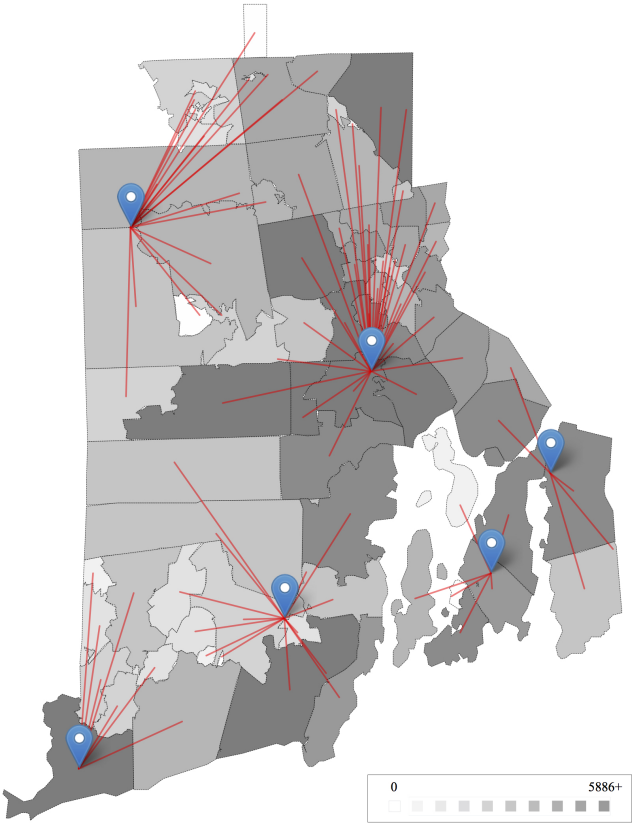
Appendix

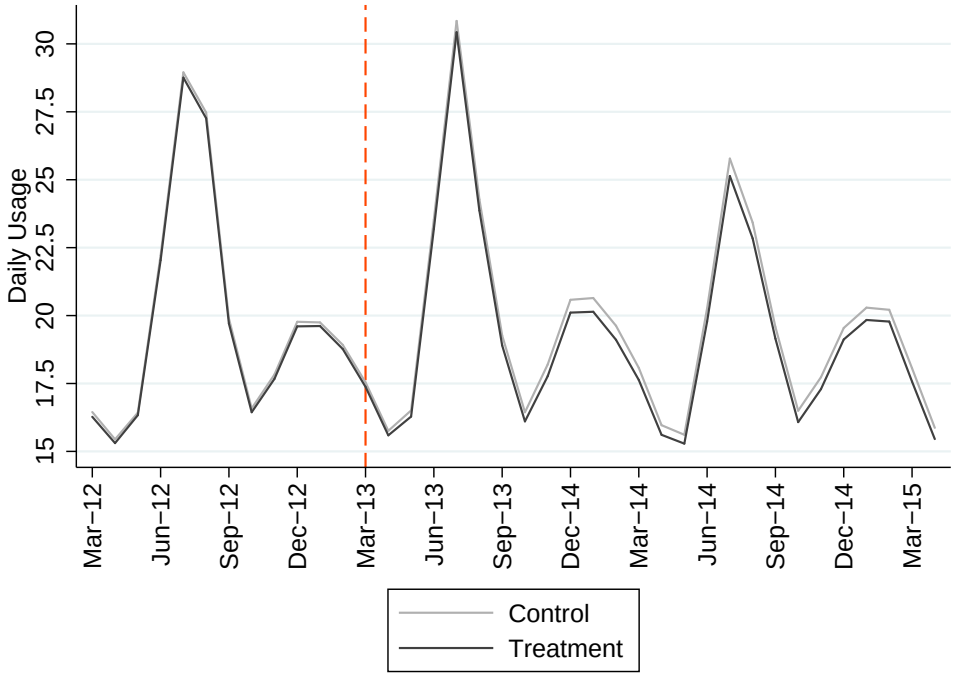
Figure A1: Geographic Location of Experimental Population



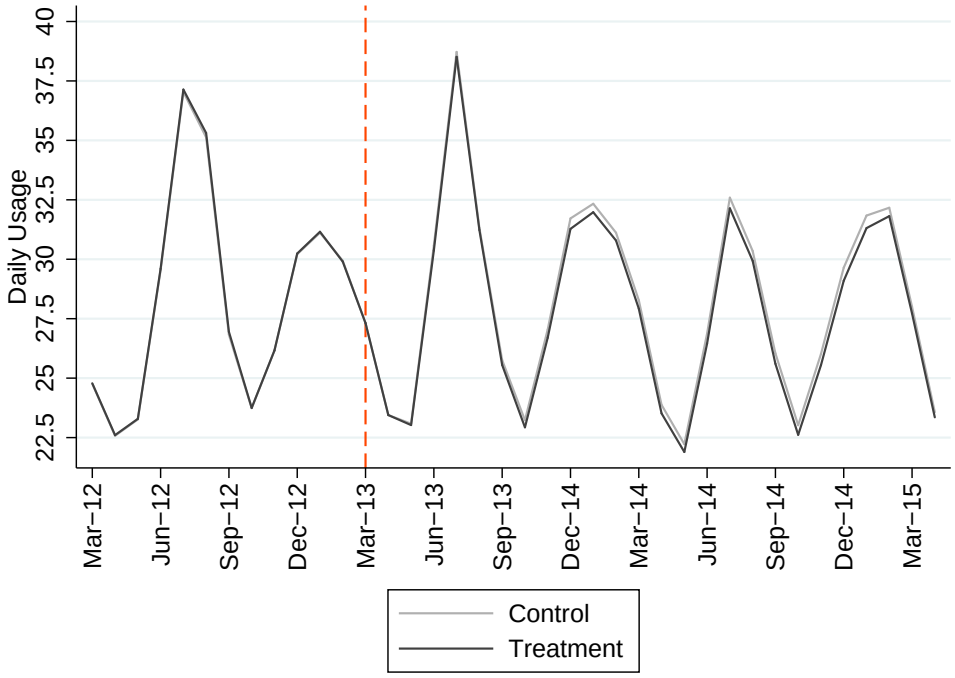
Notes: The map presents the locations of all households in the experiment. ZIP codes are shaded according to the number of households within the ZIP code's boundaries in the experiment; darker color implies more households. ZIP codes without any household in the experiment are left uncolored. Blue markers indicate locations of weather stations and red lines match these stations to ZIP codes. We use the geographic center of each ZIP code and match it to the closest weather station in terms of direct distance.

Figure A2: Raw Data: HER vs. Control Households

(a) Wave 1



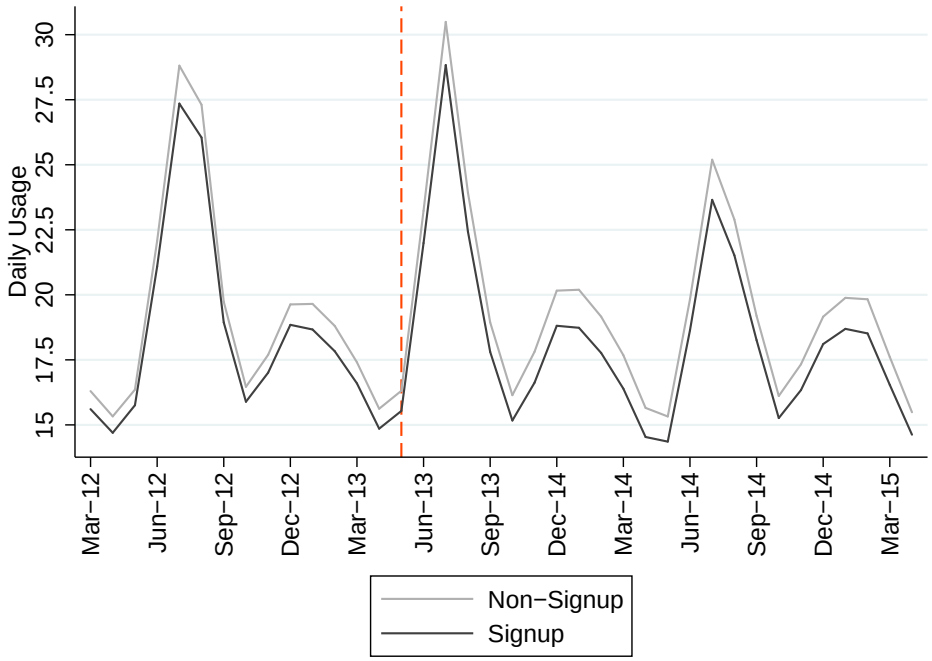
(b) Wave 2



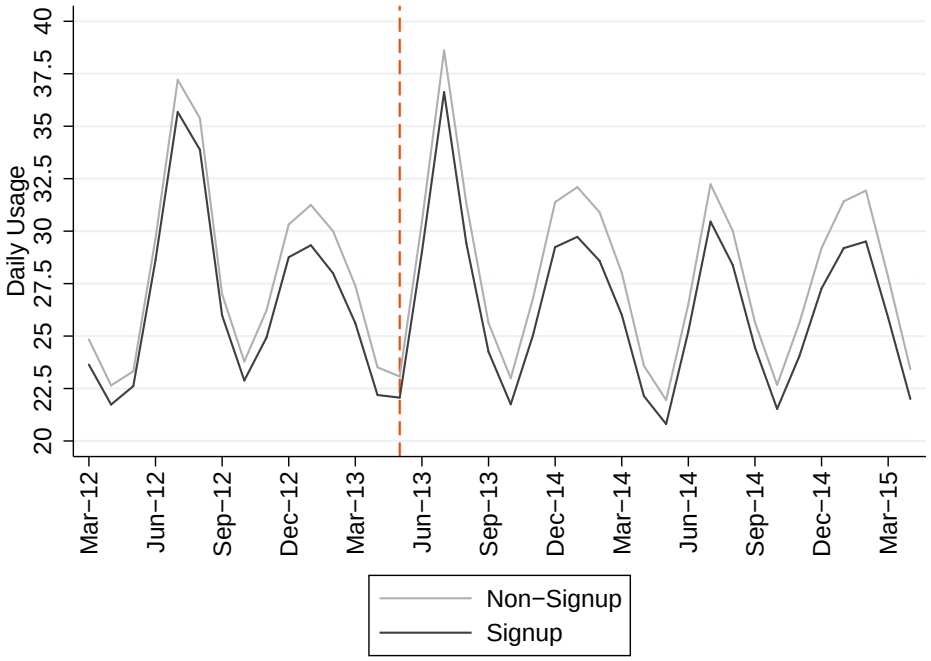
Notes: We plot average daily usage for every month in the sample. The light gray line pools all households assigned to Control, the dark gray line those in HER Only. The vertical dashed line depicts the date of the first HER. Due to different baseline levels, we split the presentation by wave.

Figure A3: Raw Data: Participants vs. Non-Participants

(a) Wave 1

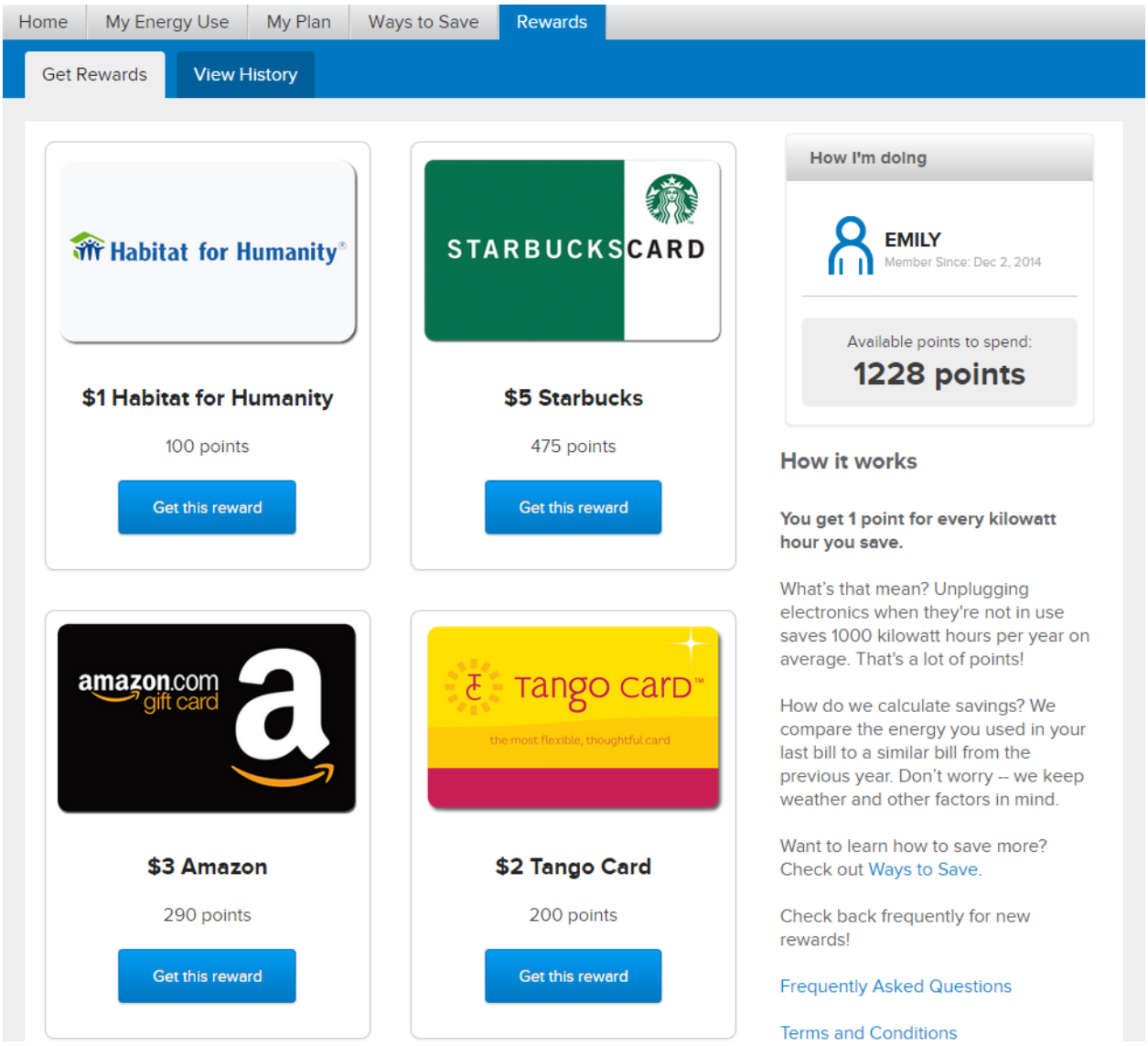


(b) Wave 2



Notes: We plot average daily usage for every month in the sample. The light gray line pools all non-participants in HER Only and Rewards Incentives, the dark gray line those who participate in the program. The vertical dashed line depicts the date of the first RI framings in the third HER in May 2013. Email campaigns are implement in June, July, and August 2013. Due to different baseline levels, we split the presentation by wave.

Figure A4: Example of Customer Rewards Portal



Notes: The screenshot presents an example of the rewards portal available to participating customers. Different goods are available at any point in time. In addition, users can view a history of purchases and have access to an overview of accumulated and redeemed rewards points. Source: Opower.

Table A1: Balance Tests of Control and HER Only Customers

	Wave 1			Wave 2		
	T	C	p-Value	T	C	p-Value
Average Usage	19.84	19.99	0.26	28.42	28.37	0.75
	(11.82)	(11.66)		(13.31)	(13.36)	
Average Usage (Summer)	24.50	24.69	0.32	32.32	32.20	0.51
	(15.83)	(15.53)		(16.89)	(16.84)	
Average Usage (Winter)	18.54	18.69	0.29	28.99	28.97	0.93
	(12.05)	(12.03)		(17.06)	(17.26)	
Owner	0.84	0.83	0.77	0.90	0.91	0.41
	(0.37)	(0.37)		(0.29)	(0.29)	
Income Level	7.03	7.03	0.61	8.53	8.54	0.07
	(2.80)	(2.81)		(2.40)	(2.44)	
Number of Children	1.86	1.92	0.00	1.96	2.09	0.00
	(1.23)	(1.16)		(1.29)	(1.24)	
Number of Adults	2.09	2.09	0.74	2.23	2.23	0.27
	(1.06)	(1.06)		(1.05)	(1.06)	
Green Affinity	0.13	0.13	0.22	0.18	0.18	0.70
	(0.34)	(0.33)		(0.39)	(0.39)	
Home Improvement	0.12	0.13	0.63	0.19	0.19	0.92
	(0.33)	(0.33)		(0.39)	(0.39)	

Notes: We report balance in terms of observable characteristics between Control (C) and HER Only (T). Randomization was administered on the wave level. Means are reported with their standard deviations in parantheses below. p-values are based on a two-sample t-Test where appropriate. The income level is reported in seven bins and we conduct a χ^2-Test of equality between the two groups.

Table A2: Balance Tests of HER Only Customer and Rewards Customers

	Wave 1			Wave 2		
	HER	Rewards	p-Value	HER	Rewards	p-Value
Average Usage	19.83	19.86	0.72	28.41	28.43	0.94
	(11.79)	(11.89)		(13.33)	(13.19)	
Average Usage (Summer)	24.49	24.52	0.87	32.32	32.26	0.75
	(15.80)	(15.93)		(16.89)	(16.85)	
Average Usage (Winter)	18.53	18.56	0.77	28.98	29.04	0.74
	(12.01)	(12.14)		(17.07)	(16.89)	
Owner	0.84	0.84	0.98	0.90	0.90	0.40
	(0.37)	(0.37)		(0.29)	(0.30)	
Income Level	7.04	6.98	0.26	8.53	8.52	0.76
	(2.80)	(2.79)		(2.40)	(2.41)	
Number of Children	1.85	1.92	0.00	1.95	2.04	0.00
	(1.23)	(1.20)		(1.29)	(1.25)	
Number of Adults	2.09	2.08	0.76	2.23	2.23	0.40
	(1.06)	(1.05)		(1.05)	(1.05)	
Green Affinity	0.13	0.13	0.68	0.18	0.19	0.46
	(0.34)	(0.34)		(0.39)	(0.39)	
Home Improvement	0.12	0.12	0.39	0.19	0.19	0.96
	(0.33)	(0.33)		(0.39)	(0.39)	

Notes: We report balance in terms of observable characteristics between HER Only (HER) homes and Rewards Incentives (Rewards) customers. Randomization was administered on the wave level. Means are reported with their standard deviations in parantheses below. p-values are based on a two-sample t-Test where appropriate. The income level is reported in seven bins and we conduct a χ^2-Test of equality between the two groups.

Table A3a: Impact of Home Energy Reports on Use

	All Households		Non-Participants		Participants
	(1)	(2)	(3)	(4)	(5)
Treatment	-0.3159***	-0.2307**	-0.2968***	-0.2310**	-0.7356***
	(0.0477)	(0.0989)	(0.0478)	(0.0988)	(0.0733)
Treatment · Rewards		-0.1016		-0.0789	
		(0.1125)		(0.1125)	
R^2	0.722	0.722	0.721	0.721	0.723
N	4,616,989	4,616,989	4,428,616	4,428,616	607,169

Notes: Dependent variable is average daily electricity usage (kWh) in a given month. All models include month-of-sample-by-wave fixed effects, i.e. we allow month-of-sample fixed effects to vary by wave. In addition, we control for pre-experiment use by including average daily use in the same calendar month before treatment. Heteroskedasticity-robust standard errors are clustered at the household level for all specifications. "Rewards" is a binary indicator equal to one for Rewards Incentives households. Columns (1)-(2) utilize the full sample, columns (3)-(4) exclude participating households, and column (5) restricts the sample to participants. We only present coefficients of interest and omit baseline differences and usage controls. Please consult Equation (1) and the following paragraph for details. *** denotes significance at the 1 percent level, ** at the 5 percent level, and * at the 10 percent level.

Table A3b: Heterogeneous Impacts of Home Energy Reports on Use

	All Households		Non-Participants		Participants	
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment	-0.134***	-0.169***	-0.126***	-0.160***	-0.295***	-0.356***
	(0.045)	(0.045)	(0.046)	(0.045)	(0.065)	(0.064)
Treatment · High Usage	-0.365***		-0.346***		-0.868***	
	(0.095)		(0.095)		(0.150)	
Treatment · High Variance		-0.285***		-0.269***		-0.729***
		(0.095)		(0.095)		(0.153)
High Usage	1.725***		1.711***		1.871***	
	(0.095)		(0.096)		(0.133)	
High Variance		1.207***		1.198***		1.265***
		(0.091)		(0.091)		(0.098)
R^2	0.723	0.723	0.722	0.722	0.725	0.724
N	4,616,989	4,616,989	4,428,616	4,428,616	607,169	607,169

Notes: Dependent variable is average daily electricity usage (kWh) in a given month. All models include month-of-sample-by-wave fixed effects, i.e. we allow month-of-sample fixed effects to vary by wave. In addition, we control for pre-experiment use by including average daily use in the same calendar month before treatment. Heteroskedasticity-robust standard errors are clustered at the household level for all specifications. "High Usage" describes a binary indicator for above-median average usage in the pre-treatment period (March 2012-February 2013), "High Variance" an indicator for above-median variance of pre-treatment usage. Columns (1)-(2) utilize the full sample, columns (3)-(4) exclude participating households, and columns (5)-(6) restrict the sample to participants. We only present coefficients of interest and omit baseline differences and usage controls. Please consult Equation (1) and the following paragraph for details. *** denotes significance at the 1 percent level, ** at the 5 percent level, and * at the 10 percent level.

Table A4: Impact of Home Energy Reports on Use

	All Households			Non-Participants			Participants		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post · T	-0.3080***	-0.1345***	-0.1712***	-0.2960***	-0.1295***	-0.1651***	-0.5676***	-0.2343***	-0.2890***
	(0.0469)	(0.0448)	(0.0442)	(0.0470)	(0.0449)	(0.0443)	(0.0724)	(0.0642)	(0.0636)
Post · High Usage · T		-0.3394***			-0.3215***			-0.7804***	
		(0.0931)			(0.0933)			(0.1480)	
Post · High Variance · T			-0.2761***			-0.2610***			-0.6754***
			(0.0934)			(0.0936)			(0.1514)
R^2	0.862	0.862	0.862	0.862	0.862	0.862	0.863	0.864	0.863
N	6,962,372	6,962,372	6,962,372	6,682,526	6,682,526	6,682,526	911,449	911,449	911,449

Notes: Dependent variable is average daily electricity usage (kWh). All models are based on a difference-in-differences framework and include month-of-sample and household fixed effects. In addition, we control for pre-experiment use by including average daily use in the same calendar month before treatment. Heteroskedasticity-robust standard errors are clustered at the household level for all specifications. "High Usage" describes a binary indicator for above-median average usage in the pre-treatment period (March 2012-February 2013), "High Variance" an indicator for above-median variance of pre-treatment usage. Columns (1)-(3) utilize the full sample and columns (4)-(6) exclude participating households. We only present coefficients of interest and omit baseline differences and usage controls. Please consult Equation (1) and the following paragraph for the exact specifications. *** denotes significance at the 1 percent level, ** at the 5 percent level, and * at the 10 percent level.

Table A5: Differences between Customer Groups

	(1) Pre-Use	(2) Pre-Use (S)	(3) Pre-Use (W)	(4) Income	(5) Owner	(6) # Adults	(7) Green	(8) HI
Panel A: Differences between HER Participants and Non-Participants:								
Participant	-2.6742***	-2.8301***	-3.0601***	0.7190***	0.0104	-0.0147	0.0512***	0.0116
	(0.3180)	(0.4230)	(0.3568)	(0.0698)	(0.0092)	(0.0268)	(0.0118)	(0.0110)
Constant	19.8720***	24.5481***	18.5791***	7.0108***	0.8355***	2.0882***	0.1284***	0.1229***
	(0.0525)	(0.0703)	(0.0535)	(0.0127)	(0.0017)	(0.0049)	(0.0015)	(0.0015)
R^2	0.094	0.049	0.095	0.074	0.011	0.004	0.005	0.008
N	143,601	143,601	143,601	135,523	124,010	131,620	139,505	139,505
Panel B: Differences between HER and Email Participants:								
Email Participant	1.8375***	1.9124***	2.0424***	-0.2069***	-0.0151	-0.0082	-0.0182	-0.0088
	(0.3507)	(0.4634)	(0.3966)	(0.0755)	(0.0101)	(0.0295)	(0.0128)	(0.0119)
Constant	17.4891***	21.8386***	16.0587***	7.9424***	0.8520***	2.0406***	0.1878***	0.1493***
	(0.3621)	(0.4850)	(0.3898)	(0.0812)	(0.0112)	(0.0310)	(0.0131)	(0.0121)
R^2	0.097	0.054	0.098	0.051	0.008	0.009	0.002	0.003
N	7,634	7,634	7,634	7,252	7,060	7,299	7,475	7,475

Notes: This table presents regression outcomes comparing different customer groups. Panel A compares HER participants' observable characteristics to all eligible non-participants. Panel B compares HER participants to Email participants along the same observable dimensions. Observables include average pre-experiment use, household income (seven bins), ownership status of the property, number of adults in a household, a binary indicator of affinity to the environment, and a home improvement indicator provided by the utility. Winter spans from December to March and summer describes average usage from June to September. Sample sizes differ because not all variables are recorded for all households in the sample. We also include wave fixed effects. *** denotes significance at the 1 percent level, ** at the 5 percent level, and * at the 10 percent level.

Table A6: Impact of Program Participation on Subsequent Use

	HER Participants		Email Participants		All Participants	
	ITT	LATE	ITT	LATE	ITT	LATE
Rewards	-0.0493		-0.0639		-0.0664*	
	(0.0400)		(0.0409)		(0.0398)	
Sign-Up		-5.4218		-1.5955		-1.4001*
		(4.3983)		(1.0215)		(0.8395)
R^2	0.721	0.720	0.720	0.720	0.722	0.722
N	3,705,259	3,705,259	3,650,230	3,650,230	3,850,288	3,850,288

Notes: Dependent variable is average daily electricity usage (kWh) in a given month. All models include month-of-sample-by-wave fixed effects, i.e. we allow month-of-sample fixed effects to vary by wave. In addition, we control for pre-experiment use by including average daily use in the same calendar month before treatment. Heteroskedasticity-robust standard errors are clustered at the household level for all specifications. Control households are excluded from the analysis. We present Intent-to-Treat (ITT) effects of being exposed to the encouragement campaigns ("Rewards"). Furthermore, we provide a Local Average Treatment Effect (LATE) based on an instrumental variables approach in which we instrument for actual participation with receipt of encouragements. Columns (1)-(2) present findings for HER participants, columns (3)-(4) for Email participants, and columns (5)-(6) for all participants. Please consult Equation (2) and the following paragraph for details. *** denotes significance at the 1 percent level, ** at the 5 percent level, and * at the 10 percent level.

Table A7: Heterogeneous Impacts of Program Participation on Subsequent Use

	HER		ITT		LATE	
	High	Low	High	Low	High	Low
Panel A: Average Pre-Experiment Usage						
Treatment	-0.5181***	-0.1185***				
	(0.0826)	(0.0459)				
Rewards			-0.0900	-0.0318		
			(0.0685)	(0.0382)		
Sign-Up					-2.0686	-0.6179
					(1.5746)	(0.7421)
R^2	0.661	0.510	0.662	0.508	0.662	0.508
N	2,356,535	2,260,454	1,968,621	1,881,667	1,968,621	1,881,667
Panel B: Variance of Pre-Experiment Use						
Treatment	-0.4718***	-0.1539***				
	(0.0835)	(0.0448)				
Rewards			-0.0370	-0.0988**		
			(0.0689)	(0.0396)		
Sign-Up					-0.8712	-1.8843**
					(1.6227)	(0.7564)
R^2	0.692	0.655	0.694	0.643	0.694	0.642
N	2,313,927	2,303,062	1,928,911	1,921,377	1,928,911	1,921,377

Notes: Dependent variable is average daily electricity usage (kWh) in a given month. All models include month-of-sample-by-wave fixed effects, i.e. we allow month-of-sample fixed effects to vary by wave. In addition, we control for pre-experiment use by including average daily use in the same calendar month before treatment. Heteroskedasticity-robust standard errors are clustered at the household level for all specifications. Control households are excluded from the analysis. We present Intent-to-Treat (ITT) effects of being exposed to the encouragement campaigns ("Rewards"). Furthermore, we provide a Local Average Treatment Effect (LATE) based on an instrumental variables approach in which we instrument for actual participation with receipt of encouragements. Results are based on all participants. Households are assigned to the binary category "High" in Panel A (B) if their average pre-experiment usage (variance of pre-experiment use) is above the median within their wave and "Low" if it is below. *** denotes significance at the 1 percent level, ** at the 5 percent level, and * at the 10 percent level.