

From Notice To Action: How Households Navigate Electricity Shutoff Risk

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ABSTRACT

Energy vulnerability is usually measured using things like unpaid bills and electricity disconnections. But this misses something important: what actually happens when a household receives a shutoff notice and has to act quickly to avoid losing power. This paper presents findings from a qualitative “week-in-the-life” mobile diary study of four U.S. households facing potential electricity disconnection. Participants included both low-income renters with ongoing arrears and a moderate-income homeowner dealing with a medical crisis.

The study shows that utility communications often create unnecessary barriers that make it harder for people to restore stability. Shutoff notices are easy to miss or confuse with junk mail, bills are often hard to understand, and online systems are not always easy to use – especially on smartphones. We also find that structural housing conditions (like broken appliances or unsafe wiring) limit how much control customers have over their energy use – and therefore their energy bill costs. Households actively seek out short- and long-term financial solutions. They rely on utility Customer Service Representatives greatly when faced with opaque energy workflows. They also use smartphones, gig work platforms, and other digital tools to manage short-term financial stress. We also saw that participation in the study itself appeared to function as an intervention: structured reflection tasks nudged households to update billing payment methods, pursue energy payment plans, and re-apply for longer-term assistance sooner than they may have otherwise.

Overall, there is a clear mismatch between modern, easy-to-use digital tools in everyday life and the much more difficult systems used by utilities and government agencies for billing assistance. We end with five practical recommendations for utilities to make shutoff notices and assistance systems clearer, easier to act on, and more supportive.

Introduction

Energy vulnerability is often described in simple financial terms: if a bill is not paid over a period of time, then electricity service is eventually shut off. But this misses the real-world experience of what happens in the time between receiving a shutoff notice and losing power. During this period, people are not ignoring the problem. They are often dealing with serious stress: medical issues, unstable income, or housing difficulties – while also trying to understand confusing energy bills and notices. In these situations, people have limited mental bandwidth, meaning they have less capacity to process information, compare options, or make long-term plans. Past research shows that households facing high energy costs use a wide range of coping strategies, including cutting back on other expenses or earning extra income in informal ways (Carley et al. 2022).

This study looks closely at what happens during this pre-electricity shutoff period. This research uses a combination of one-on-one interviews and a five-day mobile diary study, where participants record their experiences in real-time using their phones. This helps capture what people actually do, not just what they remember afterward. Participants completed 18 short tasks, including documenting bills, showing their home environment, and reflecting on daily decisions during a period we call the “Crisis Pivot” (the point where people shift into urgent problem-solving mode after receiving an electricity shutoff notice).

The findings challenge a common assumption: that non-payment is mainly due to lack of money or lack of effort. Instead, we find that system design plays a major role. Notices are easy to miss, bills are confusing, and online systems are often difficult to use, especially on mobile devices. This creates a reliance on utility Customer Service Representatives (CSRs) to demystify energy workflows. At the same time, participants rely heavily on commercial digital tools like gig work apps, retailer discount programs, and financial tech apps. This is because these systems are faster and easier for energy customers to use than utility or government traditional assistance systems. This creates a gap between how people manage money in daily life and how utilities expect them to interact with established billing and assistance program workflows.

Methodology

Study Design

This study combined a five-day mobile diary study with multiple one-on-one (1:1) in-depth interviews (IDIs) to examine how households respond to electricity shutoff notices in real time. Mobile ethnography was selected as the primary approach to reduce errors and capture in-the-moment participant decision-making, rather than relying on retrospective participant reflections. Retrospective participant data collection (e.g. surveys) was avoided in order to reduce recall bias: when study participants do not remember past events or experiences accurately or completely, leading to distorted results and incorrect conclusions. Similarly, individual per-participant data collection was chosen over a focus group approach in order to reduce visibility bias. The “loudest voice in the room” phenomenon, often referred to as visibility bias, occurs when assertive, frequent, or dominant speakers overshadow quieter, reflective participants in a group setting. In a focus group approach, volume can be frequently mistaken for value, creating opportunities for groupthink and skewing research data. Individual participant data collection approaches allow each person to share their unique experience without being swayed by other voices in the room. This enables the researcher to identify patterns across individuals during the analysis phase.

To facilitate mobile data collection and analysis, two key tools were used: Indeemo and NotebookLM. Indeemo is a mobile research platform that allows participants to document their daily experiences using their smartphones, through activities such as taking photos, recording videos or phone screen captures. This type of tooling provides researchers with an "in-the-moment" view of how people navigate apps, websites, or services in their natural home environment. It also enables efficient analysis of image and video-based participant uploads through its Optical Character Recognition (OCR) feature which extracts on-screen content as plain text. NotebookLM is an AI-powered research assistant that helps researchers interact with large amounts of qualitative information. It can analyze and transcribe audio or video files into plain text. This allows researchers to ask questions about their data and easily pull quotes from

transcripts. At the time of analysis, both tools used do not include functionality to incorporate external data sources.

Participants

The study took place during Q4 2024, with four participants from the Midwest and Northeast United States. The participants' locations and the study timing are meaningful because they fall within the heating season, a period when electricity and other home energy costs significantly increase for at-risk households (JCHS 2022; ACEEE 2024).

Participants included three low-income households managing ongoing arrears and one moderate-income household experiencing a temporary medical-related disruption. Income levels (low vs. moderate) are outlined in Table 1 below and were determined through comparing:

- Participants' self-reported 2024 household income and household size
- 2024 values for US Federal Poverty Level (FPL)
- 2024 values for the US Department of Housing and Urban Development (HUD)'s Area Median Income (AMI) levels for their state
- Cross-referencing all values against 2024 eligibility criteria for participant's electric utility's income-qualified energy assistance programs

Table 1. Diary study participant household income profiles

Participant	State	Household size	2024 annual household income	Percentage of 2024 US FPL	Percentage of 2024 US HUD state AMI	Derived income level
A	MI	4	\$111,000	356%	100%	Moderate
B	OH	5	\$36,000	98%	40%	Low
C	OH	3	\$15,000	58%	20%	Low
D	NY	4	\$11,000	35%	13%	Low

As shown in Table 1, Participants B, C, and D fit into low income categories based on their percentage of FPL and percentage of AMI. Each of these participants also met their electric utility's energy assistance program eligibility criteria, which was less than or equal to 150% FPL. Participant A fit in the moderate income category due to their electric utility's energy assistance program structure. Their utility supplied income-qualified assistance to households whose income is up to 400% FPL. Additional details on participant's electric utilities, enrolled assistance programs, and occupations are intentionally excluded from this paper to preserve participants' privacy.

Table 2 below outlines the specific circumstances and financial urgency facing each participant at the start of the study. It details the underlying reasons for their energy crisis, the approximate amount of their past-due balance, and the remaining time until potential electricity service disconnection.

Table 2. Diary study participant arrears context

Participant	Energy crisis context	Electric utility arrears “past due” balance	Days until electricity shutoff at start of study	Shutoff mitigation strategy implemented by end of study
A	Undergoing chemotherapy; requires travel for treatment and a leave of absence from work	\$274	1 day	Called a Customer Service Representative (CSR) to pay off past due balance and set up digital payments
B	Inherited and moved into a property already in arrears, with infrastructure damage	\$12,873	10 days	Made an appointment with their local Community Action Agency (CAA), which provides protected status to their utility account
C	Long-term energy assistance plan expired, which reactivated a past due utility bill balance unexpectedly	\$472	Less than 7 days	Called a Customer Service Representative (CSR) to explain their high bill and get on a transitional monthly plan – until they can re-apply for the energy assistance program again
D	Fixed income is insufficient for rising electricity rates	\$1,014	Less than 7 days	Called a Customer Service Representative (CSR) to negotiate a \$10/month “budget bill” electricity rate plan

All four participants relied primarily on Android smartphones for internet access and bill management. Desktop or laptop device access was limited or unavailable in several cases, which shaped how participants interacted with their electric utility portals and assistance program applications.

Data Collection and Analysis

Participants were double-screened before participating. This means that they completed: 1) a short online application screener form to apply to participate in the study via third-party research platform, Respondent.io, and 2) they completed a 15 minute compensated intro video call to confirm that they were comfortable participating in the scope of the study. During this

process, the researcher confirmed the participant information provided in Tables 1 and 2, and saw the participant's actual shutoff notice to ensure participants fit the study's target cohort.

Once participants chose to join the study, they completed an introductory one-on-one (1:1) interview, followed by 18 structured asynchronous tasks over five consecutive days. Tasks were designed to document behavioral, environmental, and emotional dimensions of the shutoff experience. Activities included:

- Video walkthroughs of housing conditions and appliances
- Screen recordings of bill review and payment attempts
- Documentation of assistance enrollment efforts
- Budget visualization exercises
- Daily video reflections on stress, decision-making, and tradeoffs

This structure enabled observation of both stated intentions and actual behaviors, including how participants navigated digital systems in real time. No personal identifying information (PII) was referenced or stored. After completing their diary study tasks, participants completed a final wrap-up 1:1 interview.

Participants received \$280 in total compensation, distributed across five installments tied to task completion and interviews. This staged structure supported full participation across the study. It is worth noting that the total compensation was not applied to completely pay off any participant's past due arrears balance. Expanding upon the arrears context shown in Table 2, Participant A paid off their balance within the first day of the study, before full incentives were distributed. Participants B, C, and D had past due balances ranging from 1.6x to 45x the total compensation amount. Their shutoff mitigation strategies were focused on long-term solutions. They relied upon setting up new electricity payment plans and protecting their utility account status through local agency (CAA) support.

All interviews and video submissions were transcribed using NotebookLM. Photo uploads and screen recordings were processed using Indeemo's Optical Character Recognition (OCR) to extract on-screen content as plain text. The data analysis process proceeded in three stages:

1. Individual participant review: Each participant's interviews and diary task submissions were reviewed chronologically to identify decision points, barriers, and workarounds within the specific context of their electricity shutoff mitigation journey. Individual participant verbal reflections were cross-checked against observed behaviors in uploaded screen recordings and images.
2. Cross-participant comparison: Once each participant's individual data was reviewed, their inputs and experiences were compared across all 4 participants to identify recurring patterns. Recurring patterns were manually identified and treated as emerging themes.
3. Theme refinement: Emerging themes were refined to ensure that they were supported by multiple data points rather than single anecdotes. Themes translated directly into the Findings section of this paper.

Findings

Finding 1: Households Struggle to Detect and Respond to Utility Shutoff Signals

Growing evidence links energy insecurity with elevated anxiety and stress. Research suggests that households under threat of electricity shutoff experience heightened cognitive load that can interfere with information comprehension and prioritization (Cello, Laird, and Hernández 2025). Participants' experiences with utility disconnection notices in this study reveal confusing utility communications, cognitive overload, and reactive behavioral adaptation.

Disconnection notices are often delivered in unmarked white envelopes, visually indistinguishable from marketing mail. Participant B described mistaking a final disconnect notice for spam: *"It is so easy to overlook as spam or trash... sending a final disconnect notice in an unmarked white envelope... is not very efficient."* They further explained that the utility also sends marketing for *"LED lights"* in identical packaging, identifying that there is no visual distinction. In households managing multiple stressors, this subtlety prevents critical communications from grabbing attention.

Even when opened, utility communications can obscure the logic behind charges. Participant C recalled a sudden \$472 past-due balance: *"I was really confused where the lump sum past due was coming from..."* The energy bill displayed the math (the "Total Past Due" value) but hid the logic behind it. It turned out that this surprise bill was *"zombie debt"* rolling over from an expired energy assistance plan, a carry-over past due balance from a year and a half ago. There was zero preparation for unpausing or truing-up their full past due balance, forcing them to call a utility Customer Service Representative (CSR) to decode the energy bill verbally.

Opaque design combined with the cognitive load of daily life leaves households unprepared until the threat of shutoff becomes imminent. Receipt of a notice triggers a quick shift from routine budgeting to strict resource management, referred to by prior research as "vigilant conservation" (Simes, Rahman, and Hernández 2023). Participant C reported buying *"not a single item"* outside of necessities, utilizing Electronic Benefits Transfer (EBT) and retailer rewards mobile apps to offset costs. Participant B shifted their consumption entirely to *"Dollar General and Family Dollar,"* noting, *"Bills are not optional... so I can only make changes to other things."* Participant D implemented a strict *"frivolous spending"* ban, providing the example of window-shopping for furniture while continuing to pay their existing Rent-A-Center furniture bills. Others approached the pivot operationally: Participant A paid off their entire past-due balance and switched from paper to digital payments. They also invested in *"draft-blocking rugs"* as an energy efficiency measure. However, this choice in and of itself reflects a misalignment between perceived and actual energy efficiency. Participant A's investment in temporary, low-impact weatherization measures like rugs offers limited and uncertain savings compared to durable, building-level improvements (e.g., air sealing, weatherstripping, or insulation) that would more effectively reduce their energy burden.

The mechanics of disconnection – *how* and *when* the lights actually go out – remain a mystery, forcing households to rely on guesswork. Participant B fixated on the 5 PM disconnection deadline mentioned in their notice but admitted, *"I don't know if they come to the residence... or if a switch is flipped electronically."* This stress manifested in hypervigilance: watching for utility trucks to appear outside their front window. Conversely, Participants C and D interpreted the disconnection date not as an actual power shutoff deadline, but as a negotiation deadline. Participant C viewed the notice as a signal to *"attempt to set up a payment plan"* or *"ask for an extension,"* making an assumption that the utility would pause disconnection execution during that conversation. Similarly, Participant D expressed a confident assumption that the utility *"will not take that step"* to shut off their power, as long as they had spoken to a utility Customer Service Representative about mitigation options.

Overall, household responses to disconnection notices are shaped by the transparency of utility communications. Difficult-to-distinguish shutoff notices, surprise high bills, and unclear disconnection operational mechanics combine to create a heightened stress environment. That stress can lead to missed shutoff notices, reactive resource management, and increased reliance on utility Customer Service Representatives to create mitigation strategies.

Finding 2: Manually Paying Bills Is A Deliberate Financial Strategy

All four participants showed deliberate, manual bill payment behaviors, such as logging into web portals, entering card numbers by hand, or calling automated customer support lines. This is not a lack of digital literacy; it is an intentional strategy to manage financial liquidity and mitigate identity theft risk.

For income-qualified households, autopay can be a liability rather than a convenience. Autopay removes a critical checkpoint: the ability to verify funds before releasing a payment. Participant B avoids autopay because their spouse's income fluctuates, explaining, *"the money might not always be there,"* and an ill-timed withdrawal could trigger overdraft fees. Participant C uses bill notifications merely as reminders, setting separate phone alerts to pay only when their funds are confirmed to be available. Participant D provided the most granular example: even on a \$10/month budget billing plan, they opted out of autopay because they *"knew there wasn't going to be \$10 there"* at the scheduled date. Instead, they manually paid online, which incurred an additional small transaction fee. This transaction fee was lower than a late payment fee, making the manual process worth it to maintain control over timing. Even a moderate-income household, Participant A, avoids autopay, primarily due to trust concerns. Following a prior data breach that froze their assets, they prefer manual digital payments and take a screenshot as proof, which they referred to as a *"receipt ritual."*

Beyond this study, low- and moderate-income customers often prefer manual payment methods or human interactions over autopay due to budgeting needs and trust concerns. In fact, only 29% of US households earning under \$25,000 annually use autopay for their energy bills, compared with 40% of higher-income households, highlighting that manual payment can be a deliberate strategy (Sorensen 2023).

Typically, companies across industries promote autopay by highlighting the benefit of convenience. However, a convenience-focused message may actually alienate these households, as it could conflict with their need for verification of available funds and confirming payments have been processed. Autopay promotional messaging today is likely speaking to higher income households, further perpetuating payment channel differences by household income level.

Finding 3: CSRs Fill Gaps Left By Upstream Communication Failures

Customer Service Representatives (CSRs) remain the primary mechanism for preventing electricity disconnection. While digital and paper channels often deliver the problem – via confusing energy bills or shutoff notices – human CSRs deliver the solution. From a customer experience perspective, CSRs bridge rigid software systems and the complexities of real customers' lives.

Participant D's bill and disconnection notice did not explain arrear arrangement possibilities. The CSR they spoke with broke the payment plan into manageable steps, negotiated a \$10/month budget billing plan, and clarified the consequences of missed payments. Similarly,

Participant C only acted after a CSR explained the expenses behind a \$472 surprise bill and provided a transitional payment plan while they re-applied for state energy assistance. Participant B described CSRs as *"sympathetic"* and resourceful, connecting them to external support systems like the 211 hotline. In this way, CSRs function as financial crisis negotiators. However, this reliance can create a false signal: high satisfaction scores for utility CSRs assisting these customers may mask the underlying failure of upstream utility communications. The utility depends on its most expensive operational channel (human agents) to maintain trust in these high-stress energy customer scenarios. In turn, this risks unintentionally delaying meaningful design improvements to customer communications, energy bills, and payment assistance program workflows.

Finding 4: Households Build Smartphone-Centered Safety Nets Outside Formal Assistance

While utility Customer Service Representatives (CSRs) connect households to formal assistance programs such as the Low-Income Heating Energy Assistance Program (LIHEAP), Community Action Agencies (CAAs), and 211 hotlines, participants simultaneously rely on self-created digital safety nets. These safety nets are centered on smartphones and consist of gig work platforms (e.g. Doordash, Uber/Lyft), financial technology applications (e.g. Chime, Freecash), survey sites, online retailers, and content creation platforms. Participants consistently described these tools as faster, more accessible, and often more dignified than traditional assistance programs.

Barriers to formal assistance frequently intersected with transportation, health, and technology. Participant D missed a utility assistance event because they lacked transportation. Participant B avoided in-person events due to social anxiety and public transportation access challenges. These intersections between energy insecurity, transportation, and health are well documented, with increased rates of anxiety and depression commonly observed among energy-insecure households (Cello, Laird, and Hernández 2025). Frustrated by the continued reliance on physical appointments to receive energy assistance, Participant B remarked, *"I don't really know why it has to be in person... you can email documents; you can even fax documents."* Even non-in person workflows pose challenges today. Participant C described applying for state-administered energy assistance as a *"lottery,"* where success depended on calling at exactly 7 a.m. to secure one of a limited number of appointments. Delays could extend as long as six months, requiring households to manage crises independently.

In response to these barriers, participants turned to digital platforms that offered greater flexibility and fewer administrative hurdles. Participant C noted that their eligibility for Amazon Prime Access and Walmart+ Assist discounts were almost instantly verified by uploading a photo of their Electronic Benefits Transfer (EBT) card. In this case, their EBT card was used as a proxy for income verification. These platforms reason that customers already went through a similar process to receive their government benefits. By comparison, utility and state energy assistance programs often still require extensive, repetitive income documentation. Participant B had previously been denied state and utility assistance because their spouse could not provide formal pay stubs, due to the nature of their employment. Unable to satisfy income verification requirements, Participant B relied on gig applications and survey platforms to generate enough supplemental income to pay overdue utility bills. These experiences suggest that rigid administrative processes and documentation requirements push households toward both alternative forms of income generation and commercial retailer benefits systems.

Smartphones serve as the infrastructure that makes these self-created safety nets possible. Participant A described their device as *"five things in one... a video game... a computer... I pretty much run businesses with the phone."* Participants used applications such as Freecash, DoorDash, mobile games, and survey platforms to supplement household income, sometimes teaching these practices to their children. Participant D operated an AI-generated content YouTube business entirely from a smartphone. For these households, smartphones function not merely as communication devices but as essential tools for income generation, banking, and financial management. This dependence on mobile technology is especially significant given that 27 percent of adults in households earning less than \$30,000 annually are smartphone-only internet users, meaning they do not have broadband internet access at home (Vogels 2021). Yet utility assistance systems frequently assume access to desktop computers and broadband connections. Participant C abandoned a state energy assistance application because the web portal was not mobile-friendly, adding stress and delaying access to urgently needed support.

Together, these findings reveal a growing mismatch between households' mobile-first financial lives and assistance program design. As vulnerable households increasingly construct smartphone-enabled digital safety nets to manage their finances, formal assistance systems remain constrained by in-person requirements, rigid income documentation processes, and desktop-oriented interfaces. Rather than replacing formal assistance pathways, these digital safety nets compensate for its shortcomings. This highlights the need for utility assistance programs to better align with the realities of contemporary income-qualified households.

Finding 5: Housing Infrastructure Can Limit The Impact Of Behavioral Programs

Physical housing conditions often dictate energy consumption more than behavior. Household workarounds for broken or missing appliances may actually increase overall electricity use. Participant C lacks a functioning stove because their landlord claims they *"don't really need one,"* forcing them to cook family meals primarily in an air fryer. However, their home's degraded wiring means running both the microwave and air fryer simultaneously, *"blows the whole fuse."* This limitation dictates the household's energy schedule by breaker capacity, rather than by a utility time-varying rate plan. Participant B, also lacking a functioning stove, uses plug-in hot plates. They also close off uninhabitable rooms with structural damage, creating expensive heating and cooling energy leaks through these unused spaces. These energy leaks due to structural damage raise their energy bill costs, further exacerbating the arrears cycle.

In these examples, the foundational structural issues and appliance replacements need to be addressed in order to lower energy costs long-term. Energy payment assistance and behavioral energy efficiency programs in isolation cannot overcome structural housing barriers. Previous research confirms that physical housing conditions strongly constrain energy behavior, highlighting that structural interventions are necessary in addition to behavioral and assistance programs (Hernández 2016). Direct interventions, such as appliance replacement and wiring upgrades, are necessary to reduce energy burden ongoing. These interventions should not be viewed in isolation from payment assistance programs, but rather viewed as two parts of the same utility solution set.

Finding 6: Research Participation As Positive Intervention

Customer research is designed to be a neutral act of observation and listening. Surprisingly, this study triggered what is known as the Hawthorne Effect: when people know they are being observed, their behavior tends to change. In this context, participation in the study appeared to prompt participants to take actions that they might otherwise have delayed.

At the outset of the study, Participant C felt overwhelmed by their *"zombie debt"* reappearing on their electric bill and the prospect of having to re-apply to their original state energy assistance plan. They credited the daily log they completed for this study as the *"forcing function"* that broke their avoidance loop regarding re-applying for longer-term state energy assistance: *"This is keeping things more at the front of my attention to take action, and I've been working on that application online!"*

Participant B also started the study in a state of avoidance, viewing their debt as an inevitable *"revolving door"* that they didn't feel much agency to affect. The study included a task where participants were asked to draw "where their money goes." This open-ended budget visualization task helped them to confront the reality of their finances: *"When I made a circle chart it made it even more apparent... how much of our income goes towards energy bills."* Soon after, Participant B made an appointment with the local Community Action Agency (CAA) to request formal utility account protection to guard against electricity service shutoff.

Participant A was in a different position: they entered the study with confidence but realized during the study that they relied on *"stone age"* payment habits (e.g. mailing checks to their utility). They concluded that their choice of payment method directly caused them to receive a shutoff notice when their payments were delayed in the mail. The reflection tasks in the study prompted them to audit their own logic, leading to a permanent behavior change: *"We decided to stop using checks... using digital means now"* to ensure the *"receipt ritual"* of immediate payment confirmation.

Participant D also made a meaningful change by the end of the study. They described their participation as *"the most funnest project I ever did,"* noting it, *"opened my mind."* Their reflections on energy during the study inspired them to teach their child about their new \$10 a month electricity budget rate plan, so that they could be successful on it together.

On rare occasions throughout the week, participants would call or direct message the researcher directly to share valuable contextual information pertaining to their tasks. This unexpected behavior indicated high emotional safety. It also offered participants flexibility and a sense of being heard in the moment. These unprompted quotes and behaviors suggest that for vulnerable energy customers, research participation provides an additional valuable support opportunity – in addition to direct financial incentive compensation.

Taken together, these observations suggest that structured engagements – whether through reflection tasks, visualization exercises, or supportive human contact – may function as low-cost behavioral nudges for energy-insecure households who may otherwise feel stuck in cycles that they would prefer to change.

Design Implications and Recommendations

A) Increase Visual Salience for Crisis Communications

Participants frequently missed or delayed opening disconnection notices because the envelopes looked visually similar to routine marketing mail. Utilities should discontinue the use of standard white envelopes for disconnection notices and adopt a crisis color standard (e.g.,

yellow or red envelopes) and/or explicit exterior badging such as “URGENT: ACCOUNT STATUS.” These cues should cascade consistently across digital channels (e.g. SMS, email, utility app notifications, bills, etc.). This approach leverages established color-theory heuristics to break through customers’ perceived “spam filters,” increasing notice open rates. By extension, we hypothesize that increasing notice engagement will also correlate with increased access or applications to assistance programs. It is critical that these visual adjustments be intentionally designed and tested with customers first before launching to ensure that they do not fall into the trap of appearing too much like predatory mass marketing scam communications.

B) Introduce Narrative Billing

Sudden balance changes (e.g., deferred payment rollovers) were a primary driver of confusion, mistrust, and delayed action. Bills must move beyond accounting summaries and adopt storytelling for financial events. When a balance changes materially, the bill should include an inline explanation (e.g., “*This \$472 total reflects the deferred balance from your payment plan that ended on [date].*”). When deferred balances are expected to reactivate, utilities should deploy preparatory communications, similar to “true-up” messaging used in budget billing or solar programs. Any bill with a past-due balance should include a clear, singular call-to-action for digital energy assistance or payment options. These upstream improvements will increase customer trust and create downstream operational efficiencies by reducing CSR call volume and escalations.

C) Enable Mobile Access And Modern Income Verification

Customers with variable, multi-source incomes – ranging from part-time or full-time jobs, gig work, mobile gaming, research participation, or cash payments – face significant friction when income documentation is required for assistance. One reason for this is that the application process is often designed to be desktop-focused. This is a mismatch for these customers’ reliance on smartphones as their household financial hub.

To streamline access to assistance programs, utilities should adopt mobile-first design standards. These standards would ensure that customer communications, payment workflows, and assistance applications are fully accessible on older smartphones over standard network connections, with proper visual rendering and interaction patterns for mobile device-sized screens. This will reduce structural barriers that desktop-centric systems create.

Simultaneously, utilities should explore using secure API-based income verification proxies via third-party partners in their payment assistance program applications. In this model, the third-party verifies the customer’s government program enrollment identification with government data systems in real-time (e.g. enrollments in Supplemental Nutrition Assistance Program, Electronic Benefits Transfer, etc.). Instead of providing a literal paper trail, the customer only has to provide an EBT card photo upload, for example. Commercial programs like Walmart+ Assist, Amazon Prime Access, and Comcast Internet Essentials are all examples in this growing innovation space. Given the prominence and scale of these commercial programs, this is rapidly becoming the market standard for assistance program digital income verification. This type of solution also reduces the number of required steps for the end customers to receive assistance. By combining mobile-first design with integrated verification, utilities can prevent

exclusion of customers from receiving energy assistance and make workflows functionally accessible for the households that need them most.

D) Treat Auto-Pay As A Value-Add, Not A Requirement

Income-qualified customers avoid auto-pay due to legitimate risk concerns, not lack of financial literacy. Manually paying their energy bills is a highly intentional financial strategy. While rarely seen outside of the Texas energy retailer market, utilities should avoid requiring auto-pay for rate or program enrollment. For customers with variable income, the value proposition of auto-pay is not about convenience. The value proposition is avoiding late fees and avoiding disconnection. It is also key to reinforce messages that increase trust and lower perceived risk with autopay. For example, customers can review charges before they process, so that they can ensure funds are there. If funds aren't there, customers could easily pause auto-pay, pay their bill manually, and then turn autopay back on later as needed – all without financial penalty. Every time an autopay payment processes, ensure that customers reliably receive digital receipts of payment to build trust and confidence in the process.

E) Pair Post-Crisis Outreach With Structural Interventions

Once an acute shutoff crisis has passed, utilities should proactively offer direct-install and infrastructure interventions to customers (e.g. wiring upgrades, appliance replacement, weatherization). For example, a direct marketing list could be generated from customers who have enrolled in payment assistance programs within the past couple of months. These direct interventions will reduce energy costs and household stress ongoing. Over time, this may reduce the likelihood of customers falling behind on bills and receiving disconnections notices. From the utility perspective, this may reduce their overall arrears. Pathways to direct interventions and behavioral energy efficiency programs should be embedded within utility payment assistance program customer journeys and communications for maximum effectiveness.

Conclusion

This study shows that households facing electricity disconnection are not passive or disengaged. They are highly resourceful and actively working to avoid losing electricity service, often while managing medical challenges, unstable income, or inadequate housing conditions. When utility systems are difficult to understand or use, households do not stop trying; they turn to other tools. Participants relied on smartphones, mobile apps, commercial retail programs, and gig work platforms to stabilize finances while applying for assistance. These tools often provided faster and more flexible support than formal utility systems.

The findings also suggest that many problems often attributed to customer behavior are, in fact, problems of system design. Difficult-to-distinguish shutoff notices, confusing bills, and cumbersome digital experiences push customers toward relying on phone-based Customer Service conversations. Importantly, participation in the study itself appeared to help participants take action. Structured reflection activities encouraged participants to review bills, reassess spending, update payment methods, pursue payment plans, and apply for longer-term energy assistance.

A shutoff notice does not have to represent the end of a utility customer relationship. These findings suggest that energy insecurity is not solely a matter of financial hardship, but also an intersecting challenge of communication, access, and system design. By making notices clearer, assistance easier to access, and digital experiences more aligned with customers' mobile-first financial lives, utilities can reduce disconnection risk and support customers in regaining stability sooner.

Limitations

This exploratory study involved four participants and is qualitative in nature. The findings are intended as grounded insights into household experiences rather than statistically representative estimates. Although consistent themes emerged across participants with different incomes and circumstances, additional research with larger and more diverse samples would strengthen external validity. The study was conducted during Q4 2024 in the Midwest and Northeast United States, during the winter heating season. Experiences may differ in other regions, climates, or seasons, particularly where cooling costs create different forms of energy insecurity.

Participant behavior may also have been influenced by the research process itself. Several participants reported that completing daily reflections and budget exercises helped them focus on overdue energy bills and take action. This suggests the presence of a Hawthorne effect, whereby observation and self-monitoring influence behavior. While this effect limits the ability to observe entirely natural responses, it also highlights the potential value of structured reflection and customer engagement as low-cost interventions worthy of future study.

Finally, because this research relied on mobile ethnography and self-reported experiences, some behaviors and contextual factors may not have been fully captured. However, the combination of triangulating individual's diary entries, screen recordings, photos, and one-on-one interviews provided multiple sources of evidence that increased confidence in the findings identified.

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