

One Size Fits None: Reaching Residential Customers in the New Normal

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ABSTRACT

Since last March, the COVID-19 pandemic has seen many customers spending an increasing amount of time at home. There was a rapid shift to working and schooling from home with customers occupying residences during times they would have typically been empty.

Not surprisingly, analysis of residential consumption data confirmed an overall increase in consumption in the summer 2020 as compared to previous years. Analysis also indicated that certain types of residential customers were being disproportionately impacted during a time of heightened interest in energy usage and, in some cases, a lower ability to pay bills. In response, Eversource introduced high bill alerts, a new type of personalized email communication to provide valuable usage information and encourage energy savings during the summer of 2020.

Building on the success of high bill alerts, Eversource launched delivered energy insights in 2021 –monthly personalized emails comparing customers’ current usage to their the previous year. Here we discuss the successes of both programs, and plans for improvements in communicating with customers in the new normal.

Introduction

In March 2020, COVID-19 was declared a pandemic and customers within Eversource’s service territories of Massachusetts, Connecticut, and New Hampshire were issued a shelter-in-place order. This led to Eversource customers spending much more time at home as businesses and schools moved to virtual environments. With customers’ increased time in residences, Eversource expected to observe increased residential electric usage to cool homes and run electronics during the day (when customers would otherwise often be out of the house) as the order extended into the summer. There was also heightened concern that low-to moderate income residential customers were being disproportionately impacted by unemployment, increased electric usage, and higher bills.

In light of these developments, the Eversource team responsible for sending emails with customized usage information began to think differently about their approach to digital customer engagement. As a result, the team introduced new types of personalized email communications to provide valuable usage information and encourage energy savings.

Part 1: Summer 2020, Early Pandemic

Analysis

As anticipated, investigations into usage during the first several months of the pandemic confirmed that all residential customers, regardless of demographics, had seen an increase in

electric usage. Deeper analyses of this increase showed varying effects among different demographic groups. Among income groups in Massachusetts, Connecticut, and New Hampshire March 2020 usage was below the previous four-year average despite the shelter-in-place order issued in the middle of the month. However, in April through September 2020, the electric usage increases observed in residential customers were reflective of situations corresponding to demographic criteria.

One of the most notable trends in consumption was related to income level ranging from an increase of 1.8% for customers earning under \$40,000 per year to 13% for customers earning over \$200,000 per year (figure 1).

Customers with children showed usage on par with 4-person households (figure 2), but across Eversource's service territory, there was a stark difference in the amount of usage increase in the early months of the pandemic for households with children over increases seen in childless households (Table 1). Additionally, usage was found to be inversely correlated with age for customers between the ages of 40 to 80. Interestingly, usage also appeared to increase more significantly customers under 20. One potential explanation could be that customers over 40 are more likely to live in larger suburban homes and 20-to-40-year-olds in condos/smaller homes.

A primary reason for undertaking the residential electric consumption analysis was to determine whether low-to-moderate income or elderly customers were being disproportionately impacted by increased electric usage (and higher utility bills) with a lower ability to pay due to lost wages. However, the above analysis indicated that the most affected customers were middle-aged suburban homeowners with children. This observation was generally consistent with expectations, given that that demographic was most likely to have occupations that allowed them to work from home. One hypothesis to potentially explain the lower increase in usage observed in low-to-moderate income (LMI) customers is that they may have been essential workers that did not have the ability to work remotely. Also, elderly customers were likely already spending a

substantial amount of time at home pre-pandemic so that the change in their usage was relatively small.

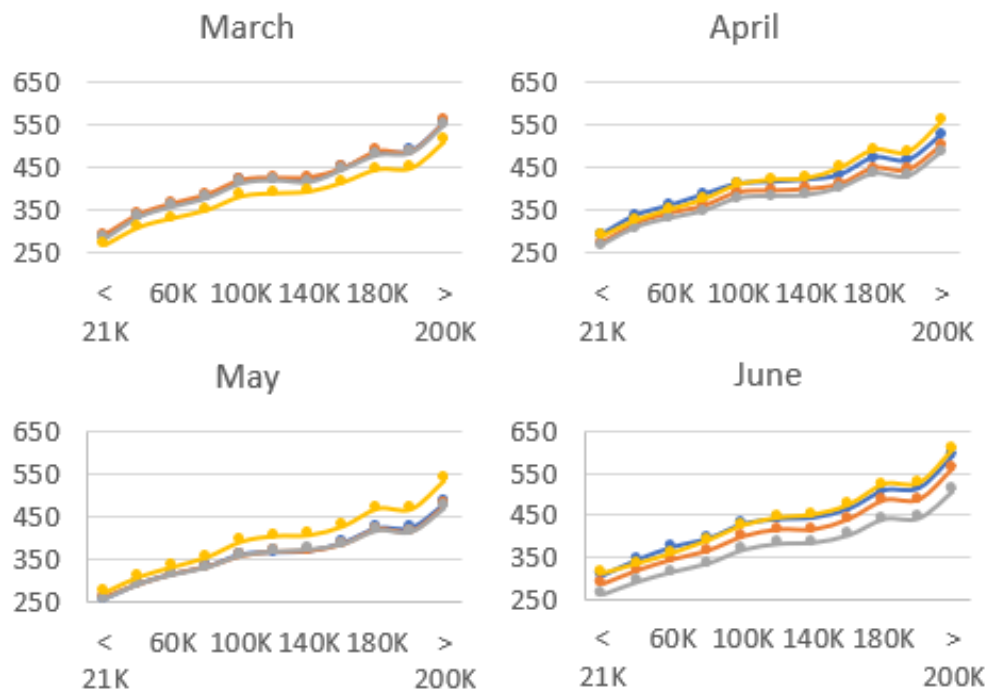


Figure 1. Change in electricity usage as a function of income for Massachusetts over four years -- yellow-2020, grey - 2019, orange - 2018, blue - 2017. March 2020 usage showed lower usage, with subsequent months showing increased usage over previous years.

		March 2020	April 2020	May 2020	June 2020
MA	Children	-5.4%	6.4%	8.4%	8.4%
	No Children	-6.3%	3.4%	5.8%	3.3%
CT	Children	-6.0%	3.8%	9.60%	6.3%
	No Children	-7.1%	0.3%	6.60%	1.8%
NH	Children	-3.8%	2.4%	10.5%	10.0%
	No Children	-4.8%	-0.3%	7.4%	5.4%

Table 1. The effect of children on usage. Monthly deviation from the 4-year average of median usage for households with and without children shpws that after March, usage increased, with larger increases in housholds with children.

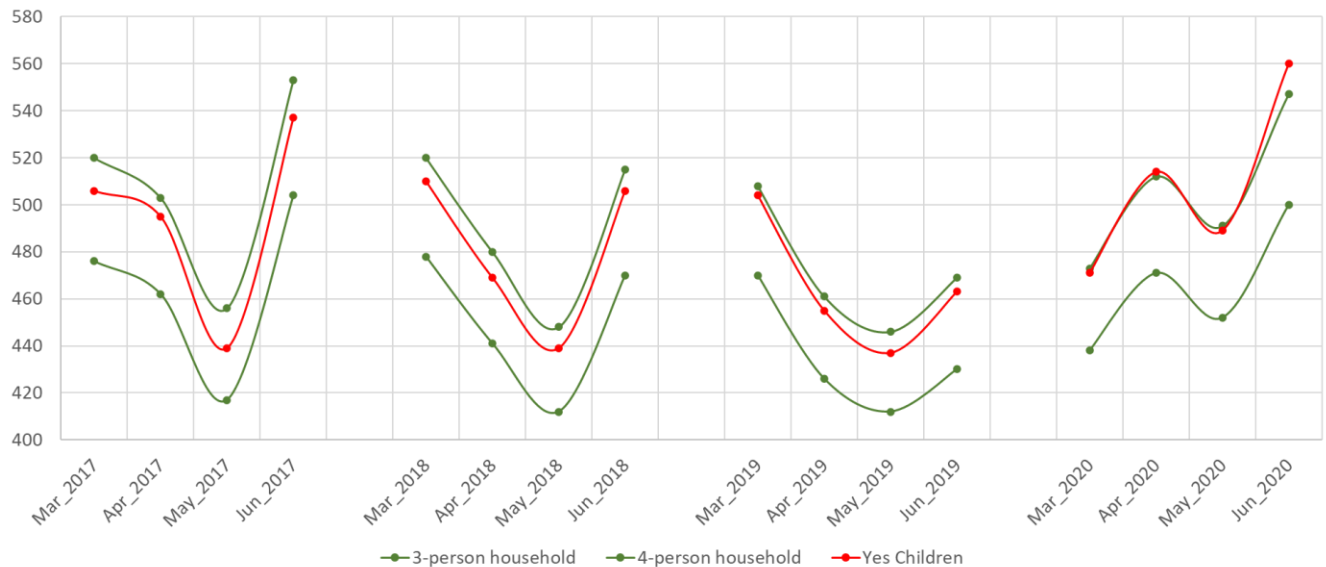


Figure 2. Comparison of households with children to 3- and 4 person households. Usage for “yes children” generally stayed within boundaries for 3 to 4-person household in previous years but matched or exceeded 4-person households in 2020

Response

Pre-pandemic plans for a summer 2020 series of customized emails focused on comparing customer usage in summer months to similar billing periods from the previous year. However, given that a vast majority of customers would likely experience increased usage in 2020 due to shelter-in-place orders, Eversource decided to change course. The aforementioned emails likely would have created a frustrating customer experience, as the comparison of usage to the previous year was no longer a relevant benchmark because customers would be spending significantly more time in their homes in summer 2020. Instead, the team sought to meet customers’ heightened interest in their personal energy usage with information that they would find useful and actionable. The team decided to send customers a high bill alert (HBA) via email with personal data points when their month-over-month usage increased over a certain threshold. These HBAs served as an alert to a possibly larger than anticipated expense in addition to providing behavioral tips for saving energy during the summer and referring income eligible customers to financial assistance programs. A simple thumbs up/thumbs down poll was also included to gauge customer response to the email. HBAs were launched in June 2020 for Massachusetts and July 2020 for New Hampshire and delivered through the end of the cooling season in September 2020. Alerts were not continued beyond September as only a limited number of customers would likely exceed the month-over-month increase threshold required to generate an HBA.

Execution

The Eversource team based customer selection for HBAs on two criteria – email availability and a month-over-month bill increase of \$25.

Email availability is a significant limiting factor on connecting with customers. Unlike direct mail which can be sent to a physical address, email outreach requires that customers provide a valid email and agree to receive online communications. Customer email addresses are then periodically checked for quality and deliverability, which is not evergreen. There are approximately 285k valid customer emails in New Hampshire and 800k in Connecticut and Massachusetts representing 50-60% of the Eversource customer base.

The HBA threshold was chosen with input from an online customer group survey with 368 respondents. 75% of customers were interested in receiving bill alerts and a majority of customers surveyed indicated they would like to receive alerts when they experienced a month-over-month increase that exceeded \$25, as seen in Figure 4. Interest in receiving HBAs generally decreased as bill amount increased, likely because customers with higher electric bills are less concerned in general about the expense, as evidenced in Table 2. Given that \$25 was the most common selected notification amount regardless of the estimated bill total, the team felt that confident setting the threshold based on a fixed dollar amount rather than the percentage of a total bill. The increase was presented in units of dollars rather than kWh because customers indicated that a change in expense is ultimately what they cared about rather than a less tangible change in kWh usage.

Typical Summer Bill Amount	Percent Interested
Less than \$50	62%
\$50 - \$99	88%
\$100 - \$149	81%
\$150 - \$199	76%
\$200 - \$250	69%
More than \$250	58%

Table 2. Percentage of customers interested in receiving a high bill alert based on bill amount the customer would expect to see. Interest trends downward as bill amount increases (n=368).

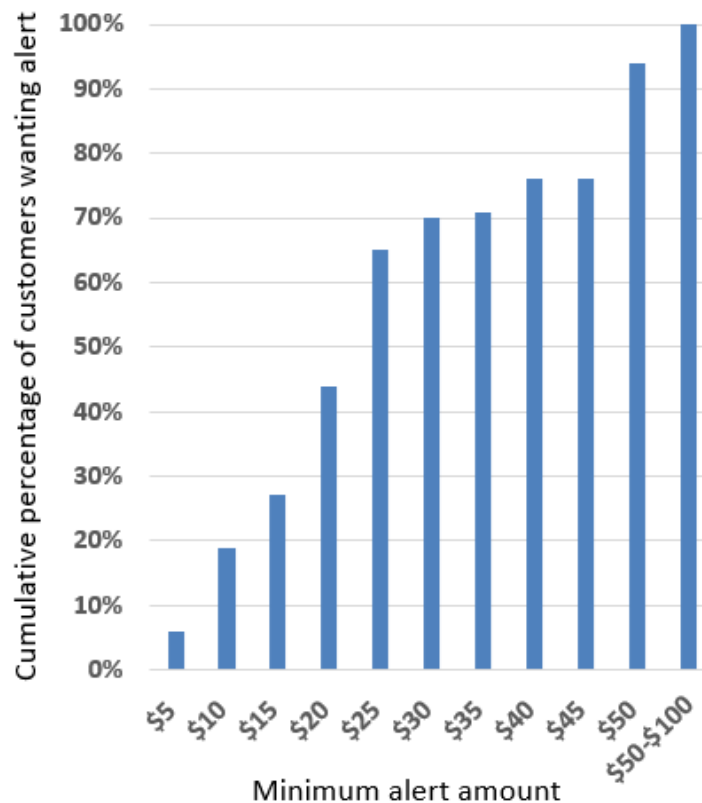


Figure 3. Cumulative percentage of customers interested in receiving a high bill alert based on the minimum alert amount. Largest increases occurred at \$20, \$25, and \$50, with over half of customers interested at \$25 (n=368).

Additionally, to address concerns for customers who may have been struggling to pay higher electric bills, the Eversource team developed two separate versions of the HBAs: one for customers identified as LMI and a second for non-LMI customers. The LMI version encouraged customers to look into financial assistance programs if they had trouble paying their bill whereas non-LMI customers received behavioral energy efficiency tips and information about energy efficiency programs. LMI customers were identified using a combination of information, such as income at the census tract level, energy budget, ability to pay, arrears data, and internal hardship flags.

HBAs were designed with a few key components in mind:

1. Personalized information in the email subject line i.e., including the customer's first name and the amount of the bill increase to grab customer attention
2. Bill information and potential causes for the increase in the email body, i.e., the amount of the billing increase was reiterated, along with two major potential causes of a bill increase – changes in the number of billed days and changes in the average temperature from the previous billing cycle; temperature measurements calculated from the National Weather Service NOAA websites at the county level on a weekly basis before each send.

3. A recommendation for “Ways to Save”, which differed for LMI and non-LMI customers as mentioned above
4. A single poll question, “Did you find this information useful?” with a thumbs up/thumbs down response choice, used to gauge interest in the emails

Results

Massachusetts.

Over the course of the HBA program, 148,652 unique customers in Massachusetts received an HBA. Of those, 107,662 received one email, 38,064 received two, and 2,926 received three. HBAs were sent weekly, targeting customers as their billing period ended. Open rates declined over the course of the program, with a clear split between the first half and second half of the program. Overall, 65% of customers opened at least one email, and 38% of customers who received two emails opened both. The poll presented in the email had 6,635 unique respondents with a 96% overall positive response rate (“This email was helpful”) and a 97% positive response rate among LMI customers.

The team examined differences in open rates among different demographic groups. There appear to be slight correlations based on the home age, house size, household size, and income. The larger the house and household size and older the home, the fewer HBAs were opened. Open rates peaked for customers earning \$121,000 to \$140,000 per year, with lower-than-average open rates for households earning under \$60,000 per year and more than \$160,000 per year.

Measurements of different demographic groups receiving an HBA email against their representation in the overall population revealed trends in customers more affected by high bills. Trends along income showed customers earning under \$100,000 per year received fewer high bill alerts compared to the overall population, while earners over \$140,000 per year received proportionally more. Similar trends appeared as household members increased, house square footages increased, and house age decreased. Homeowners, single family homes, and households

with children also had a greater representation among alert recipients.

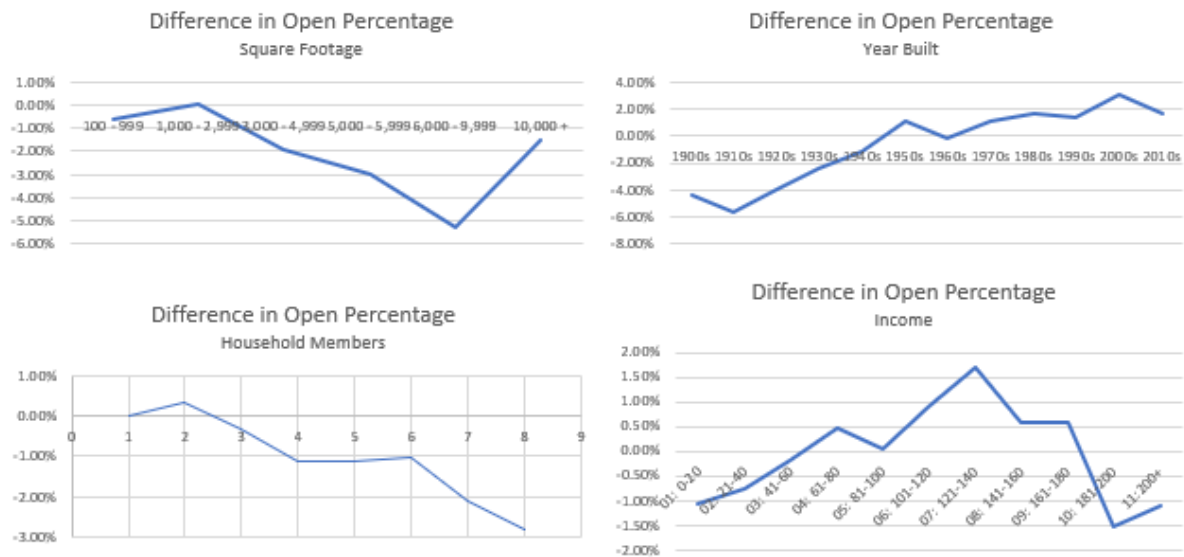


Figure 4. Deviations from the average open rate (65%) by demographic group for Massachusetts. Linear relations with home age and a distribution around incomes of 120-140k.

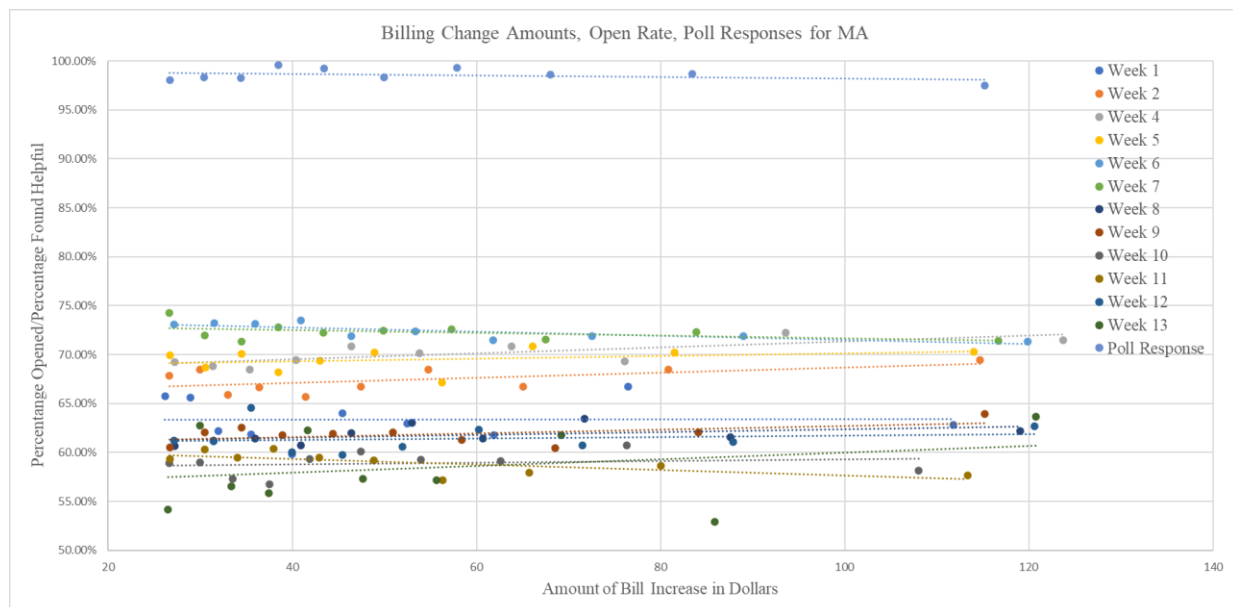


Figure 5. Open rates as a function of bill increase in dollars. Clear split in open rates between early weeks (top) and later weeks (bottom). Blue points indicate approval rating based on poll. Week 1 was sent the week of June 16.

New Hampshire.

In New Hampshire, 31,189 unique customers received an HBA with 29,686 receiving one, 1,501 receiving two, and 2 receiving three. In New Hampshire, HBAs were sent every other week. Overall, 82% of New Hampshire customers opened at least one email, and 56% of

customers receiving two opened both. The poll presented in the email had 6839 unique respondents with an 82% overall positive response rate.

We found no strong indicators for greater open rates in NH. Many demographic splits varied between groups. The only notable indicator showed people with children opened 1.39% above the average.

Measurements of different demographic groups receiving an HBA email against their representation found trends similar to those found in Massachusetts along home age and income demographics with single family homes and households with children. Homes with square footage between 1,000 and 5,000 feet had greater representation as well, but no other strong trends were seen.

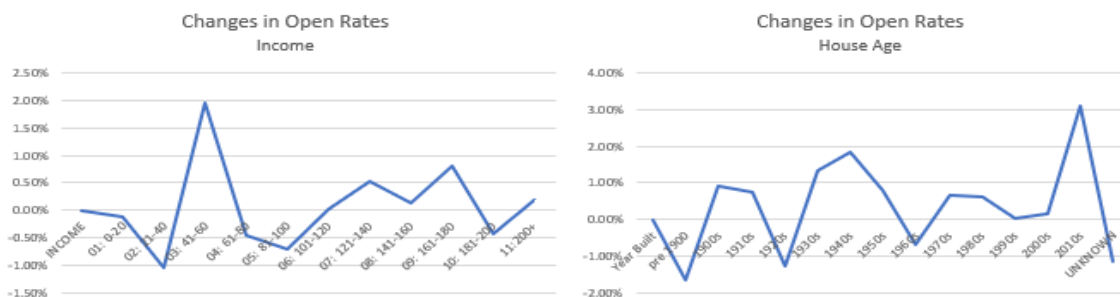


Figure 6. Changes in open rates based on demographic information for New Hampshire. No strong correlations found in demographic comparisons.

Connecticut.

Only one set of HBAs that compared June to July was sent to approximately 55,383 Connecticut customers. After that time, HBAs were discontinued due to concerns for creating a dissatisfying customer experience in the wake of Hurricane Isaias.

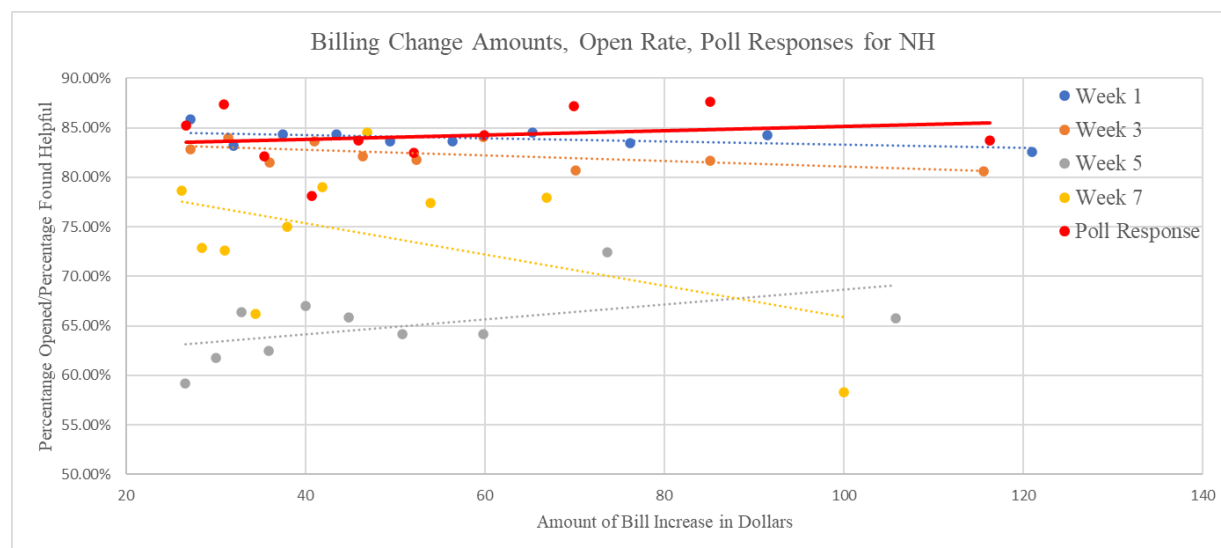


Figure 7. Open rates as a function of bill increase in dollars. Clear split in open rates between early weeks (top) and later weeks (bottom). Red points indicate approval rating based on poll. The week 1 send was sent the week of July 27.

Part 2: Summer 2021, Mid-Pandemic

Analysis

With the release of a vaccine and removal of some stay-at-home restrictions, the Eversource team expected to see the start of a new normal – people leaving their house more, but a majority still working and schooling remotely on a part-time basis.

Electric usage in summer 2021 had a bit more variance as compared to summer 2020, where an increase above the four-year average was observed across all demographic categories to varying degrees. In Massachusetts, usage across all demographic groups was above the four-year average in June and September but dropped drastically in July and August. The decrease in July and August could be summer travel that was enabled by a return to normal. The September increase could be due in part to the extended heat brought on by hotter than average temperature and the potential implementation of hybrid work and school models. The story in New Hampshire is similar, though July is more of a “return to normal” than a specific decrease. The effect of children versus no children was also diminished in 2021.

Response

Almost a year into pandemic-related behavior modifications, a move towards comparing customers’ personal electric usage to the previously year made sense. Customers could compare their behavior to last year and, given the lifting of pandemic shelter-in-place restrictions, a decrease in year-over-year usage was again a possibility.

The team launched monthly Delivered Energy Insights emails (DEIs) well in advance of the upcoming cooling season, and broadened reach of communications to all available customers, not just customers who had seen a bill increase. To measure any behavioral savings or energy efficiency program uplift that might be garnered by the program, this was launched as a randomized control trial with a 50/50 split between treatment and control. In this case, rather than segmentation based on income, customers received a different version of the same graphic in the email based on the percent of usage change.

Execution

The Eversource team based customer selection for the DEI emails on the availability of a valid email address, a minimum of one year as a residential electric customer at the same address, and monthly usage between 100kWh and 5,000kWh. Usage limits were employed to ensure a good customer experience with the monthly email communications. The minimum usage limit was set to target homes that were likely to be occupied with enough usage to warrant behavioral savings tips relevant. The maximum usage limit would prevent the team from emailing residential customers about behavioral tips in cases where employing those tips would be unlikely to have a significant impact on usage given their unique situation. Email availability

was again the major limiting factor, similar to sending HBAs. The aforementioned filtering criteria led to an initial pool of 417,682 customers in Massachusetts, 250,085 customers in Connecticut, and 217,072 customers in New Hampshire.

The team divided the initial pool into 50% treatment and 50% control based on statistical power calculations to monitor the impact of emails on usage. The divisions were made along available demographic data, with F-Tests to ensure that the treatment and control groups were statistically indistinguishable in all states. Due to the lower numbers of potential recipients any impact will take at least two years to be found at any statistical significance.

The program was launched in January 2021 for Massachusetts and in February 2021 for Connecticut and New Hampshire. The key components to DEIs are as follows:

1. An animated bar graph comparing the customer's usage for the current and previous year for the given billing cycle. Customers were divided into one of five categories depending on the percentage change in their usage from the previous year, with the percentage change determining how much the animated bar would fill.
2. Usage information for the subsequent month of the previous year, acting as a 'look ahead.'
3. A seasonally relevant behavioral energy savings tip changed monthly.

Additionally, customers received a summary of usage for the summer 2021 season, which compared total usage for June-August 2020 and 2021, along with limited weather information and a thumbs up/thumbs down poll asking if customers found the information useful.

The team continues to send monthly DEI emails in all three states.

Results

Across all three states, monthly open rates were around 25-30%, with May in New Hampshire being a notable outlier. However, the number of customers opening at least one email during 2021 was 65.4% for Massachusetts, 71.9% for Connecticut, and 63.4% for New Hampshire.

As anticipated, 70% of customers experienced a year-over-year decrease in electric usage in summer 2021 as compared to summer 2020, in part due to a decrease in cooling degree days across all three states, and due to decreased COVID restrictions. The DEI "Electric End of Season" email was sent mid-October with the thumbs up/thumbs down poll question "Was this information useful?" The poll had 2,398 respondents in Massachusetts with a 95% positive response rate, 1,902 respondents in Connecticut with a 93% positive response rate, and 2,300 respondents in New Hampshire with a 95% positive response rate. Of the respondents who responded positively, over 80% had seen a decrease in their usage from the 2020 season. Respondents who indicated that they did not find the email helpful were evenly split among customers who had seen an increase and a decrease in their usage.

Month	MA Open Rate	CT Open Rate	NH Open Rate
January	26.5%		
February	27.2%	31.2%	26.9%
March	27.3%	32.3%	27.5%
April	25.7%	31.0%	27.2%
May	25.6%	29.1%	9.4%
June	25.6%	29.1%	24.1%
July	26.0%	28.9%	24.2%
August	24.6%	28.4%	24.3%
September	27.5%	28.3%	24.8%
October	31.7%	34.2%	28.9%
November	34.5%	36.8%	28.9%
Total opening 1	65.4%	71.9%	63.4%

Table 3. Table of open rates for DEIs in 2021 for each state.

Eversource also received customer feedback in the form of replies to the DEI emails. Customer feedback has been overwhelmingly positive since inception, with many customers indicating that they appreciate receiving these personal usage comparisons directly via email rather than having to log into their account to do the comparison on their own. Several customers have indicated that it would be helpful to include a comparison of weather and difference in the number of days included during the billing periods being compared. The Eversource team has started to receive the data and perform the analyses necessary to make these comparisons and plans to incorporate the enhancements into DEIs in the near future.

Conclusion – Reaching Customers in the New Normal

Through the HBA emails, Eversource found customers were very interested in emails based on personal comparisons of energy usage regardless of whether or not they had opted into receiving them. Timely alerts were well received and opened at high rates, helping customers track changes in their usage and bills during the early summer months of the pandemic.

The encouraging results from the HBA emails laid the foundation for the larger-scale DEI program, both in terms of the information shown to customers and the capabilities of the internal team tasked with execution. Here, again, Eversource found that customers appreciated increased engagement with their personal energy usage data, but feedback received indicated that customers either wanted or provided context around any increase or decrease in usage. In response, over the past year the team has developed the capability to include a comparison of local current and historic weather data and a comparison of billing periods to better aid customers in understanding their usage. While customer reception has been overwhelmingly positive, statistically significant measurements of savings and program uplift will not be available until 2023.

Several trends that emerged and internal capabilities that the customer engagement team developed during the pandemic are shaping the approach to upcoming email campaigns. First, it appears that the hybrid work model that emerged for a majority of the suburban middle class will continue for the foreseeable future (Wigert 2022). Second, real estate prices in suburban areas

within Eversource service territory have steadily increased since the beginning of the pandemic, which has made purchasing a new home difficult for many residential customers. Customers are now spending more time in their homes than in pre-pandemic times and have committed to more renovations since 2020, with improvement projects expected to peak in 2022 (Fernald 2021). Most projects are primarily for aesthetic or comfort reasons, but energy efficiency is often a secondary concern and a major factor in many home improvement decisions (NMR Group 2021).

With these trends and customer interests in mind the Eversource team is developing a customized series of emails designed to motivate customers to adopt energy efficiency measures that deliver significant savings and further utility electrification goals, such as heat pump installations and weatherization improvements. Customers will be enrolled in the email series based on a combination of publicly available data and data provided by customers in response to polls contained within emails. The visual polls collect information about heating fuel and system types and allow customers to be placed in extremely targeted email campaigns designed to reach customers who are ideal candidates for certain opportunities.

The lessons learned from the pandemic-inspired shift served as a catalyst to modify the strategy through which Eversource engages customers around ways to save energy and money. In the post-pandemic “new normal,” Eversource continues to evolve capabilities to deliver digital experiences that reflect an understanding of customers’ situations and priorities while encouraging energy-saving behaviors and participation in relevant programs.

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