

# COMED ADVANCED THERMOSTATS RESEARCH

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2018 PARTICIPANT SURVEY RESULTS

2020-01-21

NAVIGANT

# INTRODUCTION

**In 2018, Navigant conducted a survey of ComEd customers who had recently installed advanced thermostats**

## **Research Objectives**

1. Gain an understanding of customer interaction with their thermostat before and after installation of an advanced thermostat
2. Provide context to understand 2019 evaluation research results

## **Population**

ComEd customers who received a rebate for an advanced thermostat in PY9

## **Timeline**

August 2018 – Survey reviewed by Advanced Thermostat Subcommittee

September / October 2018 – Survey data collected

# OUTLINE

This summary focuses on the following topics:

## Survey Reliability

- What is the response rate?
- How do survey respondents compare to the full population of program year thermostat participants?

## Thermostat Installation

- What is the approximate *in-service rate*?
- Are there any *major events* coinciding with thermostat installation?

## Thermostat Engagement

- How engaged are customers in *managing* their thermostats?
- How do *thermostat setpoints* compare before and after installation?



SURVEY  
RELIABILITY

# SURVEY RELIABILITY

## Questions

- What is the response rate?
- How do the survey respondents compare to the full population of program year thermostat participants?

## Summary

- Although the survey sample size is relatively small ( $n = 1,505$ ) compared with the full population of thermostat rebate recipients, available data does not suggest that the survey respondent population is substantially different from the full population of thermostat rebate recipients

# RESPONSE RATE

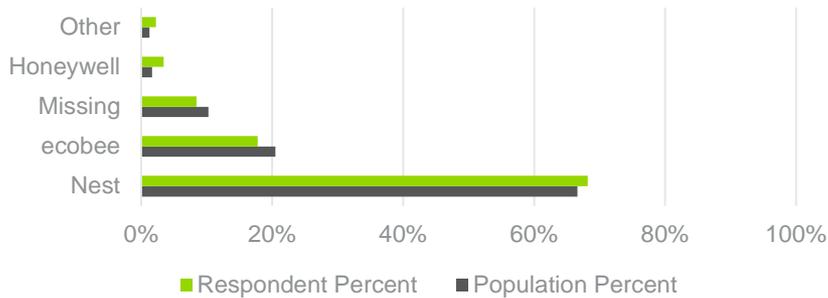
Navigant was limited by the number of respondents who could be emailed, which greatly reduced the available survey population.



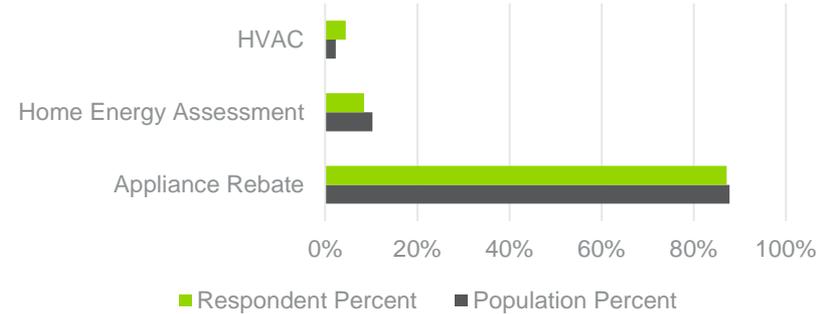
# COMPARISON OF RESPONDENTS AND POPULATION

Comparison of key characteristics shows survey respondents appear similar to the overall population of participants.

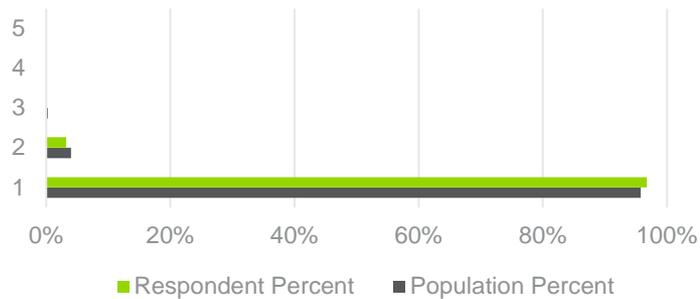
### Manufacturer



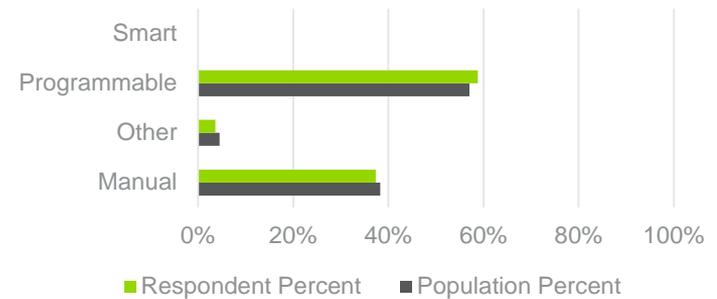
### Program



### Number of Thermostats



### Baseline Thermostat



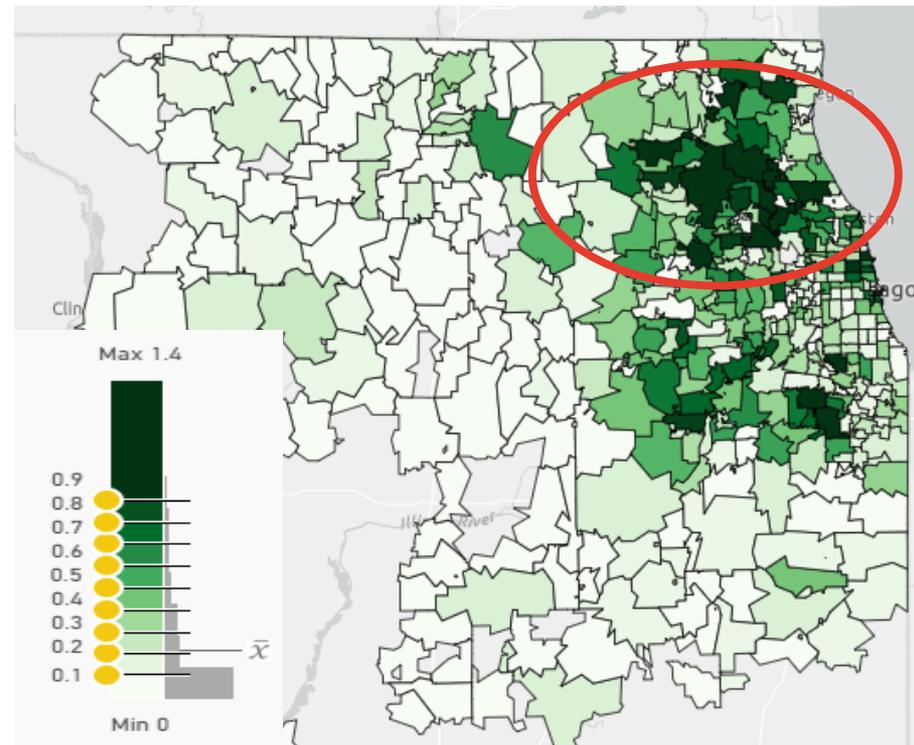
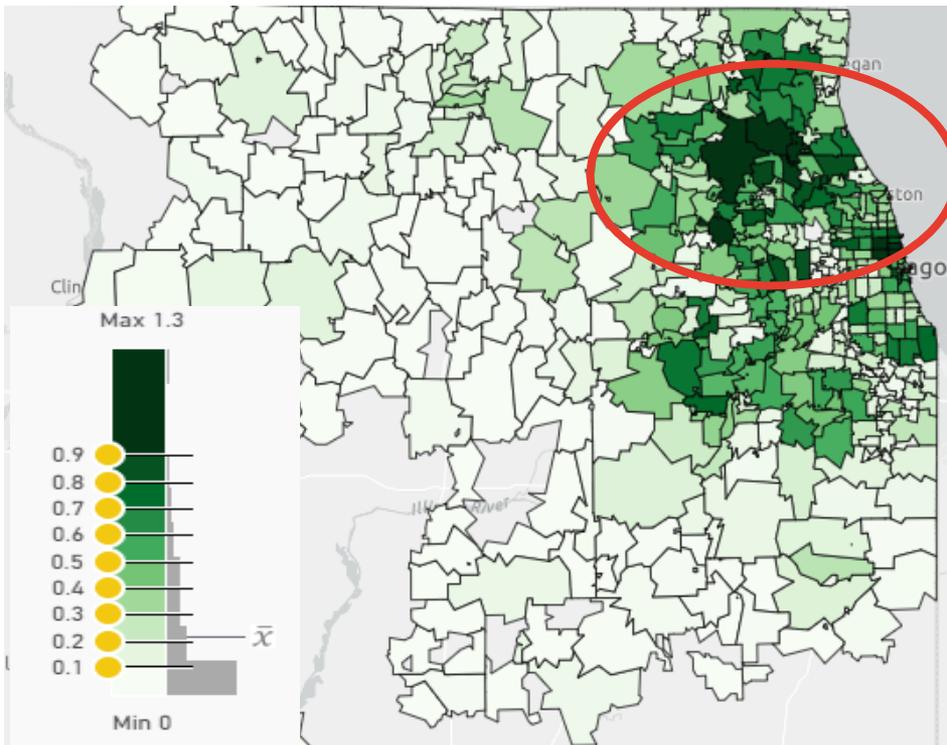
Note: The population refers to all ComEd ARP, HEA, and HVAC PY9 Smart Thermostat Customers

# COMPARISON OF RESPONDENTS AND POPULATION

The distribution of respondents by ZIP code showed higher concentrations outside of Chicago, but was similar overall with the population of rebate recipients.

Population of Rebate Recipients

Respondents





# THERMOSTAT INSTALLATION

# THERMOSTAT INSTALLATION

## Questions

- What is the approximate in-service rate?
- Do customers have air conditioning and is it controlled by the thermostat?
- What thermostats did customers have prior to installation?
- Are there any major events coinciding with thermostat installation?

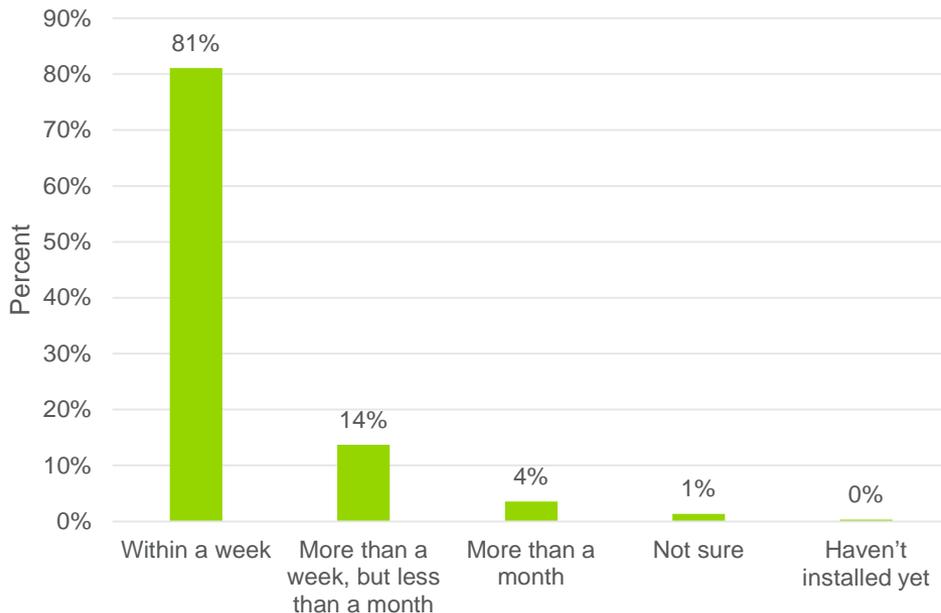
## Summary of Results

- The in-service rate is near 100%, with most customers still living in the home where their thermostat was installed.
- 97% of respondents have central air conditioning in their household and ~100% of respondents with AC have their central AC controlled through their smart thermostat.
- 63% of respondents reported replacing a programmable thermostat .
- 15% of participants indicated a change in occupancy (either up or down).
- 15% of participants indicated a change in energy usage, mostly citing installing other EE measures.

# IN-SERVICE RATE

The respondent in-service rate is near 100%, with most customers still living in the home where their thermostat was installed.

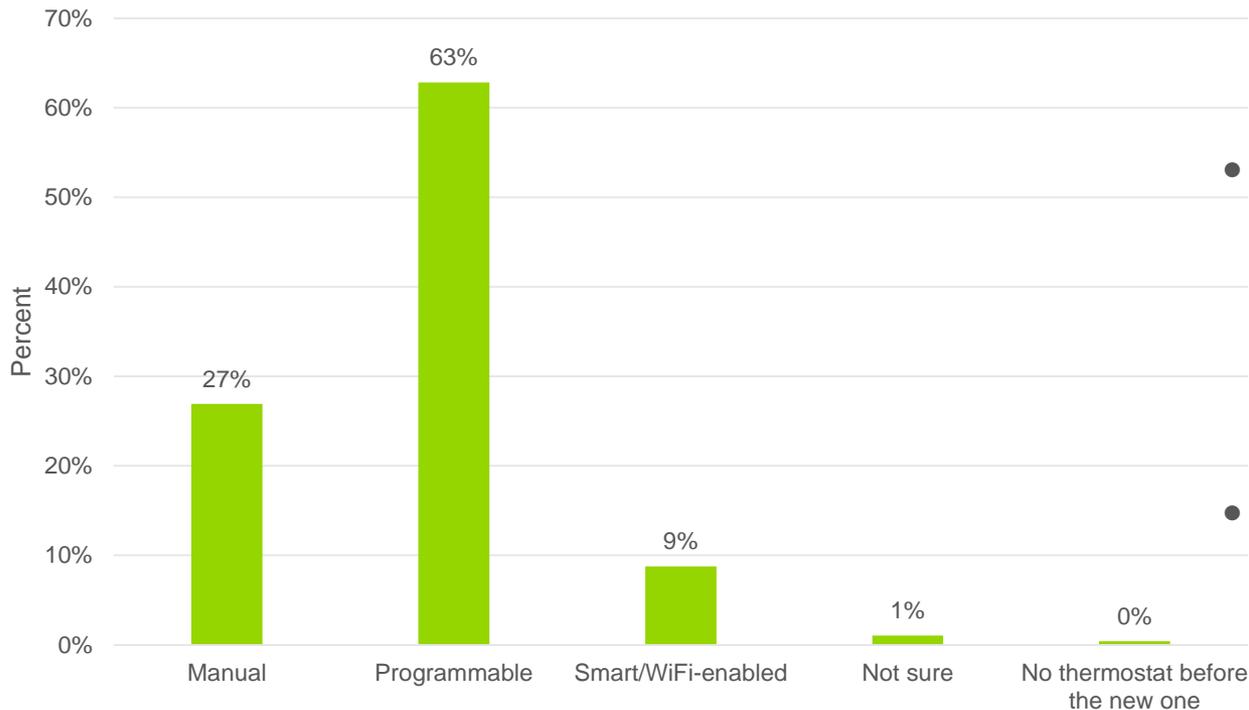
Approximately how long after purchasing the new thermostat did you install it? (n = 1,328)



- 98% of respondents still live in the home where the new thermostat was installed.
- 89% of respondents recall receiving a rebate from ComEd for the thermostat.
- 97% of respondents have central air conditioning in their household.
- ~100% of respondents with AC have their central AC controlled through their smart thermostat.

# BASELINE THERMOSTAT DETAILS

What type of thermostat did you have controlling your air conditioner or heat pump prior to purchasing the new thermostat? (n = 1230)



Note: In slide 7, Navigant compared respondents with the survey population using tracking data. This response is directly from the survey.

\*OT2. Prior to installing the new thermostat, did you have your old thermostat programmed to automatically cool to different temperatures at different times of day during the summer?

\*\*OT3. How often did you override the programmed schedule on the old thermostat?

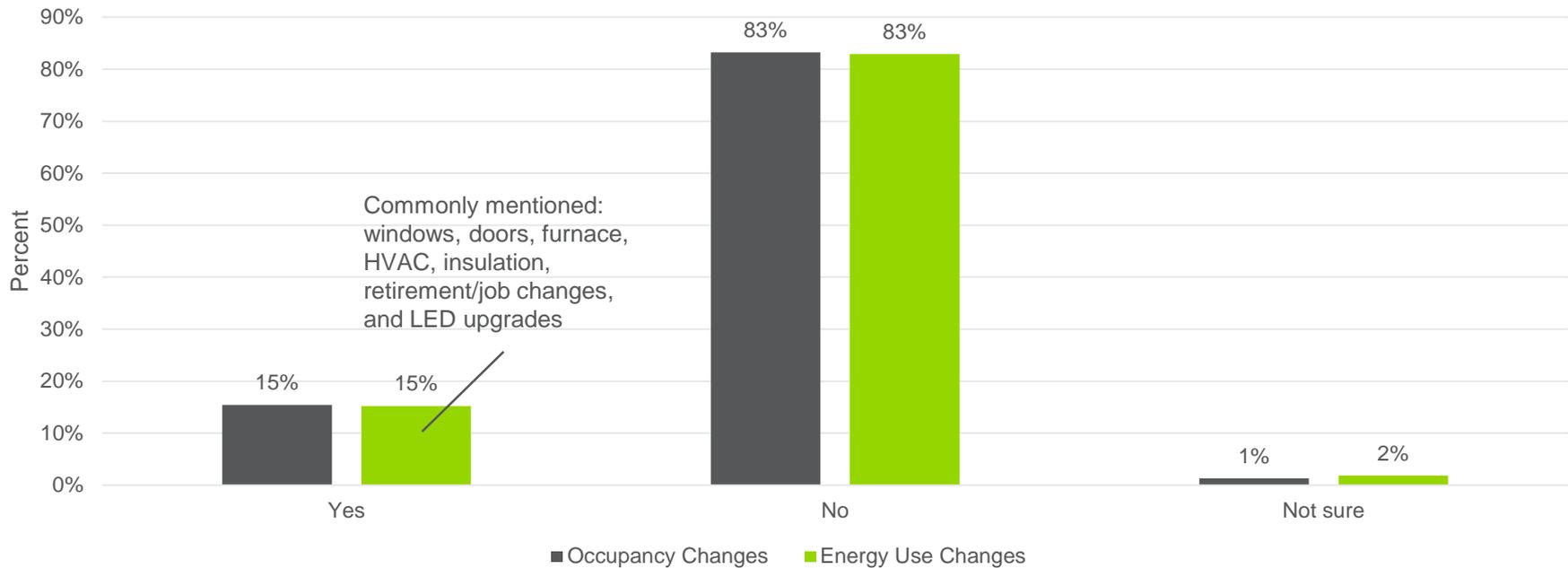
- 63% of respondents had a programmable thermostat prior to purchase
- 70% of respondents with a programmable or smart thermostat used a programmed schedule to adjust the temperature\*
- 49% of respondents frequently overrode the programmed schedule, while 48% of respondents rarely or never overrode the schedule\*\*

# COINCIDENT EVENTS (SELF-SELECTION BIAS)

## Are there any major events coinciding with thermostat installation?

28% of respondents indicated they had occupancy and/or energy use changes coinciding with the purchase of their thermostat.

Occupancy/Energy Use Changes Near Thermostat Purchase



Note: Percentages may not add to 100% due to rounding.

CC2. Did the number of people living in your home change around the time that you purchased the new thermostat? Did anyone leave or join your household? (n = 1,128)

CC3. Did you make any changes to your home that would significantly affect your energy usage around the time that you purchased the new thermostat? E.g. home addition, high-use equipment like pool pump, electric vehicle, or solar panels (n = 1,122)

# COINCIDENT EVENTS (SELF-SELECTION BIAS)

Out of 211 responses reporting an energy use change, the most common included windows, HVAC system (e.g. AC, furnace), and insulation.

Energy Use Change Coinciding with Installation	Frequency	% of Responses
Windows	34	16.1%
Furnace Replacement	23	10.9%
Insulation	23	10.9%
AC Replacement	22	10.4%
Replaced HVAC System	19	9.0%
LED Lighting	9	4.3%
Occupancy Change	7	3.3%
Doors	6	2.8%
Pool Pump	5	2.4%
Electric Vehicle	4	1.9%
Roof	4	1.9%
Schedule Change - Home More	4	1.9%
Other	51	24.2%
<b>Total</b>	<b>211</b>	<b>100%</b>

Note: Responses with fewer than 4 responses were grouped as "Other."

Note: These responses came from verbatims of respondents who answered "Yes" to CC3

CC3. Did you make any changes to your home that would significantly affect your energy usage around the time that you purchased the new thermostat? E.g. home addition, high-use equipment like pool pump, electric vehicle, or solar panels (n = 1,122)



# THERMOSTAT MANAGEMENT

# THERMOSTAT MANAGEMENT

## Questions

- How engaged are customers in managing their thermostats?
- How do thermostat setpoints compare before and after installation?

## Summary

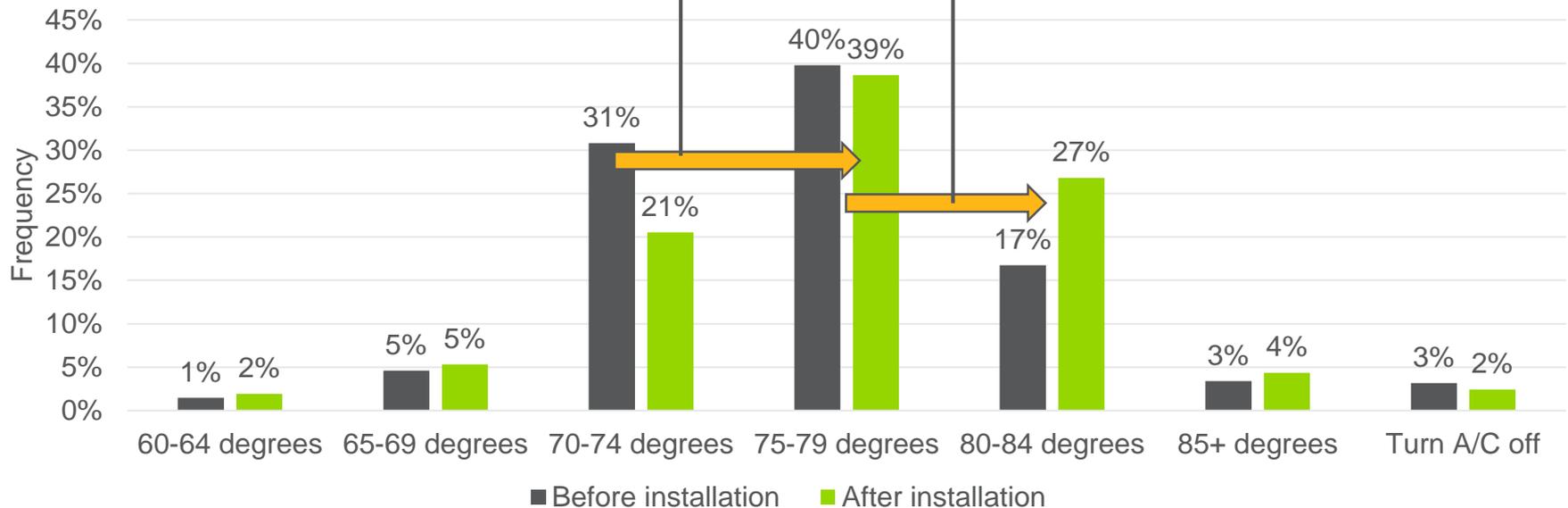
- Reported setpoints during the **daytime when people are not home showed an increase** after smart thermostat installation; however, reported setpoints **for all other times of day showed little or no change**. (i.e., participants believe they are now only using more efficient set point schedules while away from home)
  - Navigant's analysis of ODC's state-wide survey aligned with these results
- When their home was unoccupied for multiple days, many respondents switched from daily engagement (actively setting back their thermostat to a higher temperature or turning off their AC) to relying on the thermostat by using an 'away' mode feature.

# SETPOINT BEHAVIOR

Setpoints during the *daytime when people are not home* showed an increase after installation.

30% of respondents who reported **70-74°F before installation** reported **75-79°F after installation**

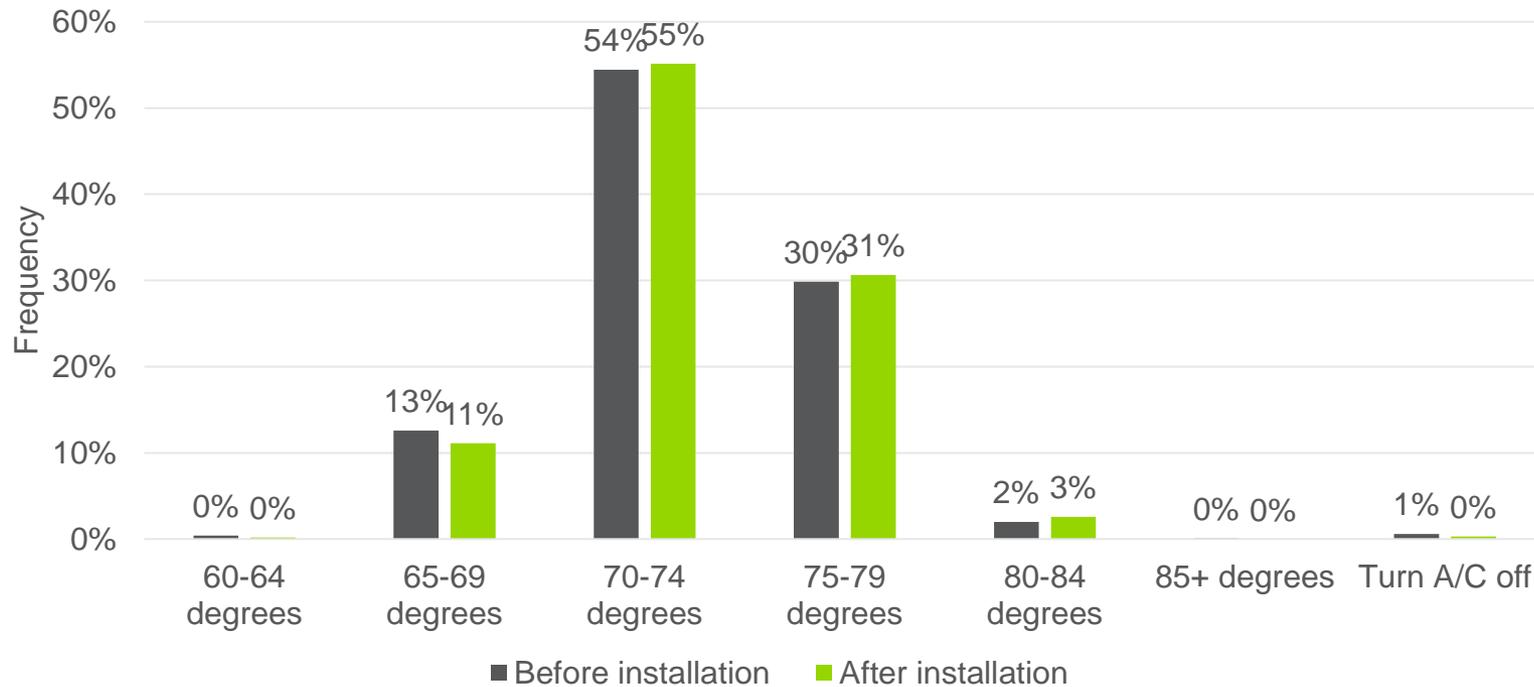
20% of respondents who reported **75-79°F before installation** reported **80-84°F after installation**



P5.1. Prior to installing the new thermostat, what temperature did you set the thermostat to most often during the summer during the day when no one is home? (n = 412)  
P7.1. Since installing the new thermostat, what temperature do you prefer the thermostat adjust to during the summer during the day when no one is home? (n = 414)

# SETPOINT BEHAVIOR

Setpoints during the *daytime when people are home* showed little change before vs after installation.

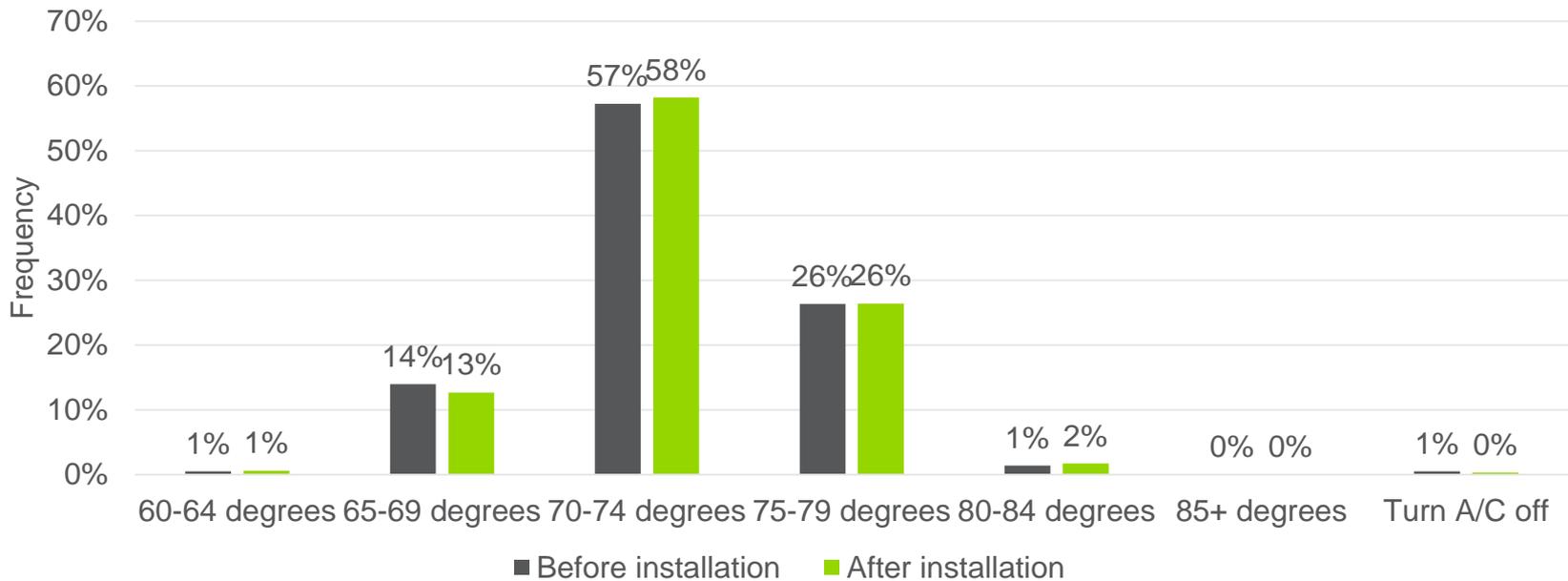


P5.2. Prior to installing the new thermostat, what temperature did you set the thermostat to most often during the summer during the day when people are home and awake? (n = 1,001)

P7.2. Since installing the new thermostat, what temperature do you prefer the thermostat adjust to during the summer during the day when people are home and awake? (n = 999)

# SETPOINT BEHAVIOR

Setpoints during the *evening when people are home* showed little change before vs after installation.

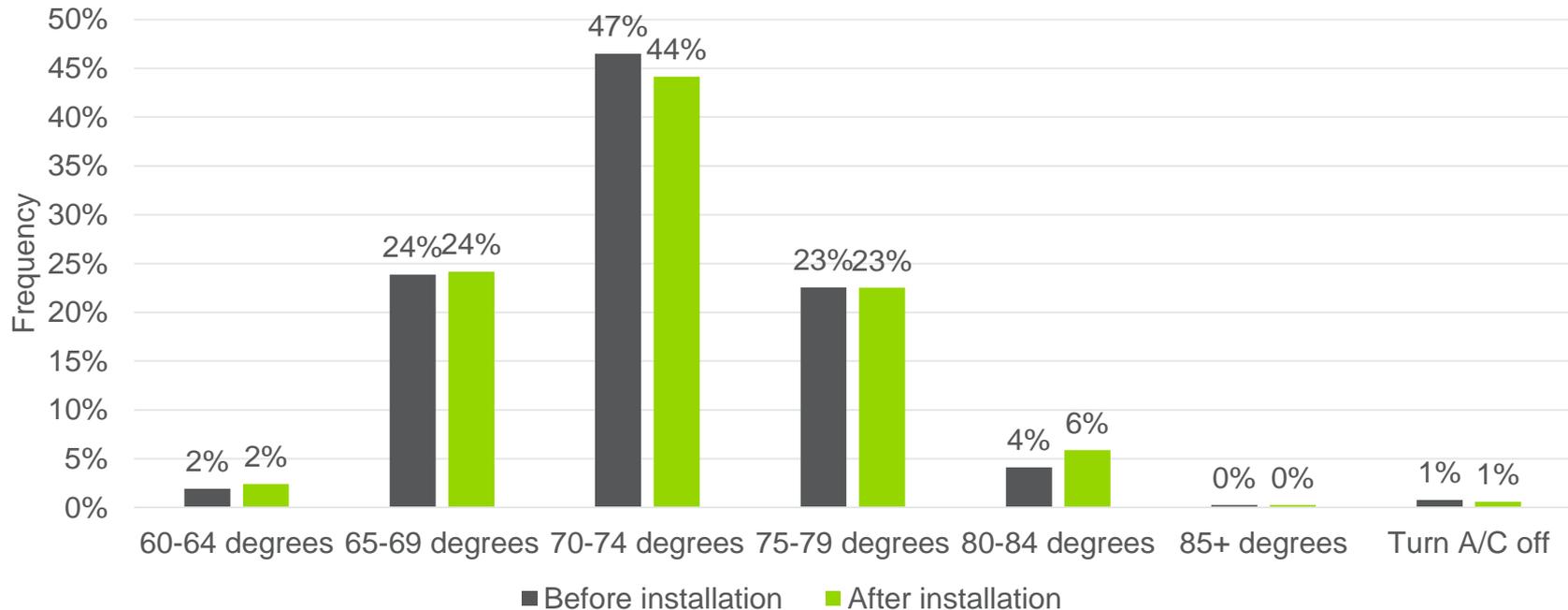


P5.3. Prior to installing the new thermostat, what temperature did you set the thermostat to most often during the summer during the evening when people are home and awake? (n = 1,146)

P7.3. Since installing the new thermostat, what temperature do you prefer the thermostat adjust to during the summer during the evening when people are home and awake? (n = 1,158)

# SETPOINT BEHAVIOR

Setpoints during the *night when people are asleep* showed little change before vs after installation.

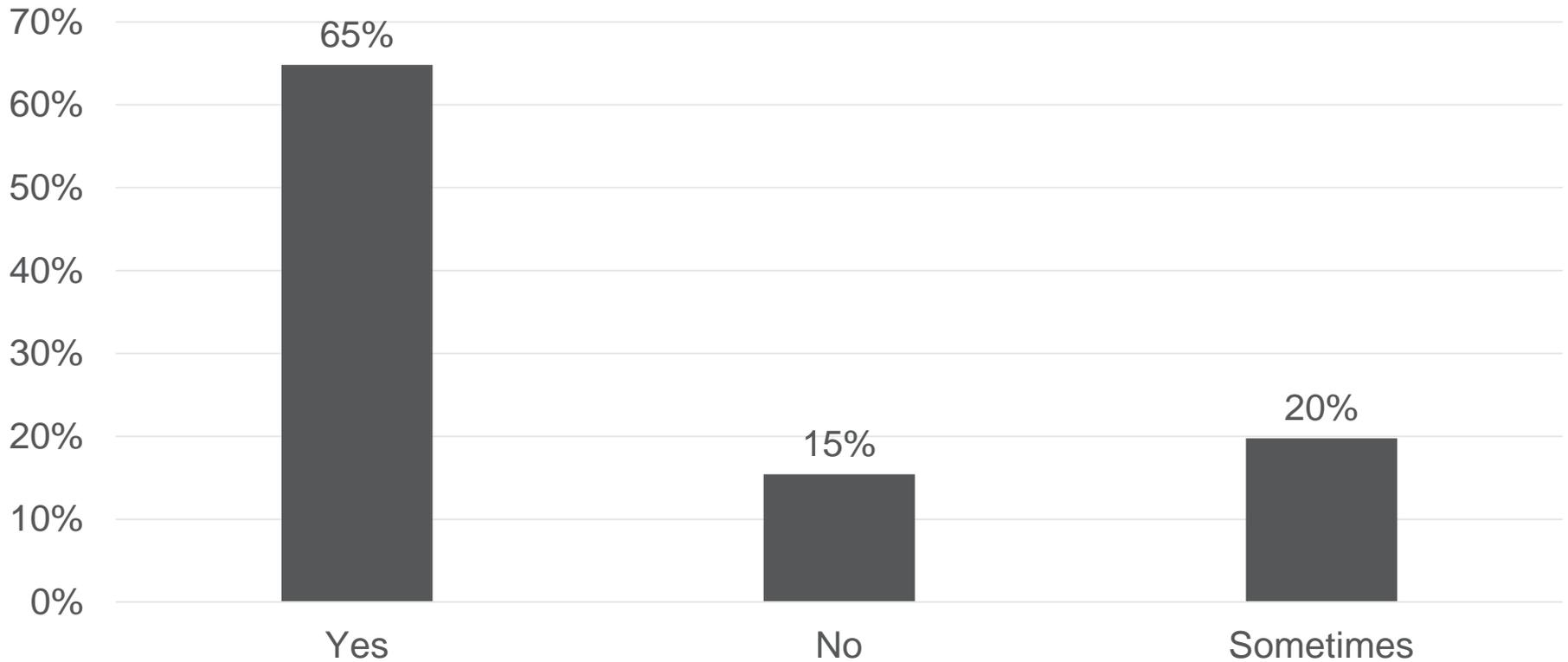


P5.4. Prior to installing the new thermostat, what temperature did you set the thermostat to most often during the summer during the night when everyone is asleep? (n = 1,144)

P7.4. Since installing the new thermostat, what temperature do you prefer the thermostat adjust to during the summer during the night when everyone is asleep? (n = 1,155)

# HOME VS AWAY FROM HOME DURING THE DAY

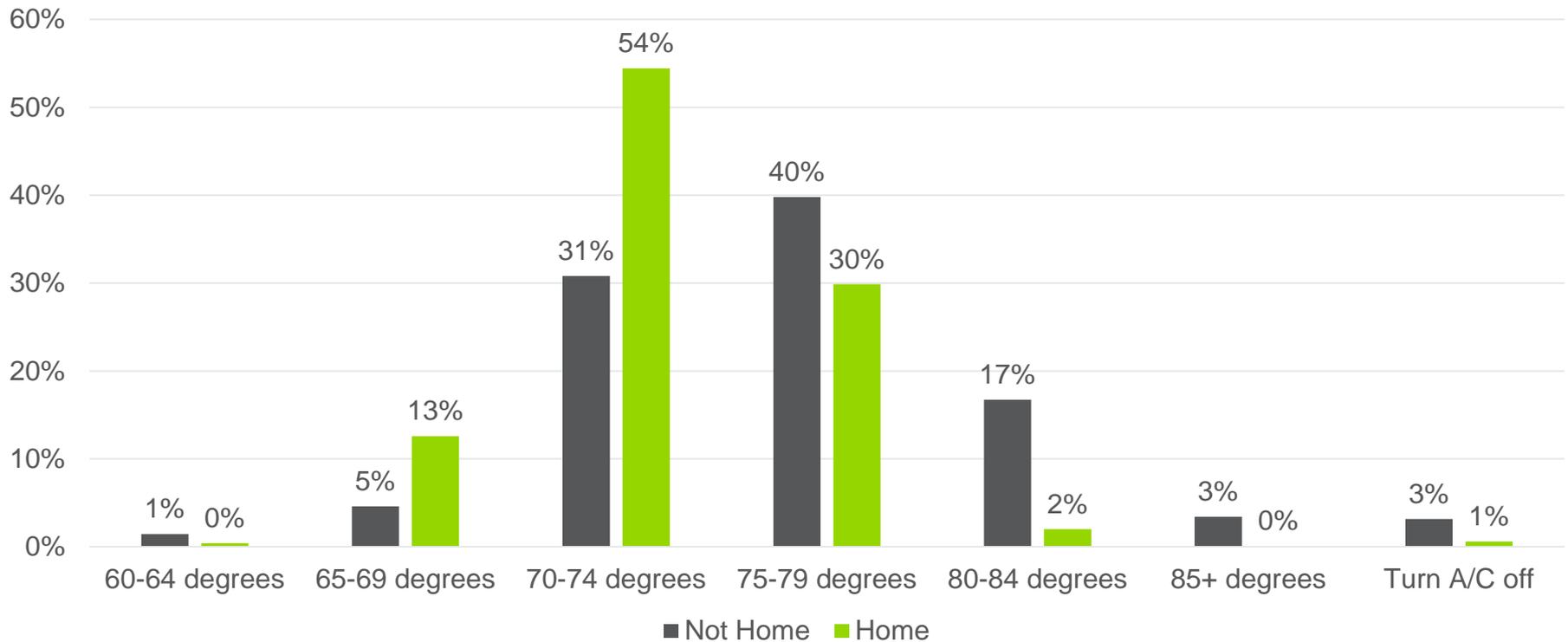
**65% of respondents reported that someone in their household was typically home on summer weekdays.**



P4. Is someone in your household typically home during the day on summer weekdays? (n=1220)

# SETPOINT BEHAVIOR

Before installation respondents reported higher setpoints during the day when people are not home vs when people are home.

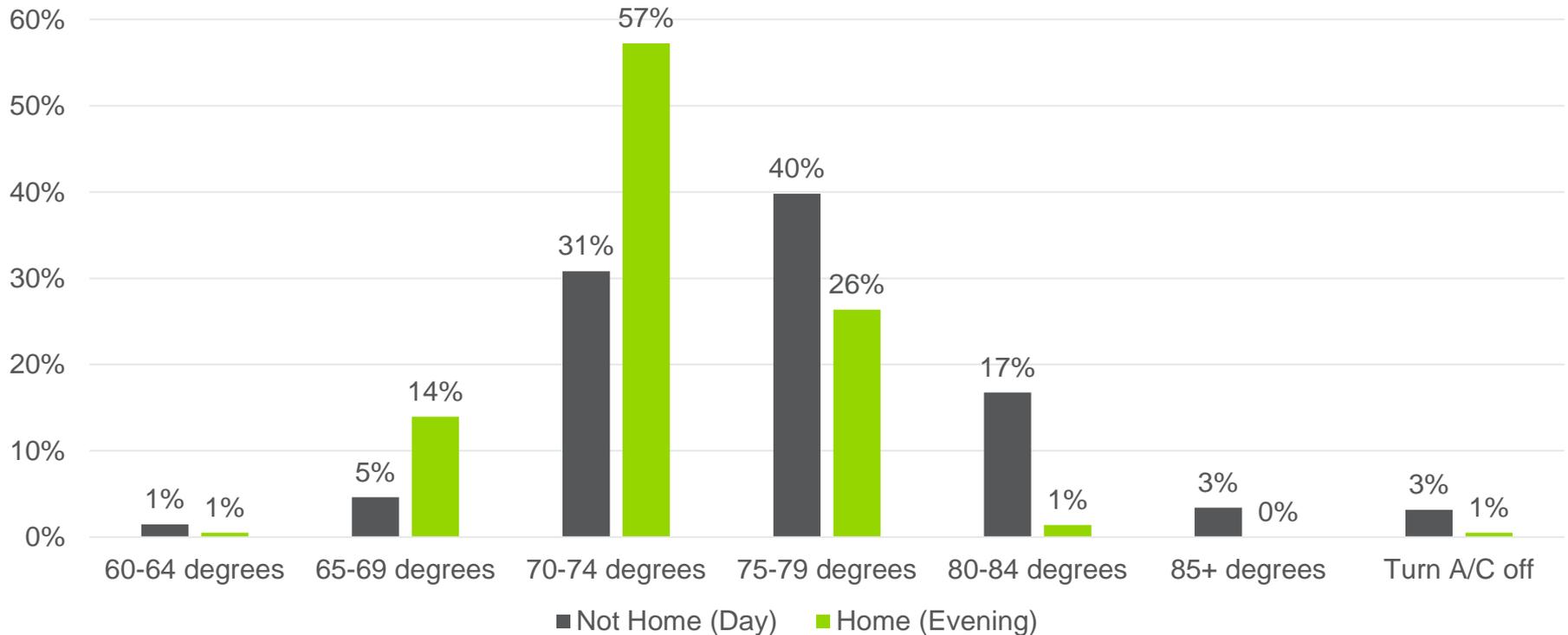


P5a. Prior to installing the new thermostat, what temperature did you set the thermostat to most often during the summer? - During the day when no one is home (n=412)

P5b. Prior to installing the new thermostat, what temperature did you set the thermostat to most often during the summer? - During the day when people are home and awake (n=1001)

# SETPOINT BEHAVIOR

Before installation respondents reported higher setpoints during the day when people are not home vs the evening when people are home.

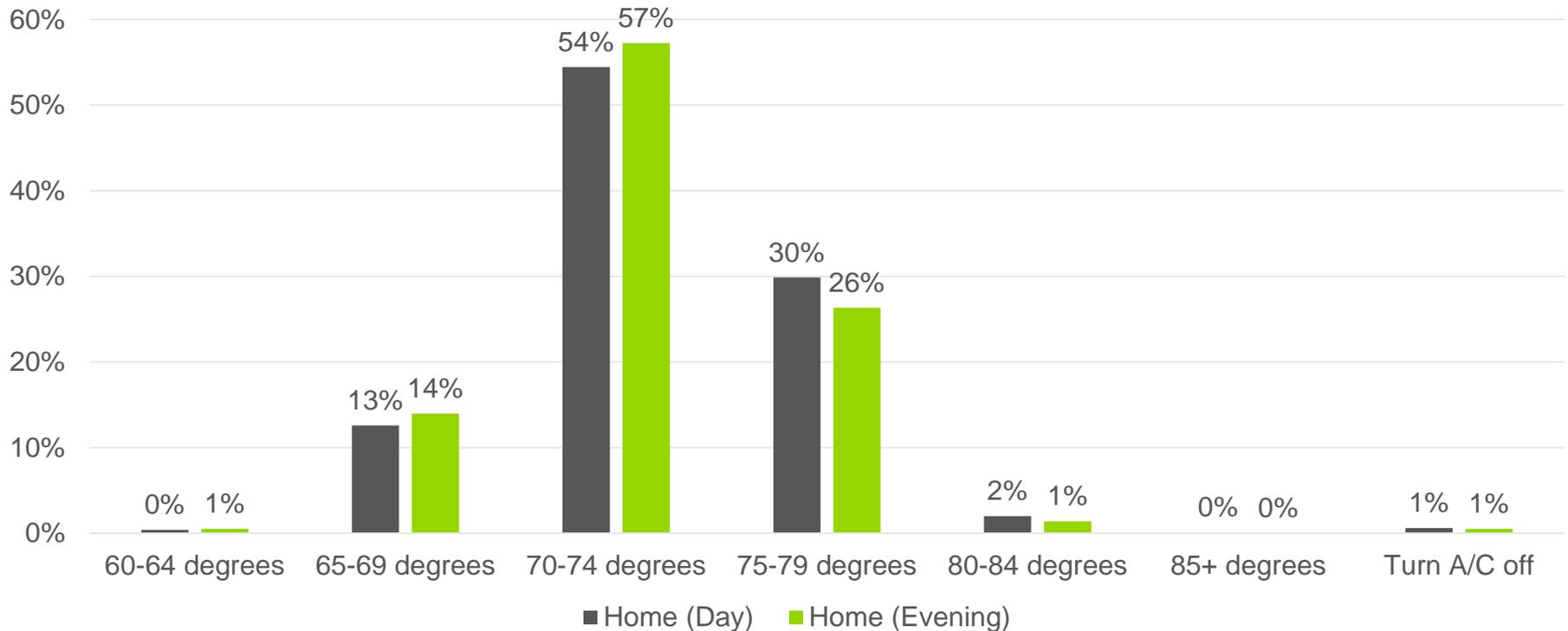


P5a. Prior to installing the new thermostat, what temperature did you set the thermostat to most often during the summer? - During the day when no one is home (n=412)

P5c. Prior to installing the new thermostat, what temperature did you set the thermostat to most often during the summer? - During the evening when people are home and awake (n=1146)

# SETPOINT BEHAVIOR

Before installation respondents reported similar setpoints during the day when people are home vs the evening when people are home.



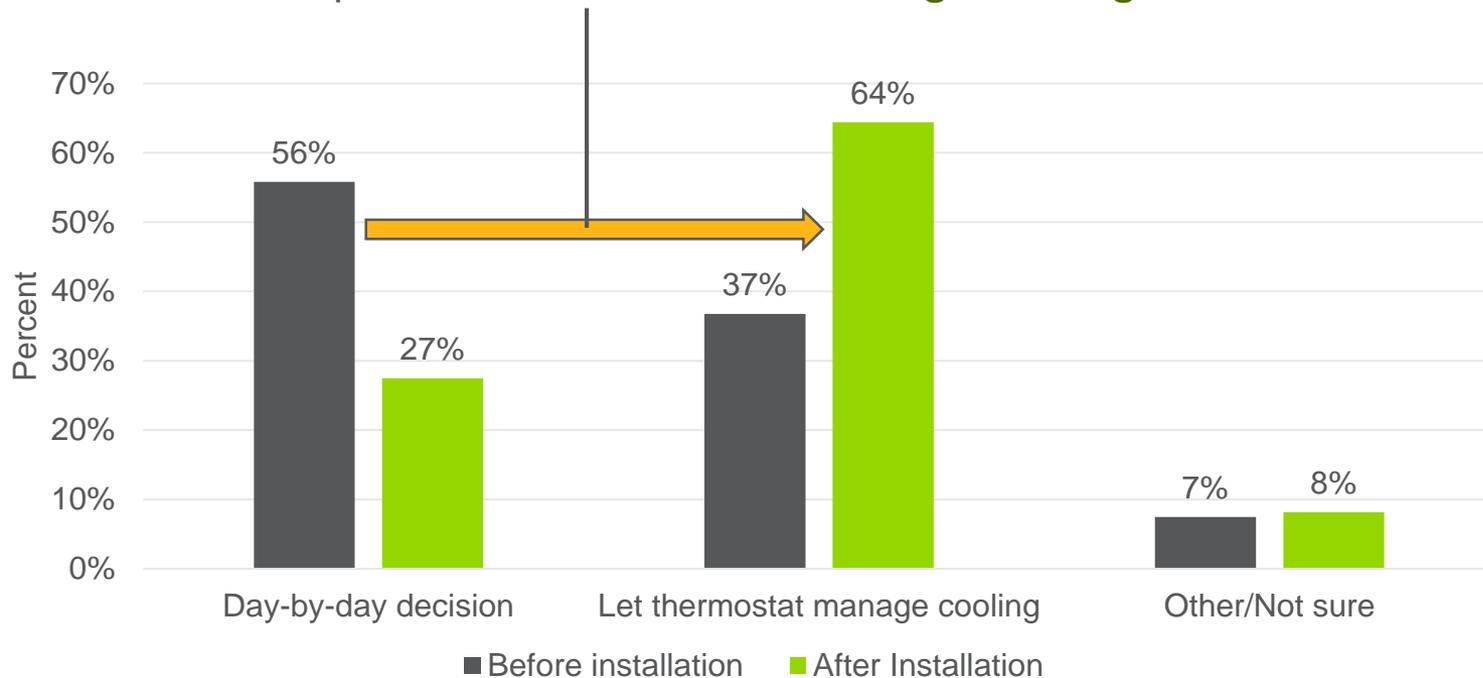
P5b. Prior to installing the new thermostat, what temperature did you set the thermostat to most often during the summer? - During the day when people are home and awake (n=1001)

P5c. Prior to installing the new thermostat, what temperature did you set the thermostat to most often during the summer? - During the evening when people are home and awake (n=1146)

# THERMOSTAT MANAGEMENT STYLE

Many survey respondents indicated that their management style changed after installation.

54% of customers who responded *'Day-by-day decision'* before installation responded *'Let thermostat manage cooling'* after installation



P1. Prior to installing the new thermostat, how would you describe how you controlled your air conditioning? (n = 1,219)

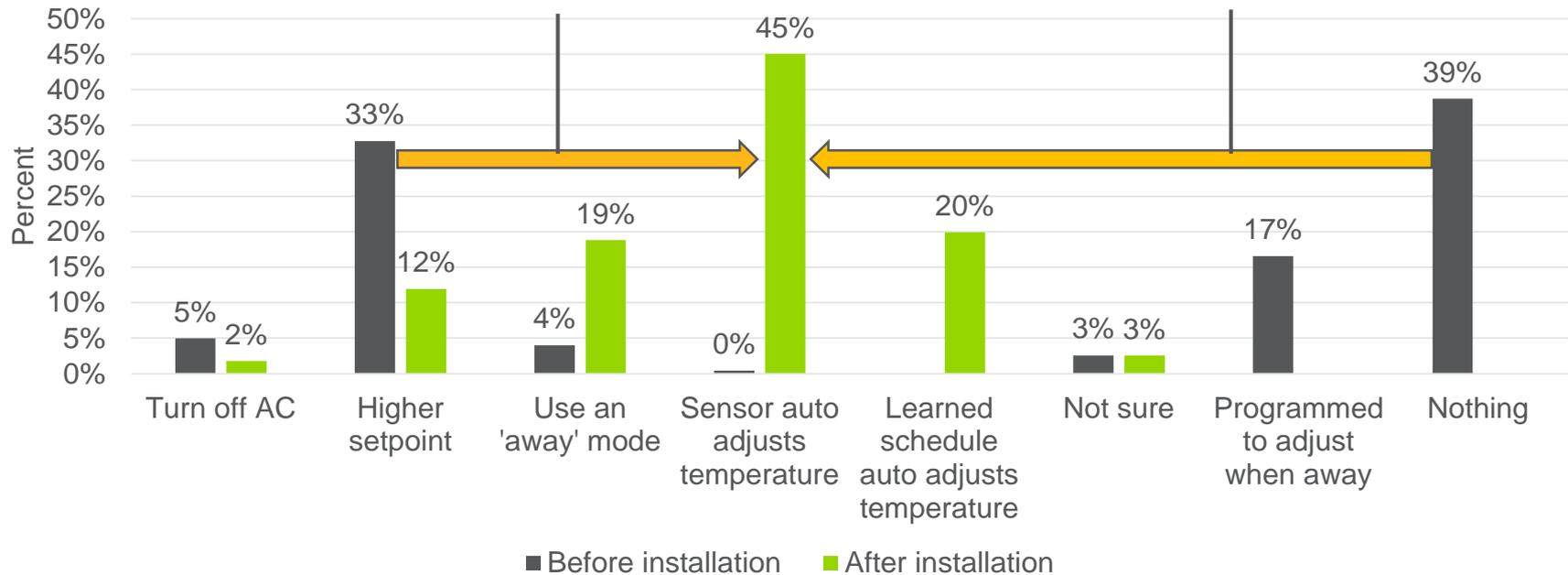
P8. Since installing the new thermostat, how would you describe how you control your air conditioning? (n = 1,188)

# THERMOSTAT MANAGEMENT STYLE

When their home was unoccupied for a few hours, many respondents switched to relying on the thermostat to auto-adjust temperature through its sensor.

39% of respondents who reported *'higher setpoint' before installation* reported *'sensor auto-adjusts temperature' after installation*

50% of respondents who reported *'nothing' before installation* reported *'sensor auto-adjusts temperature' after installation*



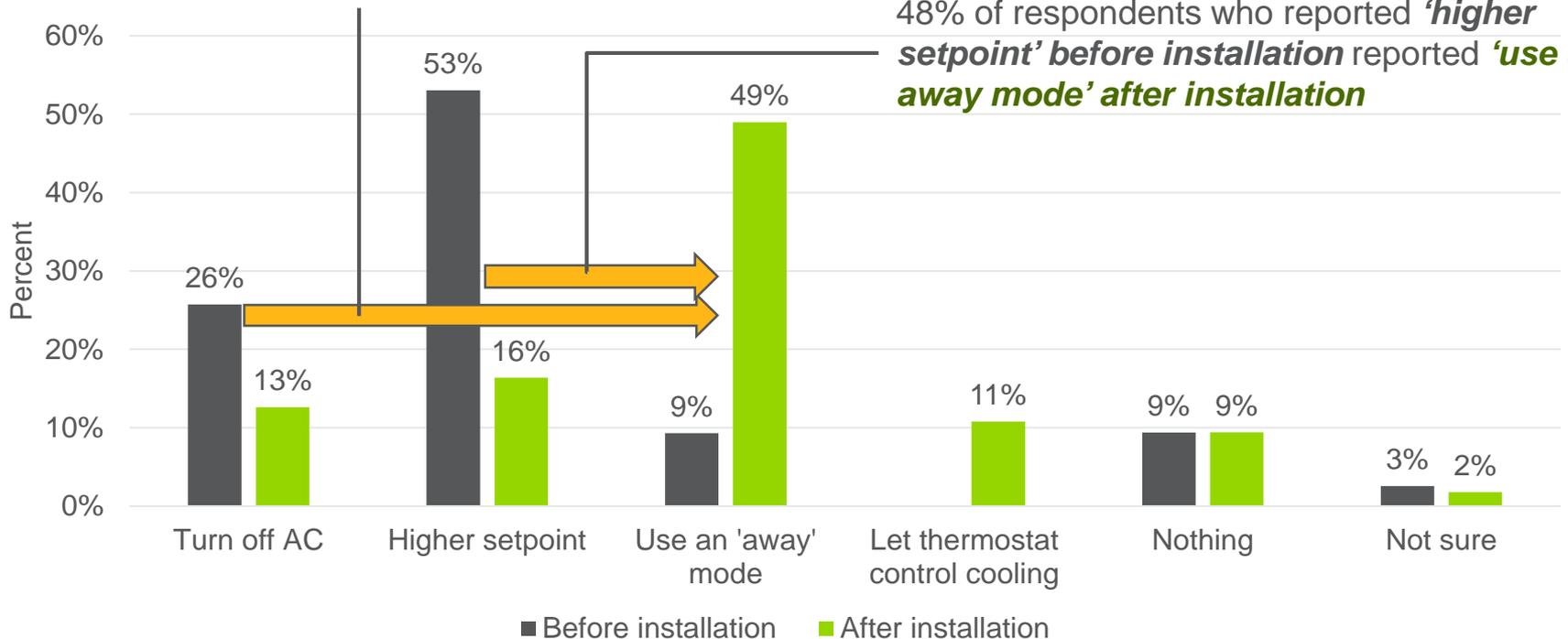
P2. Prior to installing the new thermostat, on days when you used air conditioning, what did you do when you left your home and expected it to be unoccupied for a few hours? (n = 1,208)  
 P9. Since installing the new thermostat, on days when you need cooling, what do you do when you leave your home and expect it to be unoccupied for a few hours? (n = 1,175)

# THERMOSTAT MANAGEMENT STYLE

When their home was unoccupied for multiple days, many respondents switched from setting back their thermostat or turning off their AC to using an 'away' mode feature.

38% of respondents who reported *'Turn off AC'* before installation reported *'use an away mode'* after installation

48% of respondents who reported *'higher setpoint'* before installation reported *'use an away mode'* after installation



P3. Prior to installing the new thermostat, what did you do when your home was unoccupied for multiple days? (n = 1,205)

P10. Since installing the new thermostat, what do you do when your home is unoccupied for multiple days? (n = 1,166)

# KEY FINDINGS

## **Survey Reliability**

- The overall response rate was 10%.
- Survey respondents appear similar to the general population of participants based on observable characteristics such as thermostat make and the type of device replaced.

## **Thermostat Installation**

- The respondent in-service rate is near 100%.
- 15% of respondents indicated they had occupancy or energy use changes coinciding with the purchase of their thermostat.

## **Thermostat Engagement**

- After installing an advanced thermostat, many respondents transitioned from daily engagement with their thermostat to relying on thermostat sensors or an 'away' mode to manage their cooling.
- Setpoints during the daytime when people are not home showed an increase after smart thermostat installation, while other periods showed little or no change.

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