

Customer Perception of Real-Time Pricing

Survey Findings from Southern California Edison Small Business Customers

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Executive summary

- To understand customer perceptions and preferences of Real-Time-Pricing (RTP), SCE/EPRI conducted an online survey via SCE business & residential customer panels in March 2021. The survey collected responses from 186 small business customers and 1,107 residential customers. **This report summarizes the results from small business respondents.** A separate report summarizes the results from the residential customers.
- **On enrollment intent:** Overall, about 25% of those surveyed indicate they would be “likely to enroll” in RTP based on the introductory description of RTP provided in the survey
 - Ownership of electric vehicle fleets or energy monitor/management systems correlates positively with intent to enroll: 100% of EV fleet owners and 75% of energy management system owners indicate they would be “likely to enroll” in RTP; the highest percentages among technology owner groups.
- **On appealing and unappealing aspects:** Bill saving is the most liked aspect of RTP while risk of high price and operational constraints are the top two dislikes: 44% indicate “Opportunity to save on bills” as appealing, followed by “taking advantage of lower rates” (35%). Both “risk of high prices” and “no equipment up for schedule changes” are equally unappealing aspects (47%).
- **On incentives:** Among the five incentive options presented in the survey (bill guarantee, high price protection, free smart thermostat, smart equipment rebate, and free load management device), bill guarantee and high price protection are the two most influential benefits that encourage sign-ups (64% and 56%, respectively). The influence level of the incentives is linked to current technology ownership:
 - Bill guarantee and high price protection are particularly influential to owners of smart outlets, energy storage systems, EV fleets, and smart speakers
 - Smart equipment rebate is particularly influential to owners of smart outlet and EV fleets
 - A free load management device is most attractive to owners of smart outlets and smart speakers
 - A free smart thermostat is most attractive to owners of smart speakers

Executive summary (cont.)

- **On price notification preferences:** Majority of customers (58%) prefer notification directly sent to themselves so that they can decide to whether adjust usage (referred as “price to self” customers). Only 13% customers prefer notification sent to their smart hub/device to then communicate with their end use equipment (“price to device”). An extremely small fraction of respondents (4%) prefer that prices be sent directly to the end use equipment (“price to equipment”)
 - Customers who prefer [“price to device” or “price to equipment”](#) are more likely to enroll RTP than the [“price to self”](#) customers
 - [Even among owners of smart equipment, 41% prefer the “price to self” option](#)
 - [Ownership percentages of smart outlets, smart speakers, and smart equipment are higher among “price to device/equipment”](#) customers than among “price to self” customers.
 - [Ownership percentages of solar panels or EV fleets are higher among “price to equipment” customers](#) than among “price to self” customers
- **On time intervals for price change:** Overall, respondents prefer lower time granularity: 47% voted for price change every two hours, 18% voted for hourly, only 2% voted for every 15-min and 1% voted for every 5-min.
 - [“Price to equipment” customers are most likely to prefer 15-min interval pricing:](#) (14% of “price to equipment” customers selected 15-min pricing vs 2% of “price to self” customers)
 - [Owners of solar panels, EV fleets, and EV charging stations are more likely to favor hourly pricing](#)
 - [Customers who own energy monitor systems, EV fleets or EV charging stations have higher acceptance for 15-min pricing](#) than other tech owner groups
 - [Majority of voice assistant or smart speak owners prefer price change every two hours](#)
 - [41% of smart equipment owners are indifferent about the price time intervals;](#) this is the highest percentage among all technology groups.
- **On notification time horizons:** The greater the advance in price notification the greater the intent to enroll in RTP: 46% of respondents indicate they are likely or very likely to enroll in RTP based on Day-Ahead notification. The likelihood decreased to 33% for Day-of notification, and down to 27% for Hour-Ahead notification.

Content outline

Part I: Survey of business customers NOT on RTP

- [Results of overall population](#)
- Results by segments
 - [By notification preferences](#)
 - [By technology ownership](#)
- Appendix: [Panel firmographics](#)

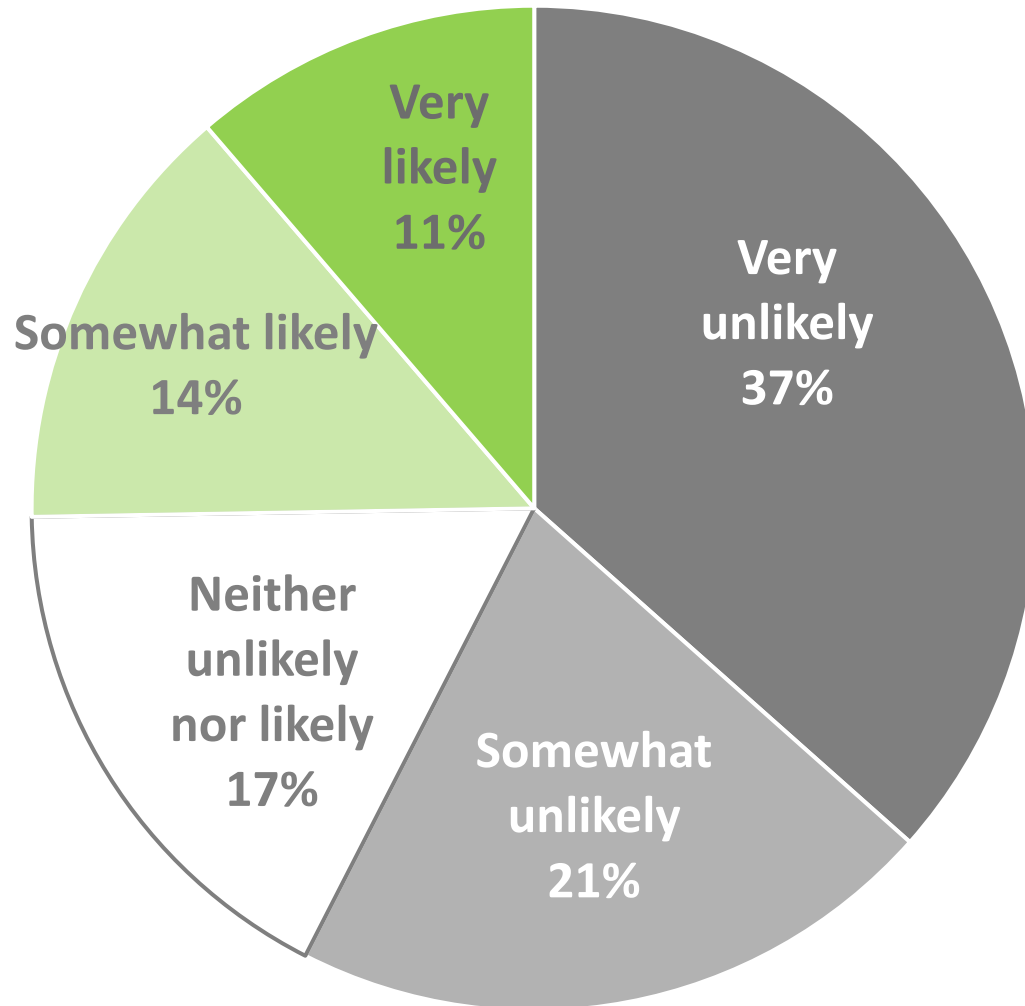
[Part II: Survey of current RTP customers](#)



Results of overall population

About 1/4 of respondents expressed positive interest in RTP

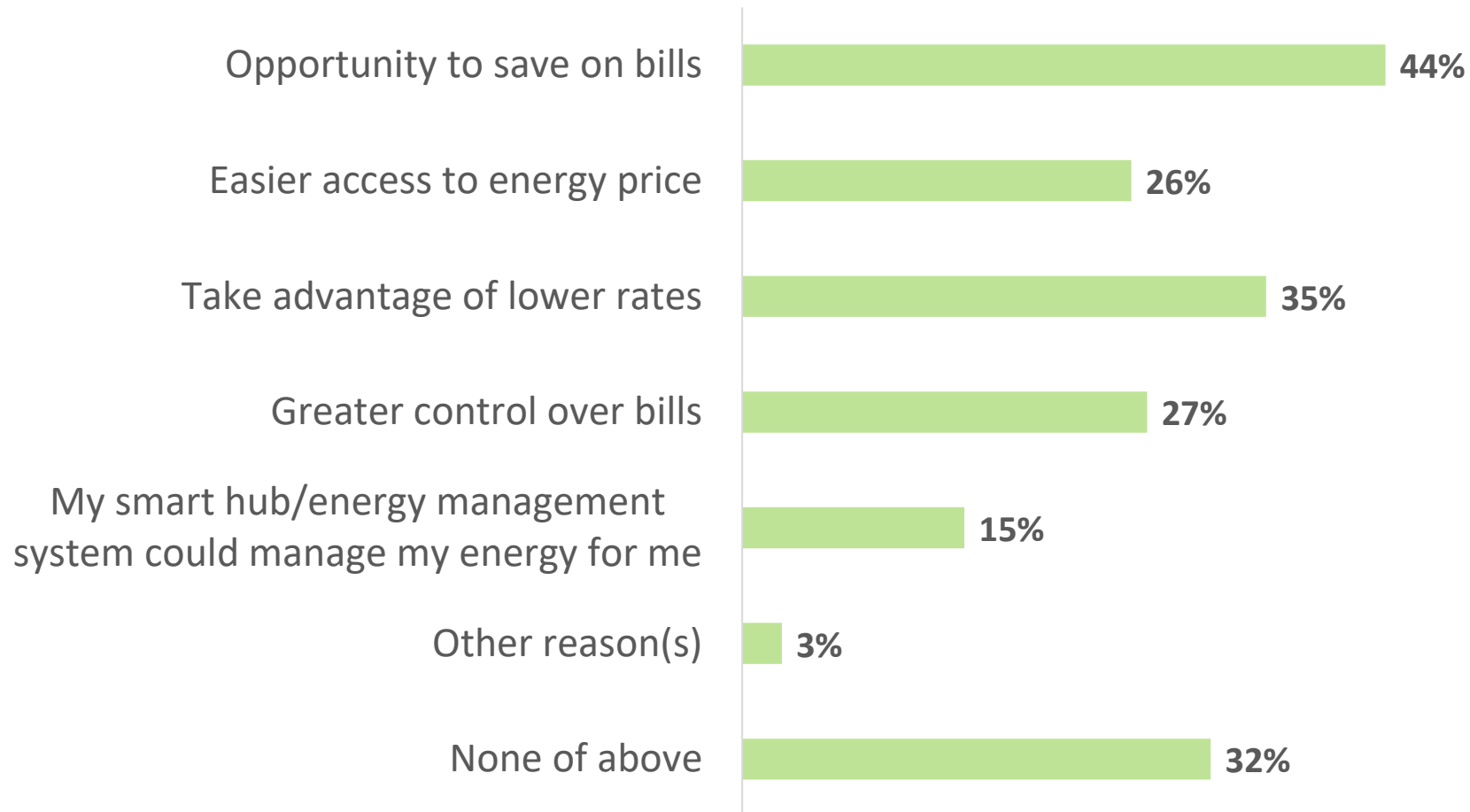
Q: How likely are you to sign-up for RTP?



- Total respondents: 186
 - 25% indicated very likely or somewhat likely to enroll in RTP
 - 58% indicated very unlikely or somewhat unlikely
 - 17% with neutral intent
- (Referred as “Likely”, “Unlikely”, “Neutral” in the rest of report)

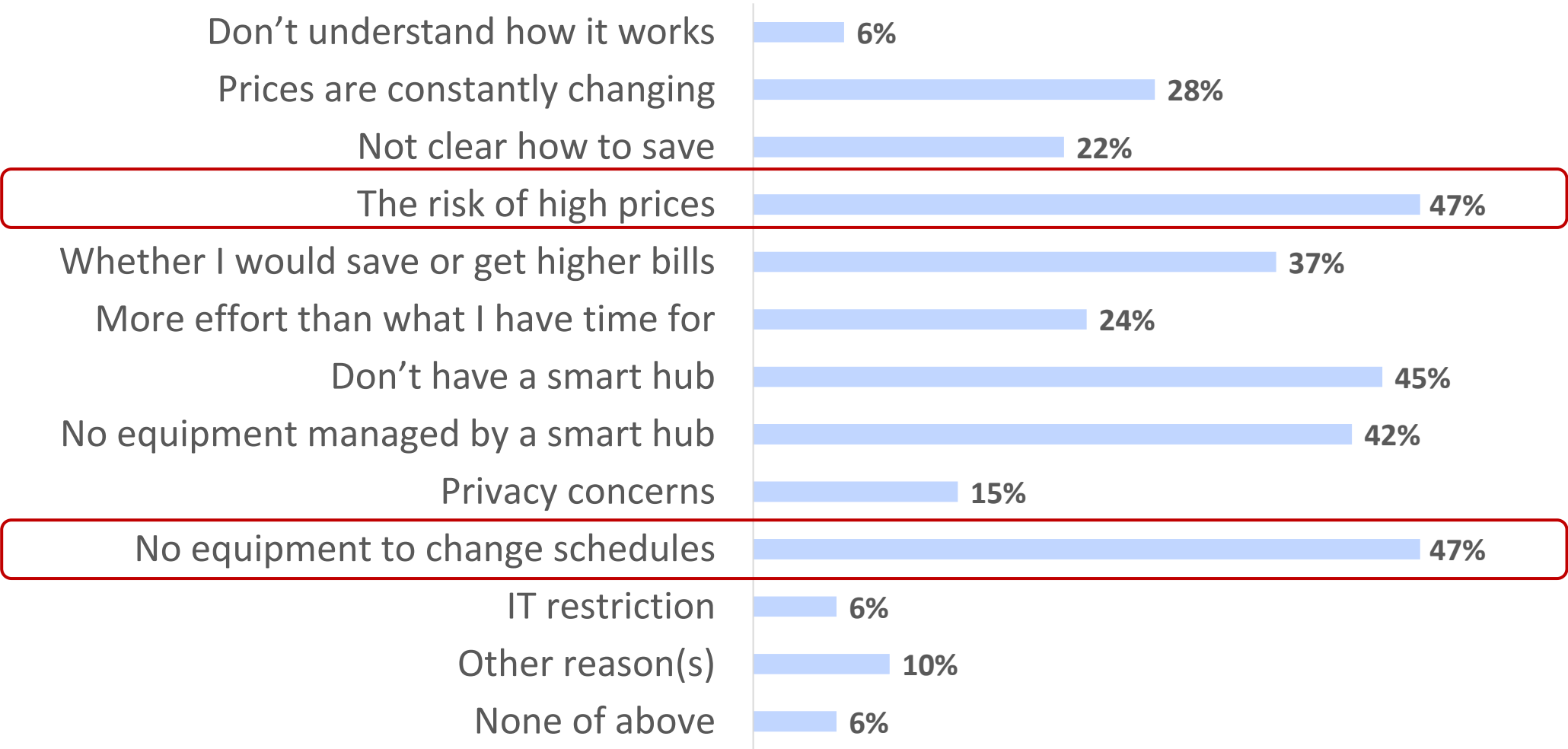
Opportunity to save on bills and taking advantage of lower rates are the two most appealing aspects of RTP

Q: What aspects of the RTP plan do you find appealing?



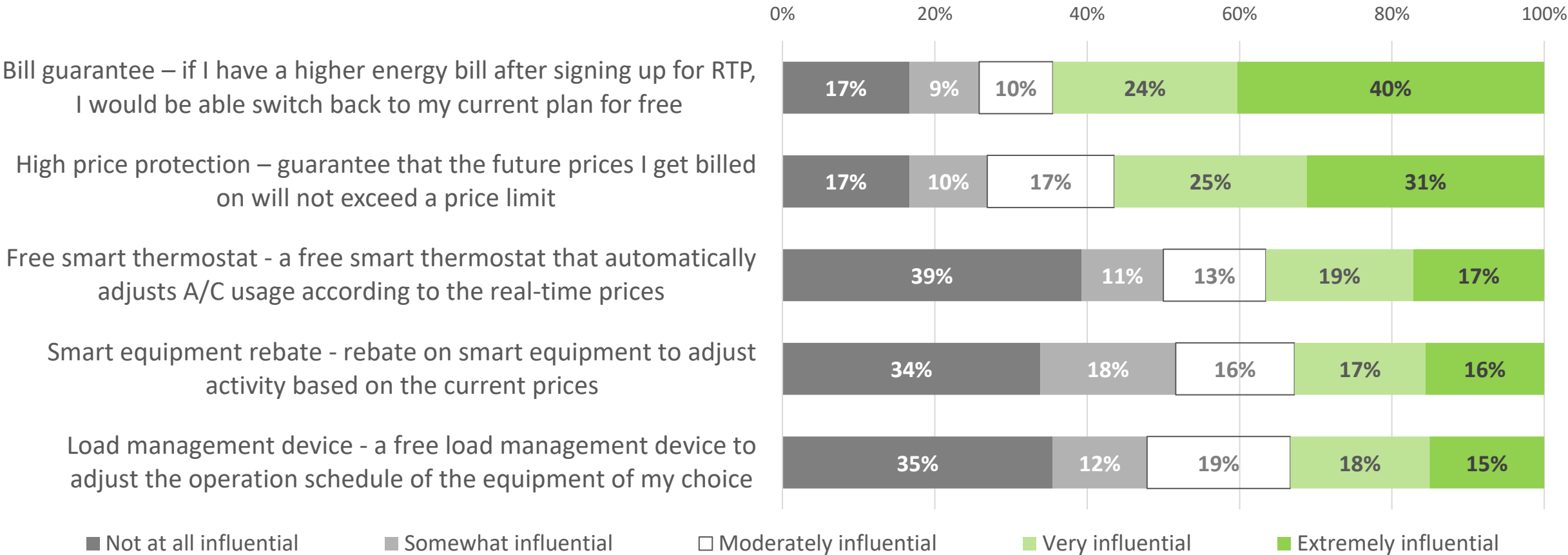
Risk of unexpected high prices and not having equipment that can change schedule are the two most unappealing aspects

Q: What aspects of the RTP plan do you find unappealing?



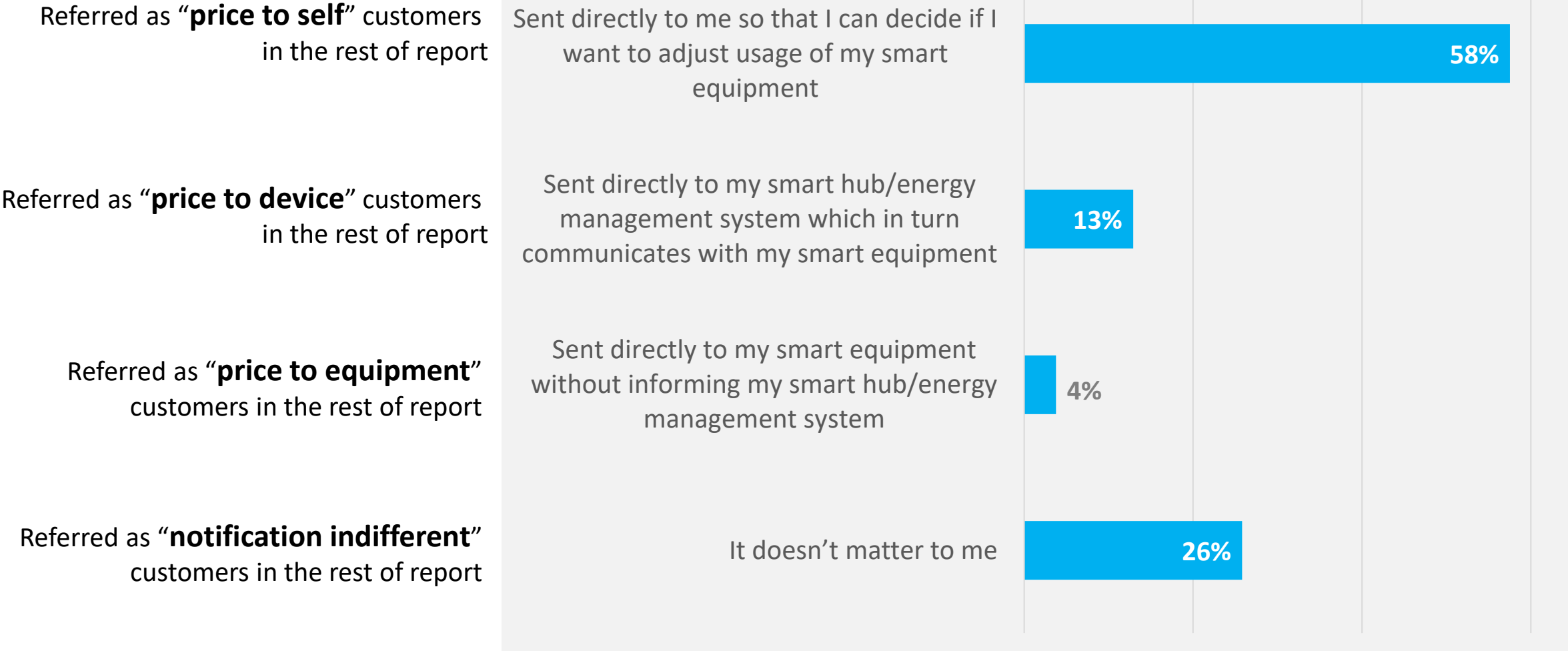
Bill guarantee and high price protection are the top two influential offers to encourage RTP sign-ups

Q: Below are some benefits that you would receive if you signed-up for the RTP rate plan. Please select how influential each benefit would be on your decision to sign-up for the RTP plan.



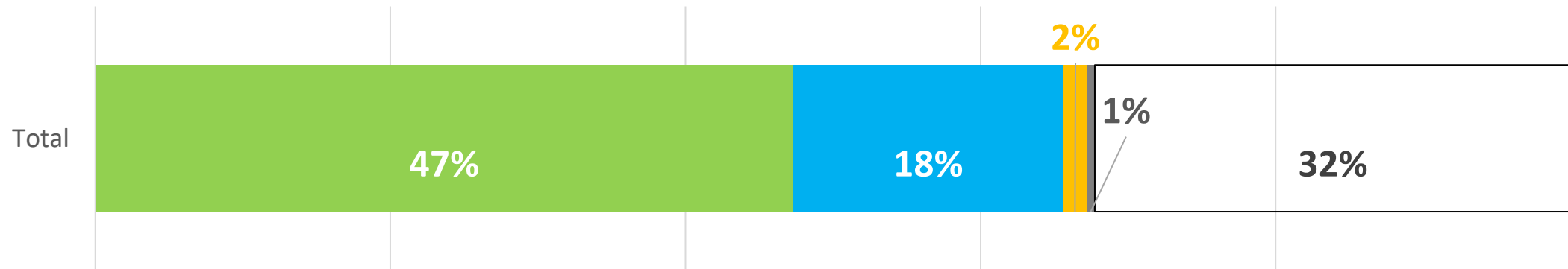
Only 4% prefer price notification sent directly to their equipment

Q: If you were on the RTP rate plan, how would you prefer to receive price notifications?



The most preferred price change interval is every two hours

Q: If you were on the RTP rate plan, which time interval for the price changes would you prefer?



■ Price change every two hours

■ Price change hourly

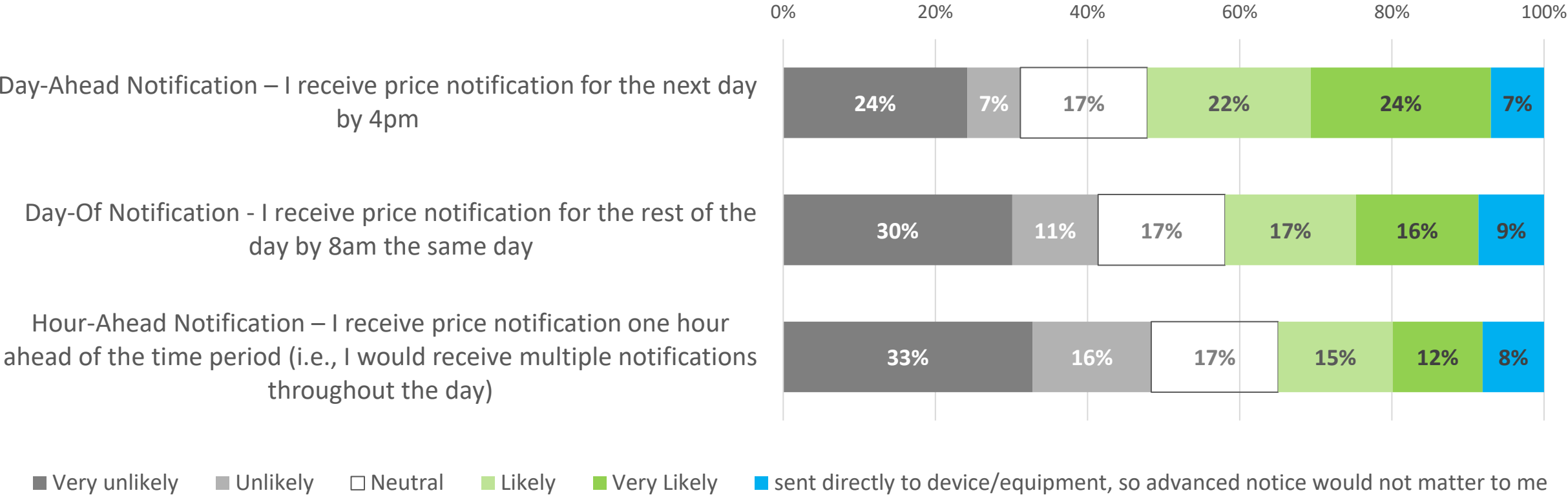
■ Price change every 15 minutes

■ Price change every 5 minutes

□ It doesn't matter

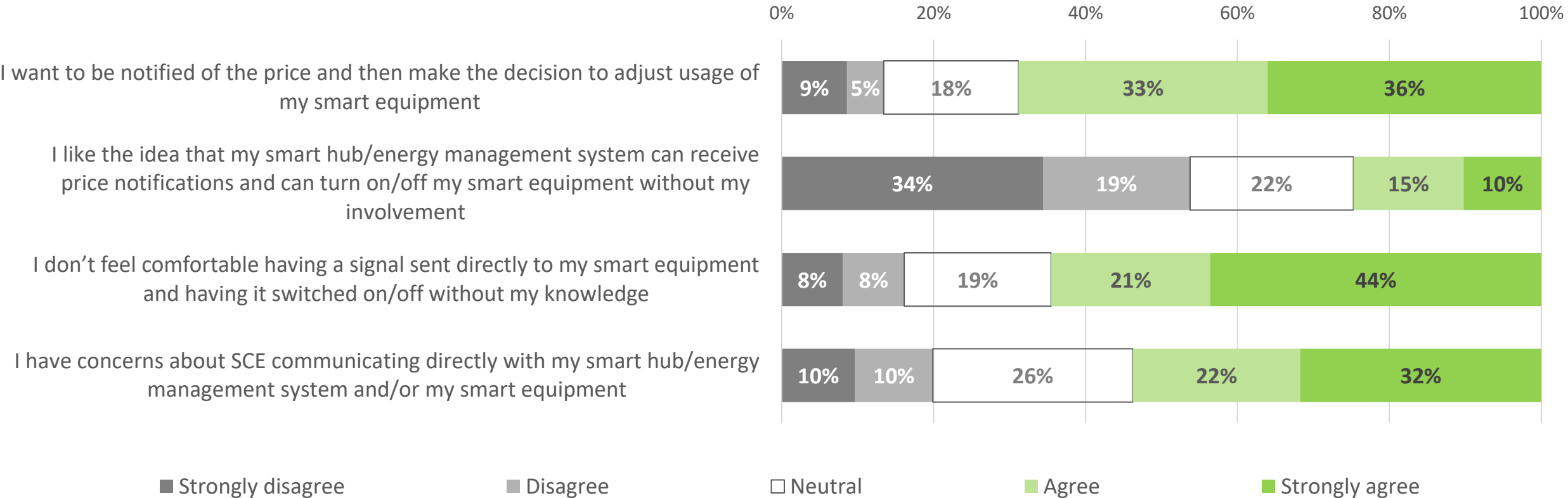
The most preferred price notification period is Day-Ahead

Q: Please rate your likelihood to participate in RTP based on each of the following price notification options



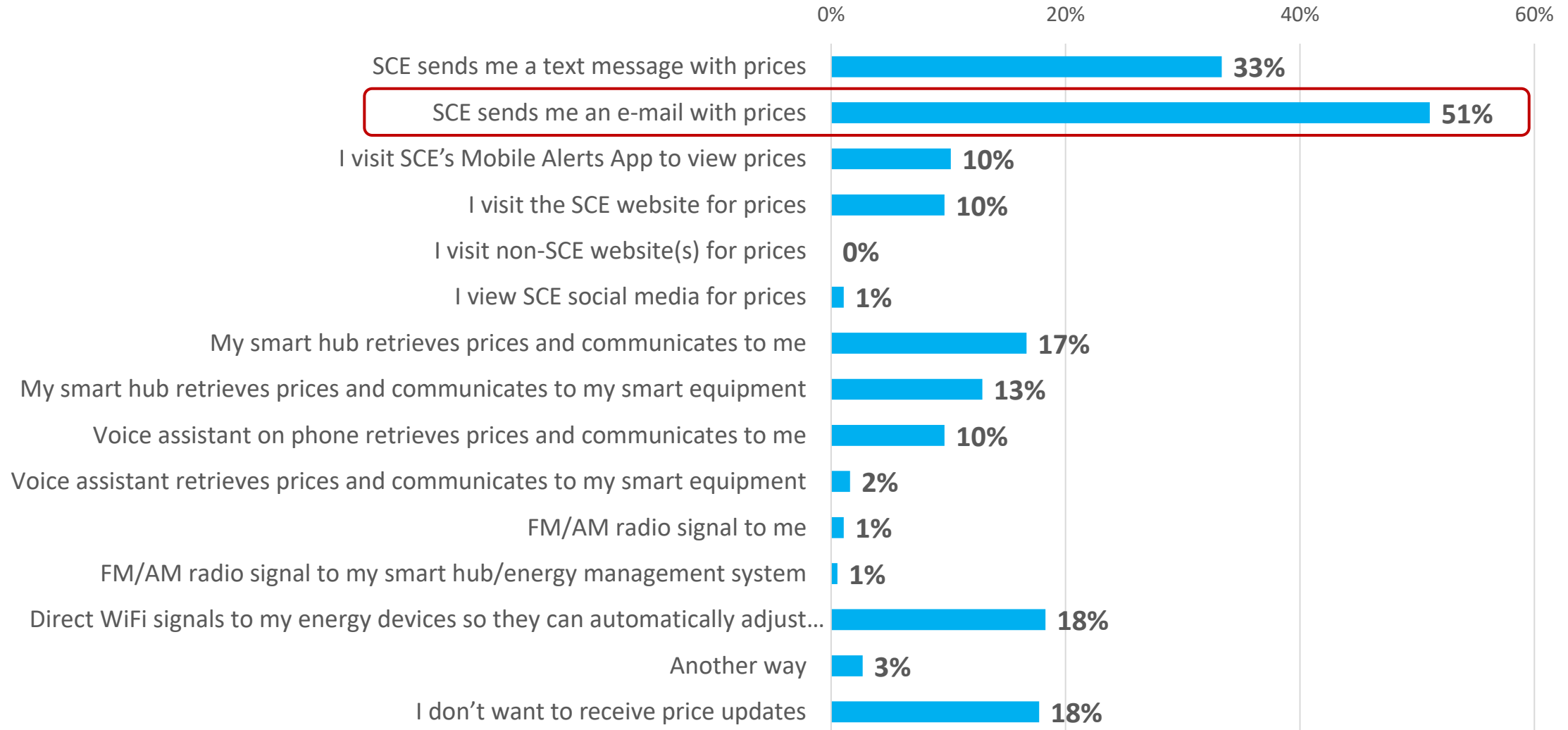
Majority prefers to be notified of the price to then make decisions, consistent with “price to self” designation

Q: Below are some statements about the RTP price notifications process. Please select how much you agree or disagree with each statement.



51% prefer receiving prices via email, consistent with “price to self” notification preference

Q: If you were on the RTP rate plan, how would you prefer to receive price notifications?



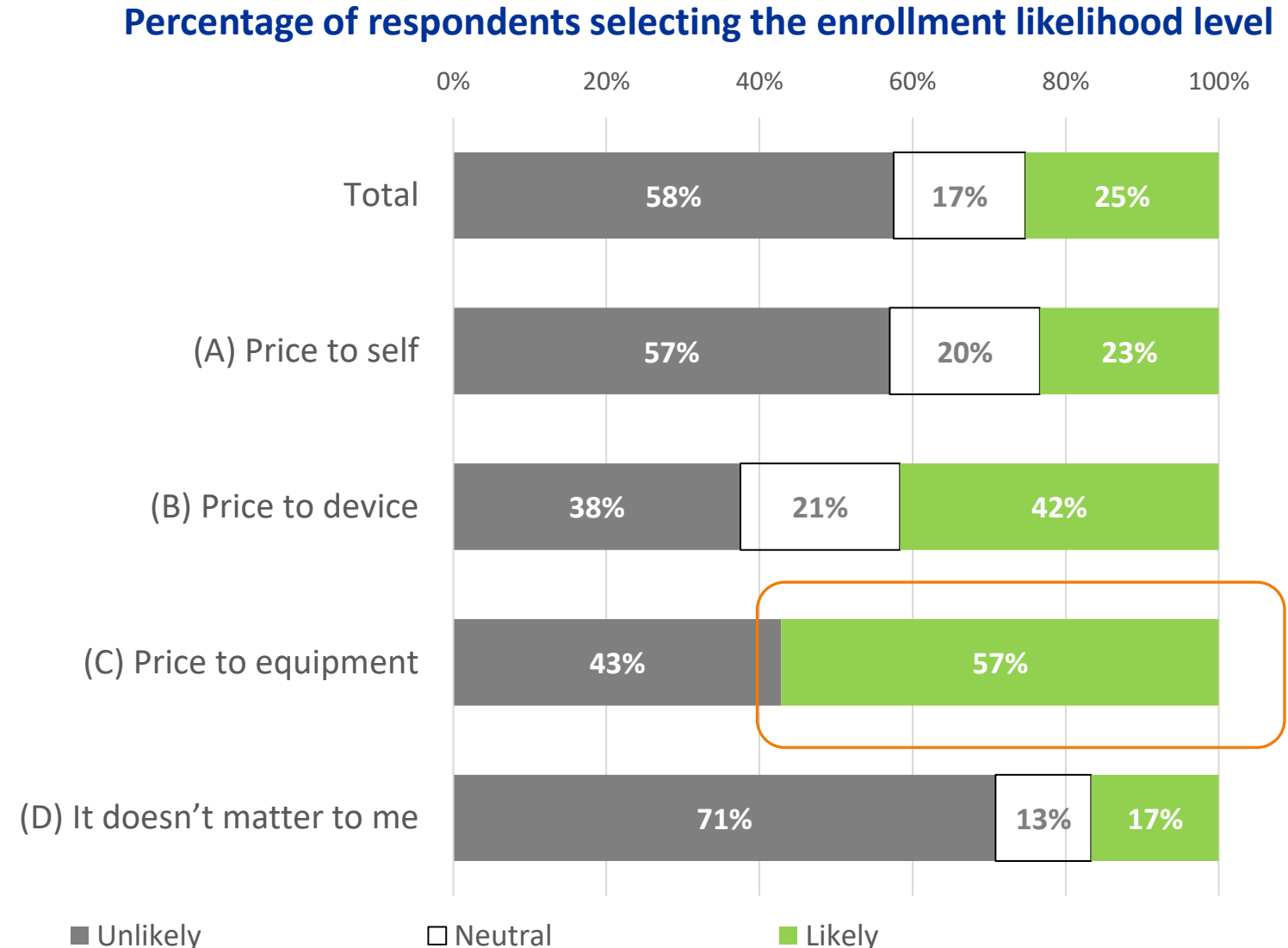


Results by notification preference segments

Customers who prefer “price to device” or “price to equipment” are more likely to enroll RTP

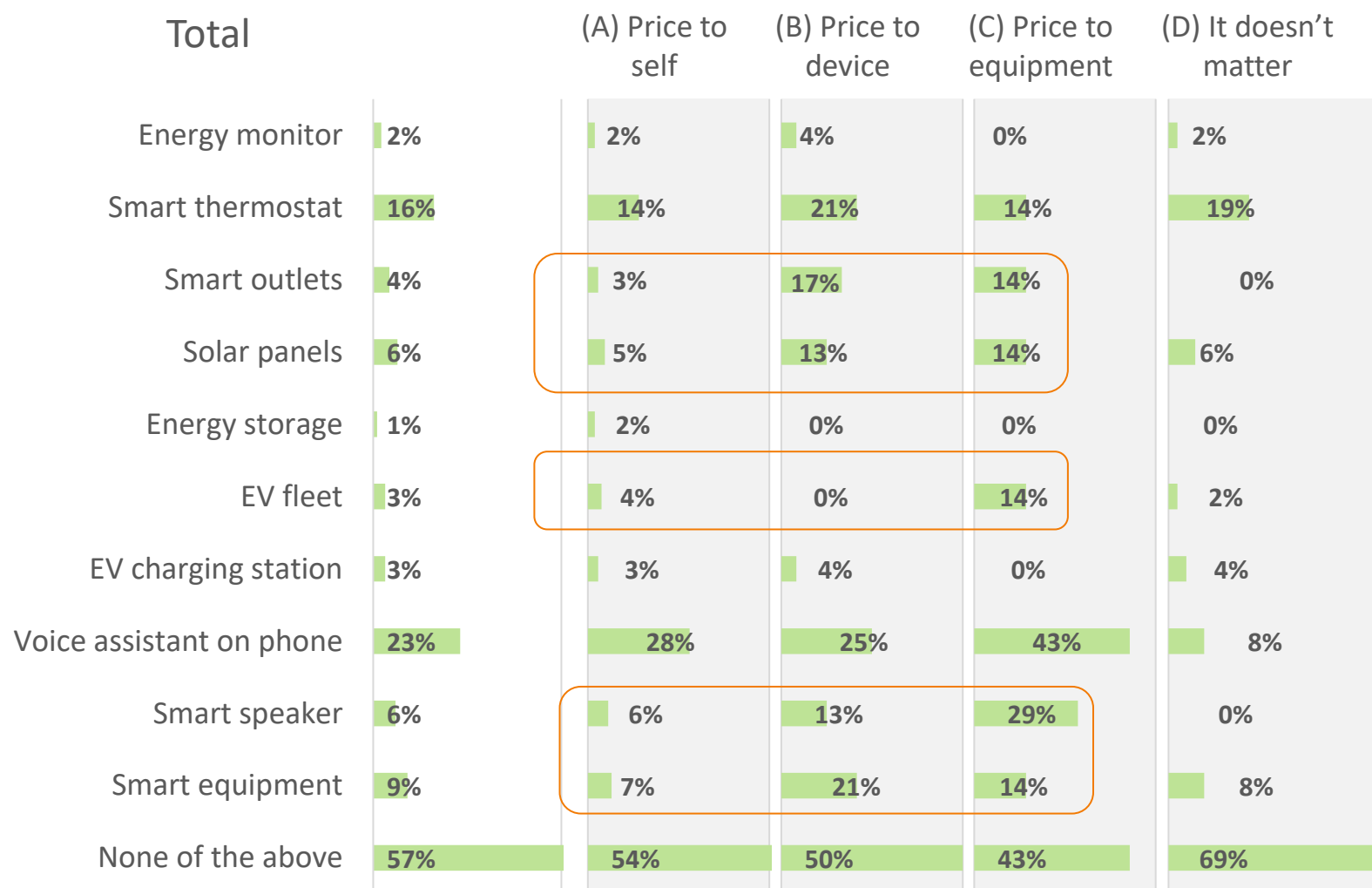
- 57% of the “**price to equipment**” customers indicated “likely to enroll” vs. only 23% of the “price to self” customers indicated such intent.

- Most of the customers indifferent about notification method are not interested in RTP.



Ownership percentages of smart outlets, solar panels, smart speakers, and smart equipment are higher among “price to device/equipment” customers than among “price to self” customers

Technology Ownership by Preferred RTP Notification Mechanism

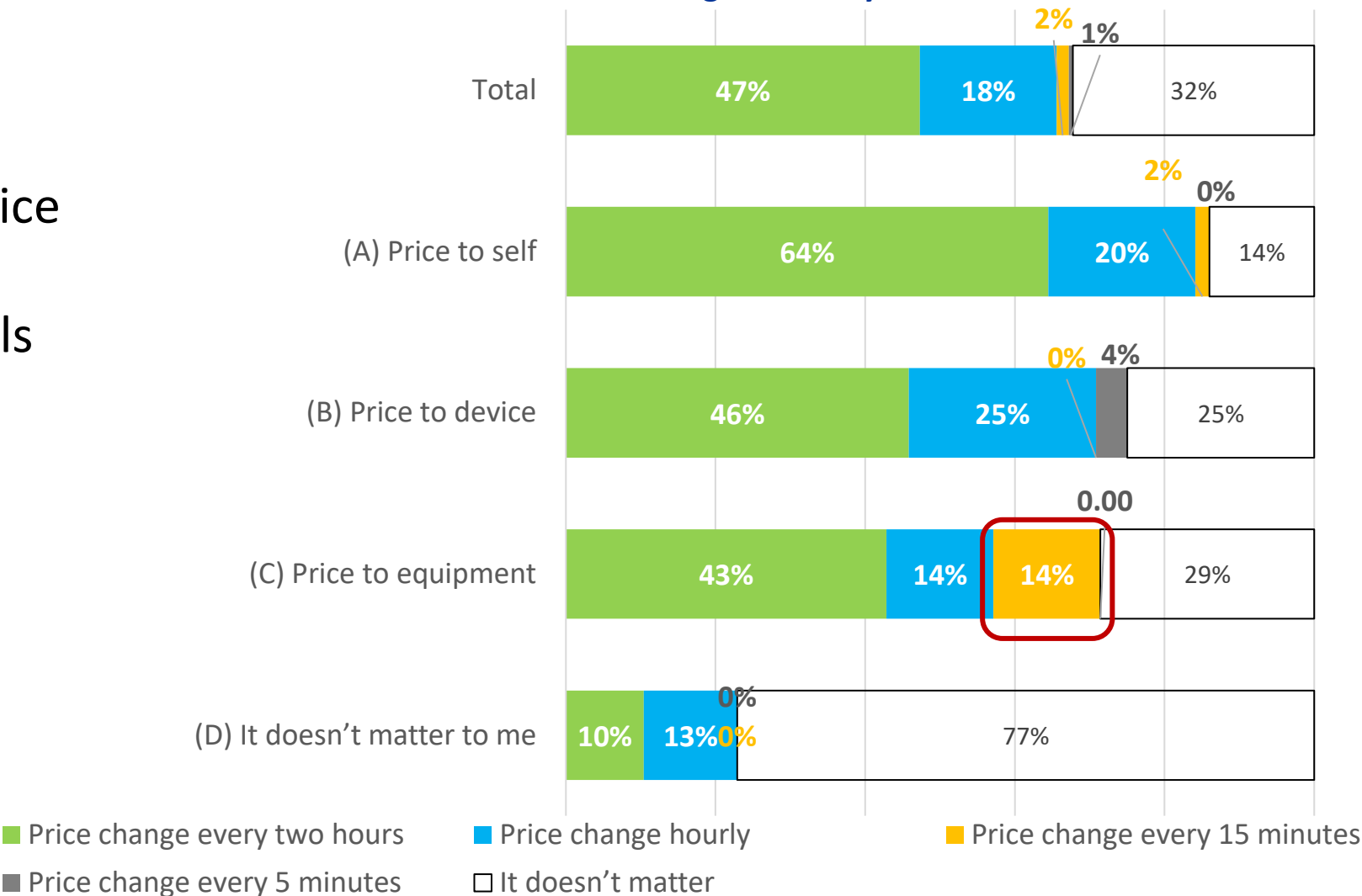


- 17% of “price to device” customers own smart outlets, vs. only 3% of “price to self” customers
- 29% of “price to equipment” customers own smart speakers, vs. only 6% of “price to self” customers
- 21% of “price to device” customers own smart equipment, vs. only 7% of “price to self” customers

Customers who prefer “price to equipment” show the highest acceptance of 15-min pricing intervals

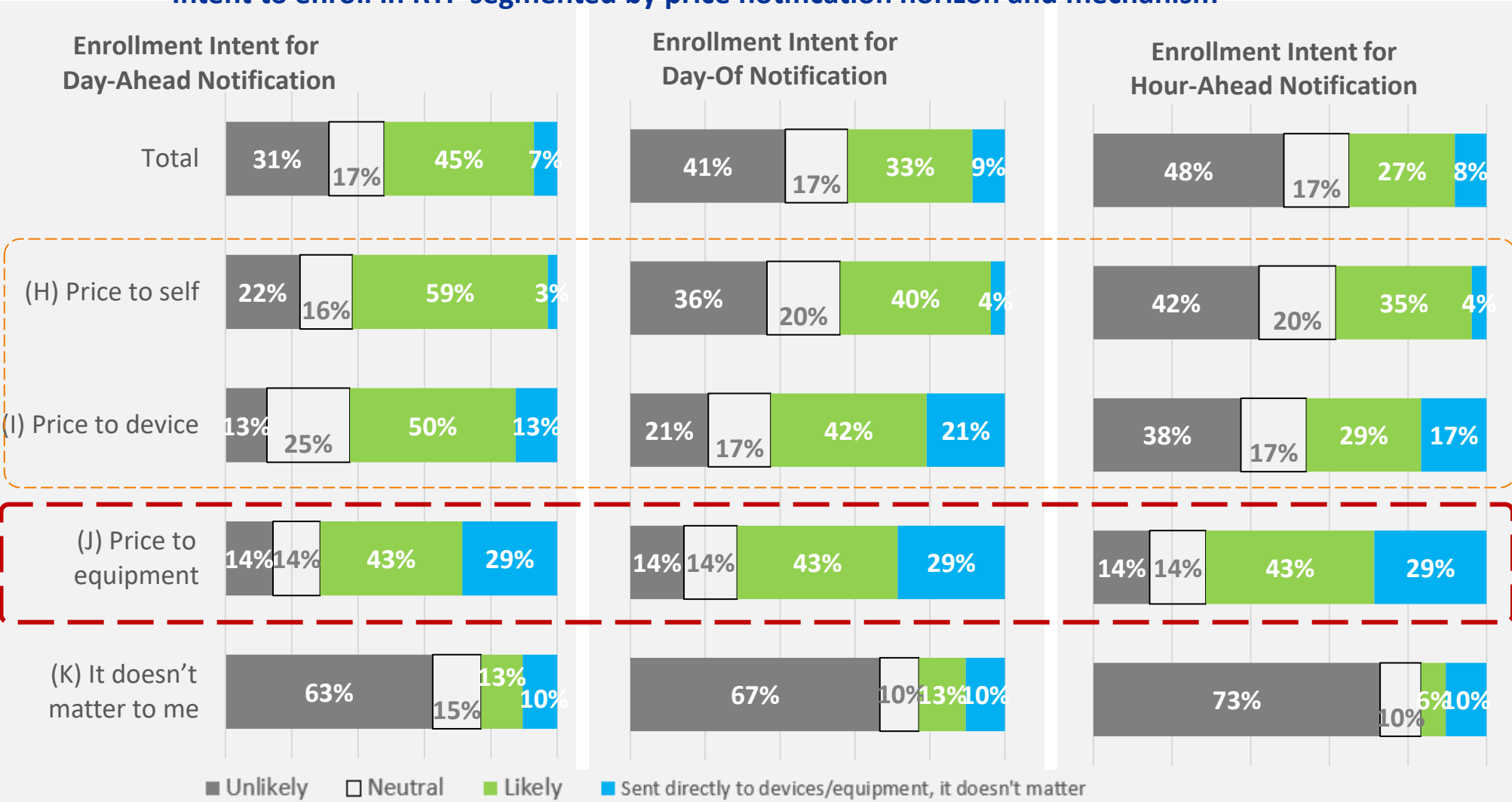
Preferences for RTP Intervals Segmented by Preferred Notification Mechanism

14% (one out of seven) “price to equipment” customers prefer 15-min price intervals



“Price to equipment” customers’ intent to enroll in RTP does not vary by notification time horizon

Intent to enroll in RTP segmented by price notification horizon and mechanism

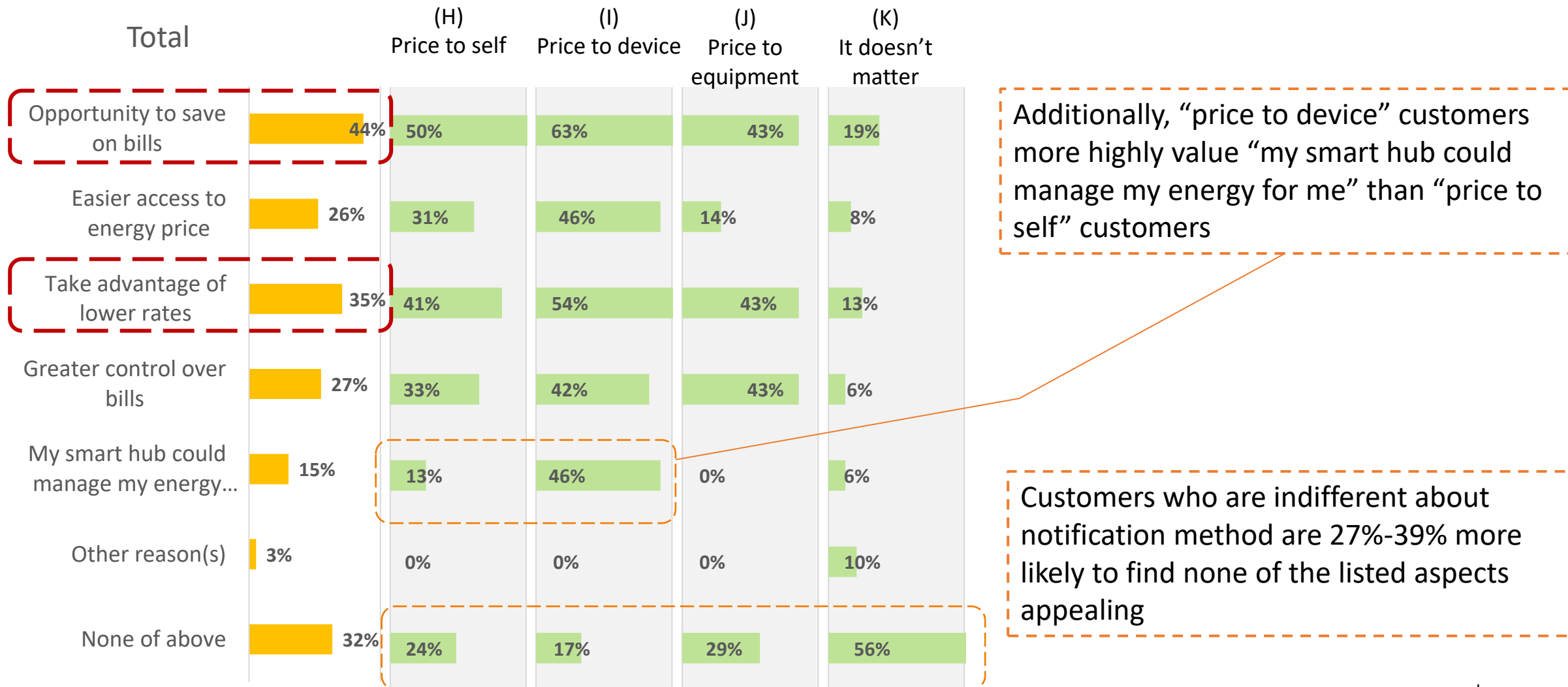


The shorter the notification time horizon, the less likely “price to self” and “price to device” customers are to enroll

Regardless of notification time horizons, 43% of “price to equipment” customers are likely to enroll and 29% do not care about time horizons

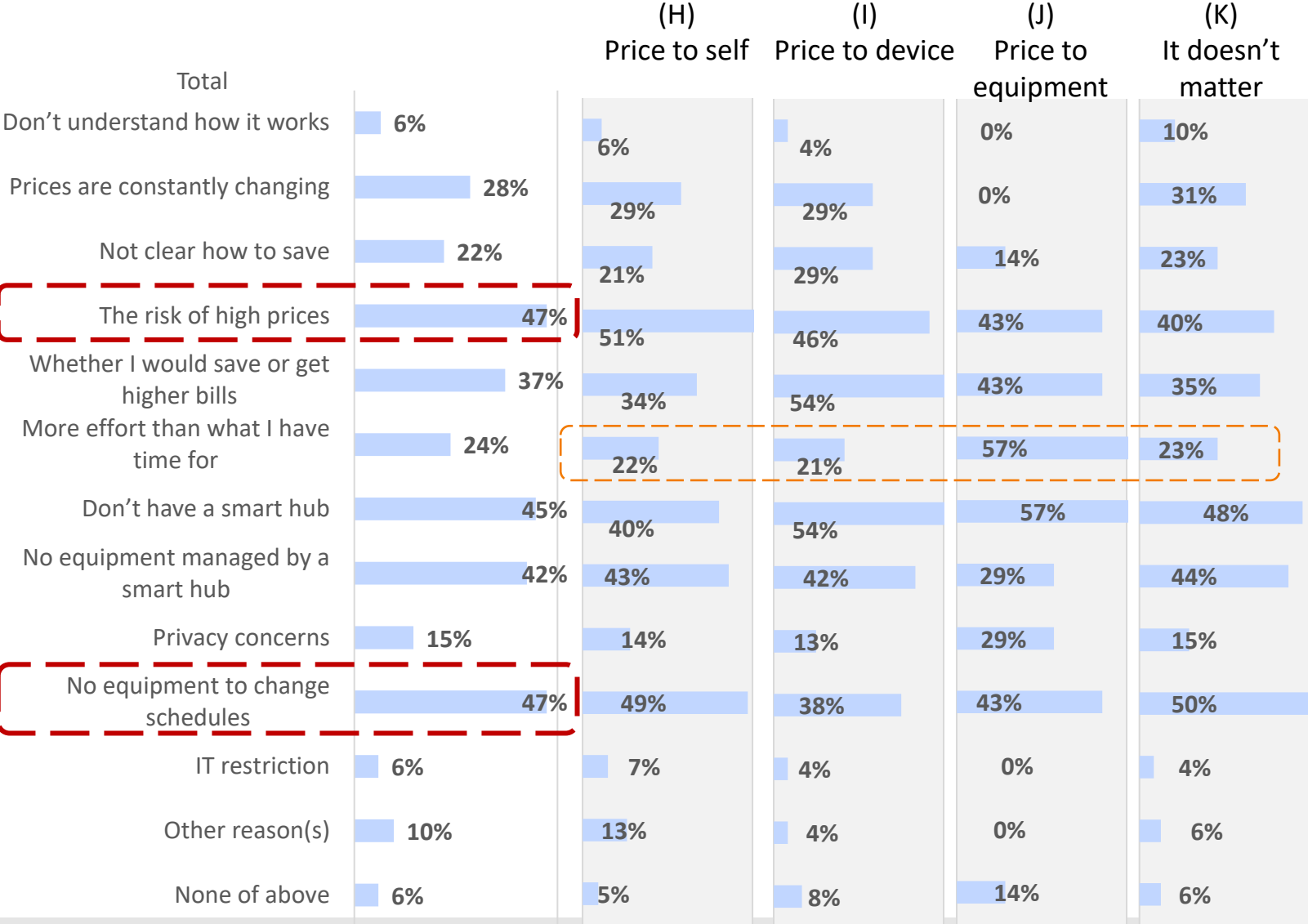
“Opportunity to save on bills” and “taking advantage of lower rates” are the two most appealing aspects of RTP

Appealing aspects of RTP, segmented by preferred price notification mechanism



“Risk of high prices” and “no equipment to change schedule” are the two most unappealing aspects of RTP overall

Unappealing aspects of RTP, segmented by preferred price notification mechanism



57% of “price to equipment” customers find “it seems more effort than I have for” unappealing, vs. only 22% of “price to device” customers (which may explain why they would prefer equipment automation)

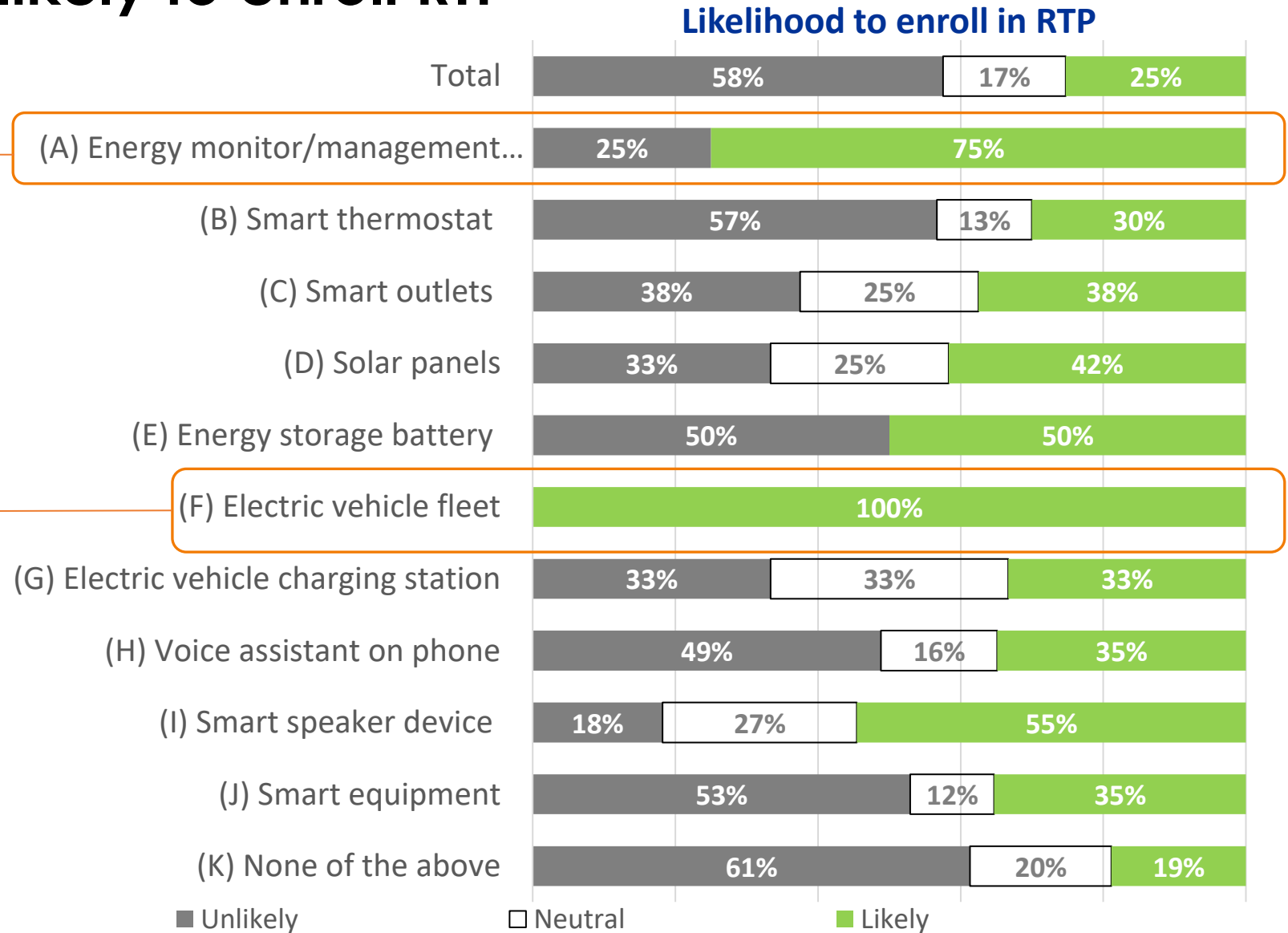


Results by technology ownership segments

Owners of electric vehicle fleets and energy management systems are the most likely to enroll RTP

75% of owners of energy management systems indicate they are “likely to enroll” in RTP

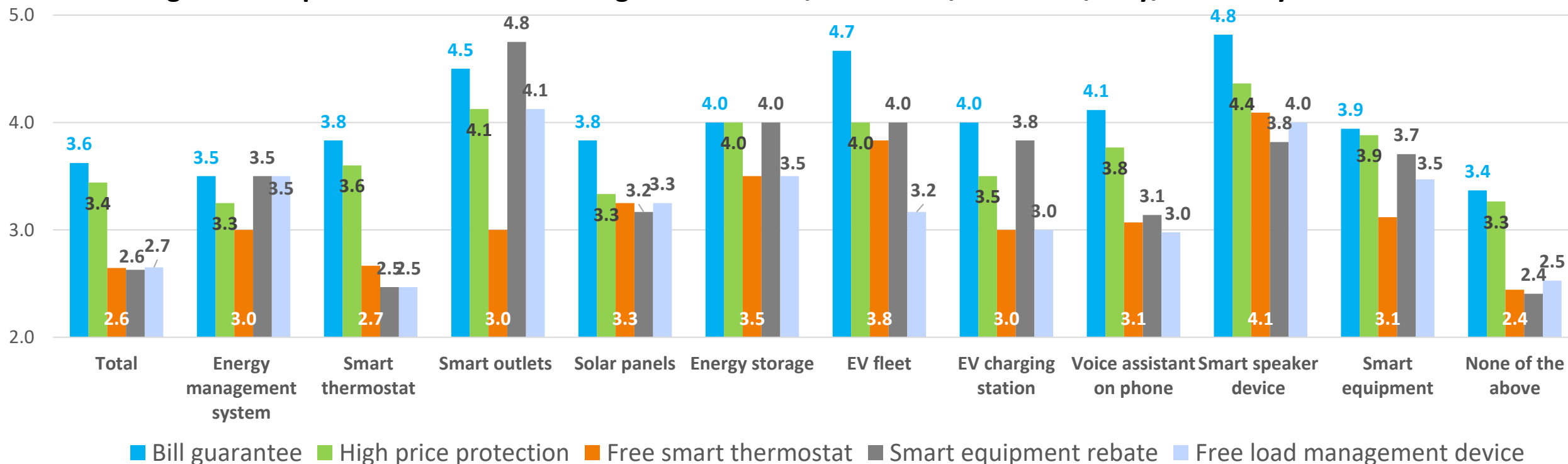
All owners of electric vehicle fleets indicate they are “likely to enroll” in RTP



Incentives are most influential to owners of smart outlets and smart speakers – four out of five incentive options are rated above “very influential” on average among these owners. The influence level of incentives also varies among different technology owner groups

- Bill guarantee and high price protection are very/extremely influential (rate > 4.0) to owners of smart outlets, energy storage systems, EV fleets, and smart speakers
- Smart equipment rebate is the most influential to owners of smart outlets and EV fleet but least influential to owners of smart thermostats
- Free load management device is most attractive to owners of smart outlets and smart speakers
- Free smart thermostat is most attractive to owners of smart outlets and smart speakers

1-5 rating scale adapted from influence ratings of “not at all/somewhat/moderate/very/extremely influential”

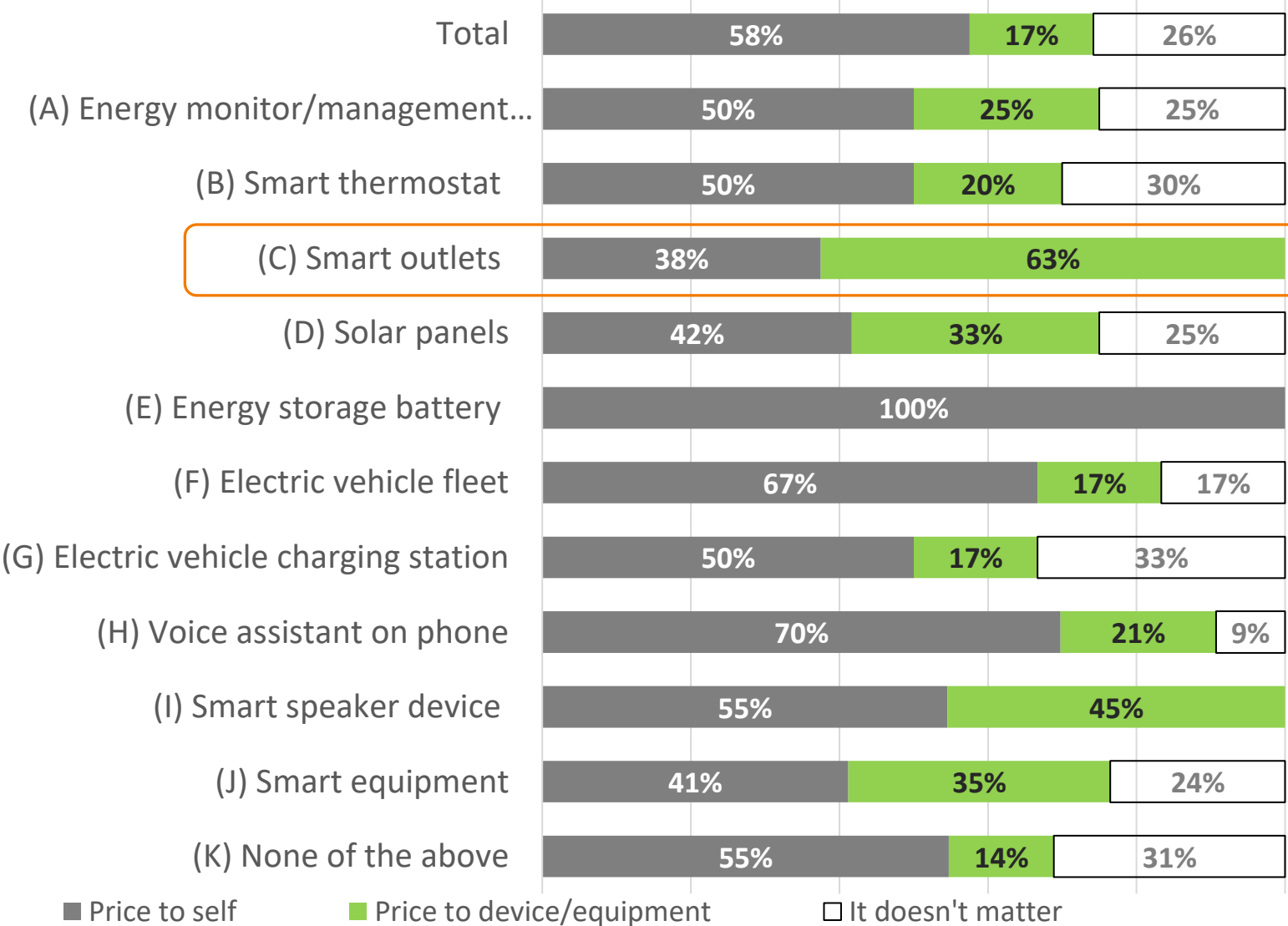


Owners of smart outlets show the highest acceptance of price notification sent directly to their devices/equipment

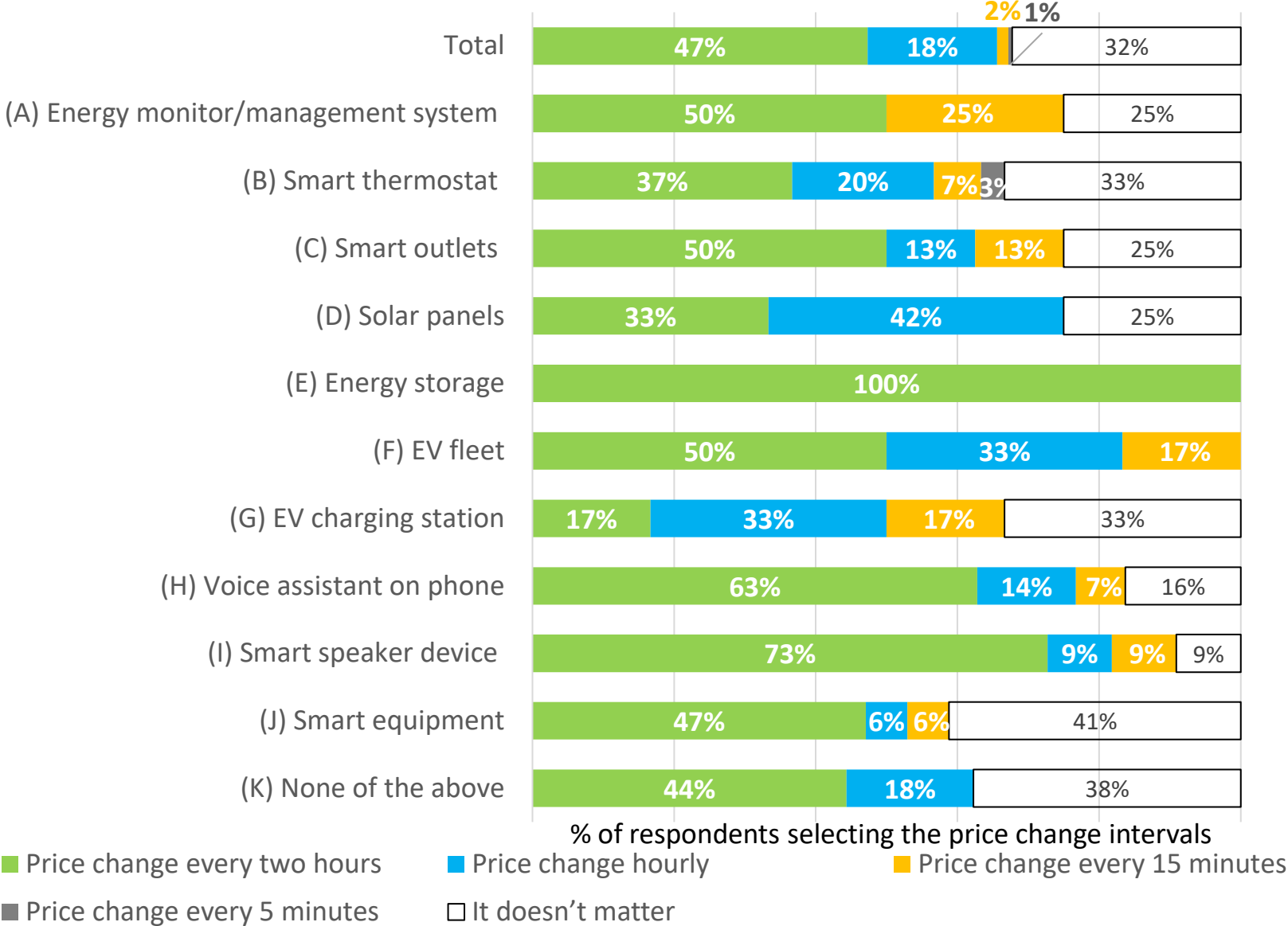
Preferred price notification method segmented by technology ownership

63% of smart outlet owners prefer the “price to device” or “price to equipment” notification method

This is significantly higher than for owners of smart thermostats or phone voice assistants



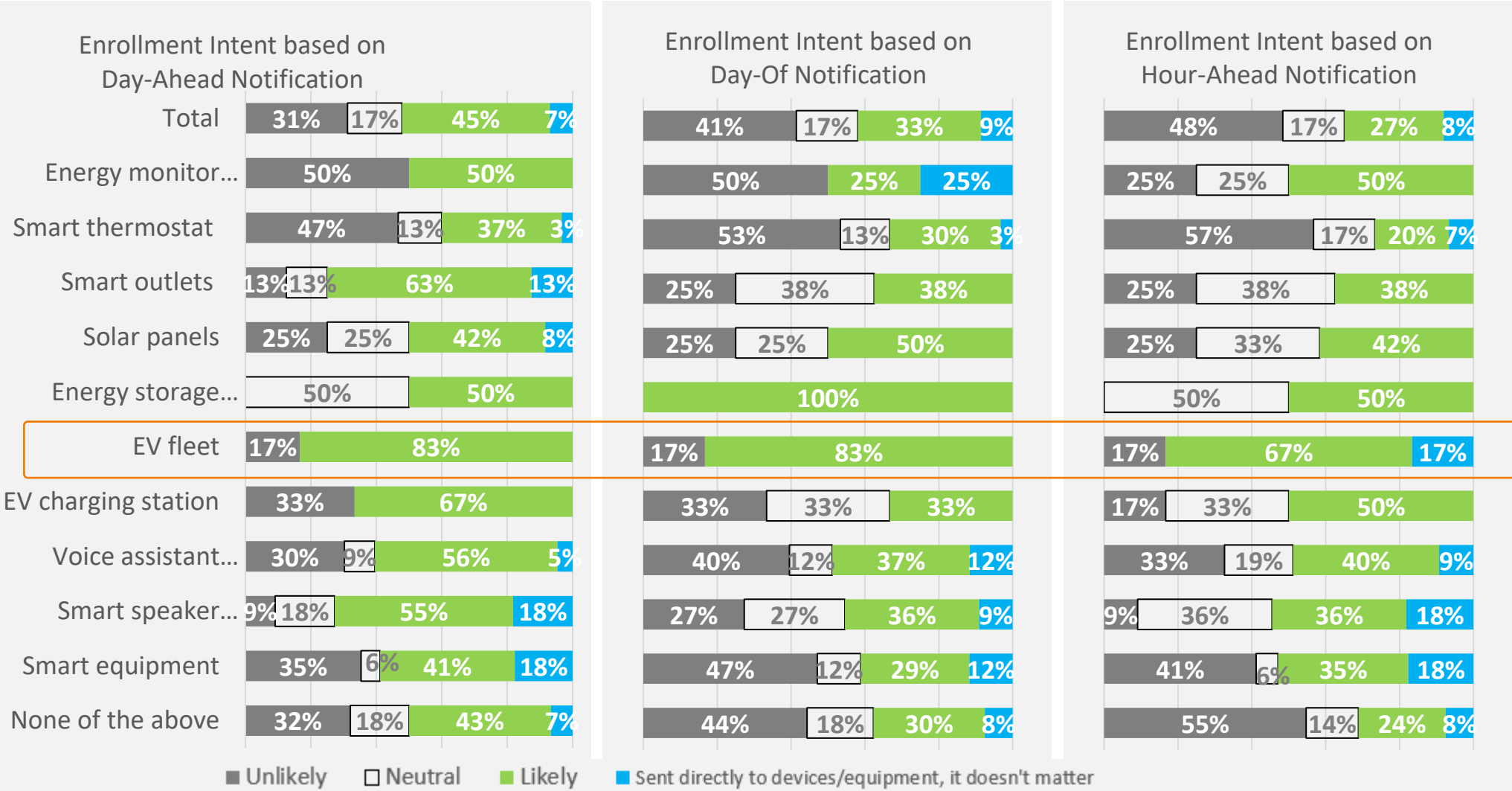
Customers who own energy monitor systems, EV fleets or EV charging stations have higher acceptance of 15-min price intervals than other tech owner groups



- Owners of solar panels and EV fleets & EV charging stations show the highest preference for hourly pricing (42% and 33%, respectively)
- Majority of voice assistant or smart speaker owners prefer two-hour pricing
- 41% of smart equipment owners are indifferent about price time intervals, which is the highest among all technology ownership groups

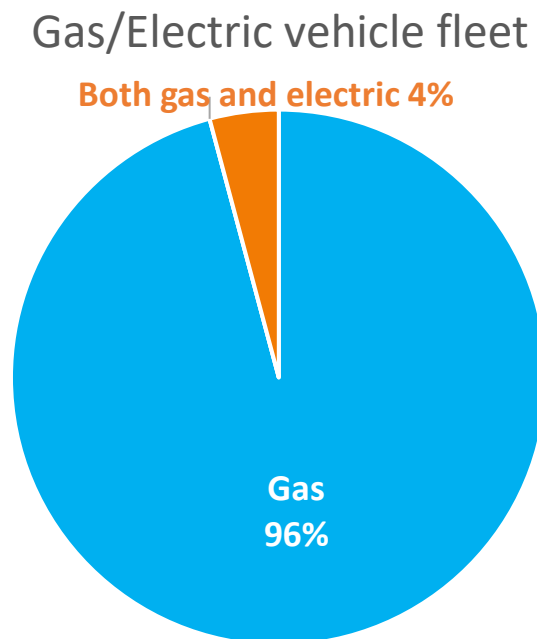
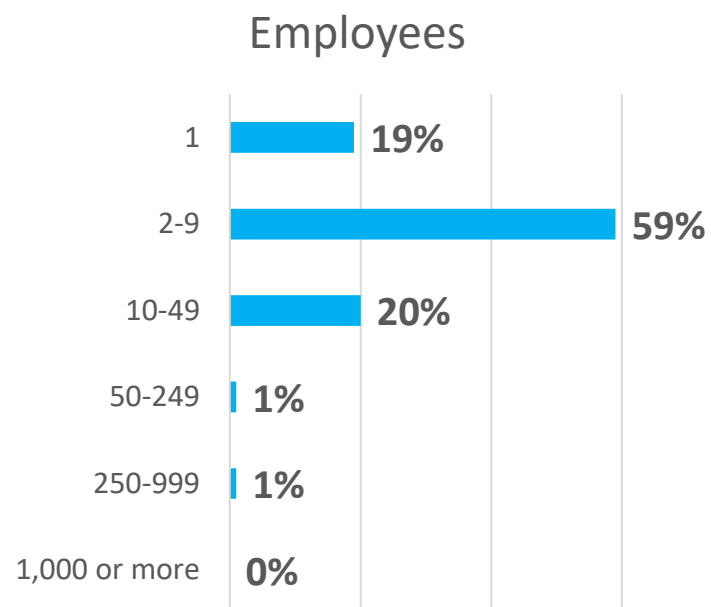
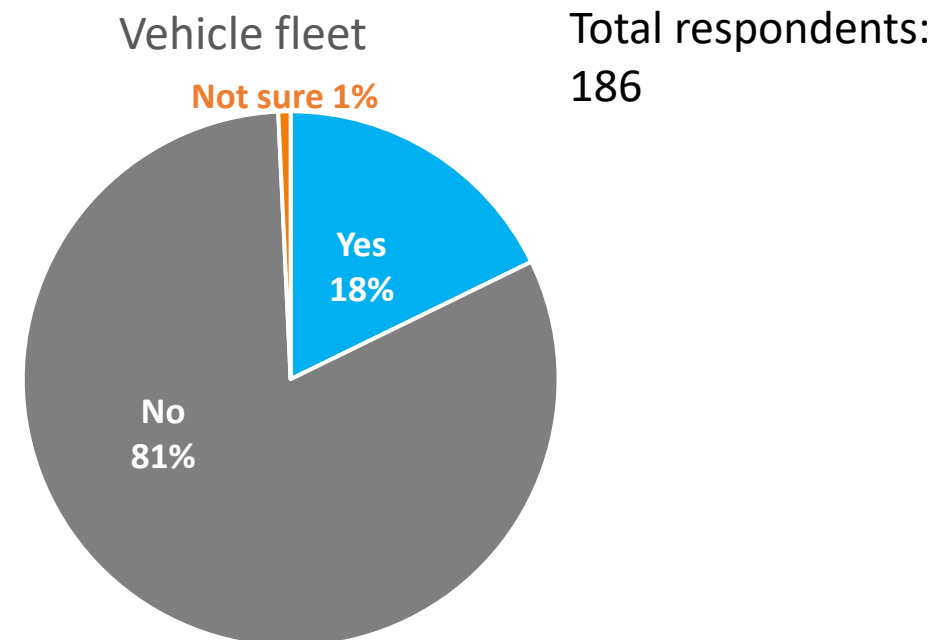
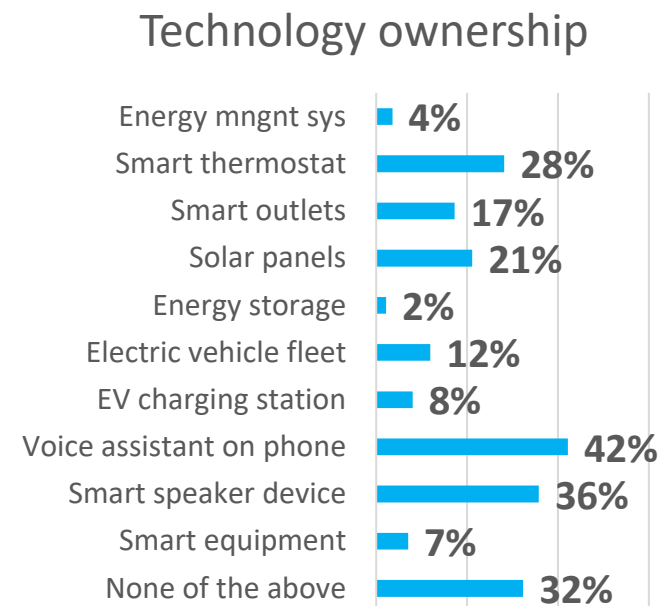
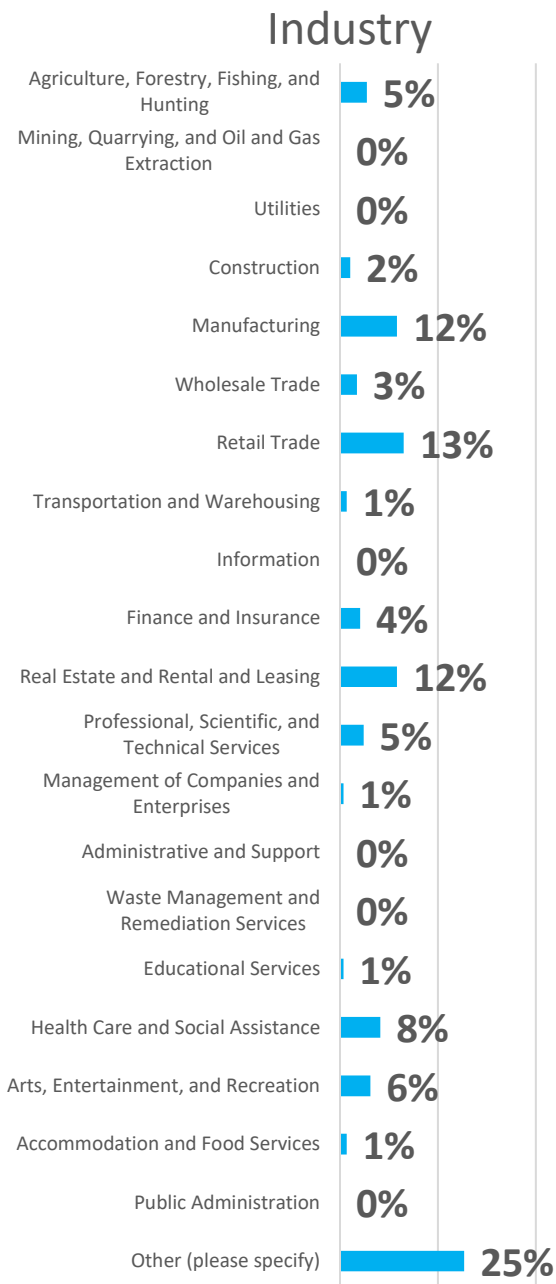
Business customers with EV fleets show the highest intent to enroll in RTP across all three price notification horizon options

Intent to enroll in RTP segmented by technology ownership and price notification horizon





Appendix – panel firmographics

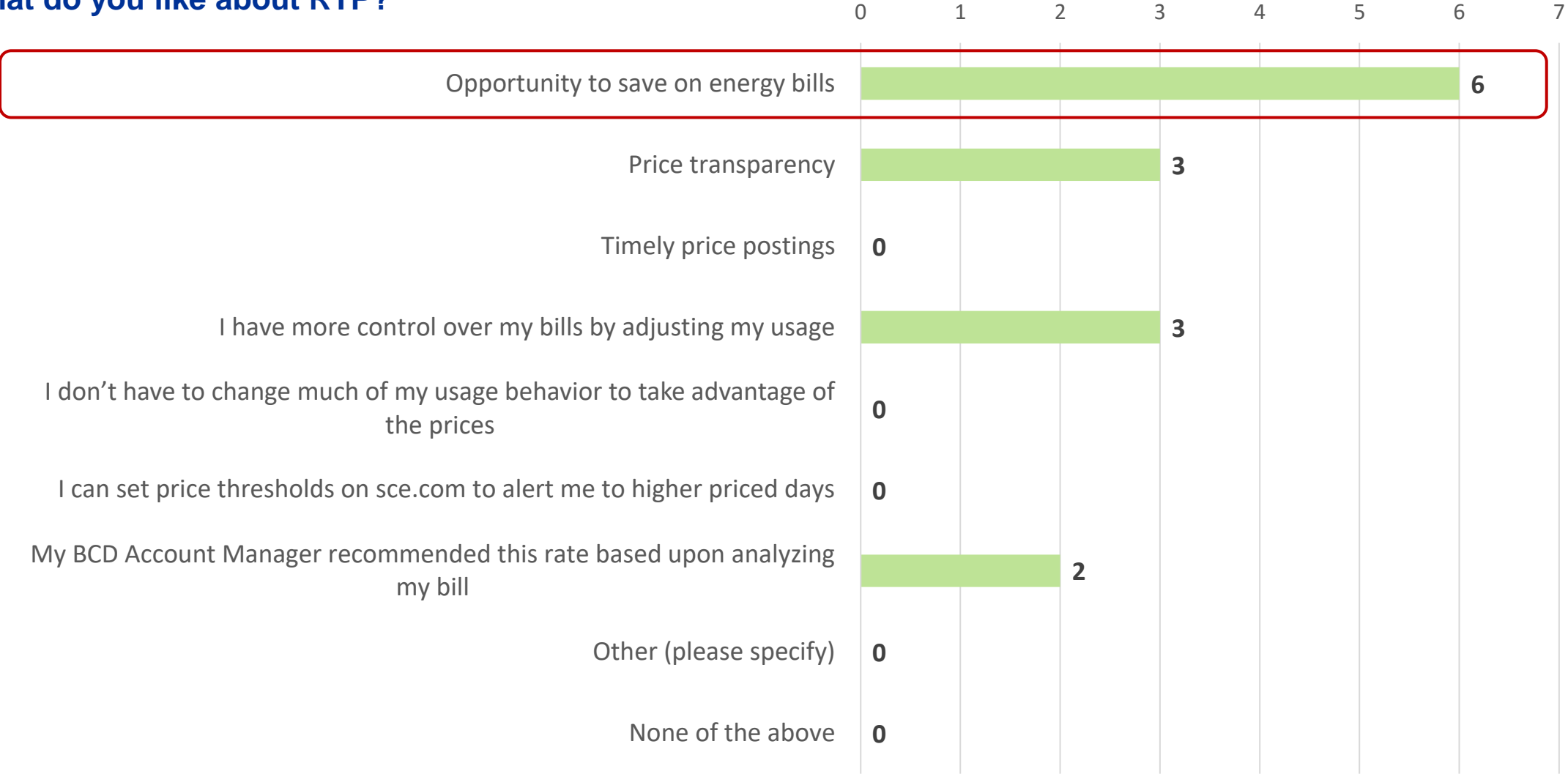




Results of Current and Recent RTP Customers Survey (7 completes)

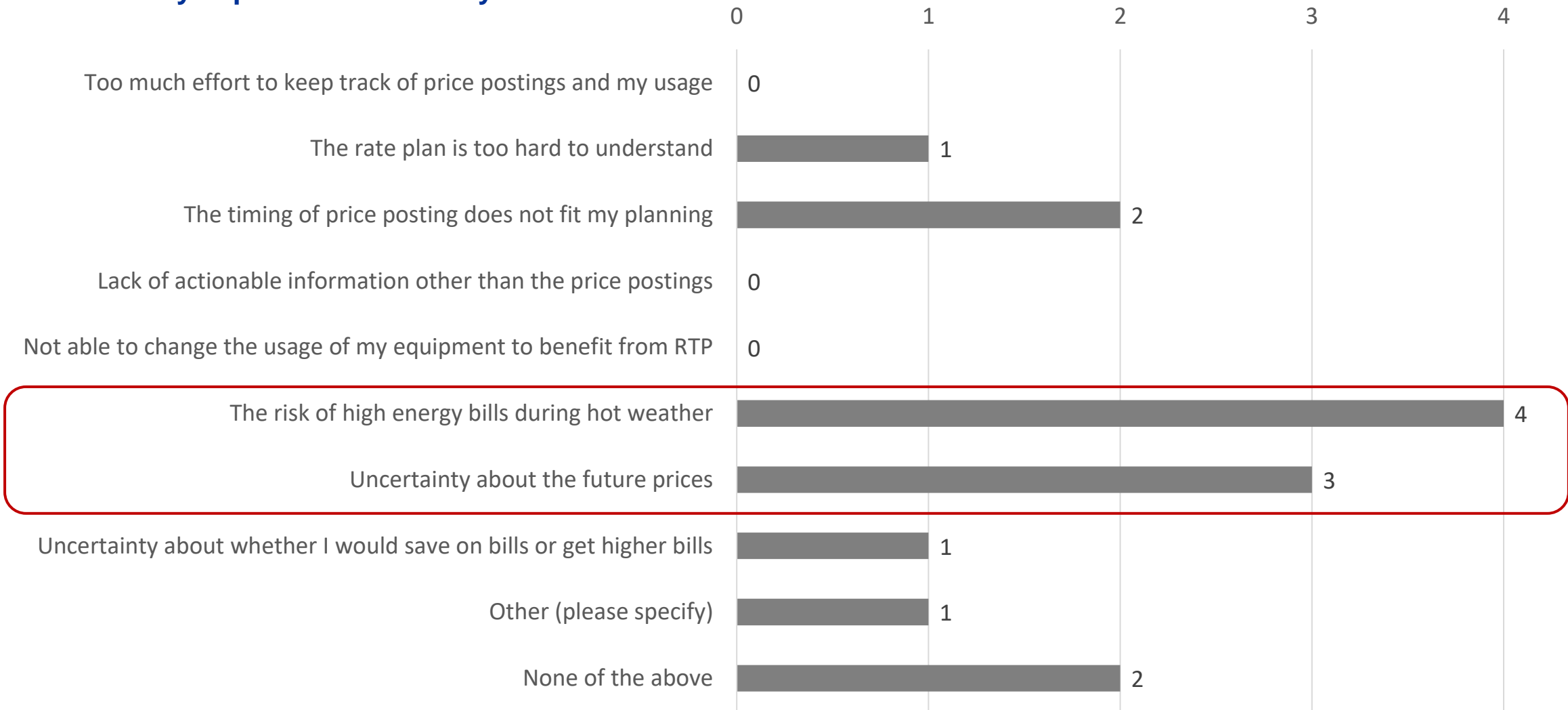
The most appealing aspect of RTP among current RTP customers is the opportunity to save on energy bills

Q: What do you like about RTP?



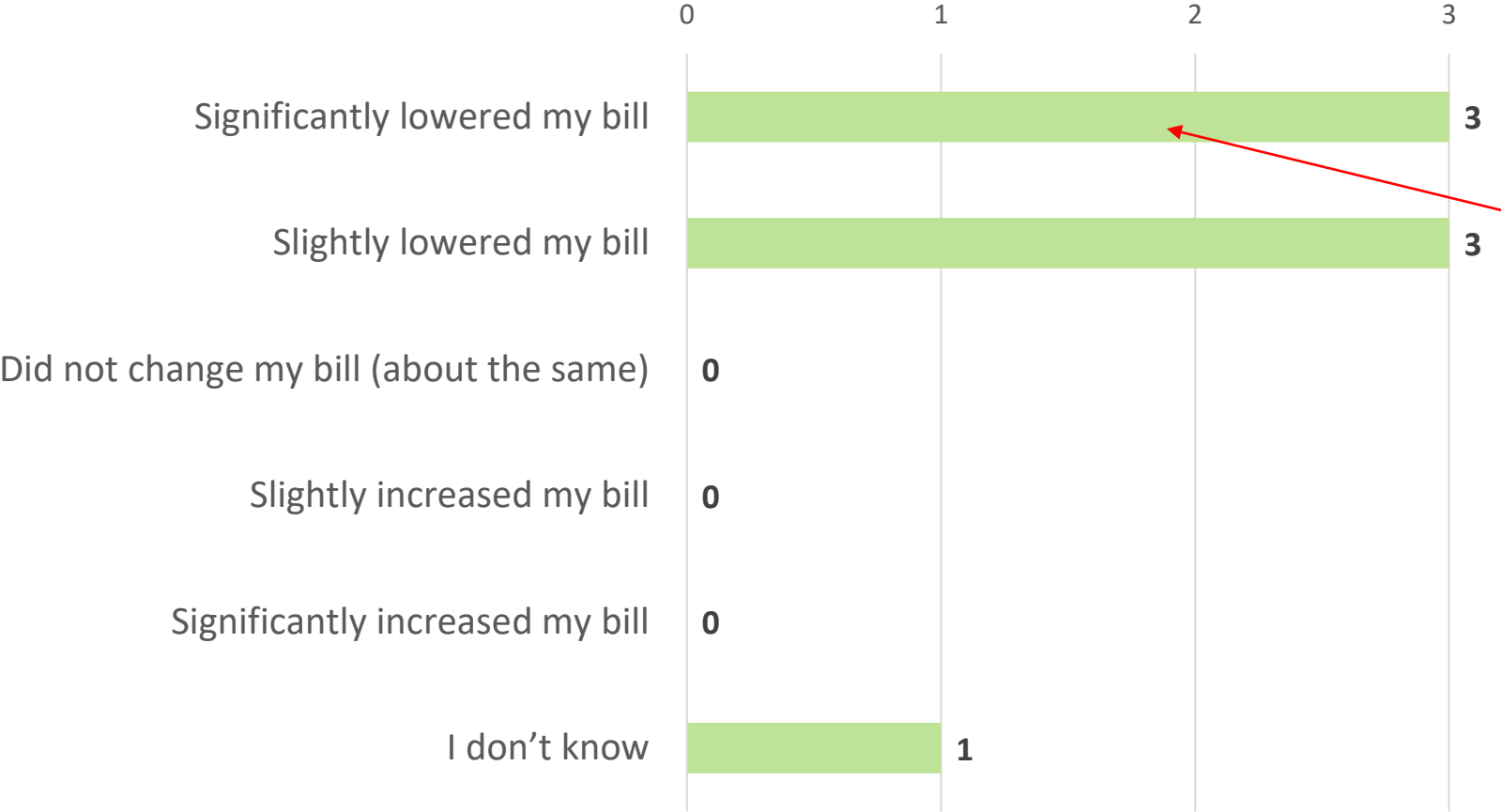
Current RTP customers most dislike the risk of high energy bills during hot weather, followed by the uncertainty of future prices

Q: Are there any aspects of RTP that you dislike?



Six out of seven respondents stated that RTP had lowered their bills

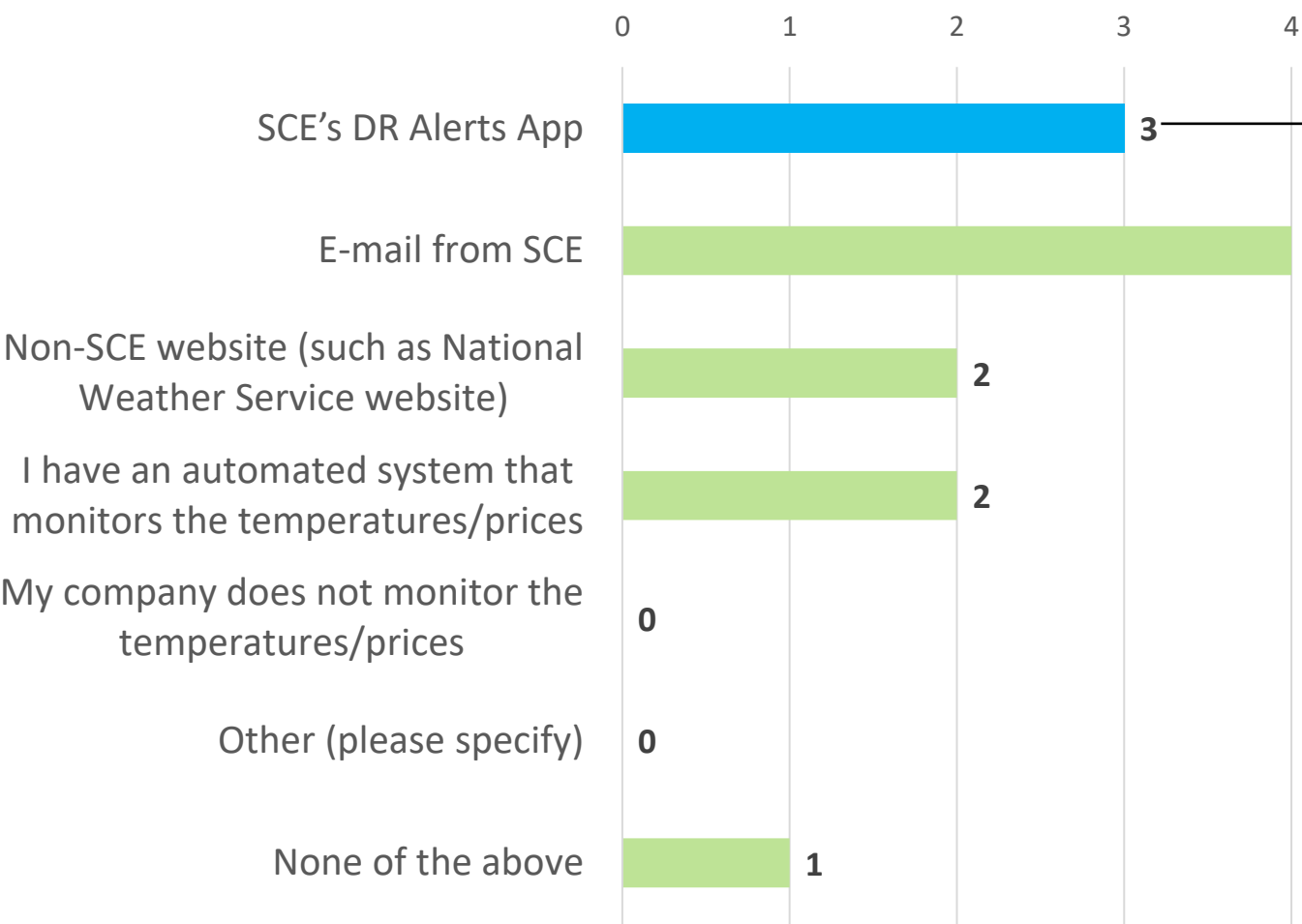
Q: Do you believe being on RTP reduced your monthly electricity costs?
Please select the option that best describes how RTP has affected your electricity bill.



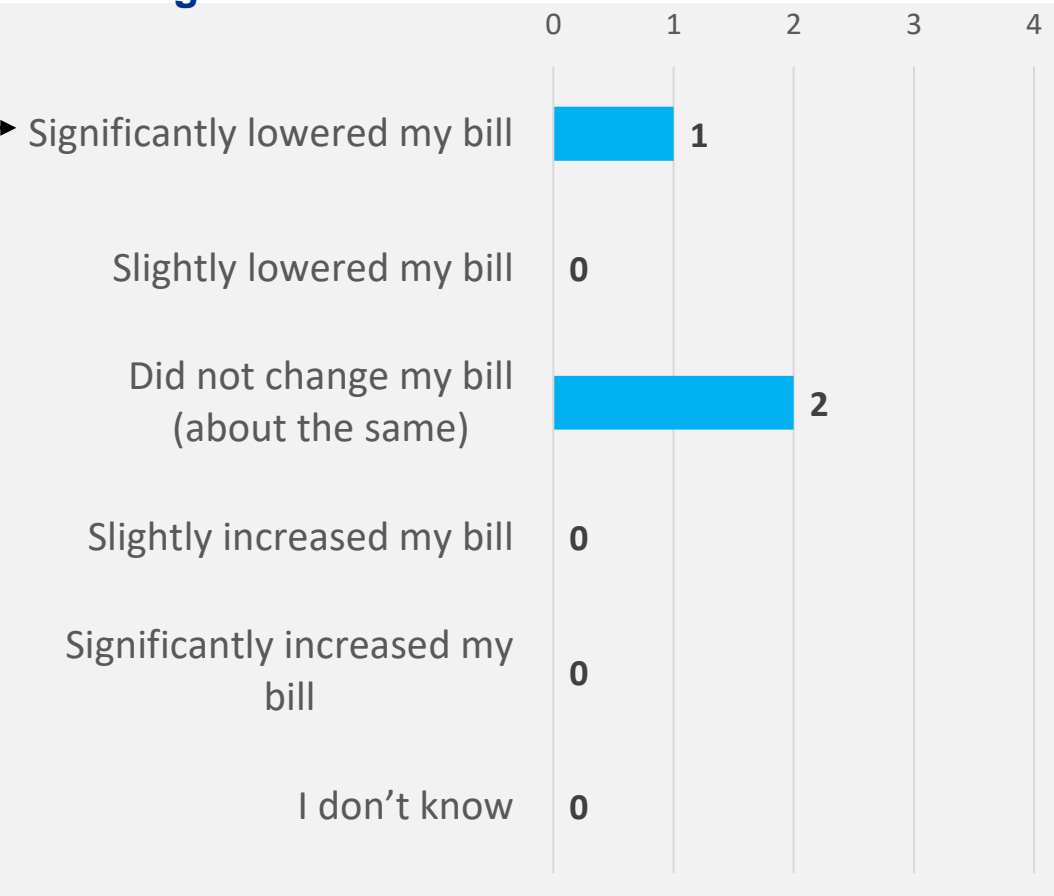
About the three customers who indicated “significantly lowered my bills”: two of them have an energy management system, one has an energy storage system to respond to RTP

Current customers mainly receive price notifications through email or DR alerts app

Q: How do you receive temperature/price information?

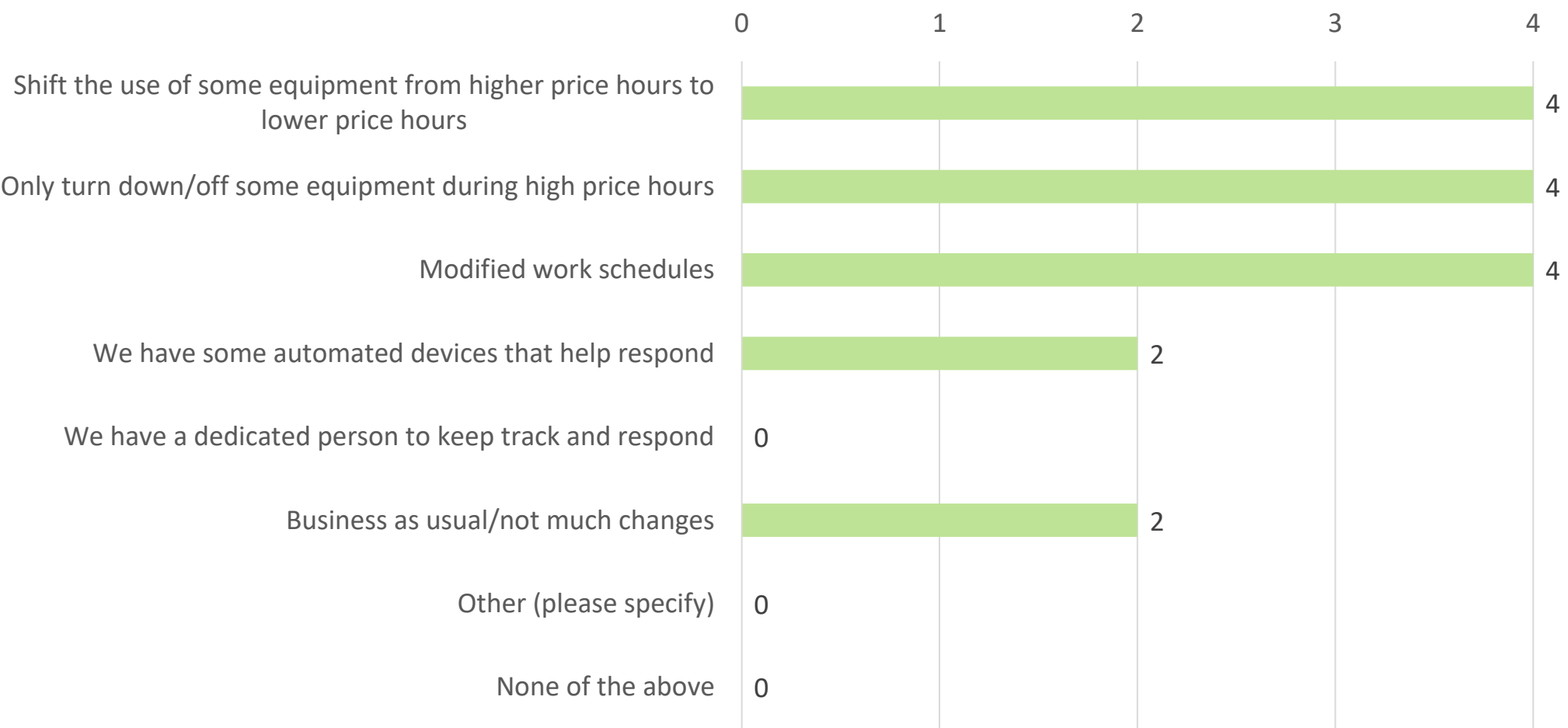


Q: If you receive temperature/price information via the DR Alerts App, did you find it beneficial to reducing bills?



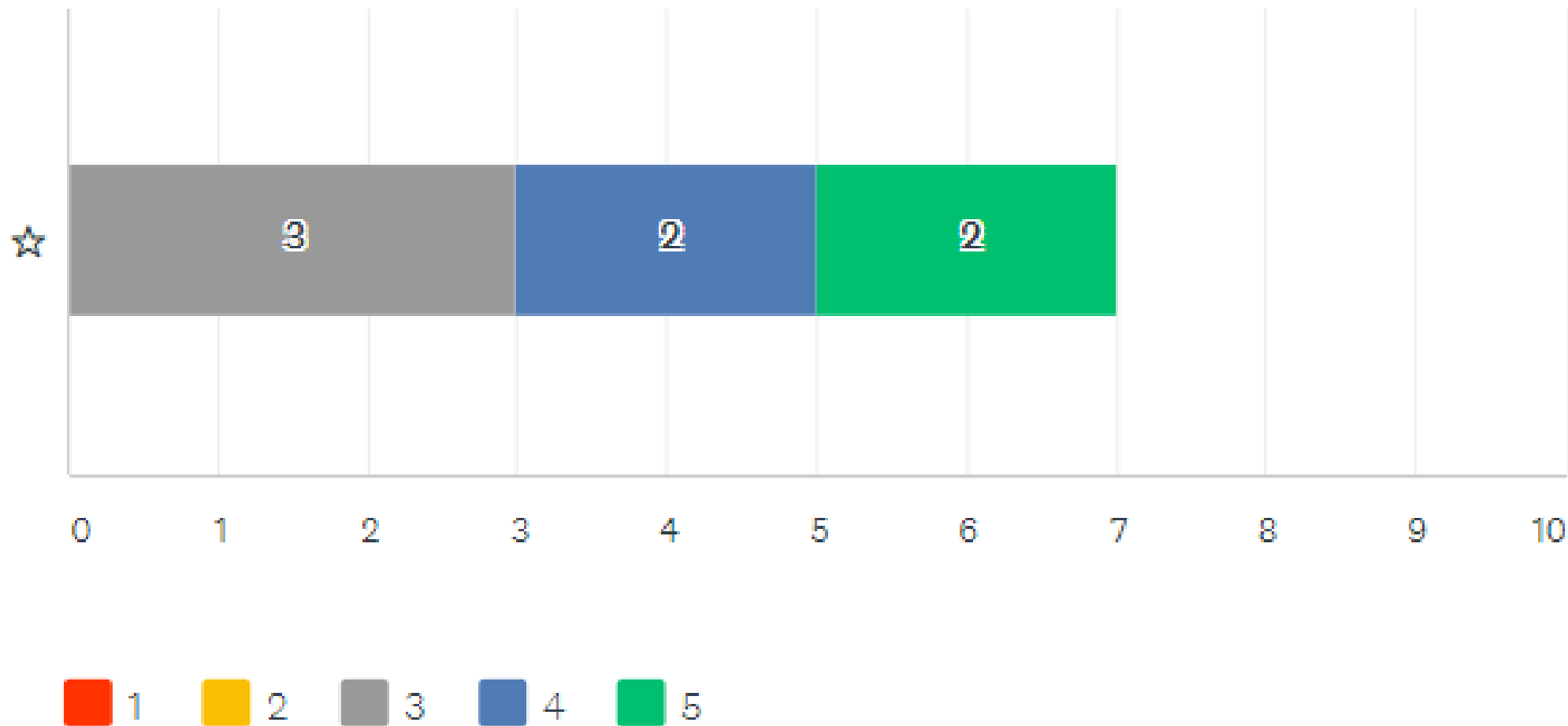
4 out of 7 respondents are able to shift equipment use or modify work schedules. Two respondents have automated devices to help respond

Q: Which of the following describe how you respond to real time price updates?



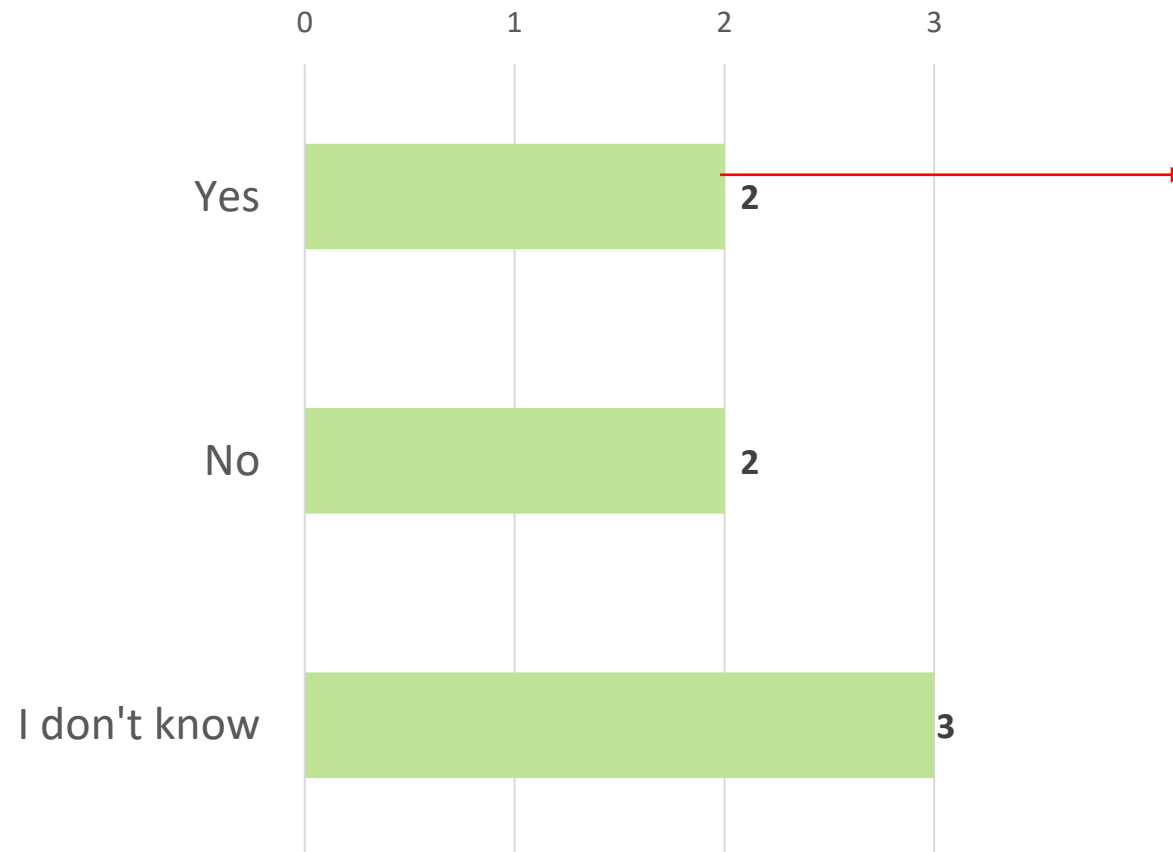
All respondents rated SCE RTP program equal or above 3 stars on satisfaction

Q: How satisfied are you being on RTP? Please rate on a scale of 1 to 5, with 5 being the highest satisfaction



Two respondents confirmed a positive experience with Automated Demand Response signals

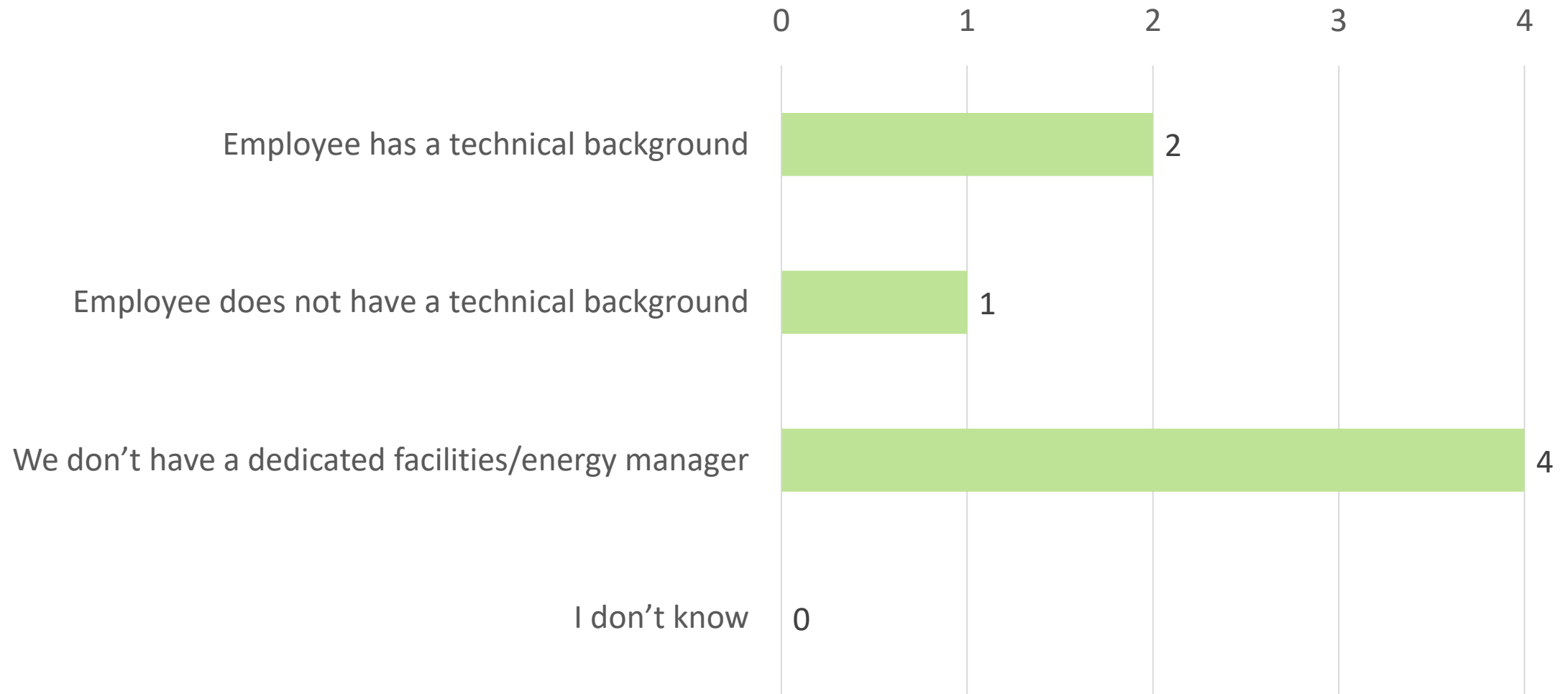
Q: Did you apply and install equipment with SCE to help shift and change loads based upon an Automated Demand Response signal from SCE?



Both respondents found that Automated Demand Response signals significantly lowered their bills, and the process to connect to SCE's system was somewhat or very easy

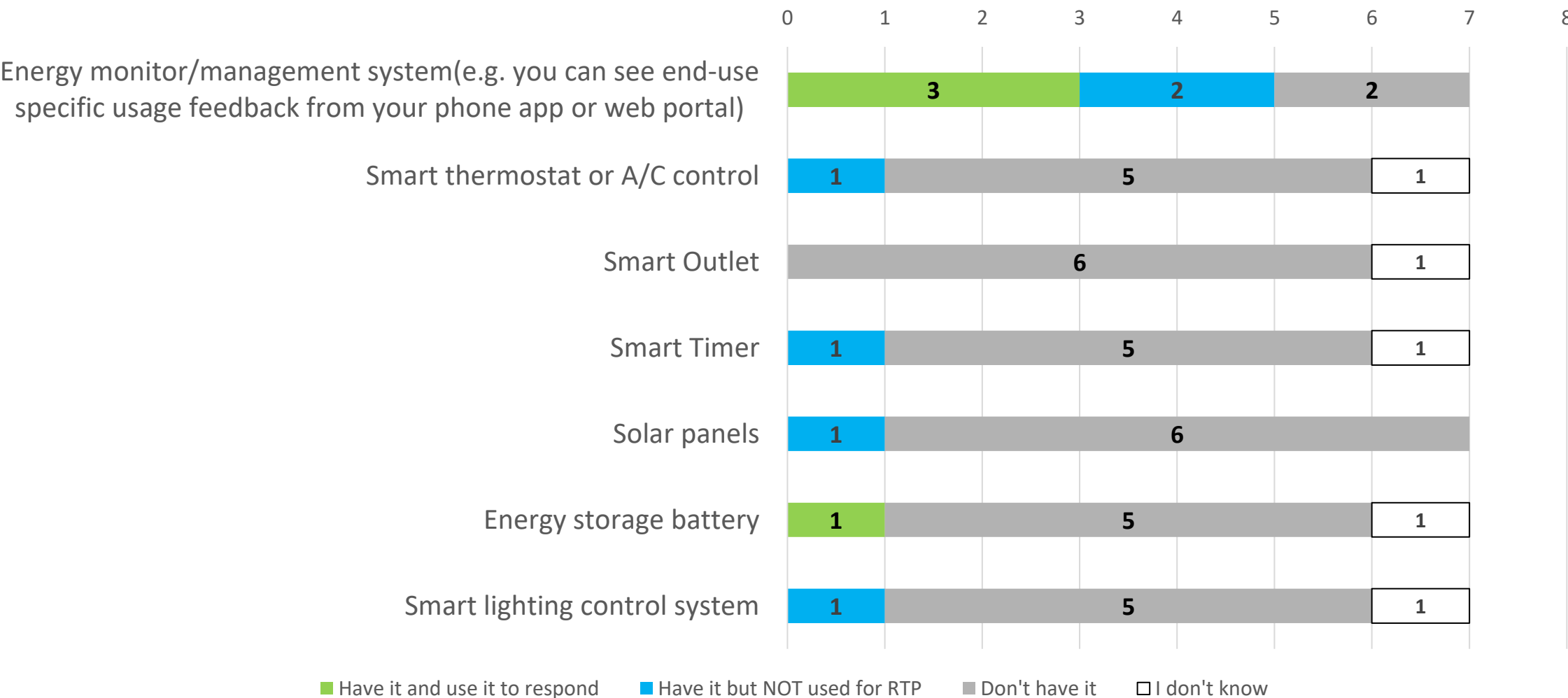
4 out of 7 respondents do NOT have a dedicated manager responsible for RTP responses

Q: How technical is the person at your facility responsible for shifting your facility's energy usage based upon the daily signals received?



Only two of five respondents who own energy management systems use them for RTP responses. Limited ownership observed for other technologies, and owners of smart timers, solar panels or smart lighting systems do not use these technologies for RTP.

Q: Which of the following technologies have helped you respond to real time price signals? Please select for each technology.



Four respondents who showed intent to enroll in market-based pricing either had assistance from technologies (energy management system or energy storage system), or already considered the RTP experience smooth and predictable

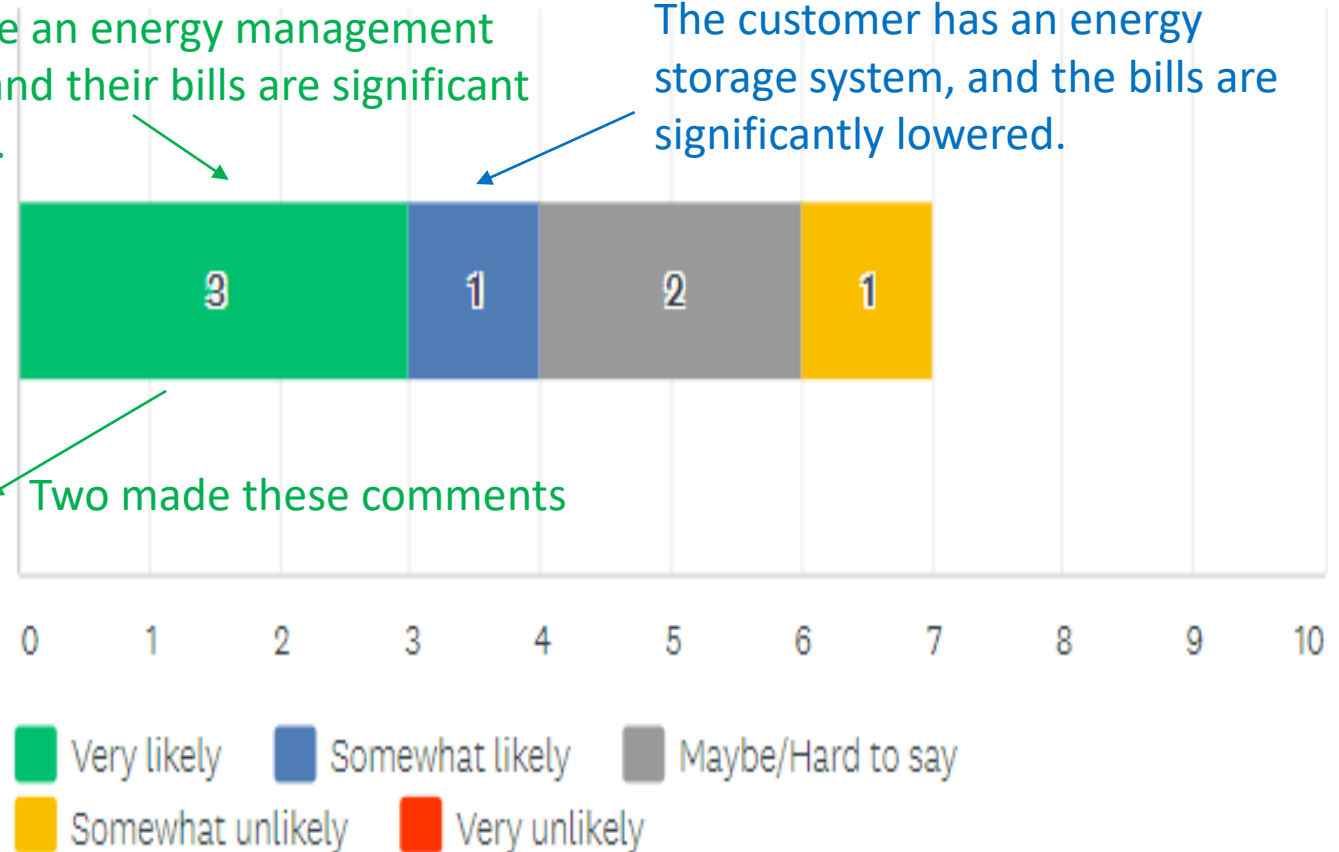
Q: Today's RTP pricing is based on a choice of one of seven pricing schedules. If the program were to change the format to more of a market-based pricing structure that varies according to energy market prices, up to a set maximum price cap, how likely would you be to still participate?

The reason behind your response:

- “Would need to understand more concerning the maximum price cap before making a decision.”
- “Don't know enough to make a decision.”
- “It has been working well here for years. It's now a lot smoother and more predictable” (this customer does not have any listed technologies, only with DR alerts app)
- “As a water utility, I like the ability to make daily changes as needed to reduce our energy bills”
- “Not sure what the market price will be and how that would impact our flexibility”

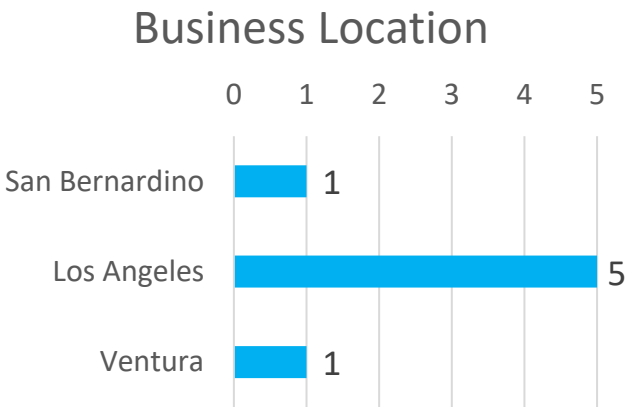
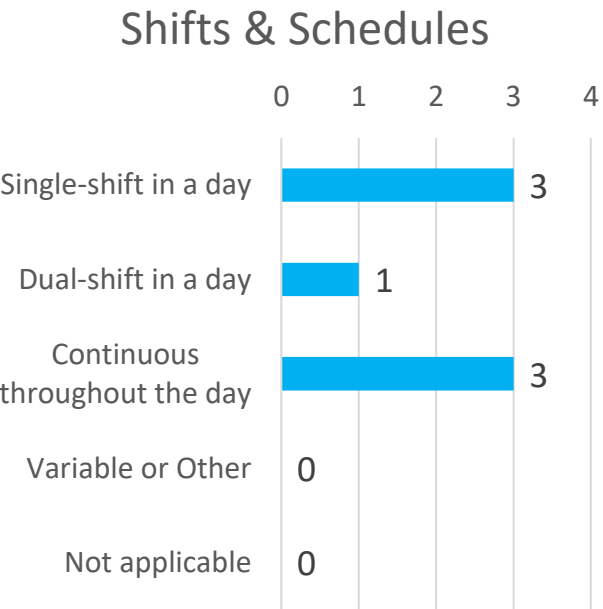
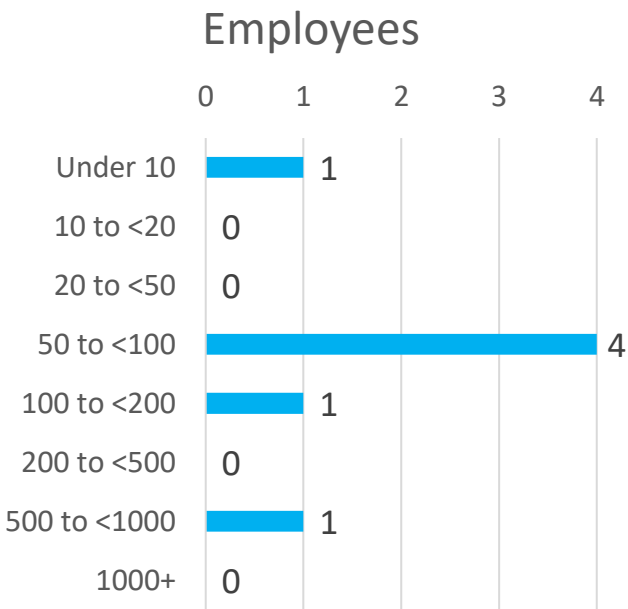
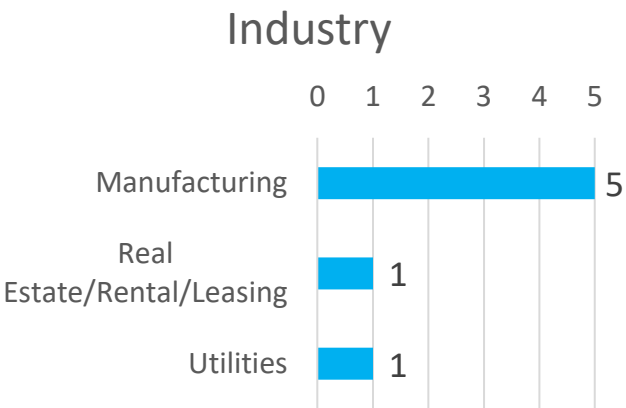
Two have an energy management system and their bills are significant lowered.

The customer has an energy storage system, and the bills are significantly lowered.



Respondent Firmographics

Total respondents: 7



A blue-tinted photograph of four people, two men and two women, standing in a row. They are all wearing white lab coats with the EPRI logo on the left chest. The man on the far left has curly hair and glasses. The man next to him has short dark hair and glasses. The woman next to him is wearing a white hard hat and has short dark hair. The man on the far right has short brown hair, a beard, and glasses. They are all smiling and looking towards the camera. The background is a solid blue color.

Together...Shaping the Future of Electricity

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Executive summary

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- **On enrollment intent:** Overall, about 32% of the customers surveyed indicated that they would be “likely to enroll” in an RTP offering based on an introductory description of RTP provided in the survey.
 - **Ownership of energy monitor/management systems, EVs and EV charging stations is the most positive indicator for enrollment intent:** 43% of energy management owners, 39% of EV owners and 40% of EV charging station owners indicated that they would be “likely to enroll” in RTP – higher percentages than for owners of other technology groups. By contrast, owners of solar panels indicated the lowest intent to enroll in RTP among technology ownership groups, with 57% indicating they would be “unlikely” to enroll in RTP.
- **On appealing and unappealing aspects:** Opportunity to save on bills is the most appealing aspect of RTP (53%), followed by “taking advantage of lower rates” (35%). The most unappealing aspect is “risk of high prices” (53%) followed by “no appliances to be managed by smart devices” (49%).
- **On incentives:** Among the four incentive options (bill guarantee, protection from high prices, free smart thermostat, and free smart appliance), having a bill guarantee and high price protection are the two most influential benefits, with 65% and 62% of respondents respectively considering them very or extremely influential in their decisions. **Influential level of incentives differs by technology ownership:**
 - Bill guarantee and high price protection are the top two influential benefits across all technology owners, while a free smart thermostat is the least influential benefit.
 - Bill guarantee and high price protection are particularly influential for EV and EV charging station owners.
 - A free smart appliance is most appealing to owners of energy management systems.

Executive summary (cont.)

- **On price notification preferences:** Majority of customers (64%) prefer notifications sent directly to themselves so that they can decide to whether adjust usage (referred as “price to self” customers). Only 15% of customers prefer that notification be sent directly to their smart hub/device to automatically communicate with end use appliances (i.e., “price to device”). Only 3% of respondents prefer that price be sent directly to their end use appliances (i.e., “price to appliance”)
 - Even among owners of smart appliances, 64% prefer the “price to self” option.
 - Ownership of energy management systems, energy storage systems, electric vehicles and charging stations is positively correlated to preference for “price to device/appliance”
- **On time intervals for price change:** Overall, respondents prefer lower time granularity: 61% voted for price change every two hours, 12% voted for hourly, only 1% voted for every 15-min and 0.5% voted for every 5-min.
 - Preference for hourly pricing, or indifference to price intervals, is highest among customers who prefer “price to appliance” notification (24% of “price to appliance” customers selected hourly pricing vs. 13% of “price to self” customers)
 - Preference for hourly pricing is higher among the owners of energy storage systems, EVs, EV charging stations and smart appliances than among owners of other technologies
- **On notification time horizon:** More advance notifications of prices increases the expressed intent to enroll in RTP. 54% respondents indicated that they were likely/very likely to enroll RTP based on Day-Ahead notification. The likelihood decreased to 43% for Same-day (Day-of) notification, and down to 26% for Hour-Ahead notification.

Content outline

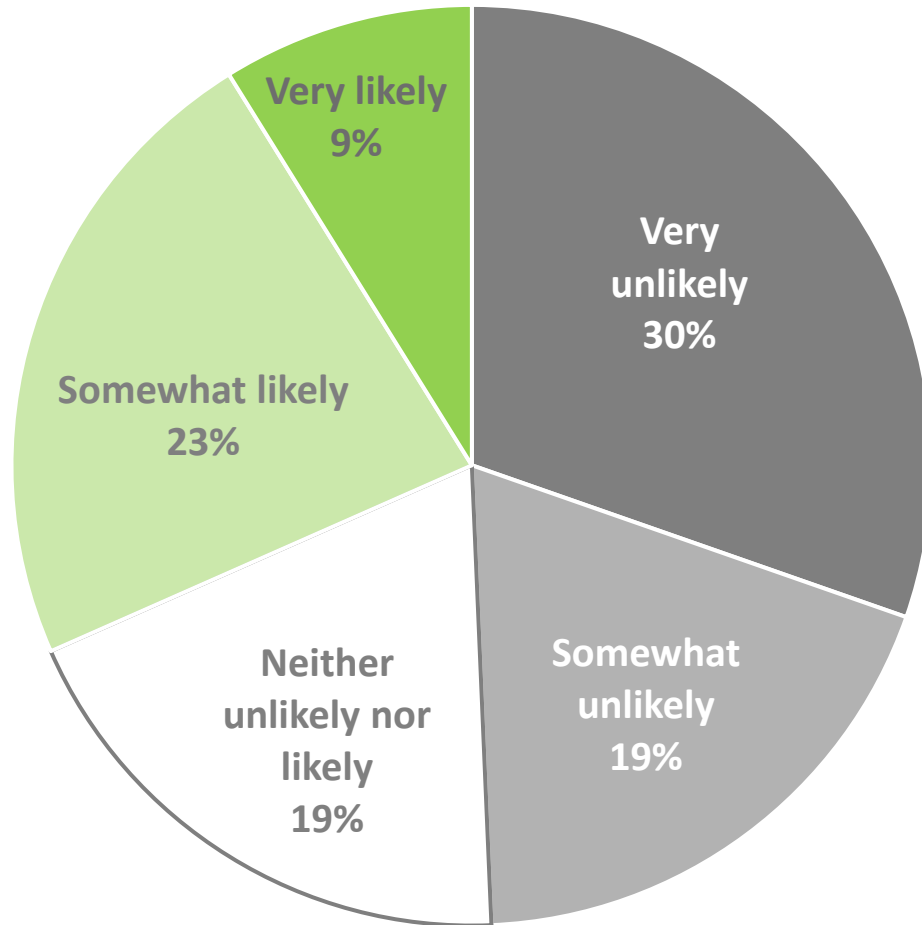
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- Appendix: [Panel demographics](#)



Results of overall population

About 1/3 of respondents expressed positive interest in RTP

Q: How likely are you to sign-up for the plan?

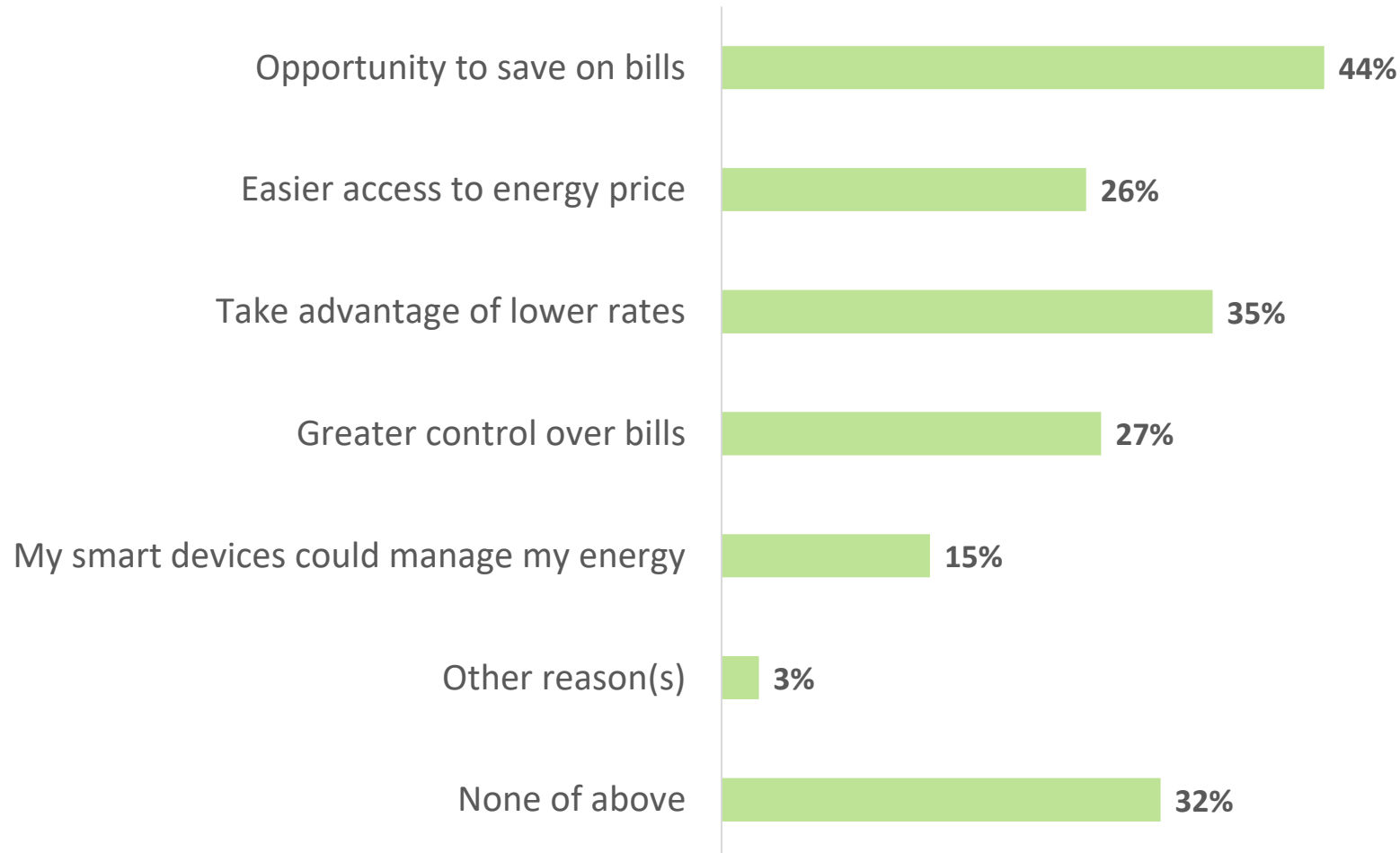


- Total respondents: 1107
- 32% indicated very likely or somewhat likely
- 49% indicated very unlikely or somewhat unlikely
- 19% with neutral intent

(Referred as “Likely”, “Unlikely”, “Neutral” in the rest of report)

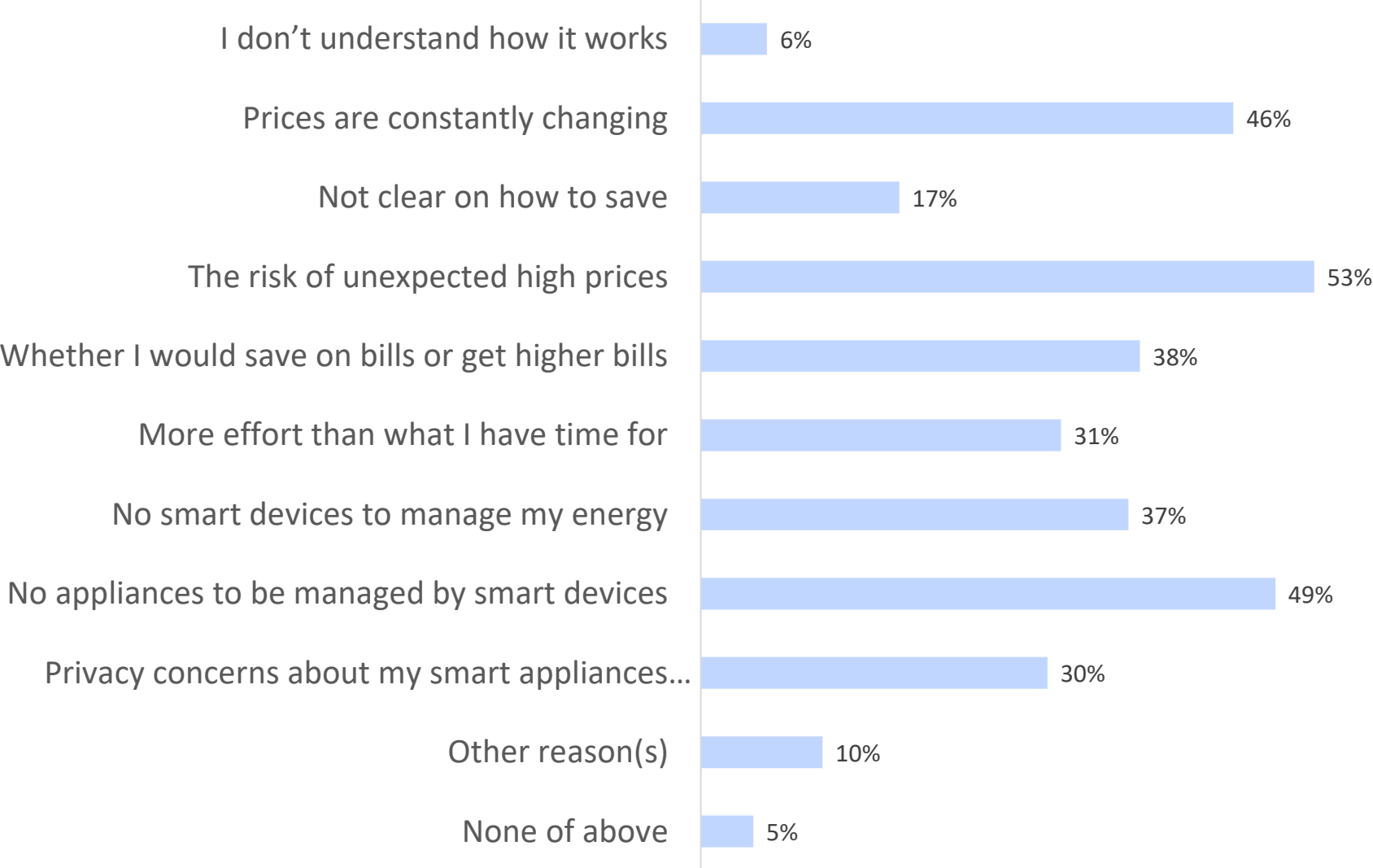
Opportunity to save on bills and to take advantage of lower rates are the two most appealing aspects of RTP

Q: What aspects of the RTP plan do you find appealing?



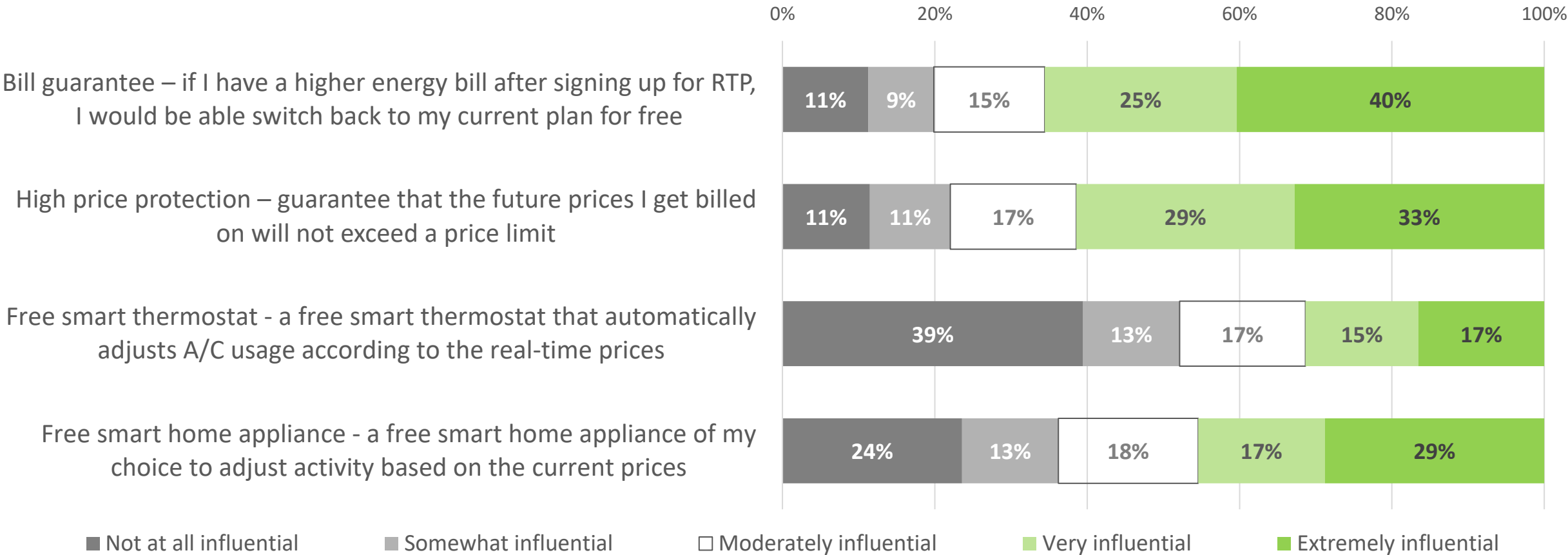
Overall, the risk of unexpected high prices and the lack of appliances to be managed by smart devices are the two most unappealing aspects of RTP

Q: What aspects of the RTP plan do you find unappealing?



Bill guarantee and protection from high prices are the two most influential incentives to encourage sign-ups

Q: Below are some benefits that you would receive if you signed-up for the RTP rate plan. Please select how influential each benefit would be on your decision to sign-up for the RTP plan.



64% of respondents prefer “price to self”; Only 3% respondents prefer “price to appliance”

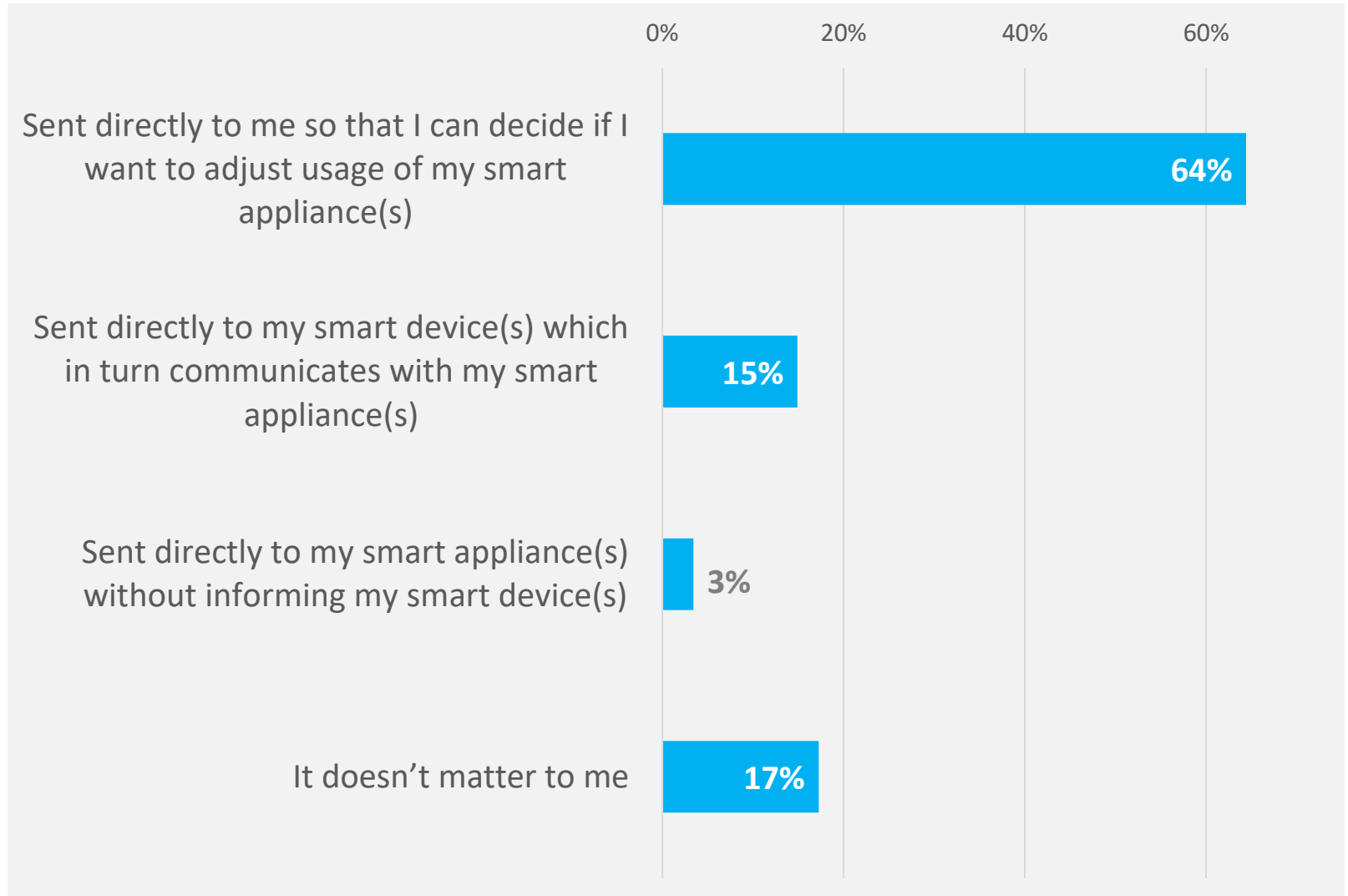
Q: If you were on the RTP rate plan, how would you prefer to receive price notifications?

Referred as “**price to self**” customers
in the rest of report

Referred as “**price to device**” customers
in the rest of report

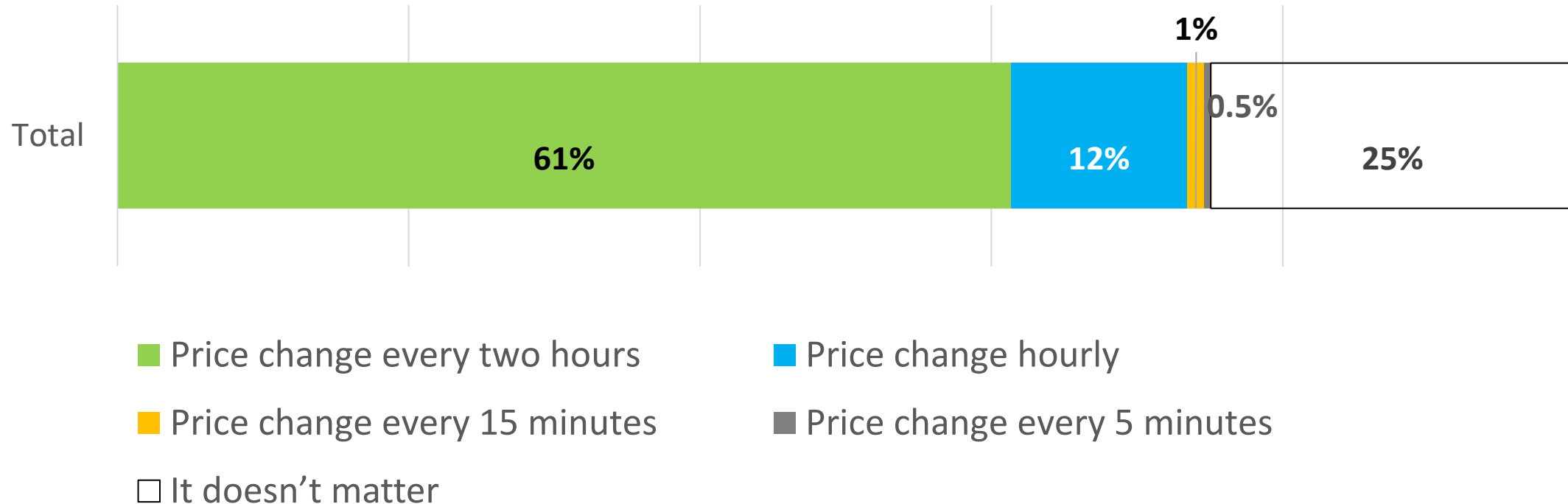
Referred as “**price to appliance**”
customers in the rest of report

Referred as “**notification indifferent**”
customers in the rest of report



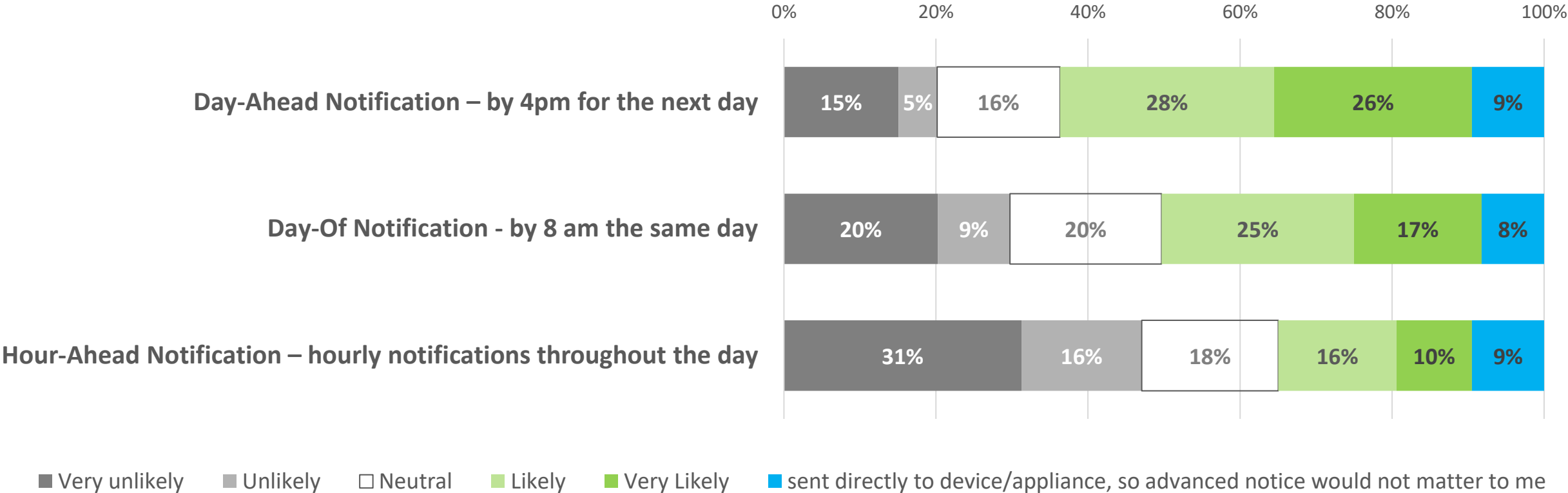
Most respondents preferred the least volatile presented option for the frequency of price change – every two hours

Q: If you were on the RTP rate plan, which time interval for the price changes would you prefer?



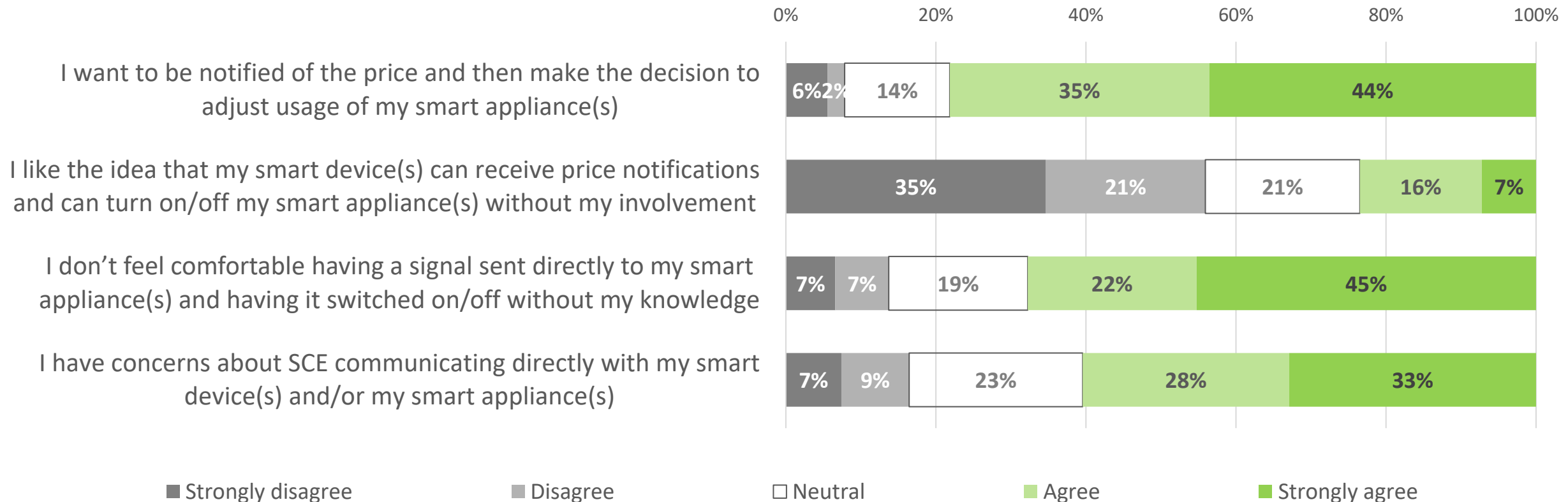
Day-Ahead Notification is the most preferred choice among the respondents

Q: Please rate your likelihood to participate in the RTP plan based on each of the following price notification options.



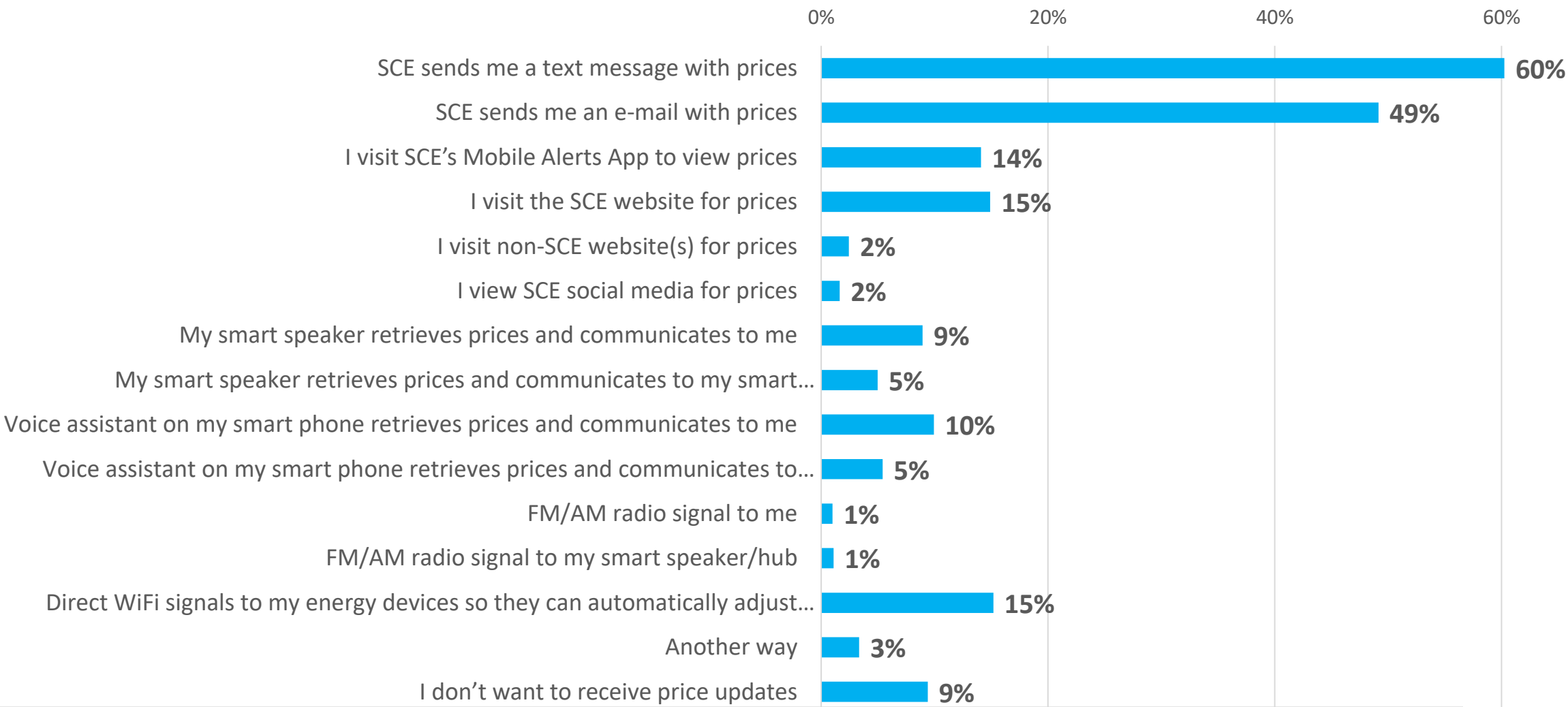
Majority of respondents prefer to be notified of the price and then make decisions, which is consistent with their choice of the “price to self” notification

Q: Below are some statements about the RTP price notifications process. Please select how much you agree or disagree with each statement.



Text message and email are the top two options for price notifications, consistent with the “price to self” preference

Q: If you were on the RTP rate plan, how would you prefer to receive price notifications



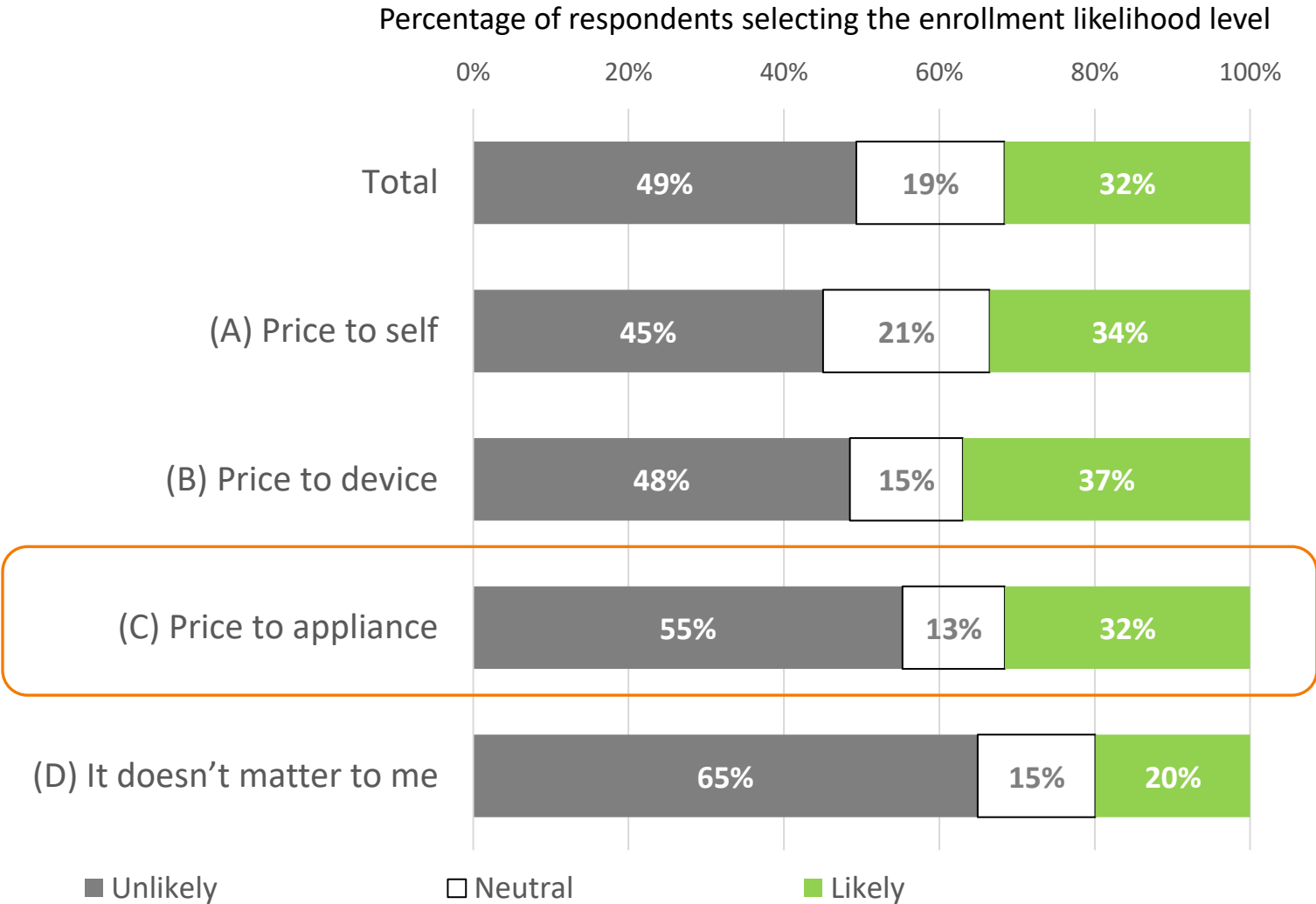


Results by notification preference segments

“Price to appliance” customers show the lowest intent to enroll in RTP compared to “price to self” and “price to device” customers (opposite to the finding among business customers)

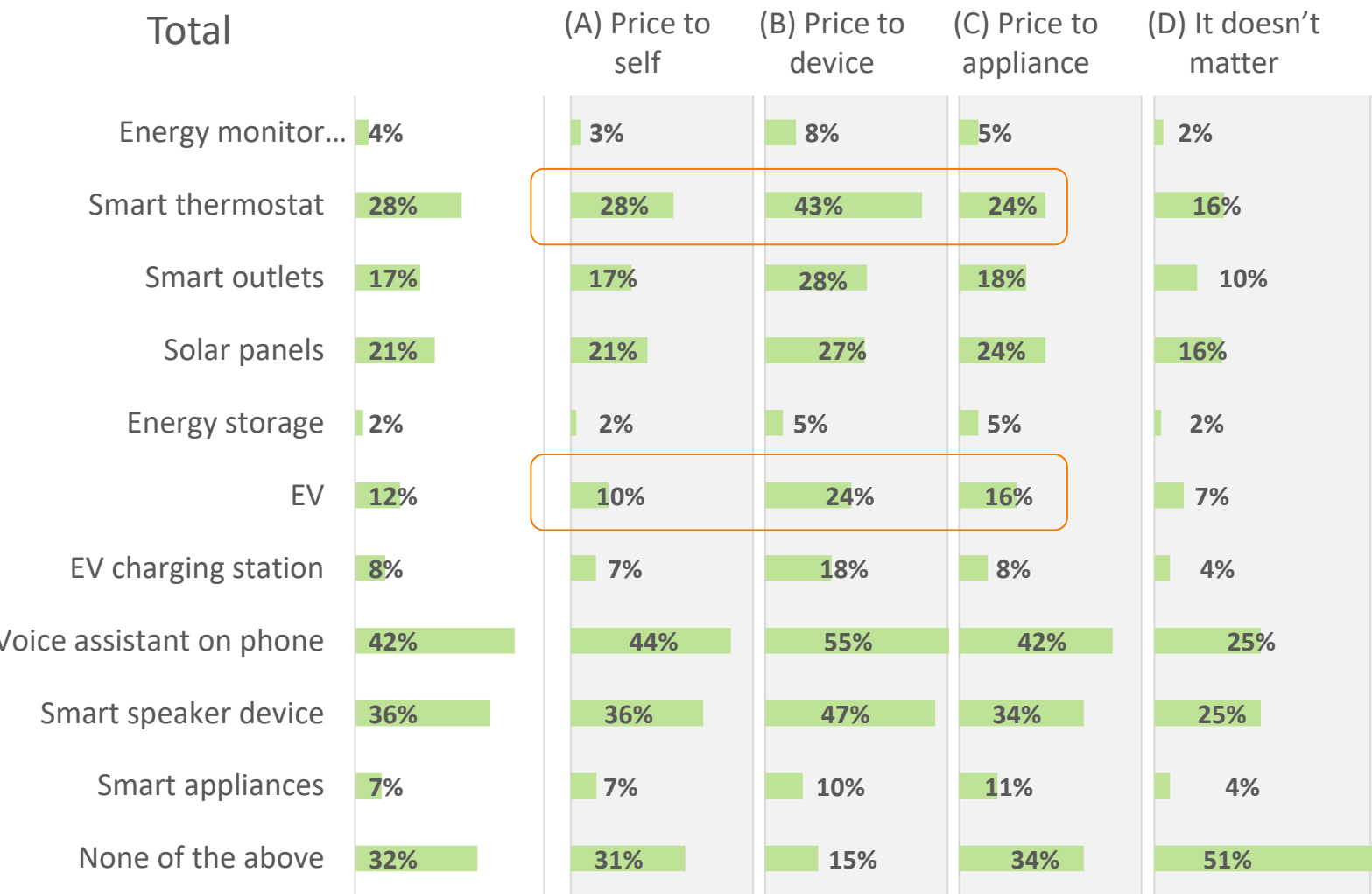
55%* “price to appliance” customers indicated “unlikely” to enroll RTP vs. 45% “price to self” customers indicated “unlikely”

*Caveat: Considering significance testing, it is inconclusive that the 55% in “price to appliance” group versus 45% in “price to self” group, or 48% in “price to device” are significantly different.



Ownership percentages of smart thermostats, smart outlets, EVs, EV charging stations, voice assistants, smart speakers, solar panels, and energy monitor systems are higher among “price to device” customers than among “price to self” customers

% of respondents owning a given technology

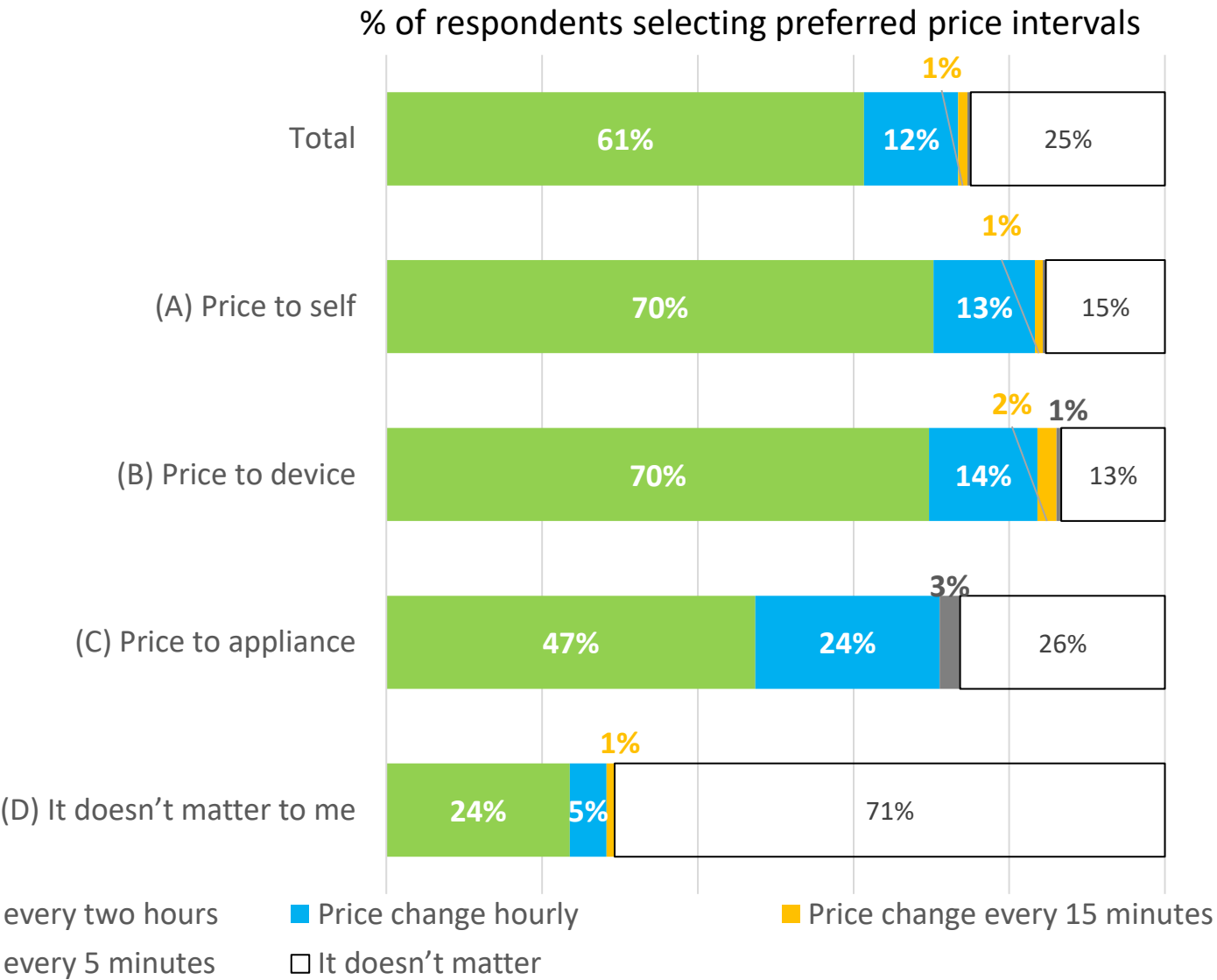


43% of “price to device” customers own smart thermostats, vs. 28% of “price to self” customers and 24% of “price to appliance” customers

24% of “price to device” customers own EVs, vs. only 10% of “price to self” customers

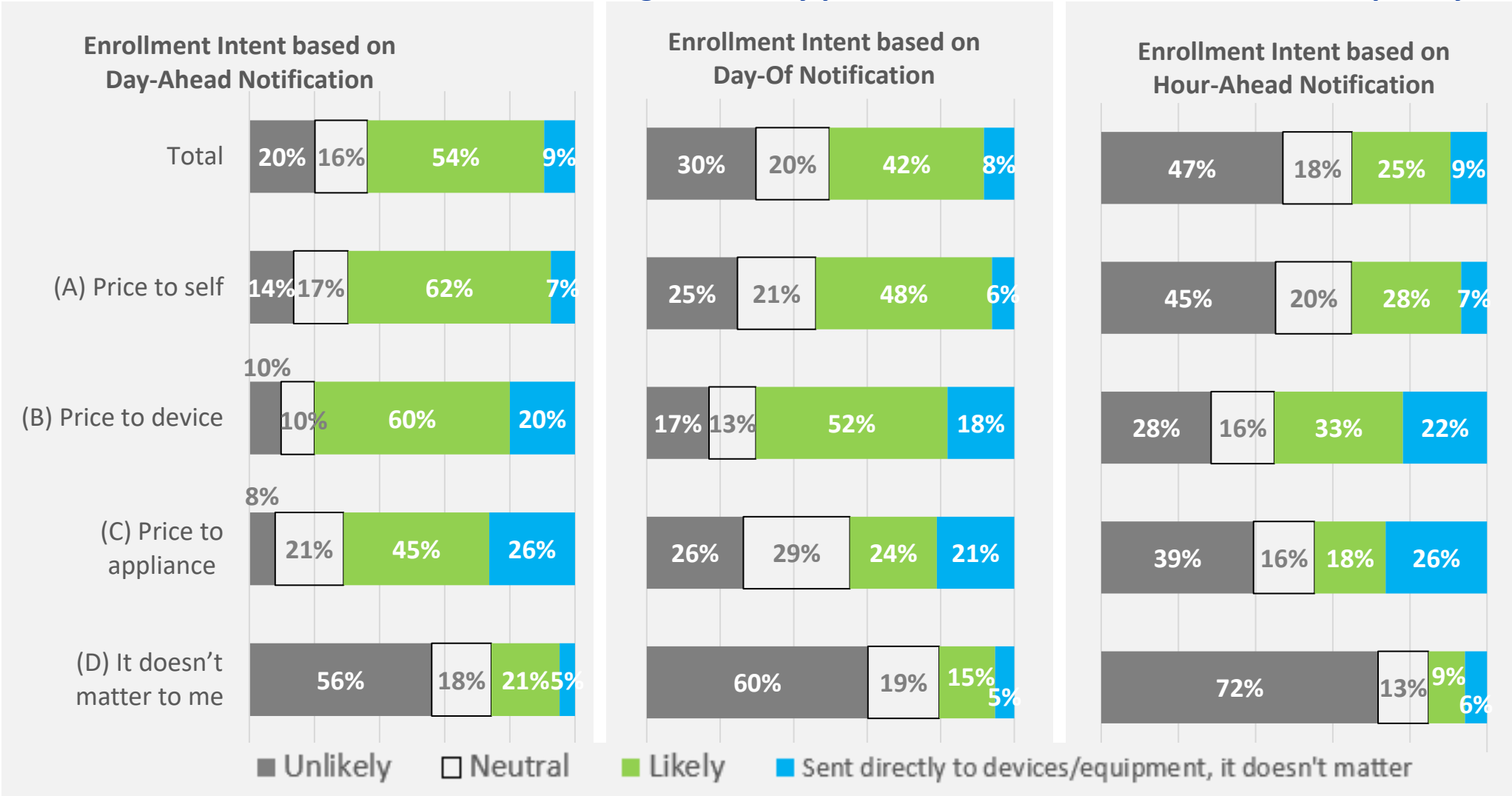
70% of both “price to self” and “price to device” customers prefer 2-hour price intervals, rather than hourly or sub-hourly

24% of “price to appliance” customers prefer hourly pricing, a higher percentage than for “price to self” or “price to device” customers



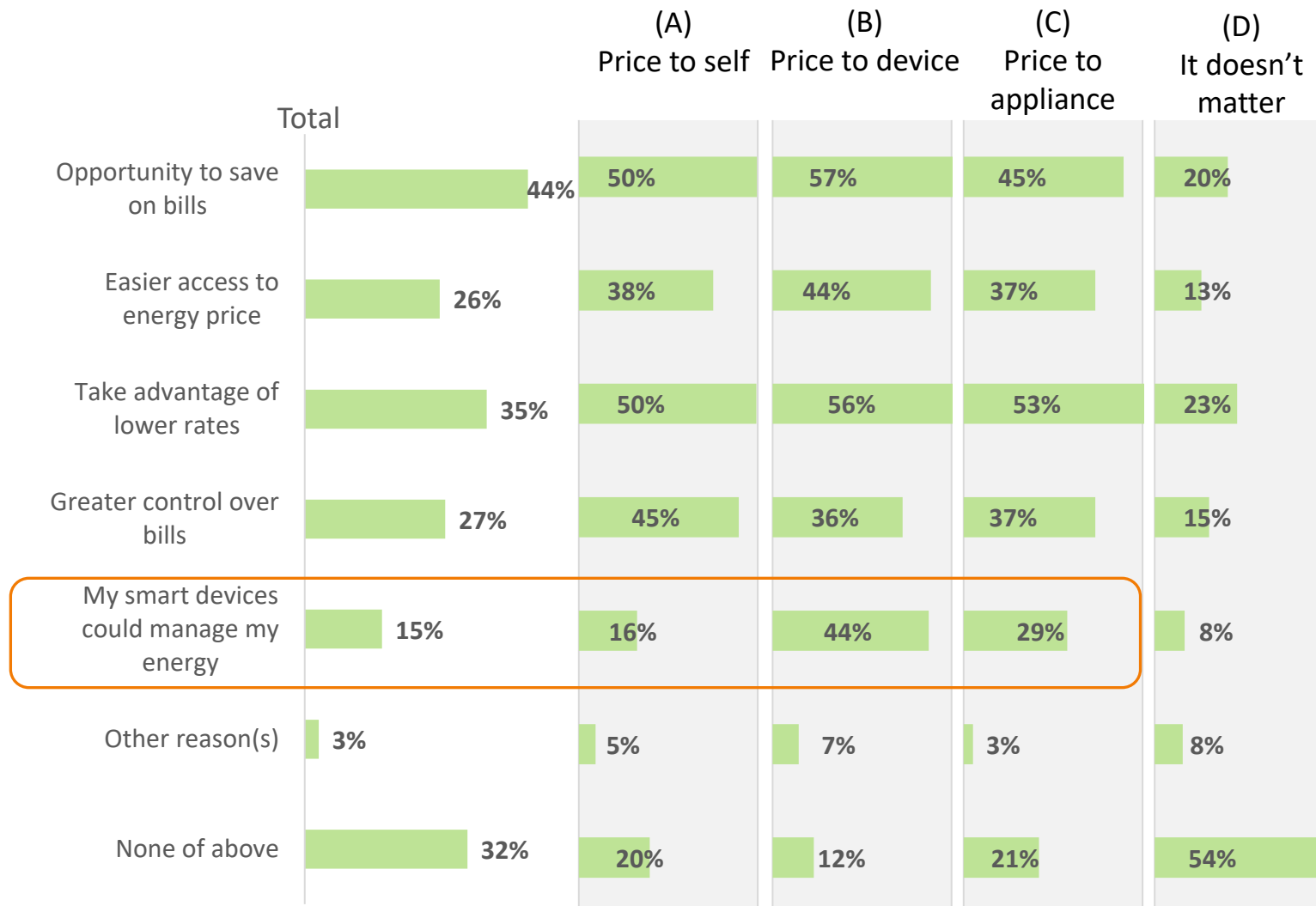
For all notification preference groups, the shorter the notification time horizon, the less likely customers are to enroll

Stated likelihood to enroll in RTP, segmented by price notification mechanism and frequency



“Price to Device” customers most value the potential for their smart device(s) to manage their energy use under RTP

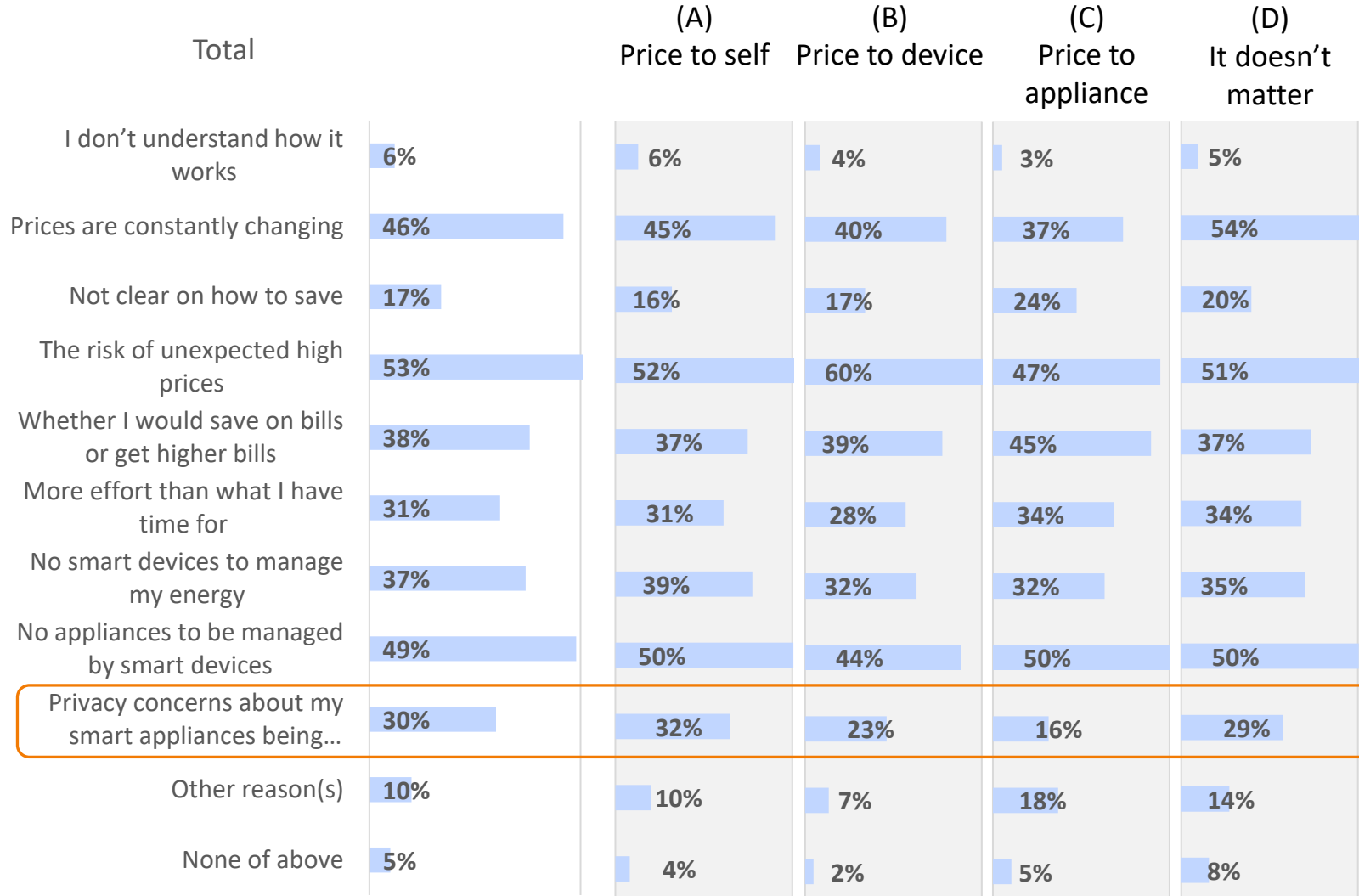
% of respondents selecting a given appealing aspect of RTP



44% of “price to device” customers consider the capability of smart devices managing their energy use appealing, vs. only 16% of “price to self” customers

“Price to appliance” customers have the least privacy concerns about their appliances being controlled

% of respondents selecting a given unappealing aspect



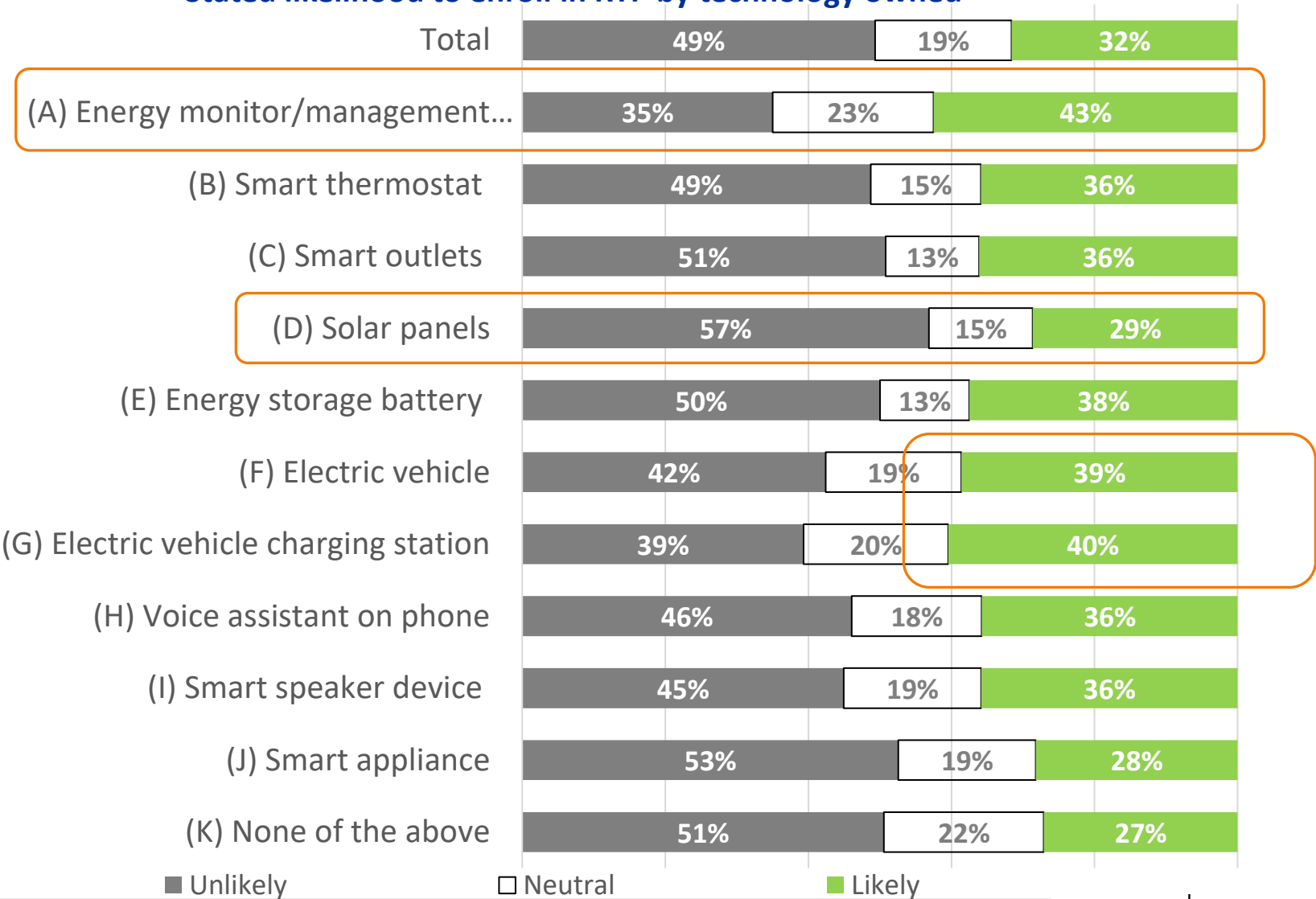
Only 16% of “price to appliance” customers consider privacy a concern under RTP, vs. 32% of “price to self” customers



Results by technology ownership segments

Intent to enroll in RTP is highest among owners of energy management systems, electric vehicles (EVs) and EV charging stations

Stated likelihood to enroll in RTP by technology owned



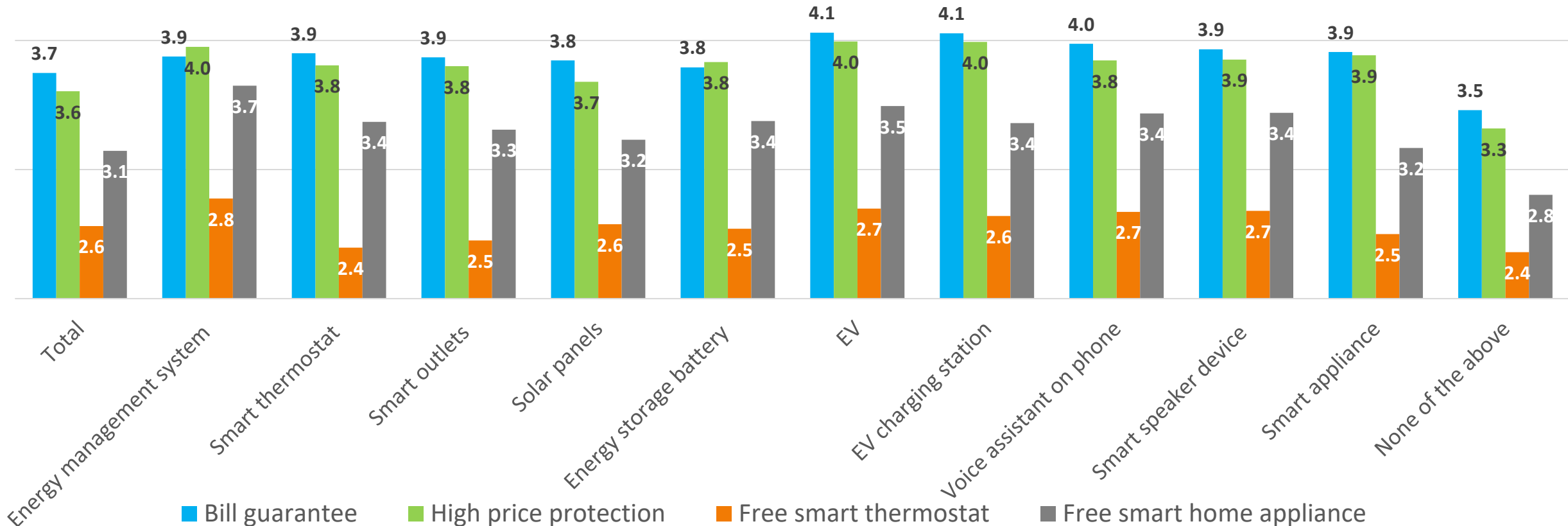
43% of energy management system owners, 40% of EV charging station owners and 39% of EV owners indicate that they would be “likely to enroll” in RTP

Among all technology owner groups, owners of solar panels have the lowest enrollment intent, with only 29% indicating they would be “likely to enroll” in RTP

Bill guarantee and high price protection are the two most influential benefits across all technology owners, while getting a free smart thermostat is the least influential benefit

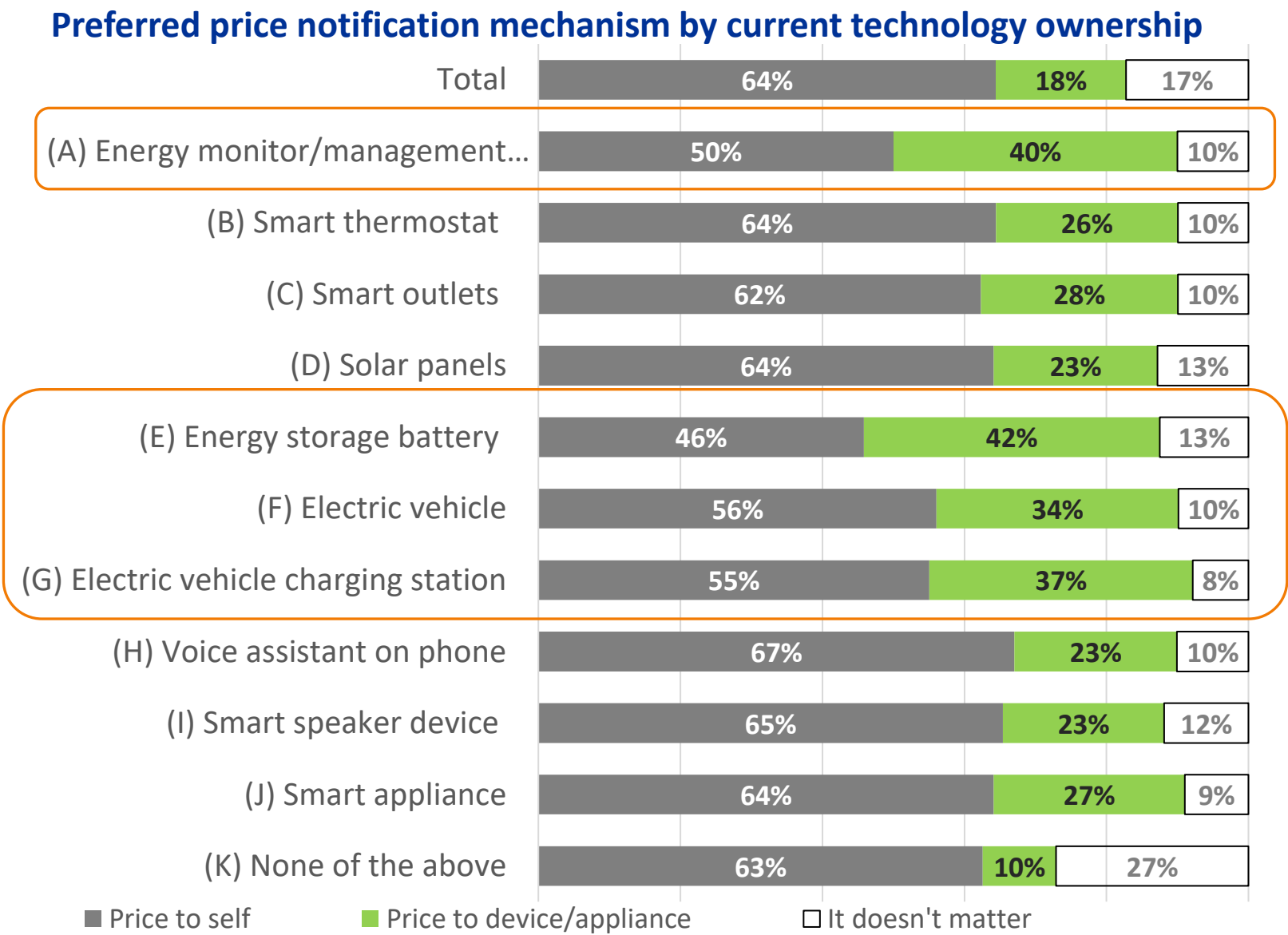
- Free smart home appliance is more attractive to the owners of energy management systems than to other tech owners
- Bill guarantee is particularly influential to the owners of EVs, EV charging stations and voice assistants

Rating score 1-5 converted from influential levels of “Not at all/somewhat/moderate/very/extremely influential”

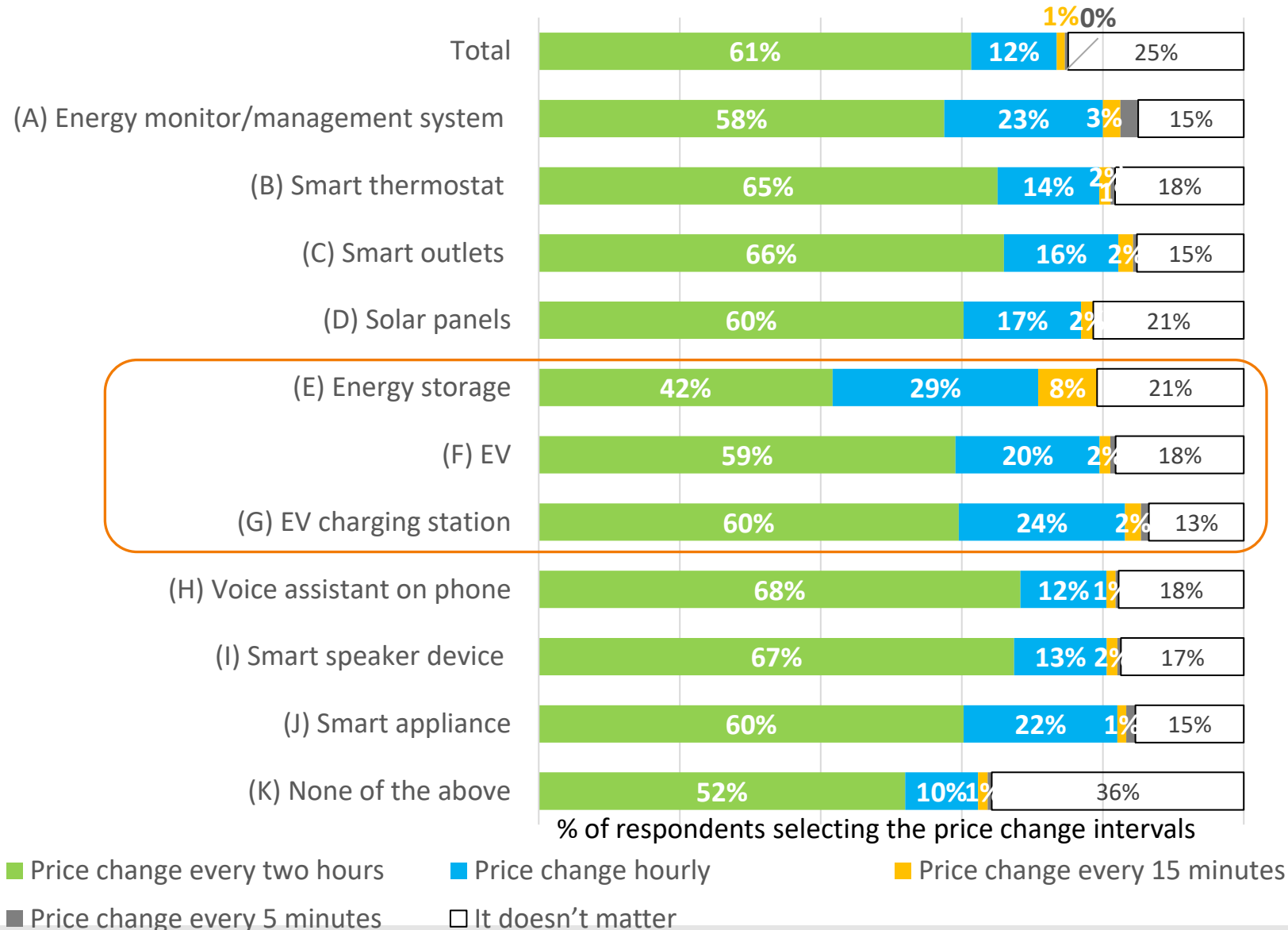


Ownership of energy management systems, energy storage systems, electric vehicles (EVs) and EV charging stations is positively correlated to the preference for “price to device/appliance” notifications

40% of energy management system owners prefer “price to device” or “price to appliance” notifications, compared to only 23% of those who own a voice assistant or smart speaker



Energy storage owners show higher acceptance of hourly price intervals and 15-min intervals than owners of other technologies

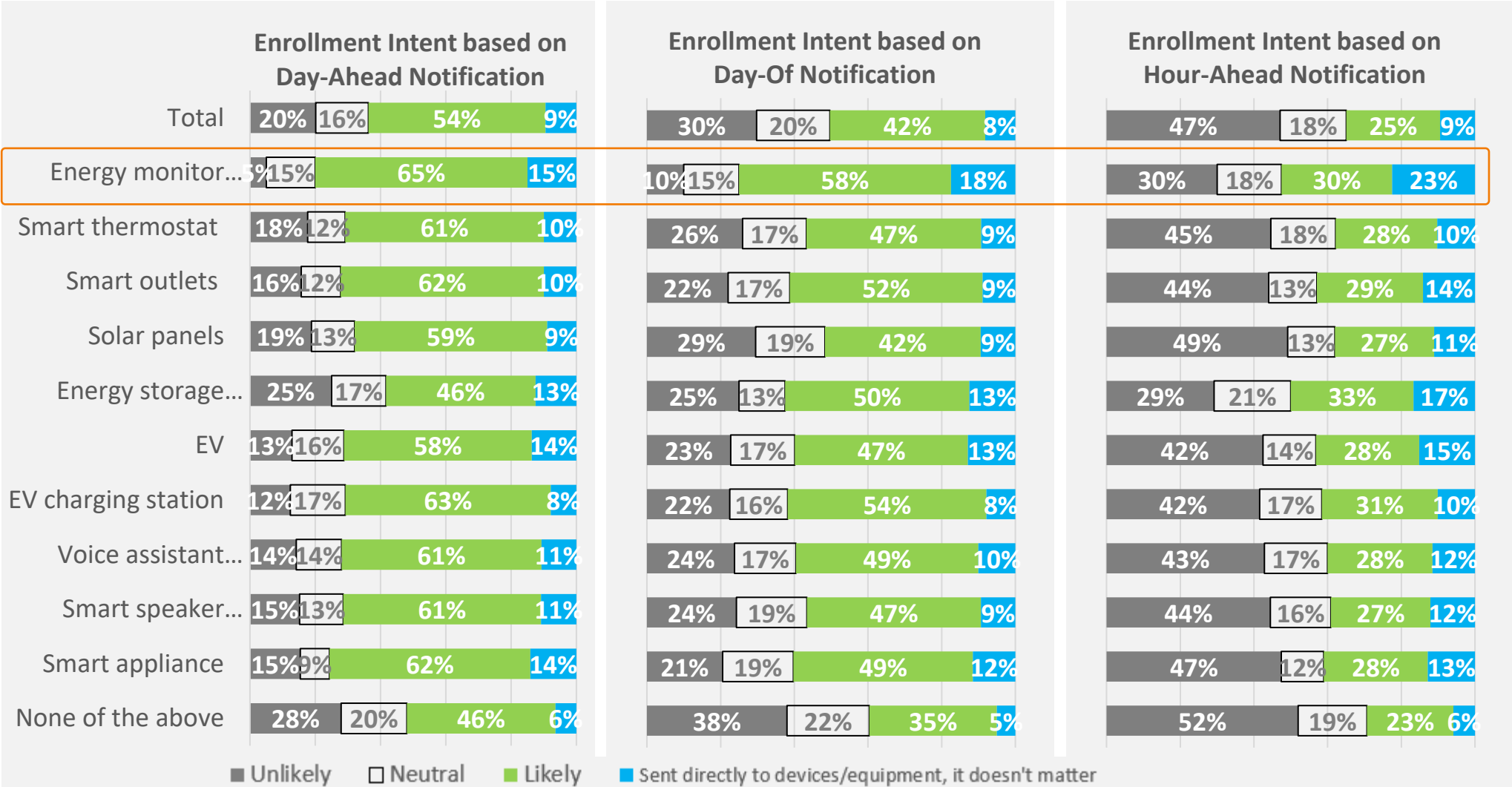


Customers in favor of hourly pricing are more likely to own energy storage systems, EVs, EV charging stations and smart appliances than other technologies:

- 29% of energy storage owners
- 24% of EV charging station owners
- 20% of EV owners
- 22% of smart appliance owners
- Versus only 12% of voice assistant owners

Customers across all technology ownership groups are least likely to enroll in RTP with Hour-Ahead notification

Stated likelihood to enroll in RTP segmented by technology ownership and price notification horizon



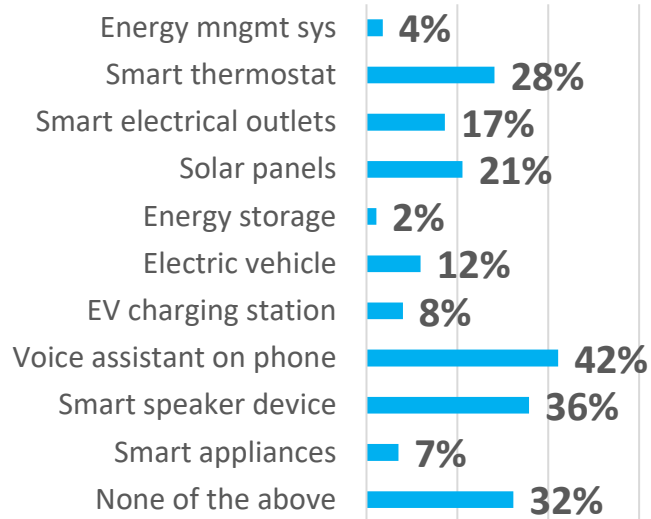
Owners of energy management systems are most indifferent about notification horizons than owners of other technologies (e.g., 23% of them indicated that hour-ahead price notification “doesn’t matter”)



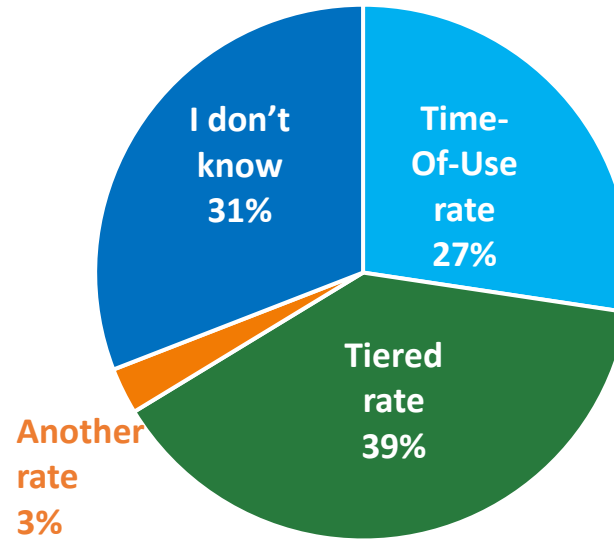
Appendix – panel demographics

Total respondents: 1,107

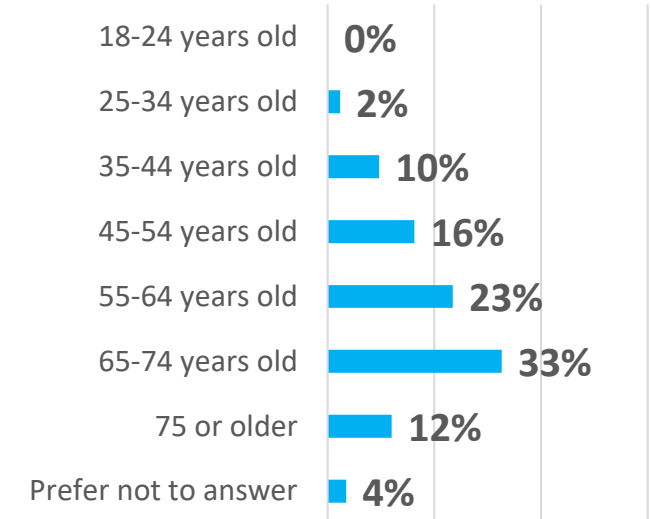
Technology ownership



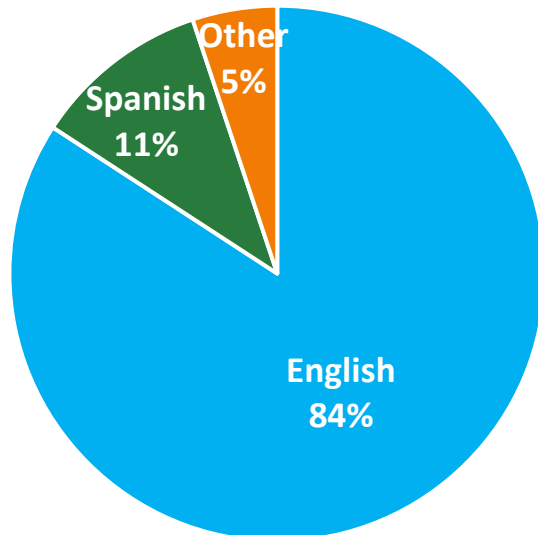
Current rate plan



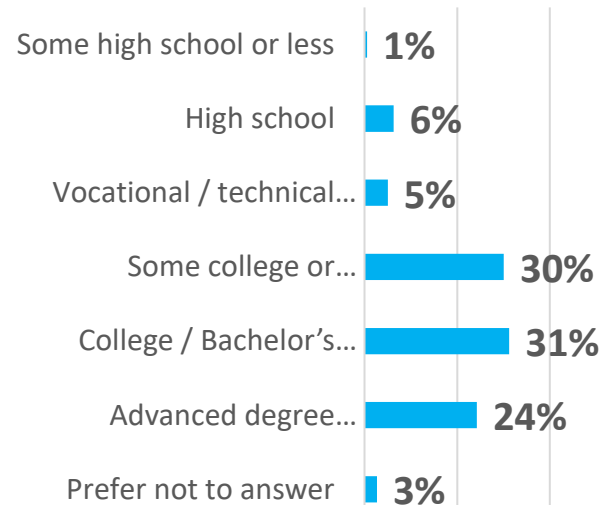
Age



Language



Education



A blue-tinted photograph of four people, two men and two women, standing in a row. They are all wearing white lab coats with the EPRI logo on the left chest. The man on the far left has curly hair and glasses. The man next to him has short dark hair and glasses. The woman next to him is wearing a white hard hat and has short dark hair. The man on the far right has short brown hair, a beard, and glasses. They are all smiling and looking towards the camera. The background is a solid blue color.

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