

Energy Savings Without Incentives: Evaluated Results from Utility Marketplace Deployments in Illinois

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ABSTRACT

For the first time ever, two Illinois utilities, Commonwealth Edison (ComEd) and Ameren Illinois, will be claiming energy savings achieved in 2021 by their online marketplaces that do not rely on any form of financial incentive. The impact of the marketplace program derives from eliminating barriers and making it simple and compelling for consumers to identify and choose the most efficient products to meet their needs, as previously documented in the scientific literature.

This paper summarizes results of the independent evaluation of the ComEd Efficient Choice pilot, as well as the evaluation methods used and program theory. We share and discuss a wide range of 2021 pilot results and insights for metrics including:

- Annual active website visitors: 46,826
- Number of net efficient purchases attributed to the marketplace: 1,484
- Verified net electricity savings: 205,492 kWh
- Net summer peak demand savings: 32.78 kW
- Average Effective Useful Life across measures: 15.9 years
- Lifetime net savings: 3,212,809 kWh
- Cost-effectiveness (TRC): 1.53
- Replace on burnout share: 42% (58% early replacement)
- Consumer value metrics related to ComEd Efficient Choice (on a zero to 10 scale):
 - Ease of efficient product selection: 8.3
 - Time savings: 8.1
 - Customer satisfaction: 8.6
 - Improved overall opinion of ComEd: 8.0

Based on these findings, and supplemental analysis conducted by Enervee, the paper discusses the implications for program design, such as the potential to augment rebate programs – and deliver claimable energy savings for product categories that may no longer deliver cost-effective savings using rebates – with this type of barrier removal effort.

Problem Statement

Large, cost-effective plug load and appliance savings continue to be left on the table (Navigant Consulting 2019), despite significant investment in energy efficiency programs for the past 30 years. Two of the main barriers that prevent consumers from buying the energy efficient products they aspire to are: 1) lack of market transparency with respect to product efficiency (market barrier) and 2) cognitive/psychological barriers, such as the lay theory that efficient

products necessarily cost more or the rational inattention to energy efficiency exhibited by consumers (refer to logic model in Figure 1).

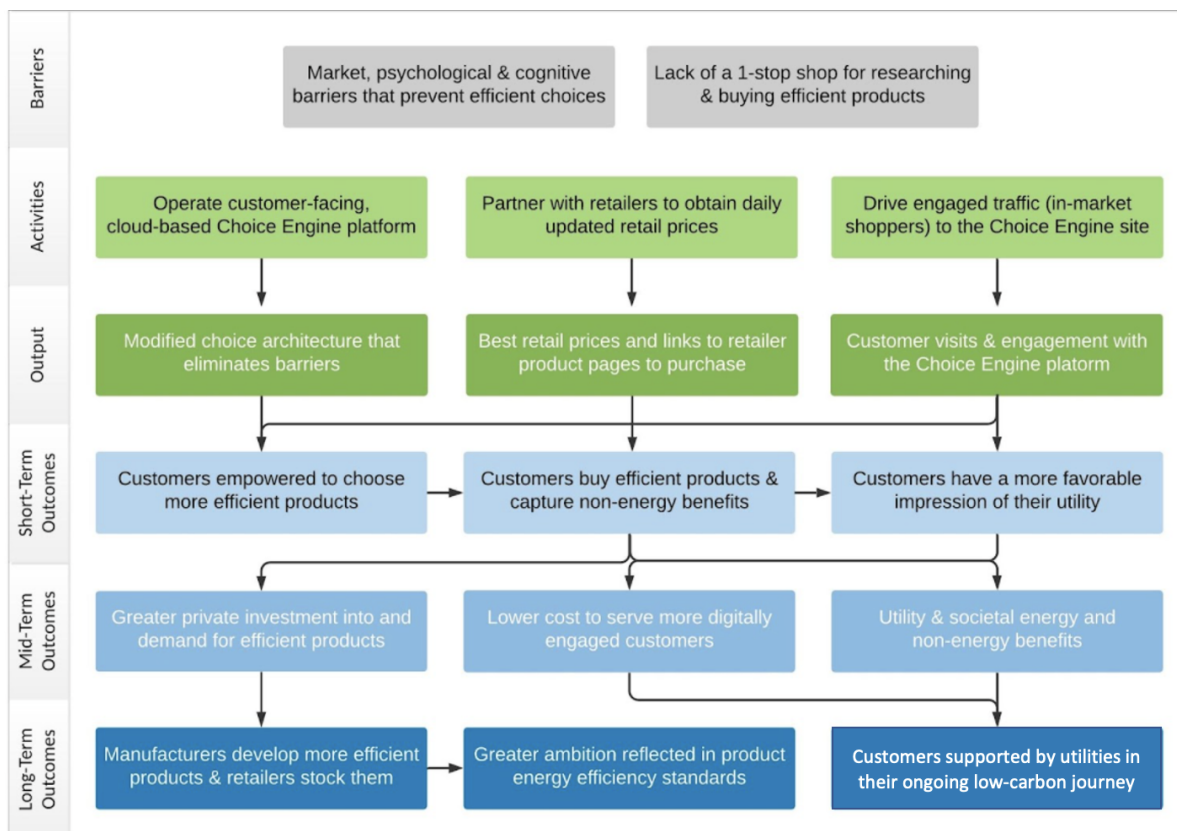


Figure 1. ComEd Efficient Choice program logic model

These widespread barriers are prevalent and persistent, and the value that the ComEd Efficient Choice program brings to the table – namely changing the choice architecture presented to consumers in a simple and actionable format proven to drive efficient choices – is unique in the energy efficiency program landscape.

In this paper, we explore the results of an evaluation of the successful [ComEd Efficient Choice](#) pilot program, which has since been transitioned to the utility’s energy efficiency program portfolio for 2022. Commonwealth Edison (ComEd) partnered with Enervee in 2020 and 2021 to run the Efficient Choice pilot program for their customers in Illinois. The benefits of programs like Efficient Choice have been well documented by previous research and include proven influence on customer buying decisions that help to overcome market and cognitive barriers (Arquit Niederberger 2020). However, ComEd is the first utility in the nation to claim the resulting evaluated energy savings.¹

This paper covers program design, evaluation methods, program outcomes, and the potential implications for expanding market-based savings programs at scale.

¹ ComEd’s filing can be accessed under [Docket 22-0362](#). Ameren Illinois conducted a similar pilot and is also claiming the resulting CY2021 savings under [Docket 22-0369](#) and continuing their program in 2022.

ComEd Efficient Choice Pilot Program

The Efficient Choice pilot was designed to help customers quickly and easily find the most efficient and cost-saving electric appliances that meet their unique requirements, spanning 17 categories of major domestic appliances, electronics, heating & cooling equipment, EV chargers, and pool pumps. It drives continuous engagement and positions the partner utility as a trusted advisor in the customer's appliance purchase decision (Arquit Niederberger 2020). ComEd Efficient Choice operates in parallel with and complements the utility's online store (where customers can buy rebated devices in limited categories, such as light bulbs, thermostats and EV chargers).

Efficient Choice Pilot Goals

The overall goals for the pilot were twofold: 1) to prove that savings achieved by ComEd Efficient Choice could be quantified and claimed and 2) to meet outreach metrics for program email marketing campaigns.

Description of Efficient Choice Platform

The pilot used Enervee's Choice Engine technology to offer a custom, fully automated appliance and product recommendation platform that eliminates barriers and nudges customers towards more efficient buying decisions – all without the use of rebates or other financial incentives. The platform brings together all the data customers need to make an informed decision – pricing, features, efficiency, popularity, and user reviews – into a single comprehensive selection of products and information available online (Figure 2).

The screenshot displays the ComEd Efficient Choice platform interface. At the top, a red header bar contains the 'ComEd Energy Efficiency Program' logo, a search bar, and links to 'ComEd Marketplace' and 'Sign in'. Below the header, a product card for a Samsung 4.5-cu ft High Efficiency Stackable Steam Cycle Front-Load Washer (Platinum) ENERGY STAR | WF45R6100AP is featured. The card includes an image of the washer, an Enervee Score of 94, and a price of \$596. To the right, a 'Best Online Offers' section lists prices from Lowe's (\$596), Appliances Connection (\$985), and Home Depot (\$1,099). Below the product card, three comparison points are listed: 'Ideal efficiency with an Enervee Score® of 94', 'Lower price compared to similar washers', and '4.6 star rating'. A 'Product Details' section is visible at the bottom. A sidebar on the right promotes the ComEd Marketplace with a 'Save Now!' button. The footer contains copyright information and links to Support, Terms & Conditions, ComEd Home, and Privacy Policy.

ComEd Energy Efficiency Program

Search by type, brand, model...

ComEd Marketplace Sign in

< browse all washers

Samsung
4.5-cu ft High Efficiency Stackable Steam Cycle Front-Load Washer (Platinum) ENERGY STAR | WF45R6100AP

- Volume Capacity: 4.5
- Load Type: Front Load
- Stackable: Yes

ENERGY STAR 2022

\$596
[Get price drop alerts!](#)

94

- Ideal efficiency with an **Enervee Score®** of 94
- **CLEARCOST** of \$814 with a lifetime energy usage of \$218

\$\$\$\$

- **Lower price** compared to similar washers
- Price drop of \$389 since last week

4.6

- **4.6 star rating**
- With 50 reviews from 1 retailer

Product Details

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Support | Terms & Conditions | ComEd Home | Privacy Policy

Buy now
from \$596

Best Online Offers

Store	Price	Buy
Lowe's	\$596	Buy
Appliances Connection	\$985	Buy
Home Depot	\$1,099	Buy

[See all 4 offers](#)

ComEd MARKETPLACE
An Edison Company

Explore ways to manage your bill. Save on energy-efficient solutions.

Save Now!

Figure 2. Example product page for a clothes washer on ComEd Efficient Choice

ComEd Efficient Choice was available to customers, in addition to the ComEd Marketplace, which was cross promoted on the Efficient Choice site. Table 1 provides an overview of these two complementary online retail program offerings.

Table 1. Comparison of ComEd Efficient Choice and the ComEd Marketplace

Feature / functionality	ComEd Efficient Choice	ComEd Marketplace
Site owner/host	Envervee	ComEd
Reliance on rebates to drive savings	No ² , focus on barrier removal	Yes
Product categories • Major domestic appliances • Heating & cooling • Energy/water conservation categories • Air quality devices • EV chargers • Electronics • Lawn & garden • Safety & preparedness	• Yes, all kitchen and laundry appliances • Yes, water heaters and air conditioners • Yes • Yes • Yes • Yes, televisions and other • Yes, electric pool pumps/heaters, garden equipment • Yes, portable power & generators	• No • No • Yes • Yes • Yes • No • No • No
Product selection	• Over 22,000 models in total • Two dozen categories feature >100 models; several feature >1,000 models	• Less than 250 models in total • <30 models per category (with the exception of lighting)
Number of merchants	• Total of 17 merchants featured • Customers referred to third-party retailers to purchase	• ComEd is marketplace merchant • Customers purchase on ComEd Marketplace

Program Activities, Outputs and Outcomes

The major program activities from Figure 1 are summarized here:

- Operating a customer-facing, software-as-a-service Choice Engine platform, designed to take advantage of behavioral insights and decision science to overcome barriers. This

² Following the Efficient Choice pilot, ComEd began featuring rebates on several categories on the site (refrigerators, washers, dryers, air purifiers, dehumidifiers, thermostats), but there were no rebates during the pilot that was evaluated by Guidehouse and reported on in this paper.

includes maintaining an accurate, daily-updated product catalog to support scoring and personalized energy impact estimates.

- Partnering with major national retailers and some regional and smaller retailers to obtain daily-updated retail prices on tens of thousands of products spanning a wide range of residential product categories.
- Executing marketing campaigns to raise awareness of and drive in-market shoppers to the site.

In addition to the platform itself, program marketing played a critical role in driving customer participation in the pilot. Campaigns reached customers through highly segmented and personalized digital marketing efforts. Marketing was designed to generate traffic, as well as to drive awareness, actions, product sales, and engagement on the Efficient Choice platform (see Figure 3 for an example email).

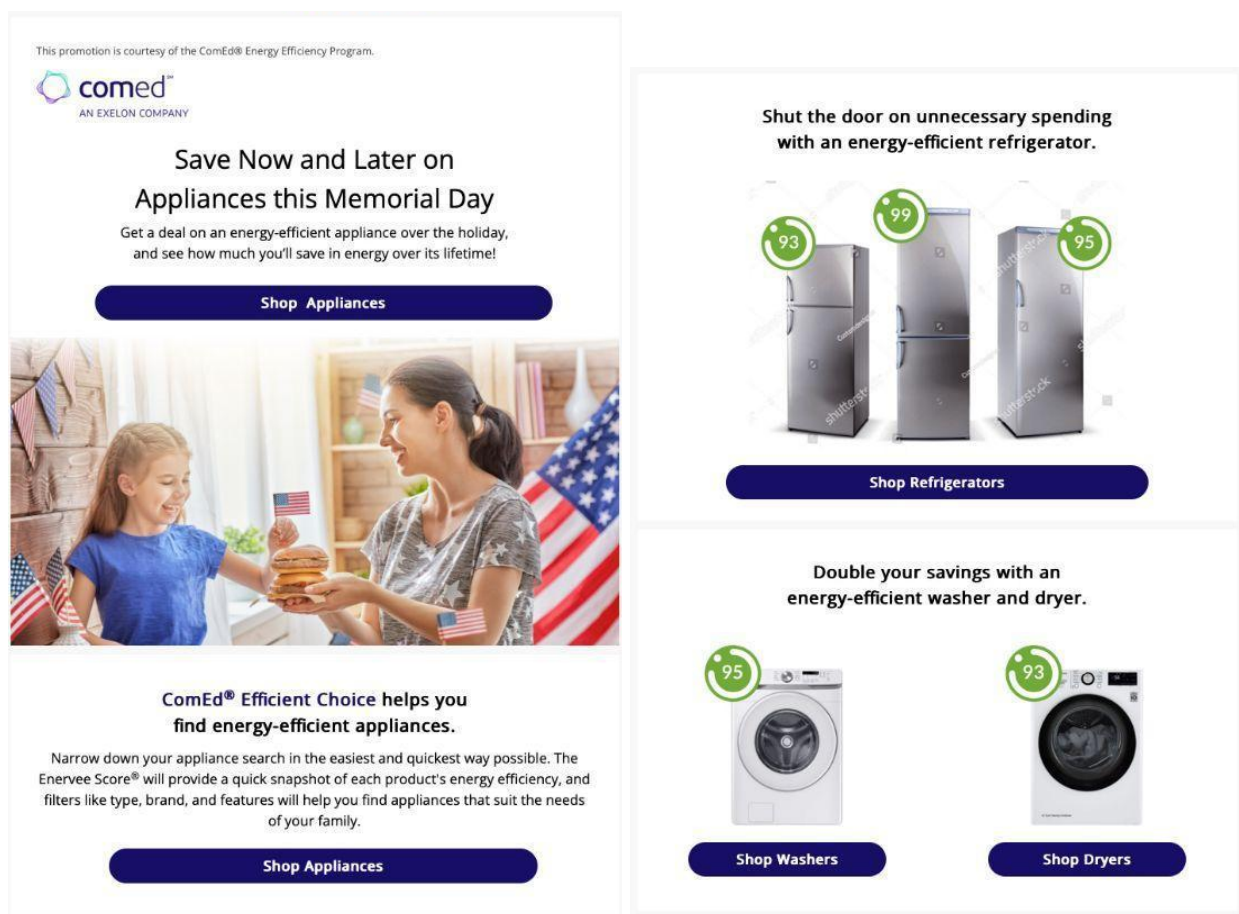


Figure 3. Memorial Day email highlighting lifetime savings, educating on how to shop and featuring white goods

All marketing was digital and included the following channels/tactics:

- Display ads to target in-market shoppers with educational content and attract them to ComEd Efficient Choice. Specifically, a “True or False?” campaign was used to attract

attention and address common myths. The ads directed shoppers to a relevant product category landing page, which provided information on how to compare efficient and inefficient products.

- Paid search promotions tied to major shopping periods.
- Promotional and educational email campaigns. “Identify” emails engaged readers in a short survey that asked whether they were in the market to buy any of the targeted categories. Customer responses helped build an audience for targeted drip email campaigns. Similarly, the promotional emails drove category engagement.
- Targeted drip email campaigns.³ A key element of Enervee’s marketing efforts were the data-informed drip email campaigns (based on the educational email survey responses and promotional email online engagement data), which encouraged known in-market shoppers to engage with features of our platform throughout the course of their shopping journey, from research, to choice and, ultimately, purchase.

The program delivers the following outputs to eliminate barriers to energy efficient purchases (refer to Figure 1):

- Energy-aware choice architecture. Utility online marketplaces featuring Choice Engine technology inject actionable energy efficiency information into the shopping journey, with a view to eliminating barriers and closing the attitude – behavior gap (Arquit Niederberger 2020).
- Buying advice. Participants can find the best retail prices and links to buy at their preferred retailer, and are provided with personalized product recommendations that reflect their needs, such as price point, size/capacity and product feature preferences.
- Visits by in-market shoppers. It goes without saying that the Choice Engine platform will only be effective if customers become aware of and take advantage of it. Digital and other marketing acquires and engages customers actively shopping for energy-using consumer products at scale.

These program outputs lead to immediate and longer term outcomes, as indicated in Figure 1. Key program outcomes include efficient product purchases, the resulting utility and societal benefits, a lower cost to serve, and greater private investment into and demand for energy efficient products overall. Efficient Choice programs can thus stimulate more savings in the future. The digital platform is an important mechanism for partnerships that can change the way markets function, meet customers where they are and help them along their low-carbon journey on an ongoing basis.

Evaluation Methods

The evaluation of the ComEd Efficient Choice pilot conducted by Guidehouse included impact and process elements, to inform utility decision-making on whether to continue the program post-pilot. Evaluated impacts were also needed as a basis for [ComEd’s 2021 energy](#)

³ A drip campaign, or drip marketing, means using a series of pre-planned, automated messages to encourage interaction. The multi-step communication stream can be triggered by time, the recipient’s actions with prior correspondence, interaction with the website, and other predetermined parameters.

[savings claim](#) filed with the Illinois Commerce Commission. [Ameren Illinois also filed a 2021 savings claim](#) that included savings from their [Efficient Choice Tool](#) pilot, which was conducted at roughly the same time as the ComEd pilot. Together, 635 net MWh of CY2021 savings are being claimed for these Illinois pilots, as well as over 24,000 net therms, by Ameren Illinois.

The impact of online referral marketplaces that do not rely on rebates, but rather drive more efficient buying decisions by eliminating barriers, is a relatively new program design. The ComEd Efficient Choice evaluation (Van Eeghen and Frischmann 2022) is the latest in a series of referral marketplace program evaluations completed since 2018 by six different evaluation firms (see, for example: Con Edison 2020; Malinick 2020; Malinick 2018). The methods used to quantify savings have been refined over time, as more evaluation firms have weighed in. The overall evaluation approach taken by Guidehouse is as follows (refer to Van Eeghen and Frischmann (2022), Appendix A, for further details):

- Engineering Analysis: Conduct engineering analysis to determine the unit energy savings for ComEd Efficient Choice measures.
- Customer Population: Determine the customer population. Identify the measures visited on the ComEd Efficient Choice website for each ComEd customer.
- Surveys: Determine purchase rate, efficiency rate and net-to-gross (NTG) ratio. Determine cross-participation with the Appliances Rebate Program, based on self-reports.
- Net Savings: Calculate gross and net savings.

The ComEd evaluation (and all of those preceding it) have relied on a combination of participant surveys, platform analytics data and deemed savings values from Technical Reference Manuals (TRMs) to estimate efficient purchases and quantify energy savings (Figure 4).

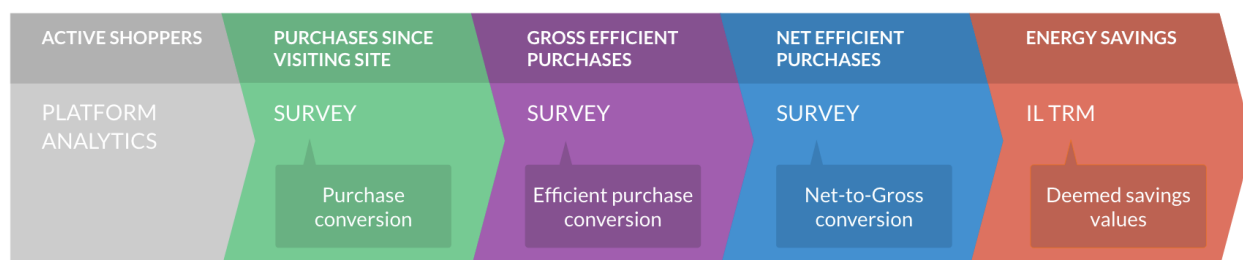


Figure 4. Overview of survey-based method to quantify energy savings

Guidehouse defines the customer population as the number of unique customer unit identifier (CUID) addresses in the ComEd service territory that made a surfing action on a measure page⁴. Guidehouse determined the customer population for each measure individually.

To effectively assess the behavior of customers using the ComEd Efficient Choice website, Guidehouse developed a sampling strategy for gathering information from customers aimed at 1) characterizing the purchase rate of customers surfing the ComEd Efficient Choice website and 2) determining the percent of customers whose purchases were energy efficient.

To achieve the above goals, Guidehouse used a nested sample approach. The initial sample frame included all customers who took an action on the ComEd Efficient Choice website

⁴ The rest of this section is based on Guidehouse (2021a).

indicative of someone actively in the market to buy. This stage was used to estimate the purchase rate, based on responses to the following question: “Which, if any, of the following product(s) did you purchase after visiting the ComEd Efficient Choice website?” A list of all Efficient Choice product categories included in the TRM was provided.

The second stage of the nested sample approach included all survey respondents from the first stage who purchased equipment. This sample was used to estimate the percent of efficient equipment purchased. The survey asked respondents to either take pictures of the manufacturer and model number of the product(s) they purchased, or to forward their purchase receipt via email.

The net-to-gross analysis asked customers who self-reported having made a purchase about the influence of the Efficient Choice website on their purchase and the intention of the customer visiting the website, consistent with the IL TRM Vol. 4 “Prescriptive Rebate (With No Audit)” NTG protocol. The evaluation team developed four questions, including: “If the website did not exist, what is the likelihood that you would have bought a product of the same high level of energy efficiency as the one(s) you bought? Please use a scale from 0 to 10, where 0 means ‘Not at all likely’ and 10 means ‘extremely likely’.”

The resulting number of efficient purchases in each product category was then scaled to the larger population of active shoppers for which the survey respondents were believed to be representative, and the number of purchases in each category made as a result of the program were multiplied by the unit energy savings and effective useful lifetime values taken from the Illinois TRM to calculate electric savings.

Evaluation Results

Below, we present the ComEd Efficient Choice pilot evaluation results, covering both energy impacts and process elements regarding the user experience and consumer value proposition.

Pilot Program Energy Savings and Cost-Effectiveness

ComEd is an electric-only utility. Guidehouse assessed total program savings and product category savings across a number of metrics, including first year net and gross electricity use and demand savings, and net cumulative persistent annual savings. Guidehouse also conducted a cross-participation analysis to determine which purchases were associated with a ComEd rebate program. Savings from these self-reported purchases were excluded from the claimable savings for the pilot.

In the base case, verified net savings for evaluated and extrapolated measures were estimated at 509,200 kWh, and lifetime electric cumulative persistent annual savings at 8,354,835 kWh (Guidehouse 2021b). The evaluation team’s sample design target was to achieve 90/25 confidence/precision at the pilot level, and 90/40 at the measure level for verified gross savings, and the team was able to achieve both relative precision targets.

The total annual incremental savings actually claimed by ComEd in their filing are lower than the total base case savings (Table 2). This is the result of a cross-participation analysis. Approximately two-thirds of surveyed customers indicated they received a ComEd rebate through the Appliance Rebates Program after visiting the Efficient Choice website. Since ComEd already claims savings through the rebate program, Guidehouse excluded savings for all of the

self-reported, rebated purchases from their ComEd Efficient Choice tally (Guidehouse 2021b). During the pilot, [rebates were available on a wide range of product categories](#) featured on ComEd Efficient Choice, although for pilot evaluation purposes, there was no indication on Efficient Choice that the rebates were available.

Table 2. ComEd Efficient Choice pilot energy and demand savings CY2021 (Van Eeghen and Frischmann 2022)

	Gross	Net
Total energy savings CY2021	328,728 kWh	205,492 kWh
Total lifetime energy savings across all measures installed in 2021		3,212,809 kWh
Summer peak demand savings CY2021	52.46 kW	32.78 kW

The simple cross-participation analysis only highlights which purchases were influenced by both programs, based on self-reports; it does not shed light on how much influence each program had on the customer decision to purchase the efficient product. Van Eeghen and Frischmann (2022) therefore recommend conducting further research to understand the full energy savings of the Efficient Choice website.

A separate analysis found the program to be cost-effective, with a TRC (Total Resource Cost) test value of 1.53 (ComEd 2022). This value is slightly lower than the corresponding TRC value of 1.63 reported for the Ameren Illinois Efficient Choice Tool pilot (Opinion Dynamics 2022). These results do not account for any benefits associated with purchases that also involved self-reported rebates.

Seventy-three percent of verified net savings came from efficient refrigerator purchases (Van Eeghen and Frischmann 2022), followed by clothes dryers (11%), clothes washers (9%), televisions (5%) and other technologies (2%). The fact that the first three delivered 93% of savings is directly attributable to the digital marketing campaigns – which focused on these three categories, so the evaluation could meet its confidence and precision targets. As described above, marketing had a strong impact on which products were purchased during the pilot.

Customer Satisfaction and Value Proposition

The evaluation found that customers gave high marks on their satisfaction with the Efficient Choice website, usefulness factors and the impact of the Efficient Choice customer experience on their opinion of their utility company (Figure 5).

On the latter, customers were asked how their experience with the ComEd Efficient Choice website affected their opinion of ComEd. Using a scale of 0-10, where 0 means significantly decreased favorability with ComEd and 10 means significantly increased favorability with ComEd, customers provided an average rating of 8.0.



Figure 5. Customer satisfaction, value proposition, and utility opinion ratings on a 0 to 10 Likkert scale.

In terms of customer value proposition, customers who self-reported that they made a purchase strongly agreed, on average, that the information on energy efficient products was useful (average score of 8.9) and that ComEd Efficient Choice improved their ability to choose efficient products and save time while doing so.

Similar results for other marketplaces featuring Choice Engine technology have been reported by prior evaluations, such as for the AEP Ohio Marketplace and the Con Edison Marketplace (Arquit Niederberger 2020).

Marketing Results

Analysis conducted by Enervee speaks to the effectiveness of the marketing program. Figure 6 plots the ratio of annualized pilot efficient purchases to estimated total annual purchases in ComEd's territory⁵.

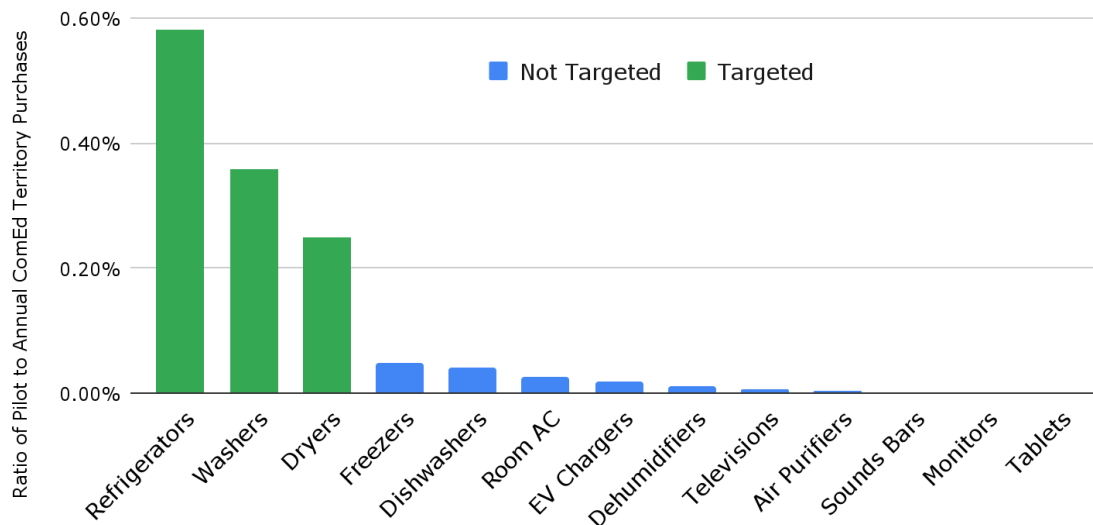


Figure 6. Ratio of Efficient Choice pilot sales to estimated ComEd territory annual sales, comparing categories targeted by marketing campaigns against other featured categories.

⁵ Service territory sales were estimated using ENERGY STAR product shipment data (EPA 2021), national households (United States Census Bureau 2022) and the number of ComEd residential customer accounts.

The green bars highlight categories that were targeted by pilot marketing campaigns, while the categories in blue were not. The targeted pilot categories saw a much higher relative share of customer participation, products purchased and energy savings than other categories⁶. This indicates that program marketing efforts were effective and suggests that savings can be scaled over time with greater marketing effort spanning more categories.

ComEd serves 3.8 million residential accounts, and the marketing email list available to the program included roughly 600,000 customers. Marketing drove 275,277 visits to ComEd Efficient Choice during the pilot. Roughly 1 out of every 5 of visits involved online behaviors suggestive of in-market shoppers actively shopping for products to purchase, as opposed to visits associated with people merely clicking through to the site from a marketing email out of curiosity.

Insights And Outlook

The documented success of the ComEd Efficient Choice pilot contributed to the utility's decision to transition the program to its energy efficiency program portfolio, beginning in 2022. Results from the Pilot Impact Evaluation Report (Van Eeghen and Frischmann 2022) were also integrated into a consolidated portfolio-wide impact evaluation report that served as the basis for [ComEd's CY2021 savings claims filed in May 2022](#), including for ComEd Efficient Choice⁷. Key insights derived from the evaluation findings and other data are the following:

- Both the ComEd Efficient Choice and Ameren Illinois Efficient Choice Tool pilots demonstrated that online utility marketplaces featuring Choice Engine technology can drive major domestic appliance purchases, spanning dozens of gas and electric categories, without incentives and in partnership with retailers. This model is a differentiator to traditional utility online stores, where the utility functions as the retailer, with a limited selection of product categories and models and a heavy reliance on rebates to generate savings.
- Claimable savings, achieved without rebates, can be quantified with robust evaluation methods. One of the main goals of the ComEd Efficient Choice pilot was to test the ability to drive claimable portfolio savings without the use of typical utility rebates, and the independent evaluation concluded that “the Efficient Choice Pilot’s energy savings can be evaluated using a survey-based approach” (Van Eeghen and Frischmann 2022).
- The Efficient Choice pilots in Illinois were found to be cost-effective.
- The Efficient Choice pilots were highly rated by utility customers across a range of metrics, including high customer satisfaction, a compelling consumer value proposition (making it quicker and easier for customers to choose efficient products) and a more favorable opinion of the utility as a result of their experience with the platform.
- Marketing was effective at attracting in-market shoppers to the site and driving more efficient purchases in targeted categories.
- The pilot engaged people replacing appliances that were no longer functioning and also drove nearly 60% of shoppers to replace outdated appliances early. The Illinois TRM only included higher savings for early replacement of refrigerators; providing deemed

⁶ This pattern also holds when excluding rebated pilot purchases from the analysis.

⁷ Ameren Illinois also [filed to claim CY2021 savings](#) from their Efficient Choice Tool on June 1, 2022.

values for early replacement of other product categories could lead to larger, more accurate savings for this common replacement scenario.

Going forward, a focus on barrier elimination – changing the way that products are bought and sold, in partnership with retailers – rather than on rebates, can scale energy and carbon savings. Research has found that residential customer actions hold the potential to reduce GHG emissions by nearly twice as much as supply side measures, and importantly, that electric efficiency holds the greatest potential for GHG reduction through 2030, more than rooftop solar or electric vehicles (Sergici et al. 2021). Most of these savings come from appliances and other plug loads that are bought by consumers at retail and do not generally require contractor installation.

The ComEd Efficient Choice pilot demonstrated the innovative program’s ability to remove barriers to efficient shopping, allowing utilities to influence a single buying decision that will have an impact for just shy of 16 years, over the average useful life of the products. With hundreds of millions of product purchases taking place each year, there is a substantial opportunity to cost-effectively reduce energy consumption and GHG emissions without the need for utility incentives for the residential sector as a whole. This means that incentives can be judiciously targeted at promoting cutting-edge technologies or supporting those customer segments that face the greatest financial barriers.

As a result of the Efficient Choice pilot evaluations in Illinois, companies undertaking potential and goals studies now have the evaluated results they need to consider this novel program design in their estimates of achievable potential. This would ensure that energy efficiency budgets are not cut, as lighting savings are phased out.

This type of program innovation should be welcome news to demand-side management practitioners, because – as mandatory energy performance standards ratchet up – it is increasingly difficult for utilities to achieve sufficient cost-effective energy savings with downstream product rebates. In April 2022, the Biden Administration released new lighting standards that will phase out energy-wasting bulbs by 2023. Given that 57% of ComEd’s residential sector electric savings in 2021 were for lighting measures (Ampong, Chung and Kunkel 2022), there is a need to ramp up savings from plug loads (electronics and appliances combined), which only contributed 5.6% to residential savings in CY2021, yet collectively account for a large share of load.

Finally, while resources like ComEd Efficient Choice help to overcome a range of market, cognitive and psychological barriers to identifying and choosing efficient products, newly launched financing programs show promise for eliminating financial barriers. Enervee and our partners are integrating affordable financing into the online shopping experience, which is proving to be a powerful tool for nudging hard-to-reach customer segments toward better buying decisions (Arquit Niederberger 2022).

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References

- Ampong, C., Chen, T., and D. Kunkel. 2022. *ComEd CY2021 Summary Impact Evaluation Report: Energy Efficiency/Demand Response Plan: Program Year 2021 (CY2021)*. <https://www.icc.illinois.gov/docket/P2022-0362/documents/324382/files/564612.pdf>
- Arquit Niederberger, A. Forthcoming 2022. Efficient Shopping For All: Achieving Climate Goals with Online Retail Eco Financing. In *Proceedings of the 2022 ACEEE Summer Study on Energy Efficiency in Buildings*. Washington DC: ACEEE.
- Arquit Niederberger, A. 2020. “Eliminating Market & Behavioral Barriers with Choice Engines.” In *Proceedings of the 2020 ACEEE Summer Study on Energy Efficiency in Buildings* 7:1-14. Washington DC: ACEEE. <https://www.aceee.org/files/proceedings/2020/event-data>
- ComEd (Commonwealth Edison). 2022. Personal communication (email exchange dated July 25, 2022).
- Con Edison. 2020. *REV Demonstration Project: Connected Homes Platform 2019 Q4 Quarterly Progress Report & Project Closeout Report*. New York, NY: Con Edison. <https://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7B2DBFFC60-2403-4D1D-9F4D-9B0B3FE9AC34%7D>
- EPA (Environmental Protection Agency). 2021. *ENERGY STAR® Unit Shipment and Market Penetration Report Calendar Year 2020 Summary*. Washington DC: EPA. https://www.energystar.gov/sites/default/files/asset/document/2020%20USD%20Summary%20Report_Lighting%20%20EVSE%20Update.pdf
- Guidehouse. 2021a. *ComEd Efficient Choice Pilot CY2020 - CY2021 Eval Plan*. Dated January 5. Internal, unpublished memo.
- Guidehouse. 2021b. *ComEd Efficient Choice Pilot Evaluation Findings Memo*. Dated November 30, 2021. Internal, unpublished memo.
- Malinick, T. 2020. *Online Marketplace Assessment AEP Ohio, Revised Final Report*. Portland, OR: Opinion Dynamics. https://drive.google.com/file/d/1ROjA1RIEZ0PnD35kr6v0ALqLOHUoPsnL/view?us%20p=s_haring
- Malinick, T.. 2018. *Assessment of PG&E’s Online Marketplace*. San Francisco, CA: Pacific Gas and Electric Company. <https://www.etcc-ca.com/reports/assessment-pge%E2%80%99s-online-marketplace>
- Navigant Consulting. 2019. *2019 Energy Efficiency Potential and Goals Study. Final Public Report*. San Francisco, CA: Navigant Consulting. <https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M309/K725/309725430.PDF>
- Opinion Dynamics. 2022. *Ameren Illinois Company 2021 Energy Efficiency Portfolio Cost-Effectiveness Results*. <https://ilsag.s3.amazonaws.com/2021-AIC-Portfolio-Cost-Effectiveness-Report-FINAL-2022-06-29.pdf>

Sergici, S., R. Hledik, M. Hagerty, A. Faruqui, and K. Peters. 2021. *The Customer Action Pathway to National Decarbonization*. Boston: Brattle Group.
<https://www.brattle.com/wp-content/uploads/2021/10/The-Customer-Action-Pathway-to-National-Decarbonization.pdf>

United States Census Bureau. March 7, 2022. [Quick Facts](#)

Van Eeghen, M., and M. Frischmann. 2022. *ComEd Efficient Choice Pilot Impact Evaluation Report: Energy Efficiency/Demand Response Plan: Program Year 2021 (CY2021)*.
<https://ilsag.s3.amazonaws.com/ComEd-Efficient-Choice-Pilot-CY2021-Impact-Evaluation-Report-2022-04-07-Final.pdf>