MEMORANDUM

To: Jonathon Jackson, AIC, and Jennifer Hinman, ICC Staff

From: Opinion Dynamics and Cadmus

Subject: AIC Heating and Cooling Program PY5 Dual Replacement Contractor Study

Date: July 22, 2013

As part of the PY5 evaluation, Opinion Dynamics and The Cadmus Group, Inc., (evaluation team) performed primary research to investigate standard market practice—as perceived by non-active registered (NAR) contractors[1]—occurring among contractors and customers regarding the simultaneous replacement of heating and cooling (HVAC) equipment. We asked questions on this topic to inform stakeholder discussions related to the Illinois Technical Reference Manual (TRM) regarding the likelihood of freeridership on when a second piece of equipment is purchased under Ameren Illinois Corporation (AIC)'s Residential Heating and Cooling Program.

The evaluation team offers the following conclusions.

- From 42% to 62% of the time, customers are likely to replace both heating and cooling equipment at the same time without any incentive. We can assume that this range reflects the standard market practice or freeridership level without any incentives. According to contractor opinion,
  - the $500 incentive would increase the likelihood of dual replacement (therefore reduceing freeridership) by about 5%
  - the $1,000 incentive would increase the likelihood of dual replacement (therefore reducing freeridership) by about 12%.

- NAR contractors have limited success promoting dual replacement on their own. More than 70% of them said they recommended simultaneous replacement of heating and cooling equipment either always or most of the time when they were on site to replace one or the other. More than 85% of the contractors said customers would follow through on their recommendation at least 50% of the time without a rebate. Thirty-two percent said their customers would act on the contractor's recommendation more than 90% of the time

[1] We did not talk to active contractors because only an NAR survey was planned for the PY5 evaluation.

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- Contractors reported that customers are motivated primarily by costs and said that the upfront cost were the main deterrent when customers did not act on the recommendation to replace heating and cooling systems at the same time.

The remainder of this memo provides the methodology and detailed results of our analysis of the standard market practice for simultaneous (dual) replacement of HVAC equipment for residential customers.

PROGRAM DESCRIPTION

The AIC Residential Heating and Cooling Program (the HVAC program) offers incentives to customers who purchase high-efficiency furnaces, boilers, air source heat pumps (ASHPs), ground source heat pumps (GSHPs), central air conditioners (CACs), and brushless furnace motors that are then installed by contractors who are HVAC program registered allies. The details of the program are these:

- The program year runs from June 1 to May 31.
- The program protocols specify sizing requirements, efficiency standards, and other elements (such as a matching indoor and outdoor coil requirement for new air conditioning equipment).
- The program provides sales and marketing training to educate the registered HVAC contractors on program requirements and benefits. The training, which is optional, covers building science basics, high-efficiency HVAC system payback analysis and marketing tips, and customer communication methods to promote high-efficiency equipment.

As shown in Table 1, the program's incentive levels vary, according to the type, efficiency of the new equipment, and whether this item was a replacement for equipment at its end of life. Contractors can provide a bonus (ranging from $200 to $500) to customers who replace equipment before it fails (Early Replacement).

Table 1. HVAC Rebate Differential for Early Replacement vs. Replace on Failure

Program Measure	Replace on Failure	Early Replacement
CAC/ASHP	≤14.9 SEER ASHP/CAC: $150 SEER 15-15.9 ASHP/CAC: $200 ≥SEER 16 ASHP/CAC: $300	≤14.9 SEER ASHP/CAC: $450 SEER 15-15.9 ASHP/CAC: $500 ≥SEER 16 ASHP/CAC: $600
New Gas Furnace	≥95%: $200 ≥97%: $300	≥95%: $400 ≥97%: $500
New Gas Boiler	≥90%: $400 ≥95%: $500	≥90%: $800 ≥95%: $1,000

AIC requires interested contractors to enter into a participation agreement that outlines the program and contractor responsibilities. Then, to obtain rebate reimbursement, AIC requires contractors to offer the incentive as a line item discount on the customer invoice (that is, the customer gets the discount upfront and the contractor may apply for reimbursement of the discount from AIC). AIC tracks reimbursement requests from registered contractors. It also categorizes as "NAR" those contractors who have not submitted reimbursement requests in the previous 12 months, but have entered into a participation agreement and had training opportunities.[2]

[2] Training is offered but optional.

METHODOLOGY

In May 2013, the evaluation team conducted a telephone survey of all 424 NAR registered, but non-active contractors (from a list provided by AIC); we stratified the list into 179 registered contractors who had never submitted a rebate application, and 245 who participated in previous program years, but not from April 2012-March 2013. We added eight questions to the planned HVAC participant survey to assess typical market practices for equipment dual replacement. We achieved a 24% response rate. Appendix B provides survey disposition and response rate details.

Within each NAR contractor stratum, we exhausted the list in an attempt to obtain 70 completed interviews, and achieved 65.[3] The evaluation team made between four and eight attempts to reach each contractor, and offered them a $25 gift card to participate in the survey.

Because of the need to attempt contact with everyone listed, any sampling errors are not random error, strictly speaking, but rather are associated with non-response. If non-response is unrelated to the survey subject, we could treat that error as random. In that case, the expected confidence limit would be ±9.4% at 90% confidence. However, there may be systematic reasons for non-response that are correlated with the survey. For example, differences in business size may exist between respondents and non-respondents. Thus, we cannot determine an exact confidence interval for the survey findings, but an uncertainty value of ±15% is cautious.

As shown in the survey in Appendix A, we asked these contractors about the following topics:

- Whether they promoted (recommended) early replacement of either: (1) heating equipment when the cooling equipment has failed; or (2) cooling equipment when the heating equipment has failed;
- How customers responded to their recommendations; and
- Hypothetically, how they believed customers would have responded to an incentive for replacing the non-failed unit at the same time with high-efficiency equipment. (Note that ICC staff suggested we ask about incentive levels of $500 and $1,000.[4])

We also asked these NAR contractors about their program experience and why they are not currently active in the program. (We will report on these responses in the PY5 evaluation report.)

Baseline Dual Replacement Analysis: Methodology

The evaluation team used the responses to questions D2 and D4 to estimate standard market practices regarding dual replacements. (That is, once customers decided to replace one heating or cooling equipment unit, how likely were they to replace the other working unit?) Next, to estimate the incentive impact on dual replacement decisions, we considered the responses to questions D7 and D8.

[3] We discarded the first 15 surveys after determining that some questions were confusing to respondents and needed to be revised.

[4] Program incentives are for purchasing high-efficiency units only. In these questions, we ask about the potential for incentives to influence dual replacements with high-efficiency equipment. Since these contractors have not been taking advantage of the program incentive, we assumed they do not think these proposed incentives are in addition to the current incentives.

We estimated the response rate for each contractor at the baseline level, the $500 incentive level, and the $1,000 incentive level using questions D2, D4, D7, and D8. The responses to Question D2 were categorical. To estimate the dual replacement baseline, we assigned percentage ranges to these subjective, categorical responses after the surveys were completed (Table 2).

Table 2. Method for Converting D2 Responses to Value Ranges

Question	Response Option	Value or Range (Assigned after the survey)
D2. About how often do you recommend replacing both heating and cooling equipment when a customer decides to replace one or the other?	Always	91 to 100%
	Most of the Time	>51 to 90%
	Some of the Time	>11 to 50%
	Never	0 to 10%

We used each individual's discrete responses to question D4, in which contractors provided their best estimates, to approximate how often customers followed through on their dual replacement recommendation without an incentive, and multiplied this by D2 to establish the baseline.

The evaluation team followed these steps to calculate both dual-replacement standard market practice and the potential for incentives to increase dual replacements with high-efficiency equipment.

1. To quantify an estimate for standard market practice for each individual, we multiplied the high end and low ends of our assigned D2 response ranges by the D4.
2. To measure the two incentive impacts ($500 and $1,000), we multiplied each D2-assigned response by the high and low ends of the D7 and D8 responses.
3. Regarding the follow- up questions D7 and D8, we did not ask those contractors who reported >90% for D4 (that is, there was a greater than 90% expectation that the customer would follow through on the contractor recommendation without an incentive). We assumed their responses to D7 and D8 would also be in the 90% to 100% range. We also did not ask these questions of contractors who never recommended dual replacement.[5]
4. We then calculated the average of all individual responses to obtain the high and the low range for each estimate: (a) an estimated range of customers that will proceed with dual replacement without AIC incentives; (b) the perceived influence of a $500 incentive to dual replace with high-efficiency equipment; and (c) the perceived influence of a $1,000 incentive (see Table 3).
5. To account for differences that might exist between the responses of two contractor groups (either never participated or did not participate in the last 12 months), we weighted the final average by the number of contractors in each strata in the original contractor population from which the sample was derived.[6]

[5] We added these questions to the survey that was already quite long; we attempted to minimize the number of questions to ensure a reasonable response rate from the limited population.
[6] We used the ratio of the number of contractors in each strata (1: 179/424; 2: 245/424) to weight the final results.

Table 3. Dual Replacement Decision-Making Estimate

Estimate	Formula for Individual Response Estimates
Baseline (w/no incentive)	(D2low – D2high) x (D4)
Customer Decision with $500 incentive	Range: (D2low x D7low) – (D2high x D7high)
Customer Decision with $1,000 incentive	Range: (D2low x D8low) – (D2high x D8high)

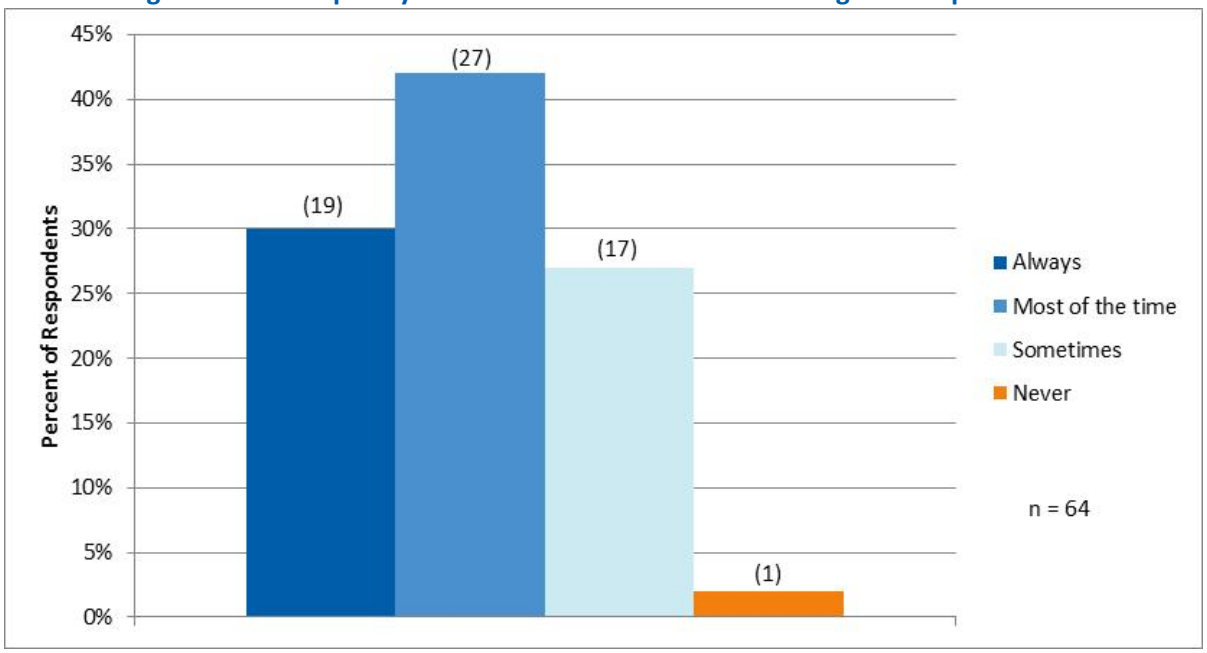
FINDINGS

The evaluation team's analysis revealed these findings.

NAR Contractor Dual Replacement Promotion Practices

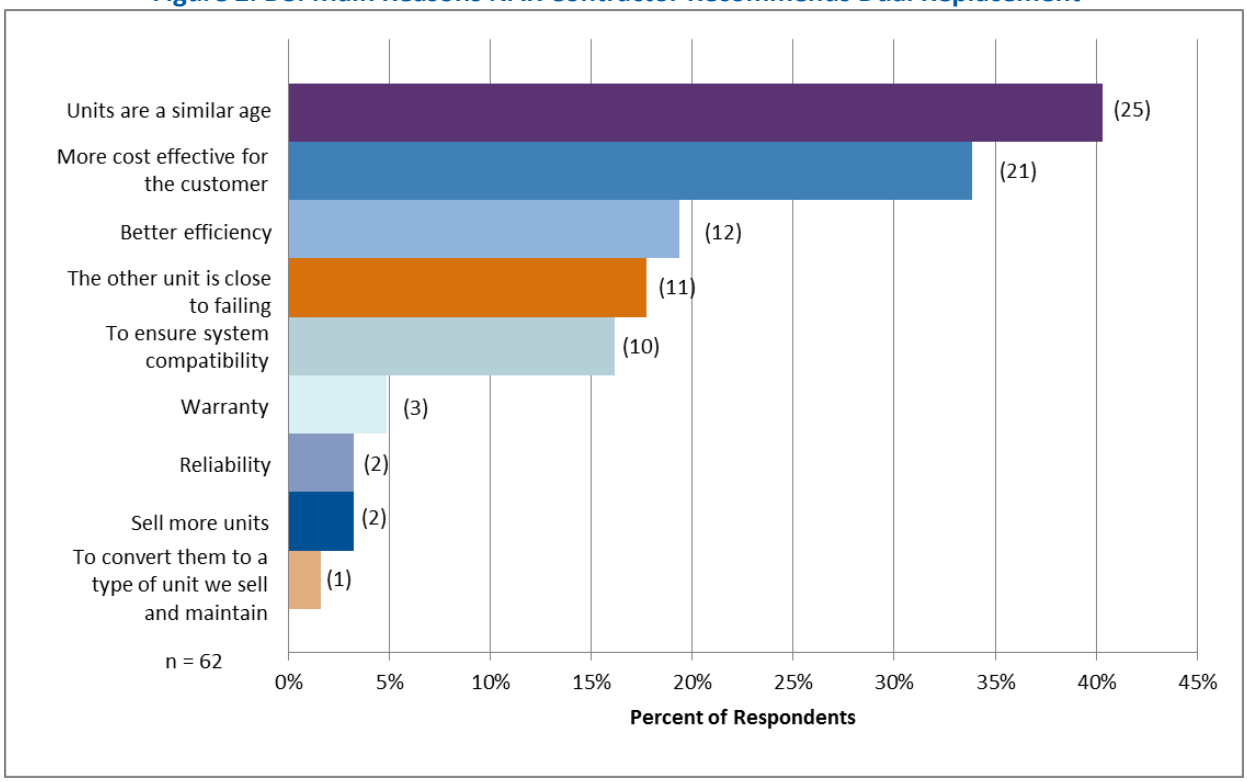
More than 70% of NAR contractors recommend dual replacement of customers' heating and cooling systems "most of the time" or "always" (Figure 1).

Figure 1. D2. Frequency of NAR Contractors Recommending Dual Replacement



Because the follow-up question (D3) allowed respondents to provide multiple answers, we received 87 responses from the 62 contractors who answered it. The two most common responses were that they made this recommendation when the units were of the same age or when the contractors believed the option was cost-effective (reduced installation costs) for the customer (Figure 2). The next set of likely reasons included "better efficiency" (operational; n=12), "the other unit is close to failing" (n=11,) and "to ensure system compatibility"(n=10; Table 4).

Figure 2. D3. Main Reasons NAR Contractor Recommends Dual Replacement*



* Respondents were allowed to give multiple responses; responses classified as "other" were categorized and combined. Full responses can be found in Table 4. To calculate percentages, we divided by total "n" the number of people who responded to the question, after we removed "Don't Know" and "Refused" from the base. Therefore, the total number of answers adds to more than 100%.

The NAR contractors mentioned other reasons such as, "better efficiency," "ensure system compatibility," and the "other system was close to failure."

A very small percentage (3 or .05%) of contractors said they made this recommendation for their own benefit, such as being able to sell or maintain more units. The verbatim responses were categorized into groups, as presented in Figure 2. We also provide the raw responses in Table 4 to indicate how these were categorized.

Table 4. Verbatim Responses for Categories Provided in Figure 2

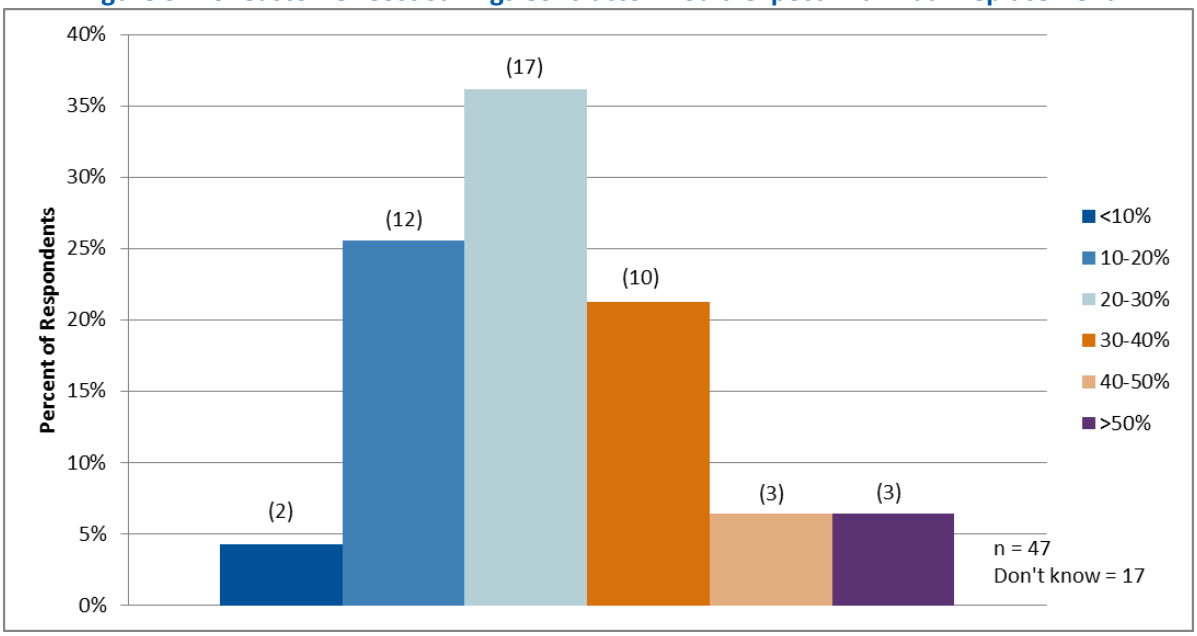
Q D3: Respondent Reason for Recommending Replacing Both Units at the Same Time Verbatim Responses	
Answer Category	**Verbatim Response**
Better efficiency	*"A matched system gets better efficiency."*
	"Better efficiency."
	"Better efficiency."
	"The energy efficiency is better."
	"The higher SEER rating for the air conditioners."
	"It gets your whole energy efficiency level out of the equipment installation."
	"Efficiency"
	"Energy efficiency"
	"Higher efficiency"
	"The new freon and higher efficiency units."
Better efficiency, Warranty	*"Warranties and efficiency."*
	"Warranty and efficiency,"
Warranty	*"Keep them both under warranty."*
Units are a similar age	*"Dependent on the age of the equipment."*
	"The age of the equipment."
To ensure system compatibility	*"To have a matched system."*
	"To create a matched system."
	"The ease of installation; if it's going to be different widths or different heights, it's easier."
	"System match."
The other unit is close to failing	*"The condition of the unit."*
	"If it's broken."
	"Because its needed."
	"If it's needed."
	"The R-22 factor and age of equipment."
More cost effective for the customer	*"The initial cost is cheaper than if they wait."*
	"No bills for 10 years"
	"The potential for additional cost that the customer will have for additional work."
	"The customer can save upfront on the installation costs."
Reliability	*"increased reliability."*
	"Quality of equipment"

Customer Response to Contractor Promotion

Seventeen of 64 contractors (26%) said they could not estimate what the customers' cost savings experience might be with dual replacement of both heating and cooling systems. Of the remaining 47 contractors, 29 (62%) said that with dual replacement, they expected the customer to have cost savings

ranging from 10% to 30%.[7] As shown in Figure 3, most of these contractors' estimates were toward the high end of that range (from 20% to 30%).[8]

Figure 3. D6. Customer Cost Savings Contractor would expect with Dual Replacement



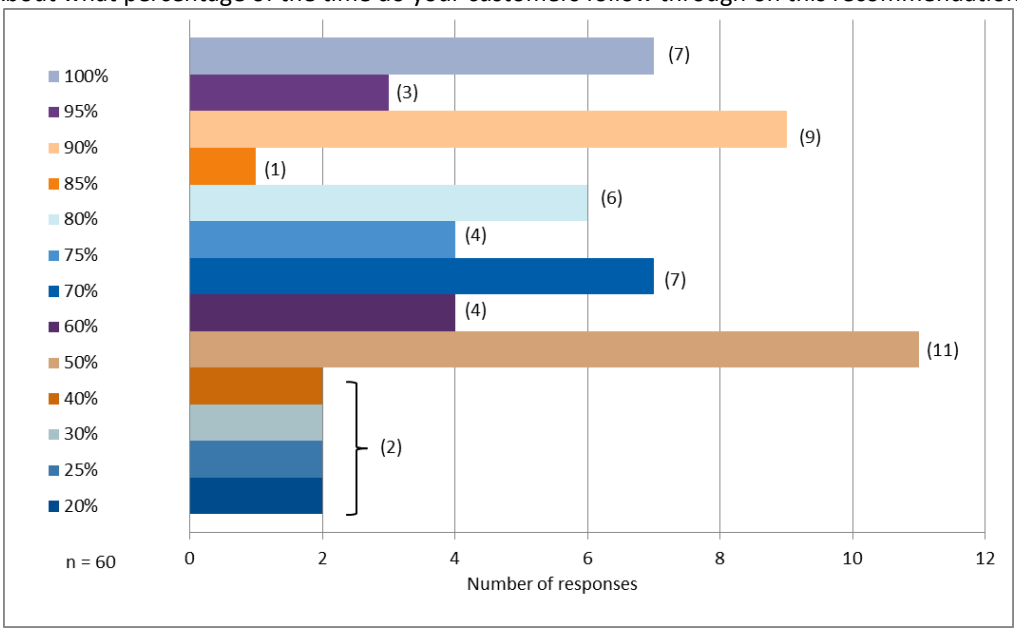
The evaluation team asked contractors how likely the customer was to follow through on a recommendation to replace both heating and cooling units at the same time (question D4). Of the 60 contractors who responded, 19 (32%) said the customer was likely to act on their recommendation at least 90% of the time (Figure 4).

[7] We kept the number of survey questions to a minimum to ensure that we could obtain a significant number of responses from the limited population of contractors. Therefore, we did not ask follow-up questions and cannot determine whether contractors considering customer cost estimates similarly.

[8] We captured responses to D6, D7 and D8 in 10% bin ranges, then re-grouped them to offer the most information with the fewest bins for easy comparison between questions. These new bin ranges were <50%; 50-69%; 70-89% and ≥90%.

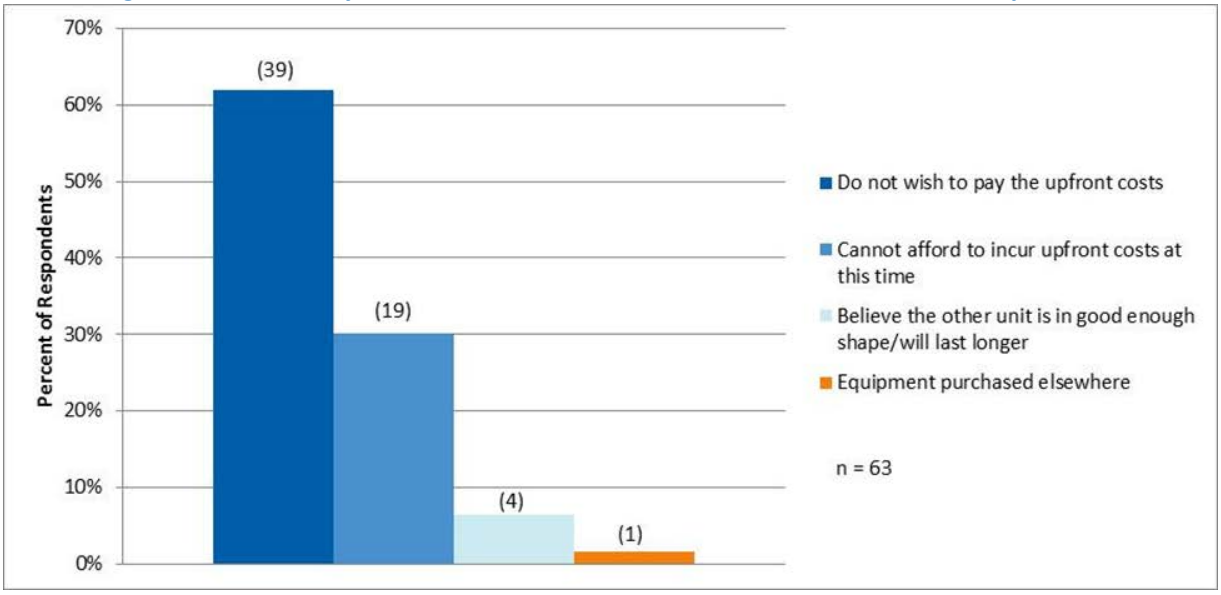
Figure 4. D4. Percent of the Time Customer Likely to follow Through on Contractor Dual Replacement Recommendation (with no rebate).

"About what percentage of the time do your customers follow through on this recommendation?"



Contractors said that a lack of funds was the primary reason customers did not replace both systems at the same time, even when recommended to do so (Figure 5). This supports the findings shown in Figure 5 and Figure 6, which suggest that an increased rebate would convince more customers to invest in higher-efficiency equipment.

Figure 5. D5. Primary Reason Customers do not choose to invest in Dual Replacement?

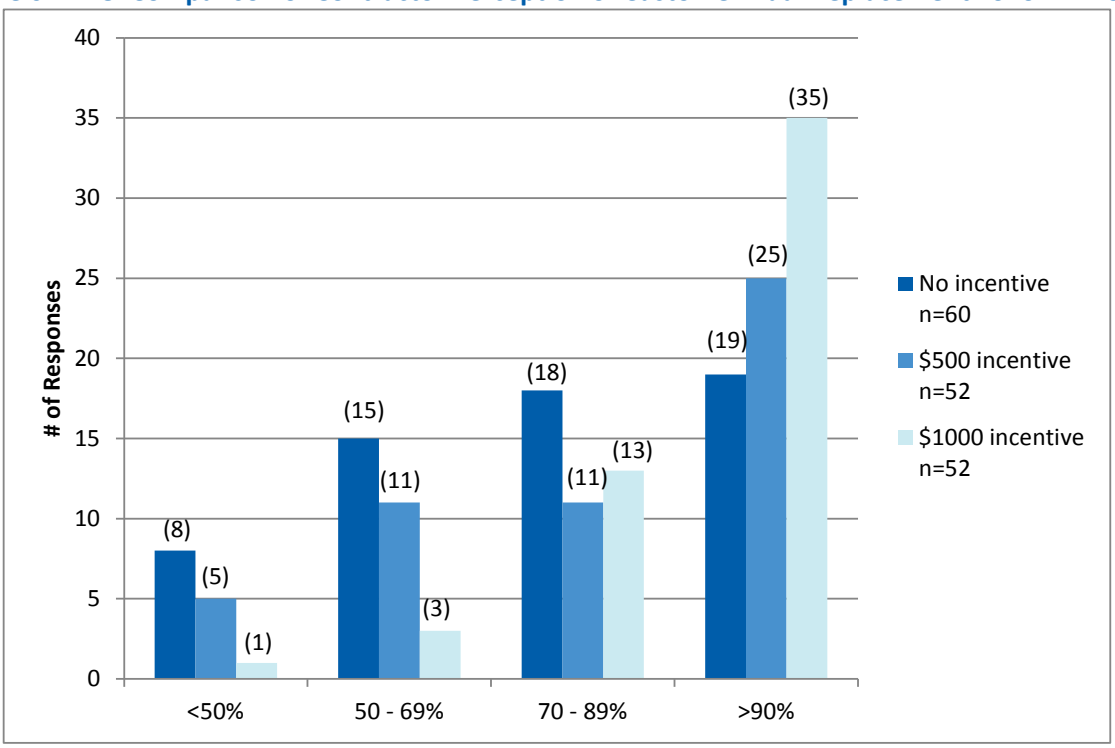


We then asked the 41 contractors who did not say that the customer was likely to act on their recommendation at least 90% of the time how they thought a $500 rebate might influence their

customers to act (Figure 6). Six of 33 contractors thought that customers would follow through 90% or more of the time with the $500 rebate. Combining the baseline of 19 respondents and $500 rebate responses results in a total of 25 contractors who said customers would act on their recommedations at least 90% of the time.

Similarly, an additional 10 contractors said that >90% of their customers would likely follow their recommedation if offered a $1,000 rebate. Thus, with increased incentives, more than half (35) of the contractors expected >90% customers to replace both heating and cooling units at the same time (Figure 6).

Figure 6. D7-8. Comparison of Contractor Perception of Customer Dual Replacement Follow Through



When we asked contractors what Ameren could do to motivate customers towards dual-unit replacement, 10 out of 65 contractors responded. Most (nine) said Ameren should either offer a rebate or increase the rebate. (Note that although AIC doesn't currently rebate specifically to influence dual replacements, it does offer rebates for replace on failure or for early replacements).[9] One respondent suggested that AIC advertise in *Better Homes and Gardens* and on television.

As Ameren's current rebate offer for equipment replaced before failure (Figure 1) could be considered a bonus or packaged rebate, it is possible these contractors are unaware of that offer.

[9] Since these contractors do not submit applications, they are likely not aware of the current rebate offering details (and we did not describe current rebate offers to respondents).

Dual Replacement Standard Market Practice and Contractor Estimate of Incentive Influence

Using the responses to questions D2, D4, D7 and D8, the evaluation team calculated the likelihood that customers would replace their heating and cooling equipment at the same time, based on the contractor recommendation. We found that, on average, customers were likely to choose dual replacement between 42% and 62% of the time as the standard market practice, depending on how often the contractor recommended doing so (Table 5). With a specific $500 or $1,000 incentive to replace the second unit with high-efficiency equipment, contractors estimated that this would increase the likelihood of customers acting on the contractor's recommendation by an average of 4.6% and 12.3%, respectively.

Table 5. Dual Replacement Decision-Making Estimate

Decision Basis	Questions	Range of Response	
		Low	High
Baseline (no incentive)	Baseline dual replacement (D2xD4)	41.6%	61.6%
Customer Decision with $500 incentive	Dual replacement likelihood (D2xD7):	42.0%	70.1%
Customer Decision with $1,000 incentive	Dual replacement likelihood (D2xD8):	48.0%	79.7%
Lift with $500 incentive:		0.5%	8.6%
Lift with $1,000 incentive:		6.4%	18.1%

CONCLUSIONS

The evaluation team offers the following conclusions.

- From 42% to 62% of the time, customers are likely to replace both heating and cooling equipment at the same time without any incentive. We can assume that this range reflects the standard market practice or freeridership level without any incentives. According to contractor opinion,
  - the $500 incentive would increase the likelihood of dual replacement (therefore reducing freeridership) by about 5% (the average of 0.5 and 8.6%)
  - the $1,000 incentive would increase the likelihood (reducing freeridership) by about 12% (the average of 6.4 and 18.1%).

  We consider the increased participation with incentives estimates to be conservative, since these contractors do not already take advantage of the current program incentives.

- NAR contractors have limited success promoting dual replacement on their own. More than 70% of them said they recommended simultaneous replacement of heating and cooling equipment either always or most of the time when they were on site to replace one or the other. More than 85% of the contractors said customers would follow through on their recommendation at least 50% of the time without a rebate. Thirty-two percent said their customers would act on the contractor's recommendation more than 90% of the time
- Contractors reported that customers are motivated primarily by costs and said that the upfront cost were the main deterrent when customers did not act on the recommendation to replace heating and cooling systems at the same time.

APPENDIX A

Survey Questions

The evaluation team asked NAR contractors eight questions to understand their promotion of and customer response to dual replacement of heating and cooling units. We focused these questions on how often contractors' recommended dual (early) replacement of a second HVAC unit when on-site to replace a unit at the customer's request, the customers' responses, and what incentive level might affect those responses. NAR contractors answered the following questions as part of a larger process evaluation survey:

1. (D2.) About how often do you recommend replacing both heating and cooling equipment when a customer decides to replace one or the other? Would you say always, most of the time, sometimes, or never?

2. (D3.) What are the main reasons you would recommend replacing both units at the same time? (we allowed for open-ended responses, but included categories below for coding purposes)
    1. (Sell more units)
    2. (More cost-effective for the customer)
    3. (To ensure system compatibility)
    4. (The other unit is close to failing)
    5. (To convert them to a type of unit we sell and maintain)
    6. (Units are a similar age)

3. (D4.) About what percentage of the time do your customers' follow through on this recommendation? *(numeric, open-ended question)*

4. (D5.) In your opinion, what is the primary reason customers do not follow through on the recommendation to replace both units at the same time?
    1. Do not wish to pay the upfront costs
    2. Cannot afford to incur upfront costs
    3. Believe the other unit is in good enough shape/will last longer
    4. Moving soon

5. (D6.) About what percentage of cost savings, *[If Q2 ≠ B, say "if any"],* would you expect customers to see by replacing both units at once versus one later than the other?
    1. (No cost saving)
    2. (Less than 10% cost savings)
    3. (10% to less than 20%)
    4. (20% to less than 30%)
    5. (30% to less than 40%)
    6. (40% to less than 50%)
    7. (50% to less than 60%)
    8. (60% to less than 70%)
    9. (70% to less than 80%)
    10. (80% to less than 90%)
    11. (90% or more)
    98. (Don't know)
    99. (Refused)

6. (D7.) *[If D2=always or most of the time" and D4<90%].* About what percent of the time do you think customers would follow through on the recommendation to replace both units if Ameren provided a discount of $500 to replace the second unit with a high-efficiency unit? (we allowed for open-ended responses, but included categories below for coding purposes)
    1. (Never)
    2. (Less than 10% of the time)
    3. (10% to less than 20%)
    4. (20% to less than 30%)
    5. (30% to less than 40%)
    6. (40% to less than 50%)
    7. (50% to less than 60%)
    8. (60% to less than 70%)
    9. (70% to less than 80%)
    10. (80% to less than 90%)
    11. (90% or more)
    98. (Don't know)
    99. (Refused)

7. (D8.) *[Ask if D7<90%].* About what percent of the time do you think customers would follow through on the recommendation to replace both units if Ameren provided a discount of $1,000 to replace the second unit with a high-efficiency unit? (we allowed for open-ended responses, but included categories below for coding purposes)
    1. (Never)
    2. (Less than 10% of the time)
    3. (10% to less than 20%)
    4. (20% to less than 30%)
    5. (30% to less than 40%)
    6. (40% to less than 50%)
    7. (50% to less than 60%)
    8. (60% to less than 70%)
    9. (70% to less than 80%)
    10. (80% to less than 90%)
    11. (90% or more)
    98. (Don't know)
    99. (Refused)

8. (D9.) *[Ask if D5≠1 or 2].* How do you think Ameren could motivate more customers to replace both units at the same time when only one replacement is planned? *[open-ended question]*

APPENDIX B

Survey Dispositions and Response Rate

<to be added by ODC>