO WHERE IN THE PROJECT AND THIS INFORMATION IS INCLUDED IN THE RFP FOR THE CONSTRUCTION OR RETROFIT PROJECT. OFTENTIMES THE SPECIFIER

WILL NAME SPECIFIC LIGHTING BRANDS TO USE, BUT GOVT. CONTRACTS REQUIRE ACCEPTABLE ALTERNATIVES TO BE LISTED.]

Now I have a few questions about your lighting specification practices.

S1. You said earlier that your company offers lighting design and specification services? Briefly for what kinds of lighting projects or customers does your company offer these lighting design and specification services?

[RECORD RESPONSE] \_\_\_\_\_

S2. FOR EACH SALES CATEGORY (NEW CONSTRUCTION, REMODELING): Roughly speaking, for what percent of your [NEW CONSTRUCTION, REMODELING,] projects does your company specify the equipment to be installed, as opposed to an architect or engineer at another firm? [RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

a. New Construction	b. Renovation/ Remodeling
___% of projects specified by survey respondents	___% of projects specified by survey respondents

S3. [ASK ONLY IF THEY DEAL WITH HIGH-BAY LIGHTING (C10 > 0%)] When you are specifying lighting for high-bay applications in Illinois, about what percentage of the time are you specifying the following technologies:

High-bay fluorescent?	___%
Pulse-start metal halide?	___%
Other HID (high intensity discharge) fixtures?	____%
We don't specify high-bay lighting	

[INSURE THAT TOTAL AMOUNTS TO 100%. RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

[IF RESPONDENT SAYS SOMETHING LIKE: "IT DEPENDS ON THE BUILDING TYPE," PROBE FOR HOW THESE PROPORTIONS MIGHT CHANGE WITH THE MOST COMMON HIGH BAY APPLICATIONS (E.G. WAREHOUSES, GYMNASIUMS, BIG BOX STORES)]

S4. Are these percentages different than what you were specifying for high-bay applications one year ago?

S4A. Are these percentages different than what you were specifying for high-bay applications three years ago?

S5. [IF S4 = “YES” OR S4A = “Yes”] How so?

[TRY TO GET RESPONDENT TO ESTIMATE PERCENTAGES AS THEY DID FOR S3. IF THEY CAN'T, AT LEAST GET THEM TO TALK IN GENERALITIES ABOUT THE CHANGE IN MIX]

S6. What factors caused these differences in the types of lighting you were specifying for high bay applications?

S7. When you are specifying linear fluorescent lighting in Illinois, about what percent of the time are you specifying the following technologies:

High-performance T8s?	___%
Standard T8s?	___%
T5s?	___%
T12s?	___%

[INSURE THAT TOTAL AMOUNTS TO 100%. RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

S8. [IF THEY SAID THEY SPECIFY HIGH-PERFORMANCE T8s] What guidelines do you use for determining whether a given T8 system is a high-performance system? [ALLOW MULTIPLE RESPONSES.]

[FYI, COMMONWEALTH EDISON DEFINES HIGH PERFORMANCE T8 SYSTEMS AS CONTAINING HIGH LUMEN, LONG LIFE F32T8 LAMPS (MINIMUM >\_ 3100 INITIAL LUMENS, 24,000 HOUR RATED LIFE) FROM CEE HIGH PERFORMANCE T8 LIST AND AN APPROVED BALLAST FROM THE “CEE HIGH PERFORMANCE T8” QUALIFIED PRODUCT LIST]

- 4. We base it on Commonwealth Edison (ComEd)/Ameren guidelines/information/website
- 5. We base it on CEE guidelines/information/website
- 6. Other guidelines/specifications/definitions [RECORD RESPONSE] \_\_\_\_\_

S9. Are these percentages [FROM S7] different than what you were specifying for linear fluorescents a year ago?

S9A. Are these percentages [FROM S7] different than what you were specifying for linear fluorescents three years ago? S10.

[IF S9 = "YES" OR S9 = "YES"] How so?

[TRY TO GET RESPONDENT TO ESTIMATE PERCENTAGES AS THEY DID FOR S7. IF THEY CAN'T, AT LEAST GET THEM TO TALK IN GENERALITIES ABOUT THE CHANGE IN MIX]

S11. What factors caused these differences in the types of lighting you were specifying for linear fluorescents?

S12. In about what percentage of your commercial/industrial lighting jobs are you specifying occupancy controls?

\_\_% [RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

S13. How does that percentage compare to what your company was doing a year ago?

S13A. How does that percentage compare to what your company was doing three years ago?

S14. [IF DIFFERENCES IDENTIFIED] What factors caused these differences in the frequency with which you were specifying occupancy sensors?

S15. I'm going to name a number of characteristics about lighting equipment that customers might consider when selecting equipment. For each one I name, please rate how important they are for your commercial/industrial customers. Please use a scale from 1 to 10 where 10 is very important and 1 is not at all important. [RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

- 7. Initial cost of the equipment..... \_\_\_\_\_
- 8. Costs of operation ..... \_\_\_\_\_
- 9. Total life cycle costs ..... \_\_\_\_\_
- 10. Quality of light ..... \_\_\_\_\_
- 11. Maintenance of lighting level ..... \_\_\_\_\_
- 12. Ease of maintenance..... \_\_\_\_\_

**SALES AND STOCKING**

Now I have a few questions about your lighting sales and distribution

SA1. [ASK ONLY IF THEY SELL HIGH-BAY LIGHTING (C10 > 0%)] When you are selling lighting for high-bay applications in Illinois, about what percentage of the time are you selling the following technologies:

High-bay fluorescents?	_____ %
Pulse-start metal halides?	_____ %
Other HID (high intensity discharge) fixtures?	_____ %

[INSURE THAT TOTAL AMOUNTS TO 100%. RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

[IF RESPONDENT SAYS SOMETHING LIKE: "IT DEPENDS ON THE BUILDING TYPE," PROBE FOR HOW THESE PROPORTIONS MIGHT CHANGE WITH THE MOST COMMON HIGH BAY APPLICATIONS (E.G. WAREHOUSES, GYMNASIUMS, BIG BOX STORES)]

SA2. Are these percentages different than what you were selling for high-bay applications a year ago?

SA2A. Are these percentages different than what you were selling for high-bay applications three years ago?

[RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

SA3. [IF SA2 = "YES" OR SA2A = "YES"] How so?

[TRY TO GET RESPONDENT TO ESTIMATE PERCENTAGES AS THEY DID FOR SA1. IF THEY CAN'T, AT LEAST GET THEM TO TALK IN GENERALITIES ABOUT THE CHANGE IN MIX]

SA4. What factors caused these differences in the types of lighting you were selling for high bay applications?

SA4A. About what percentage of your company's sales of high-bay fluorescents in Illinois receive financial incentives from Commonwealth Edison's Smart Ideas or Ameren's ActOnEnergy lighting programs?

SA4B. When you get an order for high-bay fluorescents do you generally have the equipment in stock, or do you need to order it?

SA4C. When you get an order for pulse-start metal halides do you generally have the equipment in stock, or do you need to order it?

SA4D. When you get an order for other types of HID lighting do you generally have the equipment in stock, or do you need to order it?

SA5. When you are selling linear fluorescent lighting in Illinois, about what percent of the time are you selling the following technologies:

High-performance T8s?	_____ %
Standard T8s?	_____ %
T5s?	_____ %
T12s?	_____ %

[INSURE THAT TOTAL AMOUNTS TO 100%. RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

SA6. [IF THEY SAID THEY SELL HIGH-PERFORMANCE T8s AND PREVIOUSLY DID NOT EXPLAIN HOW THEY DETERMINE/DEFINE HIGH-PERFORMANCE T8s] What guidelines do you use for determining whether a given T8 system is a high-performance system? [ALLOW MULTIPLE RESPONSES]

[FYI, COMMONWEALTH EDISON DEFINES HIGH PERFORMANCE T8 SYSTEMS AS CONTAINING HIGH LUMEN, LONG LIFE F32T8 LAMPS (MINIMUM >\_ 3100 INITIAL LUMENS, 24,000 HOUR RATED LIFE) FROM CEE HIGH PERFORMANCE T8 LIST AND AN APPROVED BALLAST FROM THE "CEE HIGH PERFORMANCE T8" QUALIFIED PRODUCT LIST]

1. We base it on Commonwealth Edison (ComEd)/Ameren guidelines/information/website
2. We base it on CEE guidelines/information/website
3. Other guidelines/specifications/definitions [RECORD RESPONSE] \_\_\_\_\_

[RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

SA7. Are these percentages [FROM SA5] different than what you were selling for linear fluorescents a year ago?

SA7A. How about three years ago?

SA8. [IF SA7 OR SA7A = "YES"] How so?

[TRY TO GET RESPONDENT TO ESTIMATE PERCENTAGES AS THEY DID FOR SA5. IF THEY CAN'T, AT LEAST GET THEM TO TALK IN GENERALITIES ABOUT THE CHANGE IN MIX]

SA9. What factors caused these differences in the types of lighting you were selling for linear fluorescents?



SA10. About what percentage of your company's sales of high-performance T8s in Illinois receive financial incentives from Commonwealth Edison's Smart Ideas or Ameren's ActOnEnergy lighting programs?

SA10A. When you get an order for high-performance T8s do you generally have the equipment in stock, or do you need to order it?

SA10B. When you get an order for T5s do you generally have the equipment in stock, or do you need to order it?

SA10C. When you get an order for standard T8s do you generally have the equipment in stock, or do you need to order it?

SA11. In about what percentage of your commercial/industrial lighting orders are occupancy controls part of the package?

\_\_% [RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

SA12. How does that percentage compare to what your company was doing a year ago?

SA12A. How about three years ago?

SA13. [IF DIFFERENCES IDENTIFIED] What factors caused these differences in the frequency with which you were selling occupancy sensors?

SA14. About what percentage of the occupancy controls that you sell in Illinois receive financial incentives from Commonwealth Edison's Smart Ideas or Ameren's ActOnEnergy lighting programs?

SA15. Are the types and quantities of *high bay lighting* products you currently stock different from those you stocked a year ago?

SA15A. How about three years ago?

SA16. [IF THEY SAY THEY ARE DIFFERENT] How are these different?

SA17. What factors caused these differences in the types and quantities of high bay and linear fluorescent lighting products that you stock?

SA17A. Are the types and quantities of linear fluorescent lighting products you currently stock different from those you stocked a year ago?

SA17B. How about three years ago?

SA17C. [IF THEY SAY THEY ARE DIFFERENT] How are these different?

SA17D. What factors caused these differences in the types and quantities of high bay and linear fluorescent lighting products that you stock?

SA18. Roughly what percentage of your 'shelf space'/ inventory is currently devoted to energy-efficient lighting products? And I'm defining energy-efficient lighting products as those that would be eligible for Commonwealth Edison or Ameren lighting rebates?

SA19. A year ago what would this percentage have been?

SA20. Three years ago what would this percentage have been?

### **The Importance of Energy Efficiency**

My last questions concern your company's energy efficiency practices and any interactions it may have had with Illinois lighting rebate programs?

EE1. You mentioned earlier that you sell some energy-efficient lighting products. How important is the promotion of lighting that is energy-efficient for your company. Please use a 10-point scale where 10 equals very important and 1 equals not important at all.

EE2. Why do you say that?

EE3. If I had asked you that question a years ago, what would your importance rating have been?

EE3A. How about three years ago?

EE4. [IF CURRENT RATING IS GREATER THAN ONE FOR PAST PERIOD] What caused energy-efficient lighting to become more important for your company over the last three years?

EE5. What kinds of things does your company do to promote energy-efficient lighting?

EE6. What factors prevent you from selling more energy-efficient lighting products than you currently are?

EE7. What concerns, if any, do your customers – whether contractors or the end users of the lighting equipment – raise about energy-efficient lighting?

EE8. What effects, if any, has the current economic downturn had on your sales of energy-efficient lighting products?

EE9. You said earlier that you also [DO/HAVE] some lighting [WORK/SALES] in Wisconsin. Are there differences between your Wisconsin contractors or customers and your Illinois contractors or customers in terms of how frequently they specify or ask for energy-efficient lighting?

EE10. [IF DIFFERENCES BETWEEN Wisconsin AND Illinois ARE MENTIONED] What are these differences? [TRY TO PROBE FOR CERTAIN TYPES OF EE LIGHTING]

EE11. [IF DIFFERENCES BETWEEN Wisconsin AND Illinois ARE MENTIONED] What basis or evidence do you have for saying that these differences exist?

EE12. [IF DIFFERENCES BETWEEN Wisconsin AND Illinois ARE MENTIONED] What factors may explain these differences?

EE13. [IF DIFFERENCES BETWEEN Wisconsin AND Illinois ARE MENTIONED] Last

year when we did a similar survey, we found that Illinois contractors reported a higher percentage of T5 installations than Wisconsin contractors. Can you think of any reasons why this might be?

## **INVOLVEMENT WITH ILLINOIS LIGHTING REBATE PROGRAMS**

[IF THEY SAID THAT THEY WERE NOT FAMILIAR WITH Commonwealth Edison or Ameren lighting rebate programs IN RESPONSE TO C19, SKIP TO F21]

F2. What interaction or involvement, if any, has your company had with the Commonwealth Edison Smart Ideas or Ameren's ActOnEnergy lighting rebate programs? [IF THEY HAVE BEEN INVOLVED IN BOTH, TRY TO OBTAIN SEPARATE RESPONSES FOR EACH PROGRAM]

F3. Have you participated in any projects that have received financial incentives from these programs?

F4. [IF THEY HAVE PARTICIPATED IN COMMONWEALTH EDISON OR AMEREN LIGHTING PROJECTS] Roughly how many such projects has your company participated in during the past year?

F5. Have you or anyone else in your company participated in any training or educational meetings offered or co-sponsored by the Commonwealth Edison (ComEd) Smart Ideas and/or Ameren's ActOnEnergy lighting rebate programs?? [IF THEY HAVE BEEN INVOLVED IN BOTH, TRY TO OBTAIN SEPARATE RESPONSES FOR EACH PROGRAM]

F6. [IF THEY HAVE PARTICIPATED IN COMED/AMEREN TRAININGS] What training or educational meetings did you or other members of your company participate in?

F7. Are the Commonwealth Edison (ComEd) Smart Ideas or Ameren's ActOnEnergy lighting programs mentioned or featured in any of your promotional efforts?

F8. [IF THEY HAVE MENTIONED/FEATURED COMED/AMEREN PROGRAMS IN PROMOTIONS] How have you mentioned or featured these programs in your promotional efforts? [IF THEY HAVE BEEN INVOLVED IN BOTH, TRY TO OBTAIN SEPARATE RESPONSES FOR EACH PROGRAM]

F9. On a scale of 1 to 10, where 1 is not at all important and 10 is very important, how important have these Commonwealth Edison or Ameren lighting rebate programs been in your company's efforts to promote energy-efficient lighting equipment? [IF THEY HAVE BEEN INVOLVED IN BOTH, TRY TO OBTAIN SEPARATE RESPONSES FOR EACH PROGRAM]

F10. Why do you give that rating?

F11. [IF NOT ALREADY EXPLAINED IN F10] In what ways have these programs helped your company promote energy-efficient lighting equipment?

F12. [ASK ONLY IF THEY PROVIDED ESTIMATES FOR HIGH BAY SALES/INSTALLATIONS FROM SA1] You mentioned earlier that about [X]% of your high-bay lighting sales are high-bay fluorescents. If the Commonwealth Edison and Ameren lighting rebate programs had not existed, give me your best estimate of what this percentage would have been?

F13. Why do you say this?

F14. If the Commonwealth Edison and Ameren lighting rebate programs went away this year, please estimate what percentage of your Illinois high bay sales next year would be high-bay fluorescents?

F15. [ASK ONLY IF THEY PROVIDED ESTIMATES FOR LINEAR FLUORESCENTS FROM SA5] You mentioned earlier that about [X]% of your linear fluorescent [SAY "SALES" FOR DISTRIBUTORS, "INSTALLATIONS" FOR CONTRACTORS] in Illinois are high-performance T8s. If the Commonwealth Edison and Ameren lighting rebate programs had not existed, give me your best estimate of what this percentage would have been?

F16. Why do you say this?

F17. If the Commonwealth Edison and Ameren lighting rebate programs went away this year, please estimate what percentage of your Illinois linear fluorescent sales next year would be high performance T8s?

F18. [ASK ONLY IF THEY PROVIDED ESTIMATES FOR LIGHTING CONTROLS] You mentioned earlier that about [X]% of your Illinois lighting projects including lighting controls. If the Commonwealth Edison and Ameren lighting rebate programs had not existed, give me your best estimate of what this percentage would have been?

F19. Why do you say this?

F20. If the Commonwealth Edison and Ameren lighting rebate programs went away this year, please estimate what percentage of your Illinois lighting projects next year would have lighting controls?

F21. Have you participated in any programs besides the Commonwealth Edison and Ameren lighting rebate programs that promote energy efficient lighting?

F22. [IF COMPANY PARTICIPATED IN OTHER PROGRAMS] What were these programs?

F23. [IF COMPANY PARTICIPATED IN OTHER PROGRAMS] What kind of incentives or services did these other programs provide your company?

F24. [IF COMPANY PARTICIPATED IN OTHER PROGRAMS] On a scale of 1 to 10, where 1 is not at all important and 10 is very important, how important have these other programs been in your company's efforts to promote energy-efficient lighting equipment?

F25. Why do you give that rating?

THANK YOU FOR YOUR TIME AND COOPERATION.

### **B.3 WISCONSIN FOCUS ON ENERGY MARKET EFFECTS ASSESSMENT – 2009: WISCONSIN LIGHTING DISTRIBUTOR SURVEY**

#### **INTRODUCTION**

C1. [IF CONTACT NAME AVAILABLE] May I speak to \_\_\_\_\_? [ONCE TARGET CONTACT IS ON THE PHONE] Hi my name is \_\_\_\_\_. I'm calling from KEMA Consulting. We are conducting a statewide study of lighting practices in Wisconsin on behalf of the Public Service Commission of Wisconsin. This research will be important for the regional development of lighting markets. Do you have a few minutes to help us with our research? All your responses will be kept confidential.

[IF CONTACT IS AVAILABLE FOR THE INTERVIEW, RECORD NAME AND PROCEED WITH THE SURVEY]

[IF CONTACT IS NOT AVAILABLE FOR THE INTERVIEW, DETERMINE BEST TIME TO CALL.]

[IF THEY ASK HOW LONG THE INTERVIEW WILL TAKE, SAY LESS THAN 15 MINUTES]

C2. [IF NO CONTACT NAME AVAILABLE] Hi my name is \_\_\_\_\_. We are conducting a statewide study of lighting practices in Wisconsin on behalf of the Public Service Commission of Wisconsin. This research will be important for the regional development of lighting markets. Who is most familiar with your company's commercial and industrial lighting sales? [ONCE APPROPRIATE PERSON IS ON THE LINE] Hi my name is \_\_\_\_\_. I'm calling from KEMA Consulting. We are conducting a statewide study of lighting practices in Wisconsin on behalf of the Public Service Commission of Wisconsin. Do you have a few minutes to help us with our research? All your responses will be kept confidential.

[IF CONTACT IS AVAILABLE FOR THE INTERVIEW, RECORD NAME AND PROCEED WITH THE SURVEY]

[IF THEY ASK HOW LONG THE INTERVIEW WILL TAKE, SAY LESS THAN 15 MINUTES]

[IF CONTACT IS NOT AVAILABLE FOR THE INTERVIEW, DETERMINE BEST TIME TO CALL.]

#### **COMPANY INFORMATION**

First I would like to get some background information about you and your company

C1. What is your title or position in the firm?

[RECORD RESPONSE. RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

C2. Which of the following best describes your firm? [READ LIST. ACCEPT ONLY ONE.]

- Electrical contractor? ..... 1
- Lighting contractor? or .....2
- Lighting /electrical products distributor .....3

[IF RESPONDENT SAYS NONE OF CHOICES FIT, RECORD ALTERNATIVE DESCRIPTION. RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

C3. I'm going to read you a list of possible lighting services. Please tell me which ones your company offers?...[ACCEPT MULTIPLES]

- The manufacture of commercial/industrial lighting equipment..... 1
- The sale and distribution of commercial/industrial lighting equipment .2
- The design and specification of commercial/industrial lighting .....3
- The installation of commercial/industrial lighting equipment.....4

[RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

C3A. [IF THEY MENTIONED MORE THAN ONE ACTIVITY IN C3, ELSE SKIP TO C4] Which of these activities accounts for the largest piece of your company's business?

C4. Does your company offer any other lighting services that I didn't mention?

C5. How many locations does your firm have in Wisconsin?

C6. How many full-time employees work at this location?

C8. Roughly what is your company's annual revenue? ..... [A RANGE OF ESTIMATES IS ACCEPTABLE]

C9. Approximately what percentage of your company's lighting sales occur in the following areas?

- 1. New construction ..... %
- 2. Major renovation and remodeling projects ..... %
- 3. Routine replacement or maintenance of existing lighting equipment \_\_\_\_\_ %

[INSURE THAT TOTAL AMOUNTS TO 100%. RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

C9A: [ASK ONLY IF PROVIDE % ESTIMATES FOR C9] How do you know what kinds of lighting projects the equipment you sell is being used for?

[RECORD RESPONSE] \_\_\_\_\_ [RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

C10: Approximately what percent of your commercial/industrial lighting sales are for high-bay applications?

\_\_\_% [RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

C12. [IF THEY SAID IN RESPONSE TO C9 THAT THEY WORK ON NEW CONSTRUCTION] You said that your company has lighting sales for new construction projects. In these types of projects, which participants in the process are typically most influential in deciding which types of lighting gets specified? [WHAT YOU'RE LOOKING TO COLLECT HERE IS TYPES OF MARKET ACTORS SUCH AS ARCHITECTS, DESIGN ENGINEERS, DISTRIBUTORS, ETC.]

C14. [IF THEY SAID IN RESPONSE TO C9 THAT THEY WORK ON MAJOR RENOVATION/REMODELING JOBS] You said that your company has lighting sales for major renovation or remodeling projects. In these types of projects, which participants in the process are typically most influential in deciding which types of lighting gets specified? [WHAT YOU'RE LOOKING TO COLLECT HERE IS TYPES OF MARKET ACTORS SUCH AS ARCHITECTS, DESIGN ENGINEERS, DISTRIBUTORS, ETC.]

C16. Do you have commercial/industrial lighting sales in Illinois?

[IF YES, ASK C17, ELSE SKIP TO C18]

C17. I'm trying to get a sense of how large your volume of Wisconsin lighting business is compared to your Illinois business. If there was a pie chart with two slices and one slice was the quantity of your Wisconsin commercial/industrial lighting sales and the other slice was the quantity of your Illinois commercial/industrial lighting sales, what would be the relative size of these two slices, in percentage terms?

C18. Have you heard of the Wisconsin Focus on Energy program?

C19. Have your heard of the Commonwealth Edison or Ameren lighting rebate programs?

**SPECIFICATION** [ASK THE QUESTIONS IN THIS SECTION ONLY IF THEY INDICATED IN C3 THAT THEY DESIGN/SPECIFY LIGHTING EQUIPMENT]

[FYI, LIGHTING SPECIFICATION IS A JOB -- USUALLY DONE BY ARCHITECTS AND LIGHTING DESIGNERS FOR NEW CONSTRUCTION JOBS. FOR RETROFIT JOBS OTHER MARKET ACTORS SUCH AS OWNERS, DISTRIBUTORS, ETC. CAN GET INVOLVED. THE LIGHTING SPECIFIER DETERMINES WHICH TYPES OF LIGHTING WILL GO WHERE IN THE PROJECT AND THIS INFORMATION IS INCLUDED IN THE RFP FOR THE CONSTRUCTION OR RETROFIT PROJECT. OFTENTIMES THE SPECIFIER



WILL NAME SPECIFIC LIGHTING BRANDS TO USE, BUT GOVT. CONTRACTS REQUIRE ACCEPTABLE ALTERNATIVES TO BE LISTED.]

Now I have a few questions about your lighting specification practices.

S1. You said earlier that your company offers lighting design and specification services? Briefly for what kinds of lighting projects or customers does your company offer these lighting design and specification services?

[RECORD RESPONSE] \_\_\_\_\_

S2. FOR EACH SALES CATEGORY (NEW CONSTRUCTION, REMODELING): Roughly speaking, for what percent of your [NEW CONSTRUCTION, REMODELING,] projects does your company specify the equipment to be installed, as opposed to an architect or engineer at another firm? [RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

a. New Construction	b. Renovation/ Remodeling
___% of projects specified by survey respondents	___% of projects specified by survey respondents

S3. [ASK ONLY IF THEY DEAL WITH HIGH-BAY LIGHTING (C10 > 0%)] When you are specifying lighting for high-bay applications in Wisconsin, about what percentage of the time are you specifying the following technologies:

High-bay fluorescent?	___%
Pulse-start metal halide?	___%
Other HID (high intensity discharge) fixtures?	____%
We don't specify high-bay lighting	

[INSURE THAT TOTAL AMOUNTS TO 100%. RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

[IF RESPONDENT SAYS SOMETHING LIKE: "IT DEPENDS ON THE BUILDING TYPE," PROBE FOR HOW THESE PROPORTIONS MIGHT CHANGE WITH THE MOST COMMON HIGH BAY APPLICATIONS (E.G. WAREHOUSES, GYMNASIUMS, BIG BOX STORES)]

S4. Are these percentages different than what you were specifying for high-bay applications one year ago?

S4A. Are these percentages different than what you were specifying for high-bay applications three years ago?

S5. [IF S4 = “YES” OR S4A = “Yes”] How so?

[TRY TO GET RESPONDENT TO ESTIMATE PERCENTAGES AS THEY DID FOR S3. IF THEY CAN'T, AT LEAST GET THEM TO TALK IN GENERALITIES ABOUT THE CHANGE IN MIX]

S6. What factors caused these differences in the types of lighting you were specifying for high bay applications?

S7. When you are specifying linear fluorescent lighting in Wisconsin, about what percent of the time are you specifying the following technologies:

High-performance T8s?	___%
Standard T8s?	___%
T5s?	___%
T12s?	___%

[INSURE THAT TOTAL AMOUNTS TO 100%. RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

S8. [IF THEY SAID THEY SPECIFY HIGH-PERFORMANCE T8s] What guidelines do you use for determining whether a given T8 system is a high-performance system? [ALLOW MULTIPLE RESPONSES.]

[ FYI, FOCUS ON ENERGY DEFINES HIGH PERFORMANCE T8 SYSTEMS AS CONTAINING HIGH LUMEN, LONG LIFE F32T8 LAMPS (MINIMUM >\_ 3100 INITIAL LUMENS, 24,000 HOUR RATED LIFE) FROM CEE HIGH PERFORMANCE T8 LIST AND EITHER OF THE FOLLOWING: A LOW BALLAST FACTOR ELECTRONIC BALLAST (<\_ .78 BALLAST FACTOR), OR APPROVED BALLAST FROM THE “CEE HIGH PERFORMANCE T8” QUALIFIED PRODUCT LIST]

- 7. We base it on Focus on Energy guidelines/information/website
- 8. We base it on CEE guidelines/information/website
- 9. Other guidelines/specifications/definitions [RECORD RESPONSE] \_\_\_\_\_

[RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

S9. Are these percentages [FROM S7] different than what you were specifying for linear fluorescents a year ago?

S9A. Are these percentages [FROM S7] different than what you were specifying for linear fluorescents three years ago? S10.

[IF S9 = “YES” OR S9 = “YES”] How so?

[TRY TO GET RESPONDENT TO ESTIMATE PERCENTAGES AS THEY DID FOR S7. IF

THEY CAN'T, AT LEAST GET THEM TO TALK IN GENERALITIES ABOUT THE CHANGE IN MIX]

S11. What factors caused these differences in the types of lighting you were specifying for linear fluorescents?

S12. In about what percentage of your commercial/industrial lighting jobs are you specifying occupancy controls?

\_\_\_% [RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

S13. How does that percentage compare to what your company was doing a year ago?

S13A. How does that percentage compare to what your company was doing three years ago?

S14. [IF DIFFERENCES IDENTIFIED] What factors caused these differences in the frequency with which you were specifying occupancy sensors?

S15. I'm going to name a number of characteristics about lighting equipment that customers might consider when selecting equipment. For each one I name, please rate how important they are for your commercial/industrial customers. Please use a scale from 1 to 10 where 10 is very important and 1 is not at all important. [RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

- 13. Initial cost of the equipment..... \_\_\_\_\_
- 14. Costs of operation ..... \_\_\_\_\_
- 15. Total life cycle costs ..... \_\_\_\_\_
- 16. Quality of light ..... \_\_\_\_\_
- 17. Maintenance of lighting level ..... \_\_\_\_\_
- 18. Ease of maintenance..... \_\_\_\_\_

**SALES AND STOCKING**

Now I have a few questions about your lighting sales and distribution

SA1. [ASK ONLY IF THEY SELL HIGH-BAY LIGHTING (C10 > 0%)] When you are selling lighting for high-bay applications in Wisconsin, about what percentage of the time are you selling the following technologies:

High-bay fluorescents?	___%
Pulse-start metal halides?	___%
Other HID (high intensity discharge) fixtures?	___%

[INSURE THAT TOTAL AMOUNTS TO 100%. RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

[IF RESPONDENT SAYS SOMETHING LIKE: "IT DEPENDS ON THE BUILDING TYPE," PROBE FOR HOW THESE PROPORTIONS MIGHT CHANGE WITH THE MOST COMMON HIGH BAY APPLICATIONS (E.G. WAREHOUSES, GYMNASIUMS, BIG BOX STORES)]

SA2. Are these percentages different than what you were selling for high-bay applications a year ago?

SA2A. Are these percentages different than what you were selling for high-bay applications three years ago?

[RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

SA3. [IF SA2 = "YES" OR SA2A = "YES"] How so?

[TRY TO GET RESPONDENT TO ESTIMATE PERCENTAGES AS THEY DID FOR SA1. IF THEY CAN'T, AT LEAST GET THEM TO TALK IN GENERALITIES ABOUT THE CHANGE IN MIX]

SA4. What factors caused these differences in the types of lighting you were selling for high bay applications?

SA4A. About what percentage of your company's sales of high-bay fluorescents in Wisconsin receive financial incentives from Focus on Energy?

SA4B. When you get an order for high-bay fluorescents do you generally have the equipment in stock, or do you need to order it?

SA4C. When you get an order for pulse-start metal halides do you generally have the equipment in stock, or do you need to order it?

SA4D. When you get an order for other types of HID lighting do you generally have the equipment in stock, or do you need to order it?

SA5. When you are selling linear fluorescent lighting for in Wisconsin, about what percent of the time are you selling the following technologies:

High-performance T8s?	___%
Standard T8s?	___%
T5s?	___%
T12s?	___%

[INSURE THAT TOTAL AMOUNTS TO 100%. RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

SA6. [IF THEY SAID THEY SELL HIGH-PERFORMANCE T8s AND PREVIOUSLY DID NOT EXPLAIN HOW THEY DETERMINE/DEFINE HIGH-PERFORMANCE T8s] What guidelines do you use for determining whether a given T8 system is a high-performance system? [ALLOW MULTIPLE RESPONSES]

[FYI, FOCUS ON ENERGY DEFINES HIGH PERFORMANCE T8 SYSTEMS AS CONTAINING HIGH LUMEN, LONG LIFE F32T8 LAMPS (MINIMUM > 3100 INITIAL LUMENS, 24,000 HOUR RATED LIFE) FROM CEE HIGH PERFORMANCE T8 LIST AND EITHER OF THE FOLLOWING: A LOW BALLAST FACTOR ELECTRONIC BALLAST (< .78 BALLAST FACTOR), OR APPROVED BALLAST FROM THE "CEE HIGH PERFORMANCE T8" QUALIFIED PRODUCT LIST]

1. We base it on Focus on Energy guidelines/information/website
2. We base it on CEE guidelines/information/website
3. Other guidelines/specifications/definitions [RECORD RESPONSE] \_\_\_\_\_

[RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

SA7. Are these percentages [FROM SA5] different than what you were selling for linear fluorescents a years ago?

SA7A. How about three years ago?

SA8. [IF SA7 OR SA7A = "YES"] How so?

[TRY TO GET RESPONDENT TO ESTIMATE PERCENTAGES AS THEY DID FOR SA5. IF THEY CAN'T, AT LEAST GET THEM TO TALK IN GENERALITIES ABOUT THE CHANGE IN MIX]

SA9. What factors caused these differences in the types of lighting you were selling for linear fluorescents?

SA10. About what percentage of your company's sales of high-performance T8s in Wisconsin receive financial incentives from Focus on Energy?

SA10A. When you get an order for high-performance T8s do you generally have the equipment in stock, or do you need to order it?

SA10B. When you get an order for T5s do you generally have the equipment in stock, or do you need to order it?

SA10C. When you get an order for standard T8s do you generally have the equipment in stock, or do you need to order it?

SA11. In about what percentage of your commercial/industrial lighting orders are occupancy controls part of the package?

\_\_\_% [RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

SA12. How does that percentage compare to what your company was doing a year ago?

SA12A. How about three years ago?

SA13. [IF DIFFERENCES IDENTIFIED] What factors caused these differences in the frequency with which you were selling occupancy sensors?

SA14. About what percentage of the occupancy controls that you sell in Wisconsin receive financial incentives from Focus on Energy?

SA15. Are the types and quantities of *high bay lighting* products you currently stock different from those you stocked a year ago?

SA15A. How about three years ago?

SA16. [IF THEY SAY THEY ARE DIFFERENT] How are these different?

SA17. What factors caused these differences in the types and quantities of high bay and linear fluorescent lighting products that you stock?

SA17A. Are the types and quantities of linear fluorescent lighting products you currently stock different from those you stocked a year ago?

SA17B. How about three years ago?

SA17C. [IF THEY SAY THEY ARE DIFFERENT] How are these different?

SA17D. What factors caused these differences in the types and quantities of high bay and linear fluorescent lighting products that you stock?

SA18. Roughly what percentage of your 'shelf space'/ inventory is currently devoted to energy-efficient lighting products? And I'm defining energy-efficient lighting products as those that would be eligible for Focus on Energy rebates?

SA19. A year ago what would this percentage have been?

SA20. Three years ago what would this percentage have been?

### **The Importance of Energy Efficiency**

My last questions concern your company's energy efficiency practices and any interactions it may have had with Focus on Energy program?

EE1. You mentioned earlier that you sell some energy-efficient lighting products. How important is the promotion of lighting that is energy-efficient for your company. Please use a 10-point scale where 10 equals very important and 1 equals not important at all.

EE2. Why do you say that?

EE3. If I had asked you that question a years ago, what would your importance rating have been?

EE3A. How about three years ago?

EE4. [IF CURRENT RATING IS GREATER THAN ONE FOR PAST PERIOD] What caused energy-efficient lighting to become more important for your company over the last three years?

EE5. What kinds of things does your company do to promote energy-efficient lighting?

EE6. What factors prevent you from selling more energy-efficient lighting products than you currently are?

EE7. What concerns, if any, do your customers – whether contractors or the end users of the lighting equipment – raise about energy-efficient lighting?

EE8. What effects, if any, has the current economic downturn had on your sales of energy-efficient lighting products?

EE9. You said earlier that you also [DO/HAVE] some lighting [WORK/SALES] in Illinois. Are there differences between your Illinois contractors or customers and your Wisconsin contractors or customers in terms of how frequently they specify or ask for energy-efficient lighting?

EE10. [IF DIFFERENCES BETWEEN Wisconsin AND Illinois ARE MENTIONED] What are these differences? [TRY TO PROBE FOR CERTAIN TYPES OF EE LIGHTING]

EE11. [IF DIFFERENCES BETWEEN Wisconsin AND Illinois ARE MENTIONED] What basis or evidence do you have for saying that these differences exist?

EE12. [IF DIFFERENCES BETWEEN Wisconsin AND Illinois ARE MENTIONED] What factors may explain these differences?

EE13. [IF DIFFERENCES BETWEEN Wisconsin AND Illinois ARE MENTIONED] Last year when we did a similar survey, we found that Illinois contractors reported a higher percentage of T5 installations than Wisconsin contractors. Can you think of any reasons why this might be?

## **INVOLVEMENT WITH FOCUS PROGRAM**

[IF THEY SAID THAT THEY WERE NOT FAMILIAR WITH FOCUS ON ENERGY IN RESPONSE TO C18, SKIP TO F21]

F2. What interaction or involvement, if any, has your company had with Focus on Energy?

F3. Have you participated in any projects that have received financial incentives from Focus on Energy?

F4. [IF THEY HAVE PARTICIPATED IN FOCUS PROJECTS] Roughly how many such projects has your company participated in during the past year?

F5. Have you or anyone else in your company participated in any training or educational meetings offered or co-sponsored by Wisconsin Focus on Energy?

F6. [IF THEY HAVE PARTICIPATED IN FOCUS TRAININGS] What training or educational meetings did you or other members of your company participate in?

F7. Is Focus on Energy mentioned or featured in any of your promotional efforts or sales communication efforts?

F8. [IF THEY HAVE MENTIONED/FEATURED FOCUS IN PROMOTIONS] How have you mentioned or featured Focus on Energy in your efforts?

F9. On a scale of 1 to 10, where 1 is not at all important and 10 is very important, how important has the Focus on Energy program been in your company's efforts to promote energy-efficient lighting equipment?

F10. Why do you give that rating?

F11. [IF NOT ALREADY EXPLAINED IN F10] In what ways has Focus on Energy helped your company promote energy-efficient lighting equipment?

F12. [ASK ONLY IF THEY PROVIDED ESTIMATES FOR HIGH BAY SALES IN SA1] You mentioned earlier that about [X]% of your high-bay lighting sales are high-bay fluorescents. If the Focus on Energy program had not existed, give me your best estimate of what this percentage would have been?

F13. Why do you say this?

F14. If the Focus on Energy program went away this year, please estimate what percentage of your Wisconsin high bay sales next year would be high-bay fluorescents?

F15. [ASK ONLY IF THEY PROVIDED ESTIMATES FOR LINEAR FLUORESCENTS IN SA5] You mentioned earlier that about [X]% of your Wisconsin linear fluorescent sales are high-performance T8s. If the Focus on Energy program had not existed, give me your best estimate of what this percentage would have been?

F16. Why do you say this?

F17. If the Focus on Energy program went away this year, please estimate what percentage of your Wisconsin linear fluorescent sales next year would be high performance T8s? [

F18. [ASK ONLY IF THEY PROVIDED ESTIMATES FOR LIGHTING CONTROLS] You mentioned earlier that about [X]% of your Wisconsin lighting projects including lighting controls. If the Focus on Energy program had not existed, give me your best estimate of what this percentage would have been?

F19. Why do you say this?



F20. If the Focus on Energy program went away this year, please estimate what percentage of your Wisconsin lighting projects next year would have lighting controls?

[IF THEY SAID THAT THEY WERE NOT FAMILIAR WITH FOCUS ON ENERGY IN RESPONSE TO C18, REPHRASE F21 AS "YOU SAID EARLIER THAT YOU HAD NOT HEARD OF FOCUS ON ENERGY. HAVE YOU PARTICIPATED IN ANY PROGRAMS BESIDES FOCUS ON ENERGY THAT PROMOTE ENERGY EFFICIENT LIGHTING?"]

F21. Have you participated in any programs besides Focus on Energy that promote energy efficient lighting?

F22. [IF COMPANY PARTICIPATED IN OTHER PROGRAMS] What were these programs?

F23. [IF COMPANY PARTICIPATED IN OTHER PROGRAMS] What kind of incentives or services did these other programs provide your company?

F24. [IF COMPANY PARTICIPATED IN OTHER PROGRAMS] On a scale of 1 to 10, where 1 is not at all important and 10 is very important, how important have these other programs been in your company's efforts to promote energy-efficient lighting equipment?

F25. Why do you give that rating?

THANK YOU FOR YOUR TIME AND COOPERATION.

**B.4 WISCONSIN FOCUS ON ENERGY MARKET EFFECTS ASSESSMENT – 2009:  
ILLINOIS HVAC CONTRACTOR/DISTRIBUTOR SURVEY (DRAFT 1)**

**INTRODUCTION**

C1. [IF CONTACT NAME AVAILABLE] May I speak to \_\_\_\_\_? [ONCE TARGET CONTACT IS ON THE PHONE] Hi my name is \_\_\_\_\_. I'm calling from KEMA Consulting on behalf of the Wisconsin Public Service Commission. We are comparing the Illinois and Wisconsin HVAC markets and were wondering if you had a few minutes to help us better understand the Illinois HVAC market. All your responses will be kept confidential.

[IF CONTACT IS AVAILABLE FOR THE INTERVIEW, RECORD NAME AND PROCEED WITH THE SURVEY]

[IF CONTACT IS NOT AVAILABLE FOR THE INTERVIEW, DETERMINE BEST TIME TO CALL.]

[IF THEY ASK HOW LONG THE INTERVIEW WILL TAKE, SAY LESS THAN 15 MINUTES]

C2. [IF NO CONTACT NAME AVAILABLE] Hi my name is \_\_\_\_\_. I'm calling from KEMA Consulting on behalf of the Wisconsin Public Service Commission. We are comparing the Illinois and Wisconsin markets for high-efficiency HVAC measures and were wondering if you had a few minutes to help us better understand what's happening in these markets from your perspective.

[ONCE APPROPRIATE PERSON IS ON THE LINE] Hi my name is \_\_\_\_\_. I'm calling from KEMA Consulting on behalf of the Wisconsin Public Service Commission. We are comparing the Illinois and Wisconsin HVAC markets and were wondering if you had a few minutes to help us better understand the HVAC market in Illinois from your perspective. All your responses will be kept confidential.

[IF CONTACT IS AVAILABLE FOR THE INTERVIEW, RECORD NAME AND PROCEED WITH THE SURVEY]

[IF THEY ASK HOW LONG THE INTERVIEW WILL TAKE, SAY LESS THAN 15 MINUTES]

[IF CONTACT IS NOT AVAILABLE FOR THE INTERVIEW, DETERMINE BEST TIME TO CALL.]

**Screenener**

SCR1. Does your company do any commercial or industrial HVAC work at this location?

Yes1 [IF THEY SAY SOMETHING LIKE “A LITTLE BIT”, ASK IF THEY HAVE DONE AT LEAST 10 COMMERCIAL/INDUSTRIAL HVAC INSTALLATIONS IN PAST YEAR. IF YES, CONTINUE TO C1. IF NO, THANK AND TERMINATE]

- No .....2
- Don't know.....8
- Refused.....9

[IF SCR1. = 1 GO TO C1., ELSE TERMINATE

**COMPANY INFORMATION**

First I would like to get some background information about you and your company

C1. What is your title or position in the firm?

[RECORD RESPONSE. RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

C2. Which of the following best describes your firm? [READ LIST. ACCEPT ONLY ONE.]

- HVAC contractor?..... 1
- HVAC products distributor? .....2
- Other [SPECIFY]\_\_\_\_\_ 3

[IF RESPONDENT SAYS NONE OF CHOICES FIT, RECORD ALTERNATIVE DESCRIPTION. RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

C2A. [IF THEY SAID THEY WERE A DISTRIBUTOR IN RESPONSE TO C2] Of the following, which best describes your firm's business?

- Independent HVAC equipment distributor ..... 1
- Manufacturer-owned or franchise distributor .....2
- Independent manufacturers' representative .....3
- Other (specify) \_\_\_\_\_ 4

C3. I'm going to read you a list of possible HVAC services. Please tell me which ones your company offers? [ACCEPT MULTIPLES]

The manufacture of commercial/industrial HVAC equipment ..... 1

The sale and distribution of commercial/industrial HVAC equipment ..2

The design and specification of commercial/industrial HVAC systems3

The installation of commercial/industrial HVAC systems/ equipment..4

The design or installation of commercial/industrial HVAC control systems such as energy management systems or building automation systems .....5

C4. I'm going to read you list of types of HVAC equipment. For each one I name, please let me know if your company [SAY "INSTALLS" FOR CONTRACTORS, "SELLS" FOR DISTRIBUTORS] and a rough idea of how many units of this equipment type your company [INSTALLED/SOLD] in Illinois in the past year?

[IF THEY ARE UNABLE OR UNWILLING TO ESTIMATE THE # OF UNITS/PROJECTS, ASK THEM TO SIMPLY INDICATE IF IT REPRESENTS A LARGE, MEDIUM, OR SMALL SHARE OF THEIR COMPANY'S ANNUAL REVENUES]

<b>Type of equipment</b>	<b>1. Company installs/sells it?</b> (Y/N -98 FOR DON'T KNOW AND -99 FOR REFUSED)	<b>2. Estimated # of units [INSTALLED/SOLD] in the past year</b> (IF WON'T PROVIDE ESTIMATE TRY LARGE/MEDIUM/SMALL REVENUE SHARE, -98 FOR DON'T KNOW AND -99 FOR REFUSED)
C4A. Furnaces		
C4B. Boilers		
C4C. Chillers		
C4D. Rooftop air conditioning units, that are unitary or packaged systems		
C4E. Rooftop air conditioning units, that are split systems		
C4F. PTACs (Packaged Terminal A/C) or PTHPs		

<b>Type of equipment</b>	<b>1. Company installs/sells it?</b> (Y/N -98 FOR DON'T KNOW AND -99 FOR REFUSED)	<b>2. Estimated # of units [INSTALLED/SOLD] in the past year</b> (IF WON'T PROVIDE ESTIMATE TRY LARGE/MEDIUM/SMALL REVENUE SHARE, -98 FOR DON'T KNOW AND -99 FOR REFUSED)
(Packaged Terminal Heat Pumps)		
C4G. Infrared or Unit heaters		
C4H. Energy recovery ventilators (ERVs)		
C4H. Steam traps		

C5. How many locations does your firm have in Illinois?

C6. How many full-time employees work at this location?

C7. [IF CONTRACTOR] Roughly how many commercial/industrial HVAC installation projects did your firm work on in the last 12 months in Illinois?

C8. Roughly what is your company's annual revenue? .....

C9. Approximately what percentage of your company's Illinois HVAC [INSTALLATIONS/ SALES] occur in the following areas?

1. New construction ..... %

2. Major renovation and remodeling projects ..... %

3. Routine replacement or maintenance of existing HVAC equipment \_\_\_\_\_ %

[INSURE THAT TOTAL AMOUNTS TO 100%. RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

C9A: [ASK ONLY IF DISTRIBUTORS PROVIDE % ESTIMATES FOR C9] How do you know what kinds of HVAC projects the equipment you sell is being used for?

[RECORD RESPONSE] \_\_\_\_\_ [RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

C11A. I'm going to name a number of characteristics about HVAC equipment that Illinois customers might consider when selecting equipment. For each one I name, please rate how important they are for your nonresidential customers. Please use a scale from 1 to 10 where 10 is very important and 1 is not at all important. [RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

- 19. Initial cost of the equipment..... \_\_\_\_\_
- 20. Costs of operation ..... \_\_\_\_\_
- 21. Total life cycle costs ..... \_\_\_\_\_
- 22. Ease of maintenance..... \_\_\_\_\_
- 23. Employee/customer comfort issues..... \_\_\_\_\_

C12. [IF THEY SAID IN RESPONSE TO C9 THAT THEY WORK ON NEW CONSTRUCTION] You said that your company does HVAC [INSTALLATION/SALES] for new construction projects. In these types of projects, which participants in the process are typically most influential in deciding which types of HVAC equipment gets specified?

C14. [IF THEY SAID IN RESPONSE TO C9 THAT THEY WORK ON MAJOR RENOVATION/REMODELING JOBS] You said that your company does HVAC [WORK/SALES] for major renovation or remodeling projects. In these types of projects, which participants in the process are typically most influential in deciding which types of HVAC gets specified?

C16. Do you [SAY "DO COMMERCIAL/INDUSTRIAL HVAC PROJECTS" FOR CONTRACTORS AND "HAVE COMMERCIAL/INDUSTRIAL HVAC SALES" FOR DISTRIBUTORS] in Wisconsin?

[IF YES, ASK C17, ELSE SKIP TO C18]

C17. I'm trying to get a sense of how large your volume of Illinois HVAC business is compared to your Wisconsin business. If there was a pie chart with two slices and one slice was the quantity of your Illinois commercial/industrial HVAC [SAY "PROJECTS" FOR CONTRACTORS AND "SALES" FOR DISTRIBUTORS] work and the other slice was the quantity of your Wisconsin commercial/industrial HVAC [PROJECTS/SALES], what would be the relative size of these two slices, in percentage terms?"

C18. Have you heard of the Commonwealth Edison or Ameren HVAC rebate programs?

C19. Have you heard of the Wisconsin Focus on Energy program?

**Boilers** [ASK ONLY IF THEY SAID IN RESPONSE TO C4 THAT THEY SOLD/INSTALLED BOILERS]

B1. You said earlier that your company [INSTALLS/SELLS] boilers. Does your company [INSTALL/SELL] modulating hot water boilers in Illinois? [IF NO, SKIP TO B9]

B2. [IF B1 = YES] About what percentage of all the boilers that your company [INSTALLS/SELLS] in Illinois are modulating hot water boilers? [USE MATRIX BELOW TO RECORD RESPONSES FOR QUESTIONS B2 – B5]

B3. In the past year, about what percentage of these modulating hot water boilers were high efficiency? I'm going to define high efficiency as having AFUE ratings of 90% or greater for boilers less than 300,000 BTUs/hr. and having thermal efficiencies of 85% or greater for boilers 300,000 BTUs/hr or larger?

<b>B2. % of All Boilers That Are Modulating Hot Water</b>	<b>B3. % of Modulating HW Boilers That Were High Efficiency in Past Year</b>	<b>B4. % of High Efficiency Boilers Rebated by ComEd/Ameren</b>	<b>B5. % of Modulating HW Boilers That Were High Efficiency Three Years Ago</b>
__%	__%	__%	__%

B3A. Do you currently have any of these high-efficiency models in stock?

B4. [IF ANSWER TO B3 > 0%] About what percentage of these high efficiency boilers received financial incentives from Illinois rebate programs such as Commonwealth Edison's Smart Ideas or Ameren's ActOnEnergy programs?

B4A. [ONLY IF RESPONDENT IS DISTRIBUTOR] How do you know if the boilers you sell receive rebates?

B5. You said that in the past year about [% FROM B3] of the modulating hot water boilers your company [INSTALLED/SOLD] in Illinois were high efficiency? What would this percentage have been about three years ago?

B6. [IF % CITED FOR B5 IS DIFFERENT THAN FOR B3] What factors caused these differences in the percentage of high-efficiency boilers that your company is now [INSTALLING/SELLING]?

B7. In the past year when your company was installing boilers in Illinois that were not already equipped with controls, about what percentage of the time did you add controls to these boilers such as outside air reset or cutout controls?

B8. How does that percentage compare to what your company was doing in Illinois three years ago?

B9. [IF DIFFERENCES IDENTIFIED] What factors caused these differences in the frequency with which you were installing controls?

B9. Does your company [INSTALL/SELL] condensing boilers in Illinois?

**Boiler Tune-Ups**

B10. Does your company provide boiler tune-up services?

B11. [IF B10=YES, ELSE SKIP TO NEXT SECTION] About how many of these boiler tune-up jobs has your company done in Illinois in the past year? [USE MATRIX BELOW TO RECORD RESPONSES FOR B11 – B13]

B11. # of Boilers Tune-ups in Past Year	B12. % of Past Year Boiler Tune-Ups That Were Rebated by ComEd/Ameren	B13. # of Annual Boilers Tune-ups Three Years Ago
__%	__%	__%

B12. For about what percentage of these boiler tune-up jobs did you receive financial incentives from Illinois rebate programs such as Commonwealth Edison’s Smart Ideas or Ameren’s ActOnEnergy programs?

B13. About how many of these boiler tune-up jobs per year was your company doing in Illinois three years ago?

B14. [IF RESPONSE TO B13 IS DIFFERENT THAN B11] What factors caused these differences in the frequency with which you were doing boiler tune-ups in Illinois?



**Rooftop AC Systems (Packaged/ Unitary) [ASK ONLY IF THEY SAID IN RESPONSE TO C4 THAT THEY SOLD SUCH SYSTEMS]**

RP1. You said earlier that your company [INSTALLS/SELLS] rooftop AC systems, that are packaged or unitary systems. I want to get some sense of the relative size of the equipment your company [INSTALLS/SELLS] in Illinois. First, over the past 12 months, how many rooftop packaged or unitary systems did you [SELL/INSTALL] in [SIZE CATEGORY a – d]? [RECORD RESPONSES IN MATRIX BELOW]

RP2. FOR EACH SIZE CATEGORY [a – d] FOR WHICH RP1 >0, ASK:

- a. What percent of these units had an efficiency rating of 11.6 EER or higher?
- b. What percent of these units had an efficiency rating of 11.5 EER or higher?
- c. What percent of these units had an efficiency rating of 11.5 EER or higher?
- d. What percent of these units had an efficiency rating of 10.5 EER or higher?

	<b>Size Category</b>	<b>RP1 (# SOLD)</b>	<b>EER Level for Energy Efficiency</b>	<b>RP2 (% HIGH EFFICIENCY)</b>
a.	< 65,000 BTUs per hour (65 MBh) or <5.4 tons		>= 11.6 EER	
b.	65 – 134 MBh or 5.4 – 11.25 tons		>= 11.5 EER	
c.	135 to 239 MBh or 11.25 – 20 tons		>= 11.5 EER	
d.	240 – 749 MBh or 20 – 62.4 tons		>= 10.5 EER	
e.			<b>Average %*</b>	

\*IF RESPONDENT IS ABLE TO PROVIDE SYSTEM COUNTS FOR RP1, THEN RP2E WILL BE THE SALES-WEIGHTED AVERAGE (THE SUMPRODUCT OF RP1 A-D AND RP2 A-D). IF RESPONDENT IS UNABLE TO PROVIDE SYSTEM COUNTS FOR RP1, THEN RP2E WILL BE STRAIGHT AVERAGE OF RP2A-D )

RP2F. Do you currently have any of these high-efficiency models in stock?

RP2G. About what percentage of these high efficiency packaged rooftop AC systems received financial incentives from Illinois rebate programs such as Commonwealth Edison’s Smart Ideas or Ameren’s ActOnEnergy programs?

RP2H. [ONLY IF RESPONDENT IS DISTRIBUTOR AND DIDN’T ANSWER B4A]  
How do you know if the rooftop AC systems you sell receive rebates?

RP3. You said that in the past year about [% FROM RP2E] of the packaged rooftop AC systems your company [INSTALLED/SOLD] in Illinois were high efficiency? What would this percentage have been about three years ago?

RP4. [IF % CITED FOR RP3 IS DIFFERENT THAN FOR RP2E] What factors caused these differences in the percentage of high-efficiency packaged rooftop systems that your company is now [SELLING/INSTALLING] in Illinois?

RP4A. About what percent of the roof-top air conditioning units that you [INSTALLED/SOLD] in Illinois during the past 12 months were fitted with dual enthalpy economizers?

RP4B. About what percent of the roof-top air conditioning units that you [INSTALLED/SOLD] in Illinois during the past 12 months were fitted with CO2 sensors and demand control ventilation systems?

### **Air-Conditioning Tune-Ups**

RP5. Does your company provide tune-up services in Illinois for these roof-top air conditioning units?

RP6. [IF RP5=YES, ELSE SKIP TO NEXT SECTION (RP9)] About how many of these tune-up jobs for roof-top units has your company done in Illinois in the past year?

RP7. Is your company providing more rooftop AC tune-ups, fewer tune-ups, or about the same amount of tune-ups in Illinois as it was three years ago?

RP8. [IF RESPONSE TO RP7 IS MORE OR FEWER] What factors caused these differences in the frequency with which you were doing rooftop AC tune-ups?

### **Air-Conditioning Systems with VFDs**

RP9. Of the roof-top air conditioning systems you [INSTALLED/SOLD] in Illinois in the past year, about what percentage of these had VFDs specified for the system motors?

RP10. For those Illinois projects in the past year where the roof-top air conditioning systems you [INSTALLED/SOLD] already had VFDs specified, about what percentage of these projects received VFD rebates from Commonwealth Edison's Smart Ideas or Ameren's ActOnEnergy programs?

<b>RP9. % of Rooftop AC Systems in Past Year That Had VFDs Specified As Part of the System</b>	<b>RP10. % of Rooftop AC Systems in Past Year That Had VFDs Rebated by ComEd/Ameren</b>	<b>RP11. % of Rooftop AC Systems Three Years Ago That Had VFDs Specified As Part of the System</b>	<b>RP12. % of Projects That Did Not Have VFDs Specified As Part of the System Where Contractor/Distributor Recommended VFDs</b>
# _____ %	# _____ %	# _____ %	# _____ %

RP11. You said that in the past year about [% FROM RP9] of the Illinois rooftop AC systems your company [INSTALLED/SOLD] had VFDs specified? What would this percentage have been about three years ago?

RP12. For those Illinois projects in the past year where the roof-top air conditioning systems you [INSTALLED/SOLD] *did not already have* VFDs specified, in about what percentage of these cases did you recommend that VFDs be installed?

**HVAC Control Systems [ASK ONLY IF THEY SAID IN RESPONSE TO C3 THAT THEY DESIGN OR INSTALL HVAC CONTROL SYSTEMS]**

HVC1. You said earlier that your company designs or installs HVAC control systems. About how many of these HVAC control jobs did your company do in Illinois in the past year? [USE MATRIX BELOW TO RECORD RESPONSES FOR B11 – B13]

<b>HVC1. # of HVAC Control System Jobs in Past Year</b>	<b>HVC2. % of Past Year HVAC Control System Jobs That Were Rebated by ComEd/Ameren</b>	<b>HVC3. # of HVAC Control System Jobs Three Years Ago</b>
# _____	# _____ %	# _____

HVC2. For about what percentage of these HVAC control jobs did you receive financial incentives from Illinois rebate programs such as Commonwealth Edison’s Smart Ideas or Ameren’s ActOnEnergy programs?

HVC3. About how many of these HVAC control jobs per year was your company doing in Illinois three years ago?

HVC4. [IF RESPONSE TO HVC1 IS DIFFERENT THAN HVC4] What factors caused these differences in the frequency with which you were doing these Illinois HVAC control jobs?

## The Importance of Energy Efficiency

My last questions concern your company's energy efficiency practices and any interactions it may have had with Illinois HVAC rebate programs?

EE1. You mentioned earlier that you sell energy-efficient HVAC products and/or systems . How important is the promotion of energy efficiency for your company? Please use a 10-point scale where 10 equals very important and 1 equals not important at all.

EE2. Why do you say that?

EE3. If I had asked you that question 3 years ago, what would your importance rating have been?

EE4. [IF CURRENT RATING IS GREATER THAN ONE FOR PAST PERIOD] What caused energy-efficient HVAC systems to become more important for your company over the last three years?

EE5. What kinds of things does your company do to promote energy-efficient HVAC products?

EE6. What factors prevent you from selling a higher volume of energy-efficient HVAC systems/products than you currently are?

EE7. What concerns, if any, do your customers – whether contractors or the end users of the HVAC– raise about energy-efficient HVAC systems?

EE8. What effects, if any, has the current economic downturn had on your sales of energy-efficient HVAC systems /products?

EE9. You said earlier [QUESTION C16] that you also [DO/HAVE] some HVAC [WORK/SALES] in Wisconsin. Are there differences between your Wisconsin contractors or customers and your Illinois contractors or customers in terms of how frequently they specify or ask for energy-efficient HVAC systems/products?

EE10. [IF DIFFERENCES BETWEEN Wisconsin AND Illinois ARE MENTIONED] What are these differences? [TRY TO PROBE FOR CERTAIN TYPES OF EE HVAC equipment]

EE11. [IF DIFFERENCES BETWEEN Wisconsin AND Illinois ARE MENTIONED] What basis or evidence do you have for saying that these differences exist?

EE12. [IF DIFFERENCES BETWEEN Wisconsin AND Illinois ARE MENTIONED] What factors may explain these differences?

## INVOLVEMENT WITH ILLINOIS HVAC REBATE PROGRAMS

F1. [IF THEY SAID IN C17/C18 THAT THEY WERE UNAWARE OF THE COMED/AMEREN REBATE PROGRAM, SKIP TO F23]

- F2. What interaction or involvement, if any, has your company had with Commonwealth Edison (ComEd) Smart Ideas or Ameren's ActOnEnergy HVAC programs? [IF THEY HAVE BEEN INVOLVED IN BOTH, TRY TO OBTAIN SEPARATE RESPONSES FOR EACH PROGRAM]
- F3. Have you participated in any projects that have received financial incentives from these programs?
- F4. [IF THEY HAVE PARTICIPATED IN COMED/AMEREN-INCENTED PROJECTS] Roughly how many such projects has your company participated in during the past year? [IF THEY HAVE BEEN INVOLVED IN BOTH, TRY TO OBTAIN SEPARATE RESPONSES FOR EACH PROGRAM]
- F5. Have you or anyone else in your company participated in any training sponsored or co-sponsored by the Commonwealth Edison (ComEd) Smart Ideas and/or Ameren's ActOnEnergy HVAC rebate programs? [IF THEY HAVE BEEN INVOLVED IN BOTH, TRY TO OBTAIN SEPARATE RESPONSES FOR EACH PROGRAM]
- F6. [IF THEY HAVE PARTICIPATED IN COMED/AMEREN TRAININGS] What training did you or other members of your company participate in? [IF THEY HAVE BEEN INVOLVED IN BOTH, TRY TO OBTAIN SEPARATE RESPONSES FOR EACH PROGRAM]
- F7. Are the Commonwealth Edison (ComEd) Smart Ideas or Ameren's ActOnEnergy HVAC programs mentioned or featured in any of your promotional or sales communication efforts?
- F8. [IF THEY HAVE MENTIONED/FEATURED COMED/AMEREN PROGRAMS IN PROMOTIONS] How have you mentioned or featured these programs in your efforts? [IF THEY HAVE BEEN INVOLVED IN BOTH, TRY TO OBTAIN SEPARATE RESPONSES FOR EACH PROGRAM]
- F9. On a scale of 1 to 10, where 1 is not at all important and 10 is very important, how important have these Commonwealth Edison or Ameren HVAC rebate programs been in your company's efforts to promote energy-efficient HVAC equipment? [IF THEY HAVE BEEN INVOLVED IN BOTH, TRY TO OBTAIN SEPARATE RESPONSES FOR EACH PROGRAM]
- F10. Why do you give that rating?
- F11. [IF NOT ALREADY EXPLAINED IN F10] In what ways have these programs helped your company promote energy-efficient HVAC/space conditioning equipment?

### **Effect of Program on Boilers, Boiler Tune-Ups**

- F12. [ASK ONLY IF THEY PROVIDED EE % ESTIMATES FOR BOILERS (QUESTION B3)] You mentioned earlier that about [% FROM B3] of your boiler [INSTALLATIONS/SALES] in Illinois are high-efficiency. If the Commonwealth Edison and Ameren HVAC rebate programs had not existed, give me your best estimate of what this percentage would have been?

F13. Why do you say this?

F13. If the Commonwealth Edison and Ameren HVAC rebate programs went away this year, please estimate what percentage of your Illinois boiler [INSTALLATIONS/SALES] would be high efficiency? [

F14. [ASK ONLY IF THEY PROVIDED ESTIMATES FOR BOILER TUNEUPS (QUESTION B3)] You mentioned earlier that you did about [# FROM B11] boiler tune-ups in Illinois over the past year. If the Commonwealth Edison and Ameren HVAC rebate programs had not existed, give me your best estimate of what this # would have been?

F15. [IF RESPONSE TO F14 IS SIGNIFICANTLY DIFFERENT THAN B11] Why do you say this?

### **Effect of Program on Packaged Rooftop AC Units**

F16. [ASK ONLY IF THEY PROVIDED EE% ESTIMATES FOR PACKAGED ROOFTOP AC UNITS] You mentioned earlier that about [% FROM RP2E] of your boiler [INSTALLATIONS/SALES] in Illinois are high-efficiency. If the Commonwealth Edison and Ameren HVAC rebate programs had not existed, give me your best estimate of what this percentage would have been?

F17. Why do you say this?

F18. If the Commonwealth Edison and Ameren HVAC rebate programs went away this year, please estimate what percentage of your Illinois rooftop AC unit [INSTALLATIONS/SALES] would be high efficiency?

### **Effect of Program on Air-Conditioning Tune-Ups**

F19. [ASK ONLY IF THEY PROVIDED ESTIMATES FOR # OF AC TUNEUPS (QUESTION RP6)] You mentioned earlier that you did about [# FROM RP6] boiler tune-ups in Illinois over the past year. If the Commonwealth Edison and Ameren HVAC rebate programs had not existed, give me your best estimate of what this # would have been?

F20. [IF RESPONSE TO F14 IS SIGNIFICANTLY DIFFERENT THAN B11] Why do you say this?

### **Effect of Program on Packaged Rooftop AC Units with VFDs**

F21. [ASK ONLY IF THEY PROVIDED ESTIMATES FOR % OF PACKAGED ROOFTOP AC UNITS WITH VFDS SPECIFIED (QUESTION RP9)] You said earlier tha of roof-top air conditioning systems you [INSTALLED/SOLD] in the past year, [% FROM RP9] had VFDs specified for the system motors? If the Commonwealth Edison and Ameren HVAC rebate programs had not existed, give me your best estimate of what this # would have been?

F22. [IF RESPONSE TO F14 IS SIGNIFICANTLY DIFFERENT THAN B11] Why do you say this?

- F23. Have you participated in any programs besides the Commonwealth Edison and Ameren HVAC rebate programs that promote energy efficient HVAC/ space conditioning solutions? [IF THEY SAID IN C16. THAT THEY WERE NOT AWARE OF THE COMED/AMEREN PROGRAMS, INSTEAD SAY: “Have you participated in any programs that promote energy efficient HVAC/ space conditioning solutions?]
- F24. [IF COMPANY PARTICIPATED IN OTHER PROGRAMS] What were these other programs?
- F25. [IF COMPANY PARTICIPATED IN OTHER PROGRAMS] What kind of incentives or services did these other programs provide your company?
- F26. [IF COMPANY PARTICIPATED IN OTHER PROGRAMS] On a scale of 1 to 10, where 1 is not at all important and 10 is very important, how important have these other programs been in your company’s efforts to promote energy-efficient HVAC/ space conditioning solutions?
- F27. Why do you give that rating?

THANK YOU FOR YOUR TIME AND COOPERATION.

**B.5 WISCONSIN FOCUS ON ENERGY MARKET EFFECTS ASSESSMENT – 2009:  
WISCONSIN HVAC CONTRACTOR/DISTRIBUTOR SURVEY (DRAFT 1)**

**INTRODUCTION**

C1. [IF CONTACT NAME AVAILABLE] May I speak to \_\_\_\_\_? [ONCE TARGET CONTACT IS ON THE PHONE] Hi my name is \_\_\_\_\_. I'm calling from KEMA Consulting on behalf of the Public Service Commission of Wisconsin. We are comparing the Illinois and Wisconsin HVAC markets and were wondering if you had a few minutes to help us better understand the Wisconsin HVAC market. All your responses will be kept confidential.

[IF CONTACT IS AVAILABLE FOR THE INTERVIEW, RECORD NAME AND PROCEED WITH THE SURVEY]

[IF CONTACT IS NOT AVAILABLE FOR THE INTERVIEW, DETERMINE BEST TIME TO CALL.]

[IF THEY ASK HOW LONG THE INTERVIEW WILL TAKE, SAY LESS THAN 15 MINUTES]

C2. [IF NO CONTACT NAME AVAILABLE] Hi my name is \_\_\_\_\_. I'm calling from KEMA Consulting on behalf of the Public Service Commission of Wisconsin. We are comparing the Illinois and Wisconsin markets for high-efficiency HVAC measures and were wondering if you had a few minutes to help us better understand what's happening in these markets from your perspective.

[ONCE APPROPRIATE PERSON IS ON THE LINE] Hi my name is \_\_\_\_\_. I'm calling from KEMA Consulting on behalf of the Public Service Commission of Wisconsin. We are comparing the Illinois and Wisconsin HVAC markets and were wondering if you had a few minutes to help us better understand the HVAC market in Wisconsin from your perspective. All your responses will be kept confidential.

[IF CONTACT IS AVAILABLE FOR THE INTERVIEW, RECORD NAME AND PROCEED WITH THE SURVEY]

[IF THEY ASK HOW LONG THE INTERVIEW WILL TAKE, SAY LESS THAN 15 MINUTES]

[IF CONTACT IS NOT AVAILABLE FOR THE INTERVIEW, DETERMINE BEST TIME TO CALL.]



**Screenener**

SCR1. Does your company do any commercial or industrial HVAC work at this location?

Yes1 [IF THEY SAY SOMETHING LIKE “A LITTLE BIT”, ASK IF THEY HAVE DONE AT LEAST 10 COMMERCIAL/INDUSTRIAL HVAC INSTALLATIONS IN PAST YEAR. IF YES

- No .....2
- Don't know.....8
- Refused.....9

[IF SCR1. = 1 GO TO C1., ELSE TERMINATE

**COMPANY INFORMATION**

First I would like to get some background information about you and your company

C1. What is your title or position in the firm?

[RECORD RESPONSE. RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

C2. Which of the following best describes your firm? [READ LIST. ACCEPT ONLY ONE.]

- HVAC contractor?..... 1
- HVAC products distributor? .....2
- Other [SPECIFY]\_\_\_\_\_ 3

[IF RESPONDENT SAYS NONE OF CHOICES FIT, RECORD ALTERNATIVE DESCRIPTION. RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

C2A. [IF THEY SAID THEY WERE A DISTRIBUTOR IN RESPONSE TO C2] Of the following, which best describes your firm's business?

- Independent HVAC equipment distributor ..... 1
- Manufacturer-owned or franchise distributor .....2
- Independent manufacturers' representative .....3
- Other (specify) \_\_\_\_\_ 4

C3. I'm going to read you a list of possible HVAC services. Please tell me which ones your company offers? [ACCEPT MULTIPLES]

The manufacture of commercial/industrial HVAC equipment ..... 1

The sale and distribution of commercial/industrial HVAC equipment ..2

The design and specification of commercial/industrial HVAC systems3

The installation of commercial/industrial HVAC systems/ equipment..4

The design or installation of commercial/industrial HVAC control systems such as energy management systems or building automation systems .....5

C4. I'm going to read you list of types of HVAC equipment. For each one I name, please let me know if your company [SAY "INSTALLS" FOR CONTRACTORS, "SELLS" FOR DISTRIBUTORS] it and a rough idea of how many units of this equipment type your company [INSTALLED/SOLD] in Wisconsin in the past year?

[IF THEY ARE UNABLE OR UNWILLING TO ESTIMATE THE # OF UNITS/PROJECTS, ASK THEM TO SIMPLY INDICATE IF IT REPRESENTS A LARGE, MEDIUM, OR SMALL SHARE OF THEIR COMPANY'S ANNUAL REVENUES]

<b>Type of equipment</b>	<b>1. Company installs/sells it?</b> (Y/N -98 FOR DON'T KNOW AND -99 FOR REFUSED)	<b>2. Estimated # of units [INSTALLED/SOLD] in the past year</b> (IF WON'T PROVIDE ESTIMATE TRY LARGE/MEDIUM/SMALL REVENUE SHARE, -98 FOR DON'T KNOW AND -99 FOR REFUSED)
C4A. Furnaces		
C4B. Boilers		
C4C. Chillers		
C4D. Rooftop air conditioning units, that are unitary or packaged systems		
C4E. Rooftop air conditioning units, that are split systems		
C4F. PTACs (Packaged Terminal A/C) or PTHPs		

<b>Type of equipment</b>	<b>1. Company installs/sells it?</b> (Y/N -98 FOR DON'T KNOW AND -99 FOR REFUSED)	<b>2. Estimated # of units [INSTALLED/SOLD] in the past year</b> (IF WON'T PROVIDE ESTIMATE TRY LARGE/MEDIUM/SMALL REVENUE SHARE, -98 FOR DON'T KNOW AND -99 FOR REFUSED)
(Packaged Terminal Heat Pumps)		
C4G. Infrared or Unit heaters		
C4H. Energy recovery ventilators (ERVs)		
C4I. Steam traps		

C5. How many locations does your firm have in Wisconsin?

C6. How many full-time employees work at this location?

C7. [IF CONTRACTOR] Roughly how many commercial/industrial HVAC installation projects did your firm work on in the last 12 months in Wisconsin?

C8. Roughly what is your company's annual revenue? .....

C9. Approximately what percentage of your company's Wisconsin HVAC [INSTALLATIONS/ SALES] occur in the following areas?

1. New construction ..... %

2. Major renovation and remodeling projects ..... %

3. Routine replacement or maintenance of existing HVAC equipment \_\_\_\_\_ %

[INSURE THAT TOTAL AMOUNTS TO 100%. RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

C9A: [ASK ONLY IF DISTRIBUTORS PROVIDE % ESTIMATES FOR C9] How do you know what kinds of HVAC projects the equipment you sell is being used for?

[RECORD RESPONSE] \_\_\_\_\_ [RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

C11A. I'm going to name a number of characteristics about HVAC equipment that Wisconsin customers might consider when selecting equipment. For each one I name, please rate how important they are for your commercial and industrial customers. Please use a scale from 1 to 10 where 10 is very important and 1 is not at all important. [RECORD -98 FOR DON'T KNOW AND -99 FOR REFUSED]

- 24. Initial cost of the equipment..... \_\_\_\_\_
- 25. Costs of operation ..... \_\_\_\_\_
- 26. Total life cycle costs ..... \_\_\_\_\_
- 27. Ease of maintenance..... \_\_\_\_\_
- 28. Employee/customer comfort issues..... \_\_\_\_\_

C12. [IF THEY SAID IN RESPONSE TO C9 THAT THEY WORK ON NEW CONSTRUCTION] You said that your company does HVAC [INSTALLATION/SALES] for new construction projects. In these types of projects, which participants in the process are typically most influential in deciding which types of HVAC equipment gets specified?

C14. [IF THEY SAID IN RESPONSE TO C9 THAT THEY WORK ON MAJOR RENOVATION/REMODELING JOBS] You said that your company does HVAC [WORK/SALES] for major renovation or remodeling projects. In these types of projects, which participants in the process are typically most influential in deciding which types of HVAC gets specified?

C16. Do you [SAY "DO COMMERCIAL/INDUSTRIAL HVAC PROJECTS" FOR CONTRACTORS AND "HAVE COMMERCIAL/INDUSTRIAL HVAC SALES" FOR DISTRIBUTORS] in Illinois?

[IF YES, ASK C17, ELSE SKIP TO C18]

C17. I'm trying to get a sense of how large your volume of Illinois HVAC business is compared to your Wisconsin business. If there was a pie chart with two slices and one slice was the quantity of your Illinois commercial/industrial HVAC [SAY "PROJECTS" FOR CONTRACTORS AND "SALES" FOR DISTRIBUTORS] work and the other slice was the quantity of your Wisconsin commercial/industrial HVAC [PROJECTS/SALES], what would be the relative size of these two slices, in percentage terms?"

C18. Have you heard of the Wisconsin Focus on Energy program?

C19. Have you heard of the Commonwealth Edison or Ameren HVAC rebate programs?

**Boilers** [ASK ONLY IF THEY SAID IN RESPONSE TO C4 THAT THEY SOLD/INSTALLED BOILERS]

B1. You said earlier that your company [INSTALLS/SELLS] boilers. Does your company [INSTALL/SELL] modulating hot water boilers in Wisconsin? [IF NO, SKIP TO B9]

B2. [IF B1 = YES] About what percentage of all the boilers that your company [INSTALLS/SELLS] in Wisconsin are modulating hot water boilers? [USE MATRIX BELOW TO RECORD RESPONSES FOR QUESTIONS B2 – B5]

B3. In the past year, about what percentage of these modulating hot water boilers were high efficiency? I'm going to define high efficiency as having AFUE ratings of 90% or greater for boilers less than 300,000 BTUs/hr. and having thermal efficiencies of 85% or greater for boilers 300,000 BTUs/hr or larger?

<b>B2. % of All Boilers That Are Modulating Hot Water</b>	<b>B3. % of Modulating HW Boilers That Were High Efficiency in Past Year</b>	<b>B4. % of High Efficiency Boilers Rebated by Focus on Energy</b>	<b>B5. % of Modulating HW Boilers That Were High Efficiency Three Years Ago</b>
___%	___%	___%	___%

B3A. Do you currently have any of these high-efficiency models in stock?

B4. [IF ANSWER TO B3 > 0%] About what percentage of these high efficiency boilers received financial incentives from the Wisconsin Focus on Energy program?

B4A. [ONLY IF RESPONDENT IS DISTRIBUTOR] How do you know if the boilers you sell receive rebates?

B5. You said that in the past year about [% FROM B3] of the modulating hot water boilers your company [INSTALLED/SOLD] in Wisconsin were high efficiency? What would this percentage have been about three years ago?

B6. [IF % CITED FOR B5 IS DIFFERENT THAN FOR B3] What factors caused these differences in the percentage of high-efficiency boilers that your company is now [INSTALLING/SELLING]?

B7. In the past year when your company was installing boilers in Wisconsin that were not already equipped with controls, about what percentage of the time did you add controls to these boilers such as outside air reset or cutout controls?

B8. How does that percentage compare to what your company was doing in Wisconsin three years ago?

B9. [IF DIFFERENCES IDENTIFIED] What factors caused these differences in the frequency with which you were installing controls?

B9. Does your company [INSTALL/SELL] condensing boilers in Wisconsin?

**Boiler Tune-Ups**

B10. Does your company provide boiler tune-up services?

B11. [IF B10=YES, ELSE SKIP TO NEXT SECTION] About how many of these boiler tune-up jobs has your company done in Wisconsin in the past year? [USE MATRIX BELOW TO RECORD RESPONSES FOR B11 – B13]

B11. # of Boilers Tune-ups in Past Year	B12. % of Past Year Boiler Tune-Ups That Were Rebated by Focus on Energy	B13. # of Annual Boilers Tune-ups Three Years Ago
__%	__%	__%

B12. For about what percentage of these boiler tune-up jobs did you receive financial incentives from the Wisconsin Focus on Energy program?

B13. About how many of these boiler tune-up jobs per year was your company doing in Wisconsin three years ago?

B14. [IF RESPONSE TO B13 IS DIFFERENT THAN B11] What factors caused these differences in the frequency with which you were doing boiler tune-ups in Wisconsin?

**Rooftop AC Systems (Packaged/ Unitary) [ASK ONLY IF THEY SAID IN RESPONSE TO C4 THAT THEY SOLD SUCH SYSTEMS]**

RP1. You said earlier that your company [INSTALLS/SELLS] rooftop AC systems, that are packaged or unitary systems. I want to get some sense of the relative size of the equipment your company [INSTALLS/SELLS] in Wisconsin. First, over the past 12 months, how many rooftop packaged or unitary systems did you sell in [SIZE CATEGORY a – d]? [RECORD RESPONSES IN MATRIX BELOW]

RP2. FOR EACH SIZE CATEGORY [a – d] FOR WHICH RP1 >0, ASK:

- a. What percent of these units had an efficiency rating of 11.6 EER or higher?
- b. What percent of these units had an efficiency rating of 11.5 EER or higher?
- c. What percent of these units had an efficiency rating of 11.5 EER or higher?
- d. What percent of these units had an efficiency rating of 10.5 EER or higher?

	Size Category	RP1 (# SOLD)	EER Level for Energy Efficiency	RP2 (% HIGH EFFICIENCY)
a.	< 65,000 BTUs per hour (65 MBh) or <5.4 tons		>= 11.6 EER	
b.	65 – 134 MBh or 5.4 – 11.25 tons		>= 11.5 EER	
c.	135 to 239 MBh or 11.25 – 20 tons		>= 11.5 EER	
d.	240 – 749 MBh or 20 – 62.4 tons		>= 10.5 EER	
e.			<b>Average %*</b>	

\*IF RESPONDENT IS ABLE TO PROVIDE SYSTEM COUNTS FOR RP1, THEN RP2E WILL BE THE SALES-WEIGHTED AVERAGE (THE SUMPRODUCT OF RP1 A-D AND RP2 A-D). IF RESPONDENT IS UNABLE TO PROVIDE SYSTEM COUNTS FOR RP1, THEN RP2E WILL BE STRAIGHT AVERAGE OF RP2A-D )

RP2F. Do you currently have any of these high-efficiency models in stock?

RP2G. About what percentage of these high efficiency packaged rooftop AC systems received financial incentives from the Wisconsin Focus on Energy program?

RP2H. [ONLY IF RESPONDENT IS DISTRIBUTOR AND DIDN'T ANSWER B4A]  
How do you know if the rooftop AC systems you sell receive rebates?

RP3. You said that in the past year about [% FROM RP2E] of the packaged rooftop AC systems your company [INSTALLED/SOLD] in Wisconsin were high efficiency? What would this percentage have been about three years ago?

RP4. [IF % CITED FOR RP3 IS DIFFERENT THAN FOR RP2E] What factors caused these differences in the percentage of high-efficiency packaged rooftop systems that your company is now [SELLING/INSTALLING] in Wisconsin?

RP4A. About what percent of the roof-top air conditioning units that you [INSTALLED/SOLD] in Wisconsin during the past 12 months were fitted with dual enthalpy economizers?

PR4B. About what percent of the roof-top air conditioning units that you [INSTALLED/SOLD] in Wisconsin during the past 12 months were fitted with CO2 sensors and demand control ventilation systems?

RP4C. In early 2008 Wisconsin adopted a new building code that has new minimum energy efficiency standards for roof-top air conditioning systems. What effects, if any, did this have on the roof-top air conditioning systems your company [INSTALLS/SELLS]?

**Air-Conditioning Tune-Ups**

RP5. Does your company provide tune-up services in Wisconsin for these roof-top air conditioning units?

RP6. [IF RP5=YES, ELSE SKIP TO NEXT SECTION (RP9)] About how many of these tune-up jobs for roof-top units has your company done in Wisconsin in the past year?

RP7. Is your company providing more rooftop AC tune-ups, fewer tune-ups, or about the same amount of tune-ups in Wisconsin as it was three years ago?

RP8. [IF RESPONSE TO RP7 IS MORE OR FEWER] What factors caused these differences in the frequency with which you were doing rooftop AC tune-ups?

**Air-Conditioning Systems with VFDs**

RP9. Of the roof-top air conditioning systems you [INSTALLED/SOLD] in Wisconsin in the past year, about what percentage of these had VFDs specified for the system motors?

RP10. For those Wisconsin projects in the past year where the roof-top air conditioning systems you [INSTALLED/SOLD] already had VFDs specified, about what percentage of these projects received VFD rebates from Wisconsin’s Focus on Energy program?

<p><b>RP9. % of Rooftop AC Systems in Past Year That Had VFDs Specified As Part of the System</b></p>	<p><b>RP10. % of Rooftop AC Systems in Past Year That Had VFDs Rebated by Focus on Energy</b></p>	<p><b>RP11. % of Rooftop AC Systems Three Years Ago That Had VFDs Specified As Part of the System</b></p>	<p><b>RP12. % of Projects That Did Not Have VFDs Specified As Part of the System Where Contractor/Distributor Recommended VFDs</b></p>
<p>____%</p>	<p>____%</p>	<p>____%</p>	<p>____%</p>

RP11. You said that in the past year about [% FROM RP9] of the Wisconsin rooftop AC systems your company [INSTALLED/SOLD] had VFDs specified? What would this percentage have been about three years ago?



RP12. For those Wisconsin projects in the past year where the roof-top air conditioning systems you [INSTALLED/SOLD] *did not already have* VFDs specified, in about what percentage of these cases did you recommend that VFDs be installed?

**HVAC Control Systems** [ASK ONLY IF THEY SAID IN RESPONSE TO C3 THAT THEY DESIGN OR INSTALL HVAC CONTROL SYSTEMS]

HVC1. You said earlier that your company designs or installs HVAC control systems. About how many of these HVAC control jobs did your company do in Wisconsin in the past year? [USE MATRIX BELOW TO RECORD RESPONSES FOR B11 – B13]

HVC1. # of HVAC Control System Jobs in Past Year	HVC2. % of Past Year HVAC Control System Jobs That Were Rebated by Focus on Energy	HVC3. # of HVAC Control System Jobs Three Years Ago
# _____	_____ %	# _____

HVC2. For about what percentage of these HVAC control jobs did you receive financial incentives from Wisconsin’s Focus on Energy program?

HVC3. About how many of these HVAC control jobs per year was your company doing in Wisconsin three years ago?

HVC4. [IF RESPONSE TO HVC1 IS DIFFERENT THAN HVC4] What factors caused these differences in the frequency with which you were doing these Wisconsin HVAC control jobs?

**The Importance of Energy Efficiency**

My last questions concern your company’s energy efficiency practices and any interactions it may have had with Wisconsin HVAC rebate programs?

EE1. You mentioned earlier that you sell energy-efficient HVAC products and/or systems . How important is the promotion of energy efficiency for your company? Please use a 10-point scale where 10 equals very important and 1 equals not important at all.

EE2. Why do you say that?

EE3. If I had asked you that question 3 years ago, what would your importance rating have been?

EE4. [IF CURRENT RATING IS GREATER THAN ONE FOR PAST PERIOD] What caused energy-efficient HVAC systems to become more important for your company over the last three years?

EE5. What kinds of things does your company do to promote energy-efficient HVAC

products?

- EE6. What factors prevent you from selling a higher volume of energy-efficient HVAC systems/products than you currently are?
- EE7. What concerns, if any, do your customers – whether contractors or the end users of the HVAC– raise about energy-efficient HVAC systems?
- EE8. What effects, if any, has the current economic downturn had on your sales of energy-efficient HVAC systems /products?
- EE9. You said earlier that [QUESTION C16] you also [DO/HAVE] some HVAC [WORK/SALES] in Illinois. Are there differences between your Wisconsin contractors or customers and your Illinois contractors or customers in terms of how frequently they specify or ask for energy-efficient HVAC systems/products?
  - EE10. [IF DIFFERENCES BETWEEN Wisconsin AND Illinois ARE MENTIONED] What are these differences? [TRY TO PROBE FOR CERTAIN TYPES OF EE HVAC equipment]
  - EE11. [IF DIFFERENCES BETWEEN Wisconsin AND Illinois ARE MENTIONED] What basis or evidence do you have for saying that these differences exist?
  - EE12. [IF DIFFERENCES BETWEEN Wisconsin AND Illinois ARE MENTIONED] What factors may explain these differences?

### **INVOLVEMENT WITH WISCONSIN HVAC REBATE PROGRAM**

- F1. [IF THEY SAID IN C17/C18 THAT THEY WERE UNAWARE OF THE WISCONSIN FOCUS ON ENERGY PROGRAM, SKIP TO F23]
- F2. What interaction or involvement, if any, has your company had with the Wisconsin Focus on Energy program? [IF THEY HAVE BEEN INVOLVED IN BOTH, TRY TO OBTAIN SEPARATE RESPONSES FOR EACH PROGRAM]
- F3. Have you participated in any projects that have received financial incentives from this program?
  - F4. [IF THEY HAVE PARTICIPATED IN WISCONSIN FOCUS ON ENERGY - INCENTED PROJECTS] Roughly how many such projects has your company participated in during the past year? [IF THEY HAVE BEEN INVOLVED IN BOTH, TRY TO OBTAIN SEPARATE RESPONSES FOR EACH PROGRAM]
- F5. Have you or anyone else in your company participated in any training sponsored or co-sponsored by the Wisconsin Focus on Energy program? [IF THEY HAVE BEEN INVOLVED IN BOTH, TRY TO OBTAIN SEPARATE RESPONSES FOR EACH PROGRAM]
- F6. [IF THEY HAVE PARTICIPATED IN FOCUS ON ENERGY TRAININGS] What training did you or other members of your company participate in?

- F7. Is the Wisconsin Focus on Energy program mentioned or featured in any of your promotional or sales communications efforts?
- F8. [IF THEY HAVE MENTIONED/FEATURED FOCUS ON ENERGY IN PROMOTIONS] How have you mentioned or featured this program in your efforts?
- F9. On a scale of 1 to 10, where 1 is not at all important and 10 is very important, how important has this Wisconsin Focus on Energy program been in your company's efforts to promote energy-efficient HVAC equipment? [IF THEY HAVE BEEN INVOLVED IN BOTH, TRY TO OBTAIN SEPARATE RESPONSES FOR EACH PROGRAM]
- F10. Why do you give that rating?
- F11. [IF NOT ALREADY EXPLAINED IN F10] In what ways has this program helped your company promote energy-efficient HVAC/space conditioning equipment?

### **Effect of Program on Boilers, Boiler Tune-Ups**

- F12. [ASK ONLY IF THEY PROVIDED EE % ESTIMATES FOR BOILERS (QUESTION B3)] You mentioned earlier that about [% FROM B3] of your boiler [INSTALLATIONS/SALES] in Wisconsin are high-efficiency. If the Wisconsin Focus on Energy program had not existed, give me your best estimate of what this percentage would have been?
- F13. Why do you say this?
- F13. If the Wisconsin Focus on Energy program went away this year, please estimate what percentage of your Wisconsin boiler [INSTALLATIONS/SALES] would be high efficiency? [
- F14. [ASK ONLY IF THEY PROVIDED ESTIMATES FOR BOILER TUNEUPS (QUESTION B3)] You mentioned earlier that you did about [# FROM B11] boiler tune-ups in Wisconsin over the past year. If the Wisconsin Focus on Energy program had not existed, give me your best estimate of what this # would have been?
- F15. [IF RESPONSE TO F14 IS SIGNIFICANTLY DIFFERENT THAN B11] Why do you say this?

### **Effect of Program on Packaged Rooftop AC Units**

- F16. [ASK ONLY IF THEY PROVIDED EE% ESTIMATES FOR PACKAGED ROOFTOP AC UNITS] You mentioned earlier that about [% FROM RP2E] of your boiler [INSTALLATIONS/SALES] in Wisconsin are high-efficiency. If the Wisconsin Focus on Energy program had not existed, give me your best estimate of what this percentage would have been?
- F17. Why do you say this?

- F18. If the Wisconsin Focus on Energy program went away this year, please estimate what percentage of your Wisconsin rooftop AC unit [INSTALLATIONS/SALES] would be high efficiency?

**Effect of Program on Air-Conditioning Tune-Ups**

- F19. [ASK ONLY IF THEY PROVIDED ESTIMATES FOR # OF AC TUNEUPS (QUESTION RP6)] You mentioned earlier that you did about [# FROM RP6] boiler tune-ups in Wisconsin over the past year. If the Wisconsin Focus on Energy program had not existed, give me your best estimate of what this # would have been?

F20. [IF RESPONSE TO F14 IS SIGNIFICANTLY DIFFERENT THAN B11] Why do you say this?

**Effect of Program on Packaged Rooftop AC Units with VFDs**

- F21. [ASK ONLY IF THEY PROVIDED ESTIMATES FOR % OF PACKAGED ROOFTOP AC UNITS WITH VFDS SPECIFIED (QUESTION RP9)] You said earlier tha of roof-top air conditioning systems you [INSTALLED/SOLD] in the past year, [% FROM RP9] had VFDs specified for the system motors? If the Wisconsin Focus on Energy program had not existed, give me your best estimate of what this # would have been?

F22. [IF RESPONSE TO F14 IS SIGNIFICANTLY DIFFERENT THAN B11] Why do you say this?

- F23. Have you participated in any programs besides the Wisconsin Focus on Energy program that promote energy efficient HVAC/ space conditioning solutions? [IF THEY SAID IN C16. THAT THEY WERE NOT AWARE OF THE FOCUS ON ENERGY PROGRAM, INSTEAD SAY: "Have you participated in any programs that promote energy efficient HVAC/ space conditioning solutions?"]

F24. [IF COMPANY PARTICIPATED IN OTHER PROGRAMS] What were these other programs?

F25. [IF COMPANY PARTICIPATED IN OTHER PROGRAMS] What kind of incentives or services did these other programs provide your company?

- F26. [IF COMPANY PARTICIPATED IN OTHER PROGRAMS] On a scale of 1 to 10, where 1 is not at all important and 10 is very important, how important have these other programs been in your company's efforts to promote energy-efficient HVAC/ space conditioning solutions?

F27. Why do you give that rating?

- F27. In what ways could the Focus on Energy program be improved?

THANK YOU FOR YOUR TIME AND COOPERATION.