

Understanding EV Owners' Preferences Towards Enrolling in Smart Charging

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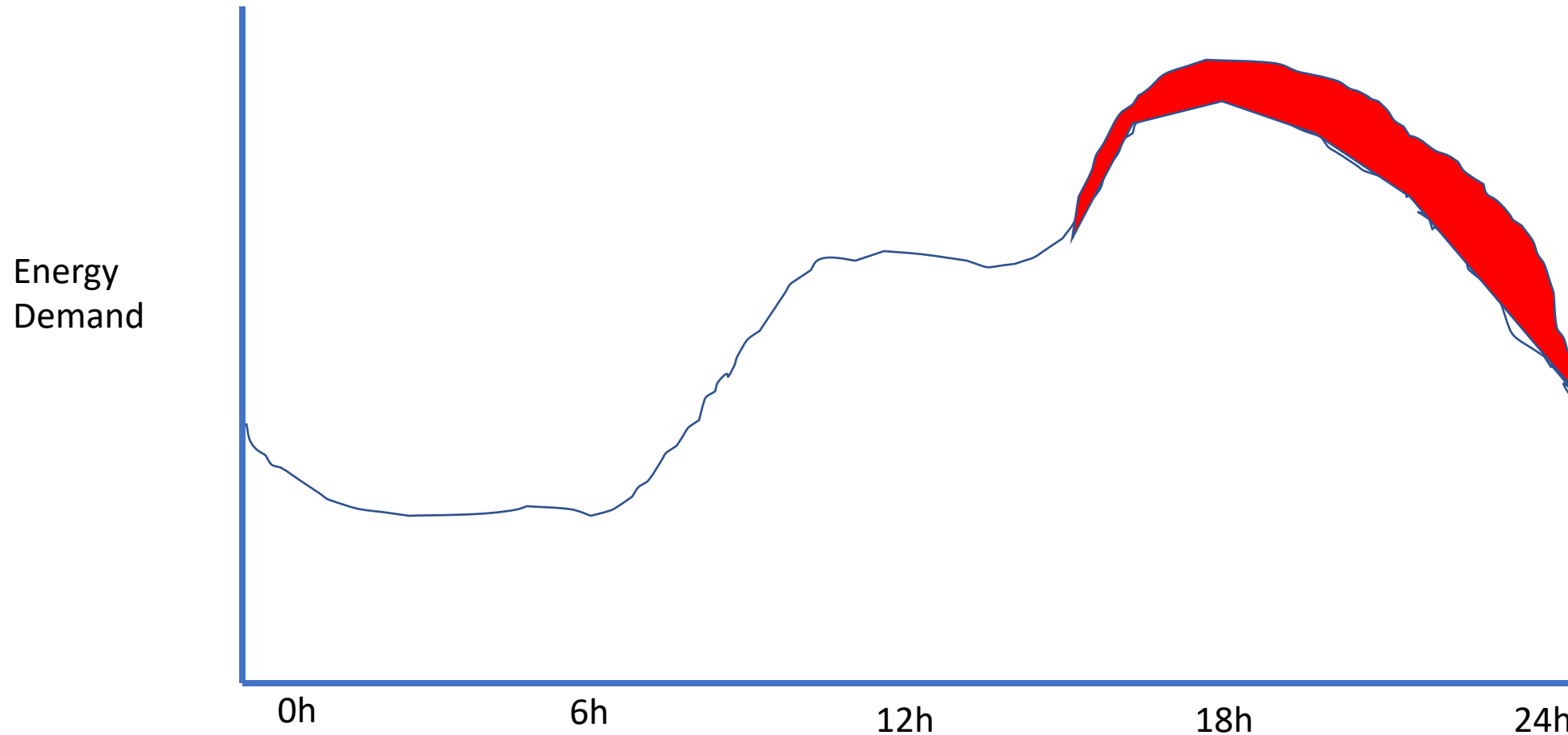
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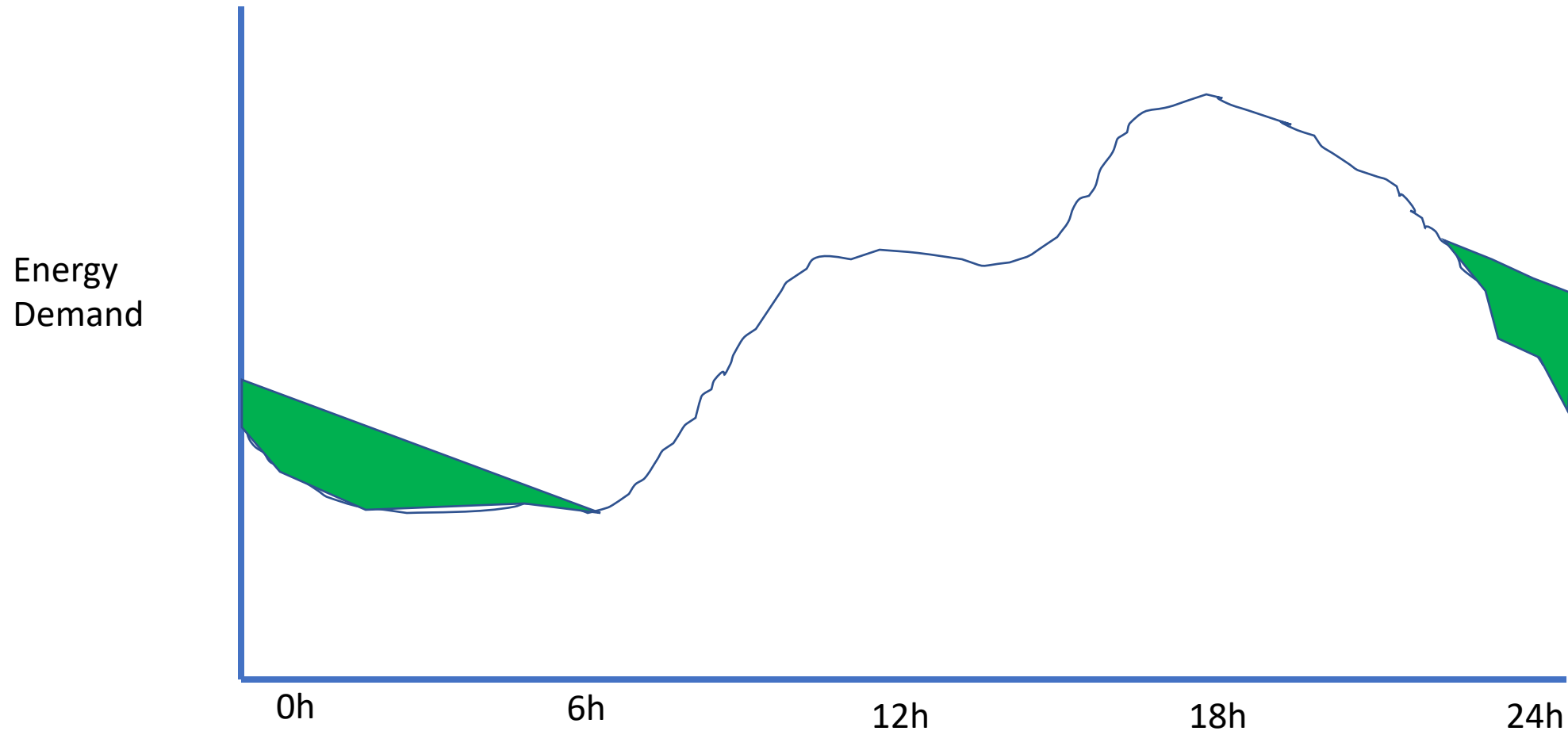


Energy Evaluation Conference - Europe
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Daily energy graph



Daily energy graph with Smart charging



Fundamental Question

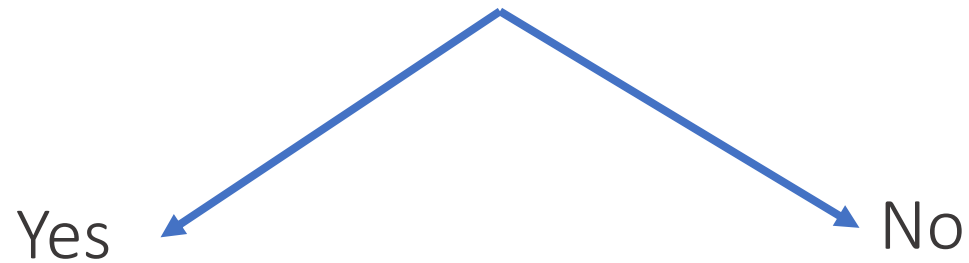
How much **money** do electric vehicle owners need to **save** on a monthly basis in order to enroll in smart charging?

Survey Design

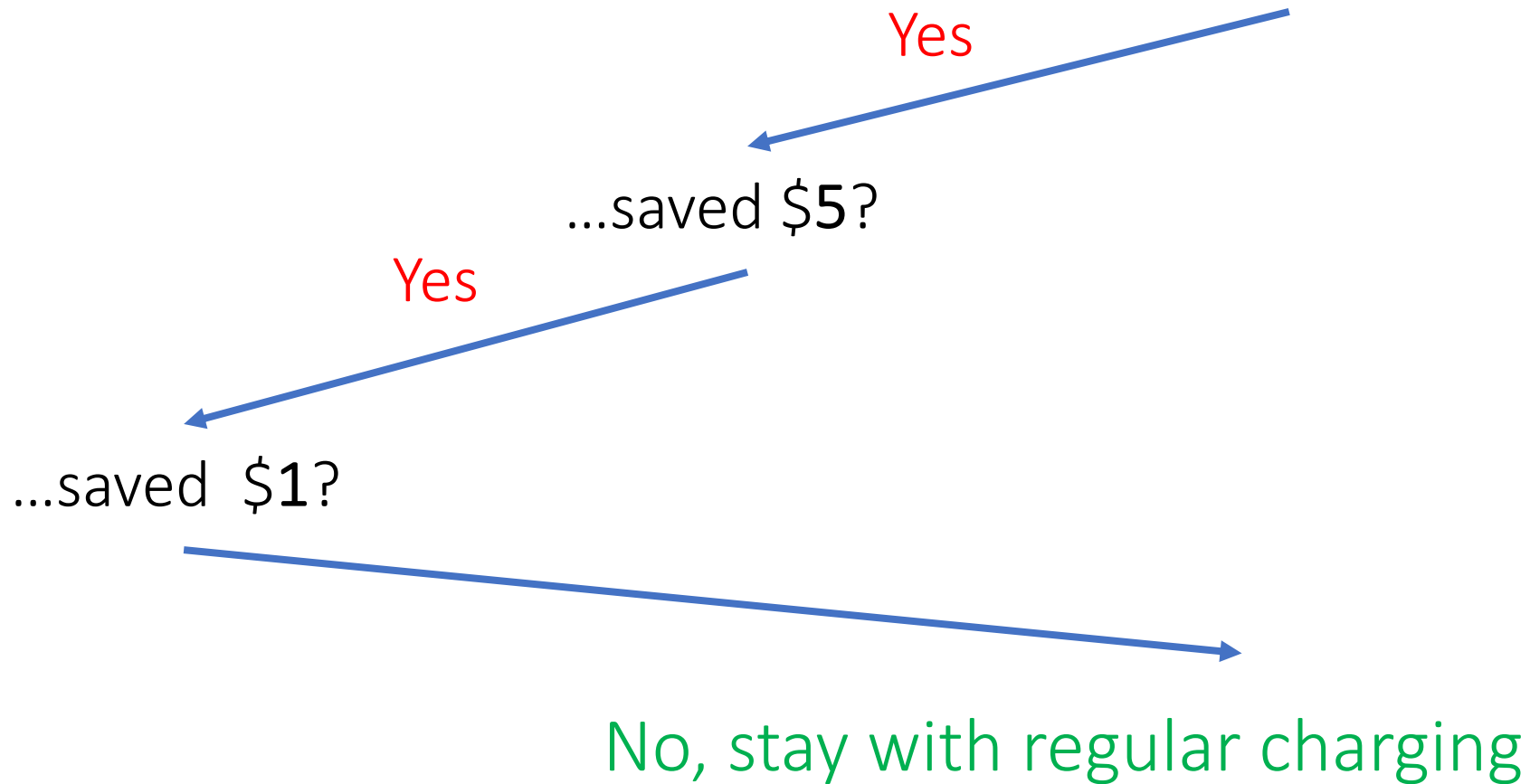


Bidding Contingent Valuation

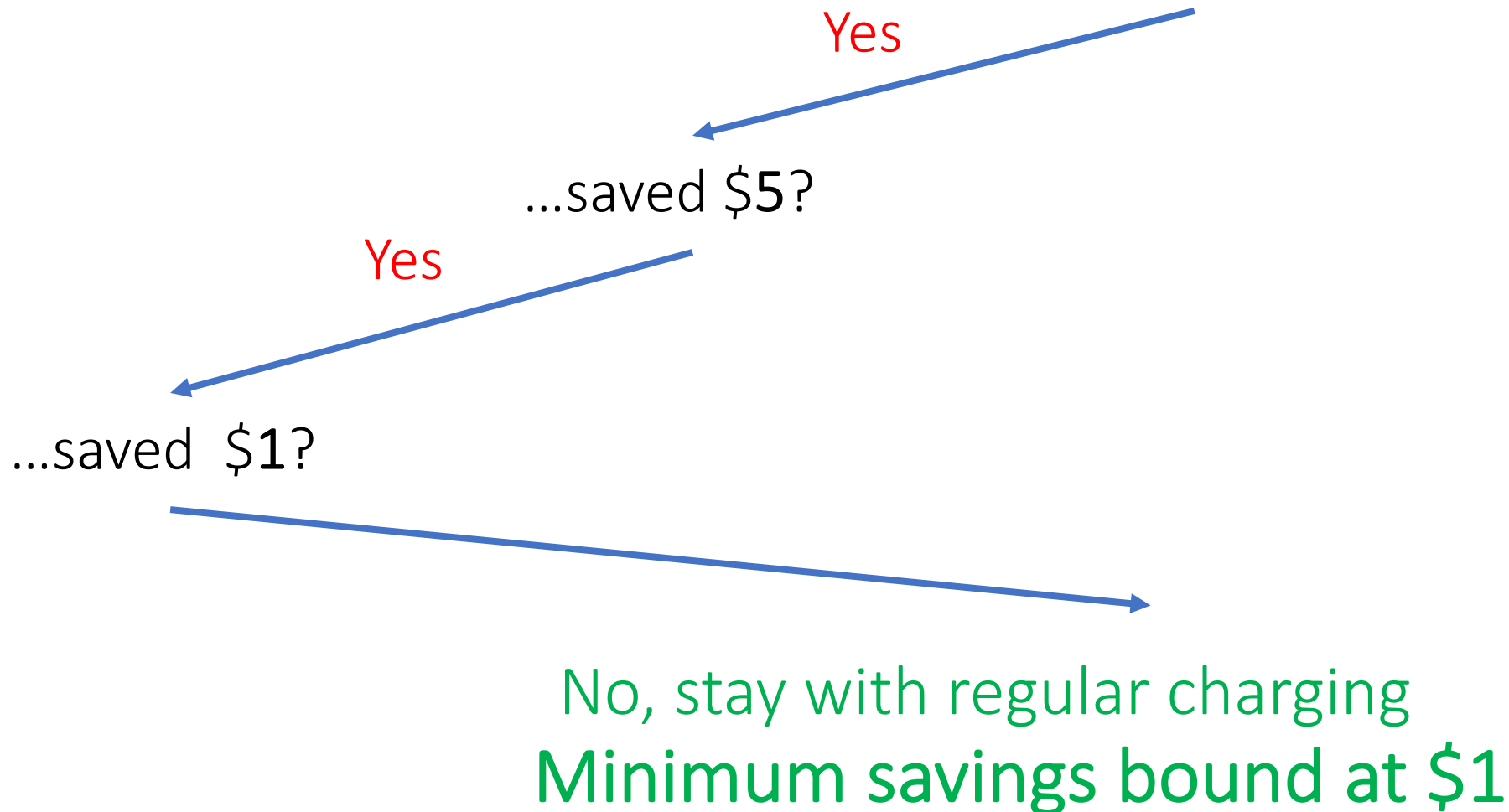
Would you buy A at \$10?



Would you enroll in smart charging if you saved \$10 a month on your electric bill?



Would you enroll in smart charging if you saved \$10 a month on your electric bill?



	Normal Charging	Smart Charging
Charging Type	Car charges immediately when plugged in	Car charges when electricity is inexpensive
Charging Completion	Car is finished charging 1.7 hour(s) after you arrive home , approximately by 6:00PM	Car is finished charging by 6:30AM , two hours before you typically leave in the morning.
Monthly Cost	\$33.54	\$13.54

Survey Distribution

241 EV Owners

facebook

No financial
incentive

“targeted
respondents”

202 non-EV owners

amazon
mechanical turk beta

\$1 for
participation

“random
participants”

A photograph of an electric vehicle charging station with two cars plugged in. A dark car is on the left and a white car is on the right. A person is visible in the background near a building entrance. The text "Key Findings" is overlaid in the center.

Key Findings

Overall high participation in smart charging

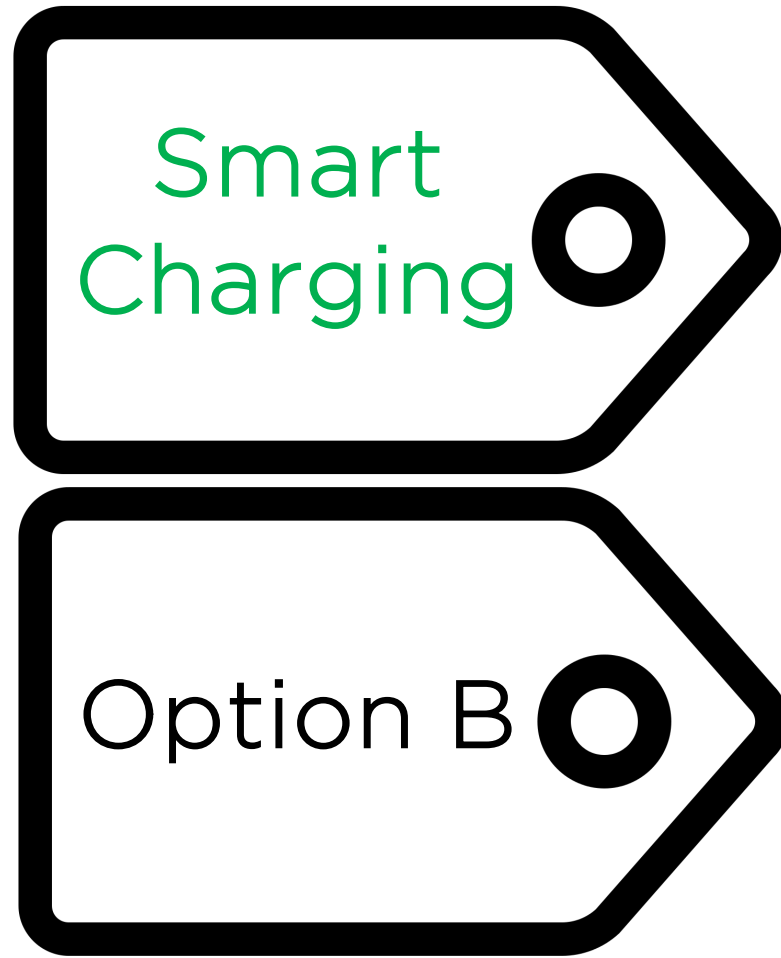


84% participate



Most for
low monthly savings of \$5 or less

- 84% percent of respondents chose to participate for at least one amount of savings (comparable among both populations; 86% of random, 83% of targeted)



Labels matter



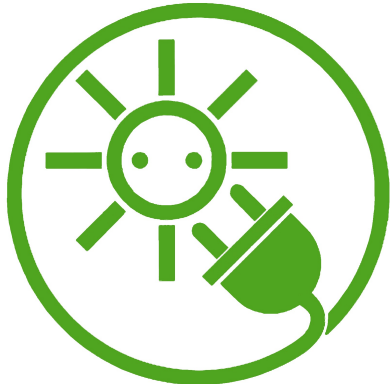
More unpredictable schedule,
Less smart charging



Implement smart charging,
people will participate
for low savings!



Smoother transition to EVs,
lower costs, Smarter cities



Smart charging accelerates
transition to net zero emissions

Appendix

Table 4.1. Summary of overall respondent observations

	Random Participants	Targeted Participants	All
N	202	241	443
% EV owners	4.29	95.02	55.98
% high EV interest	38.12	94.61	68.85
Daily VMT	44.11	24.67	35.25
VMT (Std. Dev.)	35.59	19.84	30.99
Est. Monthly Charging Cost	98.14	48.51	75.51
Cost (Std. Dev)	80.62	46.82	71.68
Median Earliest Departure Time	7:30 am	7:00 am	7:00 am
Range	[5:00 am, 4:00 pm]	[5:00 am, 5:15 pm]	[5:00 am,4:55 pm]
Median Normal Departure time	8:00 am	7:30 am	7:45 am
Range	[5:45 am, 3:00 pm]	[5:30 am, 12:00 pm]	[5:30 am,1:58 pm]
Median Return Time	5:15 pm	5:30 pm	5:30 pm
Range	[9:15 am, 7:59 pm]	[10:00 am, 8:00 pm]	[9:31 am,8:00 pm]
Median Income Group	\$50,000 to \$74,999	\$100,000 to \$149,999	\$75,000 to \$99,999

Variation	First variation	Second Variation
Labels of charging options	“Regular Charging” and “Smart charging”	“Option A” and “Option B”
Finish time of alternate charging option	1 hour before indicated regular departure	2 hours before indicated regular departure
Savings amounts	\$20, \$15,\$10, \$5, \$1	\$1, \$5, \$10,\$15,\$20

Table 3.2. Attributes used in charge cost and time calculations

Attributes	Values
Kilowatt hours per mile	$\frac{1}{3.5} \approx 0.29$ kWh per mile
Cost per kWh	\$0.27
Time to charge a kWh	$\frac{1}{3.3} = 0.30$ hours per kWh
Default days commuted in a week	5 days
Default total daily commute distance	15 miles

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Normal Charging charges your vehicle immediately, while Smart Charging charges your vehicle when electricity is less expensive. Under Smart Charging, you save **\$20** per month. Which option do you prefer?

Normal Charging

Smart Charging