

Market Transformation for Affordability: Theory and Practice

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ABSTRACT

This paper argues that market transformation initiatives have historically failed to serve the nearly one-half of American households with little to no discretionary income. This persistent “affordability gap” in the theory and practice of market transformation is caused by the near-total exclusion of diffusion-focused activities from market transformation funding, and the narrow focus of most innovation-development initiatives on improving energy performance, to the exclusion of reducing first cost. The paper makes the case that two approaches to market transformation, reducing first cost and improving minimum performance standards, are the only initiative types that are guaranteed to benefit resource-constrained households and to do so in a predictable time frame, and argues these approaches are synergistic: making efficient products affordable at the lowest price points serves resource-constrained buyers in the present and strengthens the economic justification for higher minimum performance standards in the future.

The paper then presents the Shift Consortium, an eight-year alignment of efficiency program funders, as a case study in affordability-centered market transformation. The Consortium's experience encompasses targeted point-of-sale incentive programs, thirteen consumer and technical research studies, and, most recently, a new direction: working directly with manufacturers to bring a low-cost, high-efficiency clothes washer to market. The paper concludes with guidance for organizations seeking to adopt affordability-centered market transformation, including suggestions for measure- and portfolio-level affordability assessments, and identifies two challenges that must be addressed for this approach to succeed: the need for national collaboration and the adjustment of cost-effectiveness frameworks to account for the value of serving resource-constrained buyers.

Introduction

This paper introduces an approach to scaling up service delivery to resource-constrained households that leverages the most effective strategy yet developed by energy efficiency funders: market transformation. Part I explores the U.S.'s widening economic divide and the constrained budgets of a near-majority of American households and argues this is critical context for the discussion of affordability and energy efficiency. It examines the relationship between income and purchase price and describes the large market segment of “opening price point (OPP) buyers,” households that shop for lowest-cost products. The paper then introduces the concept of the “affordability gap” in market transformation, explains its two related causes, and shows how it has resulted in the failure of most market transformation initiatives to serve OPP buyers.

Part II presents affordability-centered market transformation and the work of the Shift Consortium, an alignment of efficiency program funders, as a case study in the generative effects

of market transformation that centers affordability. It shows how a focus on affordability has informed the Consortium's research and implementation design and led it to evolve its theory of change and activities, from its first rebate program in 2018 to its launch, in 2026, of a new product specification that marries efficiency and affordability, new partnerships with manufacturers to bring qualifying products to market, and a new efficiency award program with a focus on price point that complements the ENERGY STAR® Partner Award.

Part III explores lessons learned in the attempt to implement affordability-centered market transformation and suggests how organizations can take steps in this direction by conducting affordability-focused market assessments as well as measure-level, and potentially portfolio-level, affordability assessments. It also discusses two key challenges the Shift Consortium has faced that must be addressed in order for affordability-centered market transformation to succeed: the importance of national collaboration and the need for cost-effectiveness calculations that account for the costs of meeting the affordability challenge.

I. The Case for Affordability as an Organizing Theory for Market Transformation

The dramatic growth of wealth inequality in the U.S. over the past 50 years is well-documented and widely discussed in academic and popular literature. As of 2025, the poorest 40% of Americans included approximately 54 million households whose reported household incomes were below \$65,000 (Census Bureau 2025a). As a group, they received just over 11% of total income, while the wealthiest 20% received nearly 53% of total income (Congressional Research Service 2021).

Less discussed is the cost of living for households with below-median income. Housing, transportation, food, insurance, and healthcare are Americans' top expenses and they account for nearly 84% of a household's annual budget. The average U.S. household in the second income quintile spends about \$50,000 per year or \$4,200 per month: \$1,400 on housing (33% of monthly expenditures, including utilities), \$700 on transportation (17%), \$540 each on food and insurance (12.9% and 12.5% respectively), and \$330 on healthcare (7.9%) – leaving less than \$700 per month for all other expenses: clothing, entertainment, childcare, education, debt repayment, and emergencies (Bureau of Labor Statistics 2025).

The statistics on average expenditures, however, obscure a reality faced by the approximately 47% of households in the bottom 40% of earners who are renters (Census Bureau 2025b). Their ability to afford housing has been steadily declining. Since 2001, the cost of rent has increased nearly 27%, while renters' incomes have grown only 8%. So while the average U.S. household may spend 33% of their income on housing, as of 2023 one-quarter of all renters (12.1 million households) paid more than half of their income for rent (Center on Budget and Policy Priorities 2025).

The effect of higher housing costs on the budget of a household spending \$50,000 per year is stark. All of the household's remaining income will be needed to cover the major expenses (transportation, food, insurance, healthcare), leaving nothing at all for anything else. So while households with average costs for major expenses like housing or healthcare will be able to spend approximately \$400 to \$800 per month on discretionary categories like "entertainment" and "apparel," those with higher rents or healthcare costs, for example, may have discretionary budgets near zero.

It is not just lower-income Americans who are living precarious financial lives. Nearly 70% of U.S. households say they live paycheck-to-paycheck (PYMNTS 2025). These data explain the explosive growth in the use of buy-now-pay-later financing, the high rate of credit card debt, and the low rate of saving (PartnerCentric 2025, FINRA 2025). In a 2026 survey, 53% of households said they did not have enough savings to pay a \$1,000 emergency expense and 29% said they had more credit card debt than emergency savings (Bankrate 2026).

This context is critical to understanding the enormous potential benefit to the poorest Americans of programs that lower utility costs. Through a variety of methods including rate reductions, bill subsidies, and no-cost efficiency improvements, these programs can markedly improve the financial stability of lower-income households. For example, reducing the energy burden of the highest-burdened lower-income households, who spend more than 15% of their income on energy, to parity with the national median of 3%, would *nearly double* the amount of a household's monthly income available for discretionary spending (ACEEE 2024). This would give average households in the bottom 40% of earners an additional \$350 to \$500 per month to spend not just on entertainment and apparel but also on education, debt repayment, and emergencies.

The typical monthly budget of a below-median income household is critical context to another type of energy program as well: energy efficiency market transformation initiatives that fund the development, testing, promotion and adoption of efficient technologies. The next sections of this paper discuss the approaches these programs have historically taken and why they have often been a poor match for the purchasing power of nearly half of American households.

An Introduction to Opening Price Point (OPP) Buyers

The extraordinarily tight household budget of at least 40%, and perhaps as many as 70%, of American households drives the sales distribution, by price point, of an enormous variety of goods. Across product categories as diverse as grocery items, vehicles, and clothing, items selling at the lowest or “opening” price points account for a disproportionately high volume of sales. Private label grocery items (like Walmart's Great Value brand) are typically lower-priced than competitors and had a 21% market share in 2024 (Statista 2025a); Dollar stores are the fastest growing segment in American retail and the fastest growing food retailers, by share of household expenditures (Statista 2025b, AJPH 2023). Used vehicles outsell new vehicles two-to-one (Consumer Affairs 2024).

This distribution is well-known to appliance manufacturers and retailers, who have another name for the bottom rungs of the price ladder: the “volume” price points. In nearly every home improvement and electronics store, the cheapest washers and refrigerators are the best-sellers and the cheapest five models together typically make up about one-quarter of all sales in the category (Shift Consortium 2025a). The distribution of appliance sales by price point is, in fact, nearly the inverse of the wealth distribution, with the majority of sales concentrated in the lower half of the distribution.

This paper refers to the group of households who purchase at the lowest price points as OPP buyers because that is a characteristic they have in common and the way in which efficiency programs can identify and reach them. But the price at which they are shopping is not the only thing OPP buyers have in common. As a group, they share several demographic characteristics that make them qualitatively and quantitatively different from buyers who shop at higher price points.

Unsurprisingly, OPP buyers have lower incomes than buyers who shop at higher price points. They have lower median incomes (\$68,500 vs. \$99,000), are two to three times more likely to have incomes under \$50,000, and are less likely to have incomes over \$100,000 (36% vs. 52%) (Shift Consortium 2025b and 2020). In addition to income, there are three notable demographic characteristics that differentiate OPP buyers from higher price point buyers. OPP buyers are twice as likely to be renters (30% vs. 14%), less likely to live in a single-family home (66% vs. 79%), and less likely to have a college degree (69% vs. 78%). (Shift Consortium 2025b).

Three characteristics of OPP buyers' appliances purchases also differentiate them from buyers who shop at higher price points: they are more likely to buy used appliances (29% vs. 0%), nearly all are purchasing out of necessity or "under duress" (vs. one-third of higher price point buyers), and they are more likely to buy from an independent retailer (26% vs. 18%) or online-only retailer (8% vs. 1%) and less likely to buy from one of the three major home improvement or electronics retailers: Best Buy, Lowe's, or The Home Depot (50% vs. 65%) (Shift Consortium 2025b).

In sum, the data show that OPP buyers choose the lowest-cost products across a variety of goods and make big-ticket purchases, like appliances, only in emergencies. When faced with a large, unexpected expense, OPP buyers spend as little as possible by buying used, shopping at a lower-cost independent retailer, or choosing from among the cheapest options at a big box store – more often than not sacrificing efficiency to lower their first cost.

Two Types of Market Transformation for Affordability

Households whose purchasing options are limited to the lowest-priced products will immediately and substantively benefit from two types of market transformation initiatives: those that raise minimum performance standards and those that make efficient products available at a price comparable to the lowest-cost alternatives.

Market transformation initiatives that succeed in increasing minimum performance standards are the single most effective strategy to benefit OPP buyers. Codes and standards improvements predominantly aid OPP buyers, as opposed to higher price-point buyers, and do so comprehensively and within a predictable and relatively short timeframe (since 1990, the typical lead time between the completion of DOE's appliance standards-setting processes and the new effective date has been three to five years). Because lowest-cost technologies rarely achieve efficiency levels above the statutory minimum, in contrast to mid- and high-priced products which often (or always) perform more efficiently than required, most of the value of higher minimum performance standards flows to buyers of the lowest-priced products, whose efficiency is more likely to be improved as a result of new performance standards.

The other market transformation approach that benefits OPP buyers are initiatives that reduce the purchase price of efficient technologies to a level comparable to the lowest-cost alternatives. This may be accomplished by any number of strategies, including research and development focused on bringing lower-cost options to market (for example: by making products smaller, plug-in rather than wired, self-install, or paring down features) or subsidies applied at any level of the supply chain, including those paid directly to the buyer. These activities create new choices for OPP customers in the short term and, at scale and over a longer time horizon, can be expected to increase demand and produce economies of scale which result in a permanent decrease in manufacturing cost and purchase price.

An examination of the historical data on the impacts of market transformation initiatives on the efficiency of the lowest-priced products shows that their buyers – predominantly resource-

constrained households, do not benefit from initiatives that bring super-efficient technologies to market *unless* those initiatives include provisions to ensure the products arrive at an affordable price point. The assumption that efficiency “trickles down” from premium-priced, innovative products to OPP models holds true only sometimes and, when efficiency does make the descent from high- to low-priced models, it typically takes 15 to 30 years. LED bulbs are an example of the extended “trickle-down” timeline: the first LED bulbs were introduced in 2002 at \$80-100 per bulb and did not achieve competitive pricing until the late 2010s, nearly 15 years after their introduction (PWM 2022). Market saturation and true OPP pricing was not achieved until the early 2020s. Even refrigerators, frequently touted as an efficiency success story have, since 2000, seen a lag of 10-15 years between the introduction of market-leading efficient models and the incorporation of those performance levels into Federal standards. The front-load washer case study below provides an example of an innovative technology that has failed to descend to the opening price point, even after more than 30 years in the U.S. market.

LED TVs are perhaps the only exception to this trend. They declined rapidly in price from their introduction in 2008 as a premium-priced product to become the dominant technology across all price tiers within five years. This change occurred because of two unusual factors and despite a lack of minimum performance standards: LED backlighting provided substantial benefits (thinner profile, better picture quality, lower weight) and an oversupply of LEDs in the early 2010s that caused prices to decline rapidly (Buildings 2009, Electronics360 2013).

The symbiotic relationship between minimum performance standards and the cost of opening price point efficient products. Market transformation programs that seek to lower the cost of opening price point efficient products produce two types of benefits: they create new choices for OPP buyers in the present (by increasing the number of efficient products they can afford) and they lay the groundwork for a successful standards-setting process in the future. In fact, it is the authors’ hypothesis that these two approaches, working closely together, have the potential to dramatically accelerate performance improvement to maximum technical feasibility.

By definition, minimum performance standards make efficient products available at the lowest price points by setting the performance floor for all products. But influence flows in the other direction as well: the cost of the lowest-priced products plays a large role in determining whether and at what level new standards are set. In the U.S., minimum performance standards for most residential energy-using technologies are determined by the Federal government, which regulates 28 categories of products covering 90% of household energy use (U.S. DOE 2026a). Standards are supposed to be set at the maximum level that produces significant energy savings and is “technically feasible and economically justified” (U.S. DOE 2026b). All three of these criteria (energy savings, technical feasibility, economic justification) must be met in order for a new standard to move forward.

The approach to determining a standard’s economic justifiability requires DOE to consider seven different factors, including the economic impact on consumers as measured by the effect of the standard on a product’s lifecycle cost (its first cost plus operating expenses) and payback period (how long it takes for the operational savings resulting from the standard to equal the product’s added cost). Contention over a proposed standard’s economic justification is a feature of nearly all standards-making processes. Industry commenters like the Association of Home Appliance Manufacturers (AHAM), the Air-conditioning, Heating and Refrigeration Institute (AHRI), the Gas Technology Institute, as well as individual manufacturers routinely use the likelihood of higher prices to argue against new standards.

Despite research showing DOE routinely overestimates the price impact of new standards – one analysis showed their projections were overstated by a factor of ten – expectation of higher prices has at times prevented new standards from being adopted and, more frequently, caused DOE to “walk down” a standard to set it below the maximum technically feasible level, as occurred in DOE’s 2012 clothes washer rulemaking (ACEEE 2013, Alliance to Save Energy 2018, DOE 2012). Market transformation programs that successfully lower the cost of opening price point efficient technologies can thus play a critical role in advancing more stringent minimum performance standards.

The Market Transformation “Affordability Gap”

In order to hasten the path to max tech, it will be necessary to make efficient technologies available at the lowest price points. Accomplishing this will require closing the persistent affordability gap in energy efficiency market transformation that has existed from the practice’s origin in the late 1990s until today. This paper uses the term “affordability gap” to describe the condition in the energy efficiency industry in which very few market transformation initiatives (other than codes and standards initiatives) seek to make efficient technologies more affordable as their primary outcome. The affordability gap arises from two different, independent causes: the near-total exclusion of diffusion activities from market transformation funding, and the narrow focus of most innovation development activities on improving energy performance to the exclusion of reducing first cost.

Energy efficiency market transformation has always included initiatives to bring innovative, super-efficient technologies to market and robust codes and standards efforts. In fact, so much of the work of market transformation organizations over the last twenty-five years has centered on the first and last stages of innovation adoption that these two areas of activity have come to define what the energy efficiency industry means by market transformation. The Northwest Energy Efficiency Alliance (NEEA) for example, in its online primer, “The Fundamentals of Market Transformation,” describes activities like addressing market barriers and accelerating adoption as the role of utilities and market forces, not NEEA (NEEA, undated).

However, the bookend activities of helping bring innovative technologies to market and locking in their savings in codes and standards are only two of four innovation adoption stages that market transformation initiatives can support. The others are speeding diffusion and increasing final saturation. There is nothing in the origin of energy efficiency market transformation theory that precludes activities at every stage of innovation adoption. To the contrary, one of the foundational theoretical treatises on the topic explained that market transformation activities could take any form, so long as they produced a change in the structure of the market that persisted after the intervention ceased: “Market transformation is not a label that uniquely identifies certain energy-efficiency program designs to the exclusion of others. It is instead an objective that all energy-efficiency programs have at least a theoretical potential to achieve to varying degrees” (Eto, Prahl, and Schlegel 1996).

The missing middle: market transformation to speed diffusion and increase final saturation. The Retail Products Platform (RPP) is a notable exception to the general finding that market transformation has typically focused on the first and last stages of innovation adoption rather than the middle two. However, the RPP initiative demonstrates that targeting the missing middle of the adoption curve is insufficient to improve affordability unless affordability is an explicit goal.

RPP is a collaboration among several program sponsors, facilitated by NEEA. The RPP strategy for speeding diffusion is to increase *availability*, not affordability, and the approach to influencing availability is the payment of per-unit incentives to retailers for each qualifying product sold. The RPP logic model posits the incentives will influence retailers' assortment and marketing decisions, leading to more qualifying products displayed in stores and increased promotion of those products. However, evaluations have been inconclusive as to whether this tactic has the desired outcomes (for example: ConEd 2021; NEEA 2023; PGE 2019). What is certain is that RPP did not improve *affordability* in the near term. Even though the total amount of incentives paid to retailers by the 16 program sponsors was substantial (approximately \$42 million between 2016 and 2020), most per-unit incentives were modest (most at \$10 or \$15, but a few at \$50 or \$100), and none were passed through to customers in the form of price reductions (NEEA 2023).

Front-load clothes washers are the perfect case study of an efficient technology that would benefit from affordability-centered market transformation aimed at increasing diffusion and final saturation. Front loaders are the most efficient clothes washer technology; the best performing front loaders use nearly half the energy of the best performing top loaders (50 kWh v 90 kWh annually), one-quarter the energy of a typical OPP top loader (200 kWh), and one-sixth that of the worst performing top loaders (300 kWh). Front loaders have been available in the U.S. since the late 1990s, when their market share grew from the low single-digits to 8% nationally in 2000, in part due to support from one of the earliest national market transformation efforts. Utilities and non-profits around the U.S. aligned on a technical specification, offered generous customer rebates and retail sales bonuses, and promoted the products in both traditional and new ways (deLaski and Pope 1996, NEEA 2001). This market transformation effort succeeded in bringing front-load clothes washers to America's early adopters, defined by Rogers (1962) as those who are among the first 13% to adopt a new technology, and continued programmatic efforts by utilities contributed to front-load washers "crossing the chasm" between early adopters and the early majority in the mid-2000s (Moore 1991).

But despite ongoing (although intermittent and uneven) utility rebate support, \$63 million of incentives paid through the national American Recovery and Reinvestment Act from 2009 to 2012, and near-total depiction of front-load washers (not top-load washers) in media of all types, the technology has never managed to cross a second chasm – between the early majority and the late majority, defined by Rogers as the last 50% of consumers to adopt a technology (U.S. DOE 2015). Market share of front-load washer sales peaked at 46% in 2022 and has been declining since (Figure 4). Today, front-load washers remain substantially more expensive than top-load washers. The manufacturer's standard retail price (MSRP) of an OPP front-load washer is \$899, compared to \$599 for the lowest-cost top-load washer. Taking into account frequent manufacturer discounts, a buyer must pay an additional \$150 to \$200, or about 25% more, for a front-load washer (The Home Depot 2026).

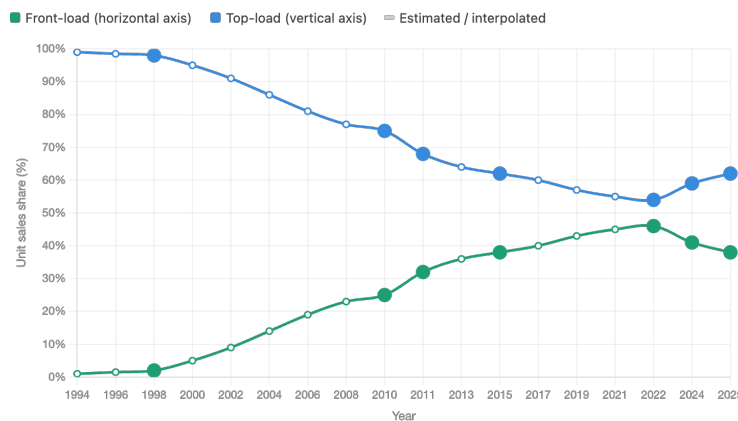


Figure 1. Market share of clothes washer sales comparing front-load and top-load configurations, 1994 to 2025. *Source:* Anthropic 2026.

Given the U.S.’s political and cultural prioritization of consumer choice, it seems unlikely Congress will ever consider legislation that would effectively phase out top-load washers in the way the Energy Independence and Security Act of 2007 (EISA) ended sales of incandescent bulbs. Thus, at around 40% market share, front-load clothes washers seem to have reached their final saturation, absent a market transformation initiative designed to further increase their adoption. The persistent price gap between front-load and top-load washers is the most likely explanation for this stagnation, and one the market has shown no inclination to close on its own.

Product innovation for affordability: a promising effort to close the affordability gap. Until very recently, nearly all market transformation initiatives aiming to bring innovative technologies to market focused on making those technologies more efficient, not more affordable. Organizations like NEEA, the New York State Energy Research and Development Authority (NYSERDA), the Institute for Market Transformation (IMT), and the Consortium for Energy Efficiency (CEE) ran initiatives that sought to support innovative, efficient technologies by developing performance specifications and test procedures, testing and modeling energy consumption, and training industry stakeholders and trade allies. The majority of energy efficiency market transformation efforts supporting the introduction of innovative technologies continue to operate this way, although there are notable exceptions, and these are promising areas for the future of affordability-centered market transformation.

Market transformation initiatives center affordability when they seek to steer the development of innovative, efficient technologies toward a lower first cost. An adjacent goal, and one which may be a necessary first step towards affordability, is to develop technology configurations or feature sets that suit the needs of lower-income customers. Leaders in this regard include NYSERDA and the California Market Transformation Administrator (CalMTA).

In 2021, NYSERDA partnered with the New York Power Authority (NYPA) and the New York City Housing Authority (NYCHA) to launch the Clean Heat for All Challenge, a competitive process to develop a heat pump product that would aid multifamily buildings in complying with the State’s climate goals by providing a simple, affordable way to electrify space heating. NYSERDA used a competitive RFP process to solicit manufacturers to design and

produce an appliance that would be easier and less expensive to install than a central or split system: a through-the-window, saddle-style configuration powered by a 120V outlet that could be installed in under two hours and without any specialized labor or modifications to the building. Two manufacturers were awarded contracts in 2022, the first products were installed for demonstration and testing in 2023 and, as of early 2026, additional testing was being completed in colder parts of the state and in the lab (March et al. 2024). NYSERDA is using a similar process to develop a second electric technology targeted to the needs of multifamily buildings: an apartment-sized induction stove powered by a 120V outlet (NYSERDA 2023). That RFP launched in 2023 and, as of 2026, NYSERDA was working to get under contract with the successful bidder.

CalMTA is a new state-wide market transformation organization in California established by a 2019 California Public Utilities Commission (CPUC) decision. At the end of 2025, the CPUC approved CalMTA's first two market transformation initiatives for the same technologies on which NYSERDA has been focused: room heat pumps and induction stoves. CalMTA arrived at these areas of focus after a comprehensive process designed to embed equity thinking throughout initiative development (CalMTA 2026c). The logic models for both initiatives include three affordability-related outcomes: inclusion of the new technologies in rebate programs, availability of affordable products in retail stores in ESJ communities, and an eventual decrease in prices over three to five years (CalMTA 2026a, CalMTA 2026b).

Both the NYSERDA and CalMTA initiatives are still in development with no timeline for the release of commercially available products. It thus remains to be seen whether these initiatives will result in technologies that are affordable for, and available to, OPP buyers. In their current form, the initiatives focus on bringing to market technologies that meet the unique needs of multifamily buildings and rental housing and do not include activities or requirements that directly address affordability. The current version of the induction stove to be developed for NYSERDA, for example, is estimated to have a purchase price of \$4,000. While this may be a reasonable choice for a public housing authority with a mandate to reduce fossil fuel use, it would not be affordable in a retail setting, where comparable OPP electric ranges sell for less than \$600 (The Home Depot 2026).

II. Affordability-centered Market Transformation: The Shift Consortium Approach

The Shift Consortium is an alignment of energy efficiency funders who aim to make efficient products affordable for OPP buyers through consumer incentives and product innovation. The Consortium's work takes two affordability-centered market transformation approaches: it aims to increase diffusion and supports the development of innovative, affordable products.

The Consortium was established in 2018 with Platte River Power Authority as its founding sponsor. Energy Trust of Oregon, Efficiency Vermont, and SMUD were early sponsors, and in its eight-year history the Consortium has also included Consumers Energy (Michigan) and Maryland utilities PEPCO, Delmarva Power, Potomac Edison. In 2026, the Consortium had three sponsors: Platte River Power Authority, Efficiency Vermont, and SMUD. In its early years, the Consortium's work focused on designing instant, point-of-sale rebates targeting the lowest-cost efficient appliances. The amount of the incentive was calibrated to the incremental cost between the OPP product and the lowest-cost comparable efficient product,

with the aim of making efficient products as affordable as possible for OPP buyers. The approach was based on a meta-study of program evaluations that showed California appliance rebate programs had been disproportionately paid to buyers of higher-priced products and the hypothesis that the cause of the disparity was the high incremental cost of the efficient options (Frank and Nowak 2016).

In addition to implementing affordability-focused incentive programs, Consortium sponsors co-fund annual research and development scopes of work. Since 2019, the Consortium has published 13 studies including market characterizations, technical and engineering research, and ethnographic consumer surveys. Its uninterrupted annual scoping process has allowed the Consortium to continually deepen its understanding of the market barriers to efficiency in the OPP appliance market and the perspectives and demographics of OPP buyers.

As a result of its ongoing co-funded research and implementation experience, the Consortium has evolved its theory of change and iterated on and refined its strategy to address the affordability barrier in the appliance market. The Consortium initially posited that its targeted point-of-sale rebates, implemented at scale, would substantially increase sales of low-cost efficient appliances and decrease sales of OPP baseline-efficient models. This shift in demand would induce manufacturers to increase production of their lowest-cost efficient models and, over a period of three to five years, prices would decline due to economies of scale such that rebates would no longer be needed.

By 2022, however, two data points required the Consortium to adjust its theory of change and activities. Sufficient geographic scale was unlikely to be achieved with the current approach: Few utility programs were willing to invest in high-dollar-value appliance rebates, preferring to focus incentives on innovative technologies with bigger per-unit savings, like heat pump water heaters, or on programs like RPP, which promised high-volume savings from very small per-unit incentives. In addition, the Consortium's 2021 market characterization study, *Equity and ENERGY STAR Appliances*, had shown that in the clothes washer, refrigerator, and window air conditioner categories there were substantial upstream barriers to efficiency affordability. Among washers there were fewer low-cost efficient models to choose from than in the past, the dominant OPP manufacturer had discontinued their lowest-cost ENERGY STAR model, and retail availability was poor. Among refrigerators there were many low-cost efficient models with a manageable incremental cost, but no major retailers floored them in store. Among window air conditioners, there were almost no efficient models being manufactured in the smallest (lowest-cost) sizes, where a majority of sales were occurring (Shift Consortium 2021).

Recognizing they were confronting entrenched structural challenges in the appliance market and facing strong headwinds in their efforts to recruit more sponsors, the Consortium organized a three-day online convening to bring together experts with a diversity of perspectives in hopes of lifting up new paths to addressing the issue of efficient appliance affordability. The Consortium funded the gathering and served as catalyst, working with a professional facilitator and guided by a six-member design team. The *Affordable/Efficient Appliance Convening* brought together more than 40 stakeholders including retailers, manufacturers, energy efficiency organizations, governments, utilities, non-profits, and advocates (Shift Consortium 2023).

The convening produced nine action items with potential to increase OPP buyers' access to efficient appliances, three of which the Consortium took on as the focus of its research and development activities in succeeding years: increase understanding of OPP buyers' appliance priorities and feature preferences, develop a specification for an OPP product that meets OPP buyers' needs and has best-on-market energy performance, and create a technology roadmap to

bring these products to market. Together, these three actions represented a decisive turn in the Consortium's direction, from attempting to influence customers' purchase decisions to focusing efforts upstream and aiming to influence manufacturers' product design process.

OPP Buyers' Clothes Washer Priorities and Feature Preferences

Following the convening, the Consortium funded two studies of clothes washer buyer priorities and feature preferences, each with its own methodology and both designed to support the development of an affordable, efficient clothes washer specification. The first customer study, completed in 2023, included 31 in-store intercept surveys at 13 appliance stores in five locations around the U.S. Surveys lasted ten minutes and were fielded in English and Spanish. Buyers were intercepted while browsing for a low-cost washer and asked about the reason for their purchase, desired washer characteristics, budget, payment method, and demographics (Shift Consortium 2024).

The second customer study, completed in 2025, used the same method as the Consortium's 2020 study (a mobile ethnography survey platform) and sought to test and expand on the findings from the more limited in-store intercepts. This study collected comparison data from 401 participants (OPP and higher price point buyers) and deep-dive data from 61 OPP buyers, all of whom had purchased an OPP clothes washer or stove in the previous year. Members of the OPP sample ranged in age from 18 to 83 and included people from 24 states. One-quarter were renters and 33% identified as an ethnicity other than white (Shift Consortium 2025b).

The study's clothes washer questions delved into OPP buyers' path-to-purchase, decision characteristics, washer preferences, and laundry behaviors. With regard to washer preferences, the findings were decisive. Participants' top complaints about their current washer were that it took too long to wash (32%), was too loud (31%), too small (20%), had too many settings (19%), and did not clean well enough (19%). Participants were resoundingly opposed to a cold-water-only washer, with very few willing to purchase such a product (17%). In addition to explicit complaints about complicated controls and proliferating settings, participants' laundry behaviors showed they used very few of their machine's wash options. During the study, researchers observed a total of 124 loads of laundry through a combination of survey questions, photos and videos. Despite the fact that a typical OPP washer has more at least 10 wash options and five temperature options, nearly three-quarters of washes (72%) were done on either normal or heavy duty, and 80% used either cold or warm water.

Participants were evenly split between those who preferred vs. did not prefer four features: agitators, detergent dispensers, glass lids, and Wi-Fi connectivity. Washer characteristics that participants overwhelmingly preferred included knobs rather than digital controls (73%), a capacity over 4 cu.ft (90%), a 10-year warranty (69%), and simpler settings and controls (64%). When asked whether they would buy a low-priced washer with fewer "bells and whistles" but the best possible energy and water efficiency, 80% responded yes, some with great enthusiasm.

These consumer insights directly informed the design of the *SimplyEfficient v1.0 Clothes Washer Specification*, described below.

The SimplyEfficient v1.0 Clothes Washer Specification and Ongoing Market Development

The Shift Consortium and its partner, Energy Solutions, used the consumer preference findings from the 2023 and 2025 customer studies to develop the *Simply Efficient v1.0 Clothes Washer Specification*, the first specification for clothes washers with a maximum allowable energy and water use, recommended feature set, and target price point. Unlike most innovative product development efforts, the SimplyEfficient specification does not require the efficiency of qualifying models to exceed that of available products. Rather, it aims to raise the efficiency of OPP models to match the best-performing (higher cost) products on the market. Unlike ENERGY STAR specifications, the SimplyEfficient specification does not include allowances for size and features (Shift Consortium 2026a).

As of mid-2026, Shift Consortium sponsors were in discussions with two manufacturers to bring a qualifying clothes washer to market for a test of concept. Lacking a partner with high-volume purchasing power like NYSERDA has in NYCHA (the largest affordable housing provider in the U.S.), the Consortium was exploring how to aggregate demand from a variety of sources in order to generate purchasing power sufficient to ensure manufacturer participation. This included a range of utility programs, including those offering consumer rebates, direct installation of appliances, and multifamily and new construction programs. In addition, the Consortium was investigating whether other bulk purchasers would be willing to engage in a pilot, including affordable housing developers and managers.

Rethinking Recognition Programs: The Affordable Efficient Award

In early 2026, the Consortium began working with ACEEE to develop a new award program that would recognize manufacturers and retailers that design, produce, and sell low-cost, high-efficiency consumer products. This award program will address the affordability and availability barriers to efficiency by increasing public awareness of affordable and efficient products, enabling utility programs to support these models, and giving the supply chain incentive to invest further in developing and assorting these models.

Award programs are a proven strategy for motivating manufacturers and retailers to fill gaps in market offerings. If complemented with prizes or guaranteed purchases, awards can accelerate market deployment of new technologies and products targeted to specific market needs. The most prominent efficiency awards program in the U.S. is the ENERGY STAR Partner Award, which U.S. EPA gives annually to businesses that promote ENERGY STAR-certified products. Retailers and manufacturers treat receipt of a Partner Award as a core pillar of their public sustainability identity and particularly like to note their consecutive-year winning streaks. Annual sustainability reports, press releases, and investor-facing materials are all places where companies use the award to validate environmental commitments, signal leadership to stakeholders, and differentiate themselves in competitive markets.

The proposed Affordable Efficiency Award program will combine stringent energy performance specifications with maximum cost requirements, ensuring the awarded products are not only top performers but accessible to OPP buyers. Development will be conducted over a two-year period. In Year 1, the team will design an infrastructure for the award program that is sufficiently broad to enable expansion across multiple product categories in future years and will include defining criteria for affordability and efficiency as well as product availability. It will establish a process for developing product-specific metrics, evaluating product categories, and a timeline and approach to delivering awards. It will also include a branding, promotion, and

outreach strategy to ensure that visibility for the awards is sufficient to create value for manufacturers and retailers. Awards in Year 1 will focus on manufacturer leaders in two product categories, clothes washers and induction stoves. Awards in Year 2 will be given to retail leaders in these categories. In future years, there is the opportunity to expand the award program to additional product categories and to continue updating, evaluating, and awarding leaders on a regular basis.

III. Lessons for Broader Adoption of Affordability-centered Market Transformation

The Shift Consortium's work has focused on large appliances, but its research and methods can be applied to any efficient product category or service in which improving affordability is a primary goal.

An important first step in developing an affordability-centered market transformation initiative is conducting a market analysis to understand the contours and extent of the affordability barrier and its causes. The most accurate way to assess market share by price point is through analysis of retail sales data. Before engaging with a retail partner, the Consortium assesses full category sales data from the previous year to identify best-selling, baseline-efficient OPP models and the market share of products by price point, efficiency, and configuration, and revises this analysis annually. The Consortium also requires retailers to submit monthly data reports that document the offering price and sale price of incented models and a selection of comparable baseline-efficient models.

In addition to market share, it is important to assess incremental costs, technical aspects, and availability of OPP baseline-efficient models versus their more efficient counterparts. For example, the Shift Consortium's research showed that, within the refrigerator product category, cost is a barrier to efficiency only in the top-freezer configuration, with other configurations having a high proportion of ENERGY STAR models and no substantial price difference between these and baseline-efficient models. An engineering analysis showed only minor differences between baseline-efficient and ENERGY STAR models, suggesting both products were produced on the same assembly line but given a small number of different components. Further, the Consortium could not find an OPP ENERGY STAR top-freezer refrigerator on a retail sales floor in its sponsors' territories and theorized this near total unavailability depressed sales and perpetuated higher prices.

A second important step in developing an affordability-centered market transformation initiative is assessing whether and to what extent the proposed activities will make the efficient technology or service more affordable: Will participants still be asked to pay a price premium for the promoted technology or service and, if so, how much? What proportion of buyers are shopping below the subsidized price point and thus not served by the initiative? For what proportion of buyers are the characteristics of the promoted product unsuitable, and why? To support incremental cost calculations, the Consortium released an online affordability calculator to help program managers evaluate, from the buyer's perspective, how subsidized measures compare to their lowest-cost alternatives (Shift Consortium 2026b).

For organizations that wish to take affordability as a primary objective across all initiatives, it may be appropriate to conduct a portfolio-level affordability analysis. While no organization has yet attempted to evaluate their work in this way, it is possible to envision an approach that would determine whether and to what extent each initiative strives toward

affordability, as well as the proportion of investment dedicated to producing affordability-related outcomes.

The experience of the Shift Consortium in pursuing affordability-centered market transformation reinforces two learnings that will be familiar to those with experience of market transformation generally and programs serving resource-constrained buyers specifically. Any effort aiming to create lasting change in a national or international supply chain needs to work at a scale commensurate with its target market. In energy efficiency, absent a tranche of Federal funding, this requires independent utility and non-profit funders to work in alignment to achieve a set of shared goals. Funders will also need to be willing to accommodate the higher cost of serving resource-constrained buyers. This is true in affordability-centered market transformation as it is in low-income, moderate-income, and direct install programs. A market transformation organization operating under cost-effectiveness requirements scaled to the costs and savings of innovation introduction and codes and standards initiatives will likely need to work with its stakeholders to revise its targets accordingly.

Conclusion

The U.S.'s widening economic divide has profound implications for the energy efficiency industry. Nearly half of American households have small discretionary monthly budgets and up to 70% report living paycheck to paycheck. Market transformation has historically failed to deliver efficiency to these households because of an entrenched affordability gap: the industry's decades-long focus on bringing innovative, high-performing technologies to early adopters, which leaves as many as half of buyers unserved for many years or, in the case of front load washers, permanently.

Closing the affordability gap requires a deliberate reorientation of market transformation theory and practice to incorporate activities that directly reduce the purchase price of efficient technologies to that of the lowest-cost alternatives. The Shift Consortium's eight years of work in the appliance market illustrates both the potential and the difficulty of this reorientation. The Consortium's experience underscores the systemic challenges that affordability-centered market transformation must overcome.

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