

# The Best Thing Since Tide Pods: Real Life Results from an All-In-One Washer/Heat Pump Dryer Pilot

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## ABSTRACT

Newly available all-in-one laundry appliances - clothes washers packaged with heat pump drying technology - may be a game-changer for laundry loads (pun intended). These devices check multiple boxes including energy efficiency, increased versatility, and improved user experience. Energy savings are projected at more than 50% relative to a traditional washer/dryer set. These new designs run on 120V power and are not externally vented. The laundry process becomes more streamlined, moving away from the traditional two-step washer/dryer cycle to a 'set and forget' process. Considered together, these benefits could position this technology as a winner for utilities as well as consumers. Potential trade-offs include longer cycle times, technology/connectivity barriers, higher cost, and increased maintenance and repair complexity. To gather rapid insight into the program opportunity for these products, Georgia Power developed a pilot program with 25 participating households for a three-month testing period. Energy consumption was directly measured using high resolution energy submeters throughout the testing period. These measurements supported a detailed analysis of household laundry appliance usage patterns, energy consumption per cycle, and load shape analysis. Energy and peak demand savings were evaluated through comparison against a prior study on traditional laundry energy consumption conducted by the same utility. Qualitative research included in this pilot focused on understanding participant experiences, along with identifying challenges and opportunities for scaling this technology as an efficiency measure. The deep understanding of equipment performance and customer experience gathered through this pilot will support more successful design of potential future programs and larger-scale rollouts.

## Introduction

All-in-one clothes washers packaged with heat pump drying technology are a new offering to American consumers. Three major appliance manufacturers (GE, Samsung, LG) released models in 2023 and 2024, with the Samsung and LG models achieving "Most Efficient" status from ENERGY STAR®.

The concept of a combination clothes washing and drying appliance is not wholly new. The first appliance was offered in 1953. Several major appliance manufacturers offered "combos" during that era but they suffered from reputations for poor performance. This generation of combos failed to ever reach a significant market share and were discontinued by the late 1970s. Combo units in smaller, compact capacity ranges have been available in European markets since the 1990s and have achieved more prevalence, around 11% in the United Kingdom in 2014 (Stamminger 2015).

Likewise, major US manufacturers began offering full-size heat pump dryers in the mid-2010s but the technology has not been broadly adopted (Slipstream 2021). The 2022 Residential Building Stock Assessment found only 0.9% of residences in the northwestern US using heat pump dryers (Evergreen Economics 2024).

The new combo models released in 2023 and 2024 package these technologies and tailor them to meet the traditional preferences of American households for capacity and cycle duration. These devices claim to check multiple boxes including energy efficiency, increased versatility, and improved user

experience. Energy savings are projected at more than 50% relative to a traditional washer/dryer set. The heat-pump based design eliminates the traditional dryer hookup, as the units are powered with 120V and are not externally vented.

In order to gather rapid feedback on the product experience and quantify the opportunity as an energy savings measure, Georgia Power piloted Samsung's Bespoke AI Ventless 5.3 Cu. Ft. All-in-One Front Load Washer & Dryer Combo (Figure 1). This unit offers 23 different cycles including AI Opti Wash & Dry™, Super Speed, Heavy Duty, and Small Load, as well as a host of options and features including automatic detergent dispensing and remote app control. The unit also has multiple built-in maintenance routines including automatic rinsing of the heat exchanger before every drying cycle to optimize dryer performance.

Georgia Power's pilot program offered these appliances at no cost to a group of 25 residential customers. Participants agreed to use the pilot device exclusively for a 3-month pilot observation period as a condition of participation and were not required to dispose of their existing laundry equipment.



Figure 1. Samsung All-in-One Front Load Washer & Dryer Combo. *Source:* <http://www.samsung.com>.

## Methodology

Data collection efforts for this pilot were designed to gather rapid insight into the program opportunity for combo appliances. Device energy consumption was directly measured via in-line appliance submeters (Onset HOB0 UX120-018), using a 5-minute sampling interval throughout the 3-month pilot period. These measurements supported a detailed, utility territory-specific analysis of household laundry appliance usage patterns, energy consumption per cycle, cycle length, and load shape analysis. The total metering sample was 22 appliances.

Energy and peak demand savings were evaluated through comparison against results of a prior metering study conducted for Georgia Power in 2014 on 42 homes that participated in an ENERGY STAR Clothes Washer energy efficiency measure (Nexant 2015). Data logging for that study included washer and dryer energy consumption, as well as a flow meter installed on the hot water inlet to track hot water usage.

Clothes washers included in the Nexant 2015 study had an average efficiency rating of approximately 2.2 IMEF, slightly higher than the 2.1 IMEF average found for existing equipment in the Combo pilot (Figure 2). Federal minimum efficiency requirements remained relatively static over the decade between the two studies. Because of this alignment between the two study populations, the Nexant 2015 measurement results were applied as a representative baseline for average existing washer and dryer equipment without further adjustment.

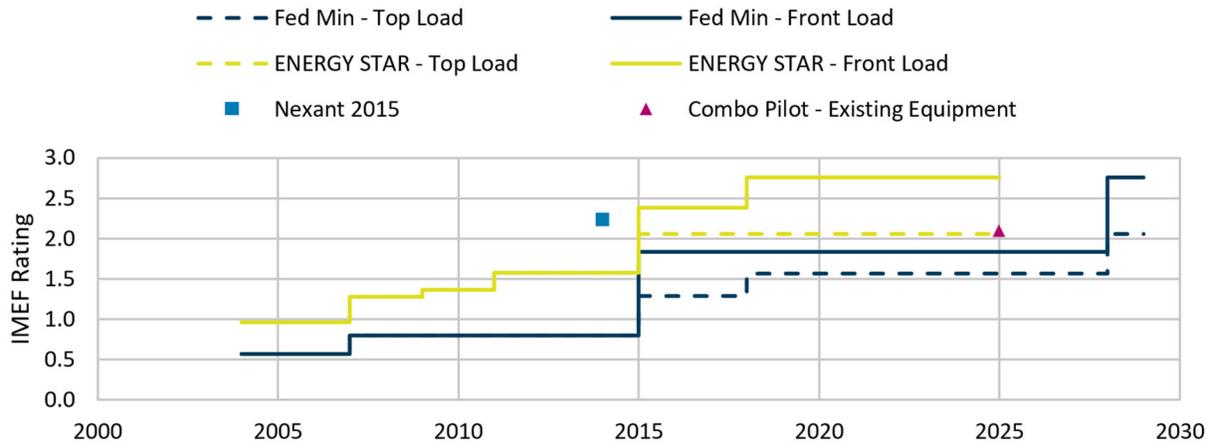


Figure 2. Clothes Washer IMEF Ratings – Historical Federal Minimum, ENERGY STAR Standard, and Study Equipment. Sources: Federal Register 2001, Federal Register 2012, ENERGY STAR 2025, Nexant 2015.

Qualitative research included in this study focused on understanding participant experiences, along with identifying challenges and opportunities for scaling this technology as an energy efficiency measure. Participants were surveyed on topics including satisfaction with the appliance, challenges experienced, and likeliness to purchase. Two appliance market actors were also interviewed on their perceptions of the state of the laundry appliance industry.

## Findings

### Laundry Cycle Characteristics

Throughout the pilot observation period, a total of approximately 1,600 individual laundry cycles were observed. A wide distribution of cycle types and characteristics were observed, with an average cycle length across participants of 2.94 hours (Figure 3). Wash-only and dryer touch-up cycles are examples of shorter cycle types in the 1- to 1.5-hour range. Longer cycles include some maintenance cycles and cycles where longer duration “wrinkle guard” options may have been in use.

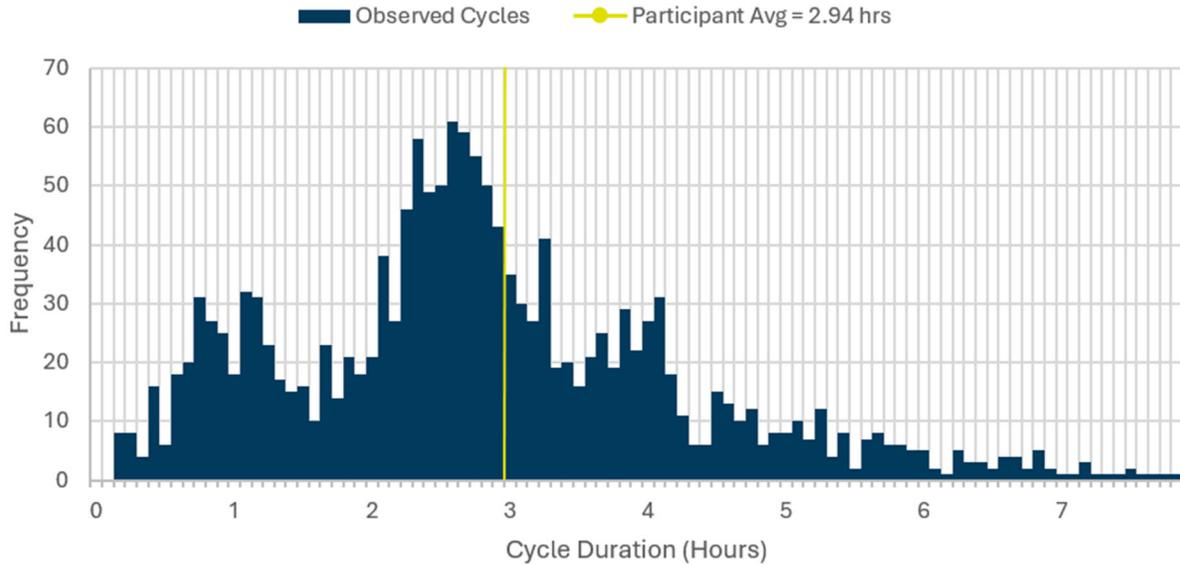


Figure 3. Distribution of Observed Cycle Durations.

The average energy consumption, including all standby energy consumption between cycles, was 1.29 kWh per cycle. Figure 4 below shows an example of a 3-hour wash and dry cycle. The appliance power draw starts around 100W during the wash cycle, followed by a spike during the spin cycle, followed by a longer period of higher consumption during the dry cycle reaching about 850W at the highest point.

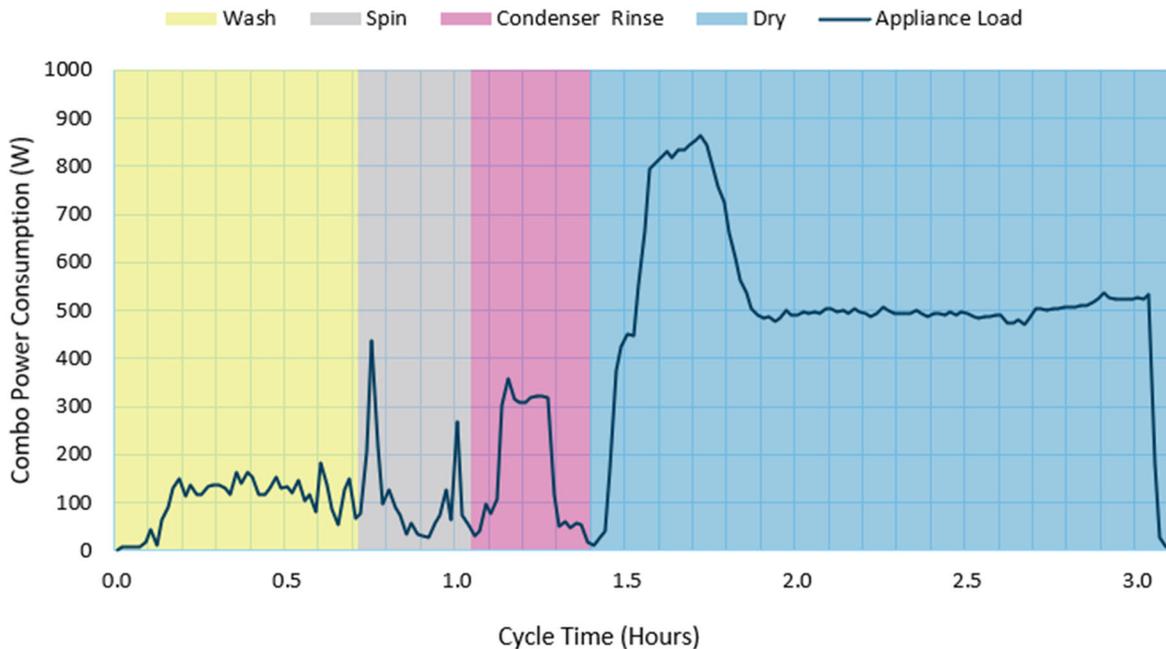


Figure 4. Typical Wash and Dry Cycle Load Profile

On average, participants were observed to complete 5.3 laundry cycles per week (280 loads per year). This estimate factors in a 6% reduction of measured loads to account for the pilot model's

prescribed maintenance routines. The number of laundry cycles per residence was not found to be well correlated with household occupancy ( $R^2=0.08$ ) in this pilot.

### Annual Energy and Demand Impacts

Georgia Power’s prior study (Nexant 2015) estimated 4.14 kWh used per load of laundry completed and annual energy consumption of 952 kWh (Table 1). The annual average kWh consumption of piloted combo appliance was measured at 338 kWh per year. Factoring in an additional 13% estimated hot water energy consumption for homes with electric water heaters (36% of pilot participants) resulted in an annual energy consumption of 353 kWh. Thus, the annual energy savings for the combo unit was determined to be 599 kWh, a 63% energy savings over the Nexant 2015 study result.

Table 1. Pilot Average Energy and Demand Impacts

	kWh per Load	Annual kWh	Winter Peak kW <sup>1</sup>	Summer Peak kW <sup>2</sup>
Nexant 2015 Study	4.14	952	0.087	0.139
Combo Including Water Heating kWh Usage	1.25	353	0.020	0.044
<b>Savings</b>		<b>599</b>	<b>0.067</b>	<b>0.095</b>

<sup>1</sup>Winter Peak period defined as 8am-9am January weekdays

<sup>2</sup>Summer Peak period defined as 4pm-5pm July weekdays

The average combo appliance load shape as compared to the Nexant 2015 results illustrates the magnitude of the improvement (Figure 5). In both studies, Sunday remains the preferred laundry day. A relative shift to late night and early morning hours is noticeable for the combo units, especially on Monday through Thursday, indicating a shift in preference towards running loads overnight.

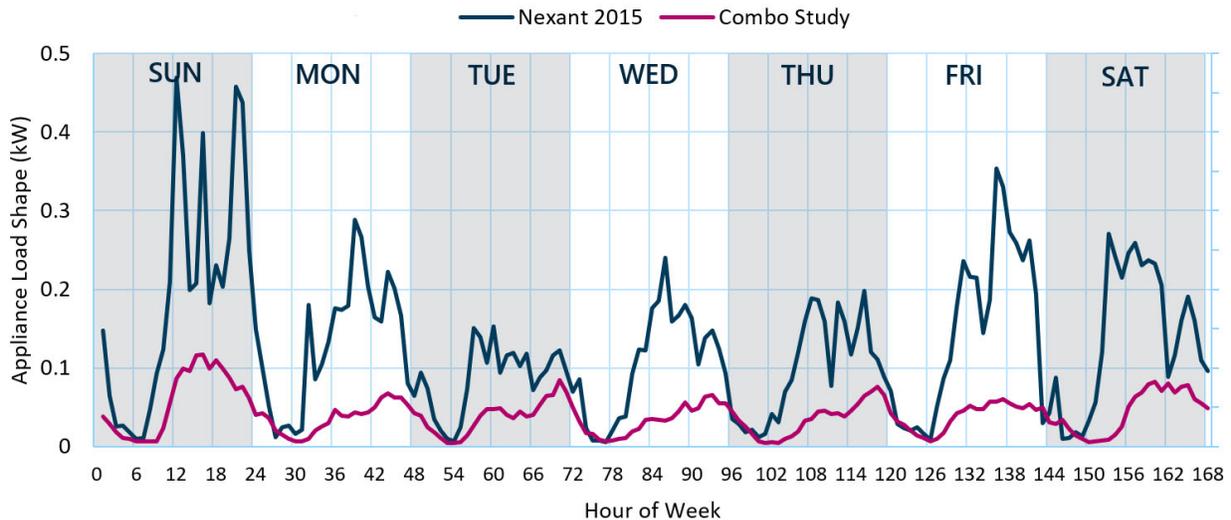


Figure 5. Laundry Appliance Load Shape – Baseline vs Metered

### Participant Experience

Participants were asked a series of questions about their experience with the combo pilot. Fourteen of seventeen respondents responded that the pilot equipment met their initial expectations and

noted a number of other benefits of the equipment including space savings and improved laundry process/experience. Three participants reported dissatisfaction with the laundry cycle time.

Of the seventeen survey respondents, two respondents stated they planned to remove the combo appliance after the pilot observation period concluded, both stating they plan to replace it with their previously used appliance or similar. These same two participants had a lower satisfaction rating with the overall experience with the appliance, and both rated the “drying times” satisfaction as zero. Drying times overall were the lowest rated satisfaction category, at a mean rating of 5.2 on a 10-point scale (Figure 6).

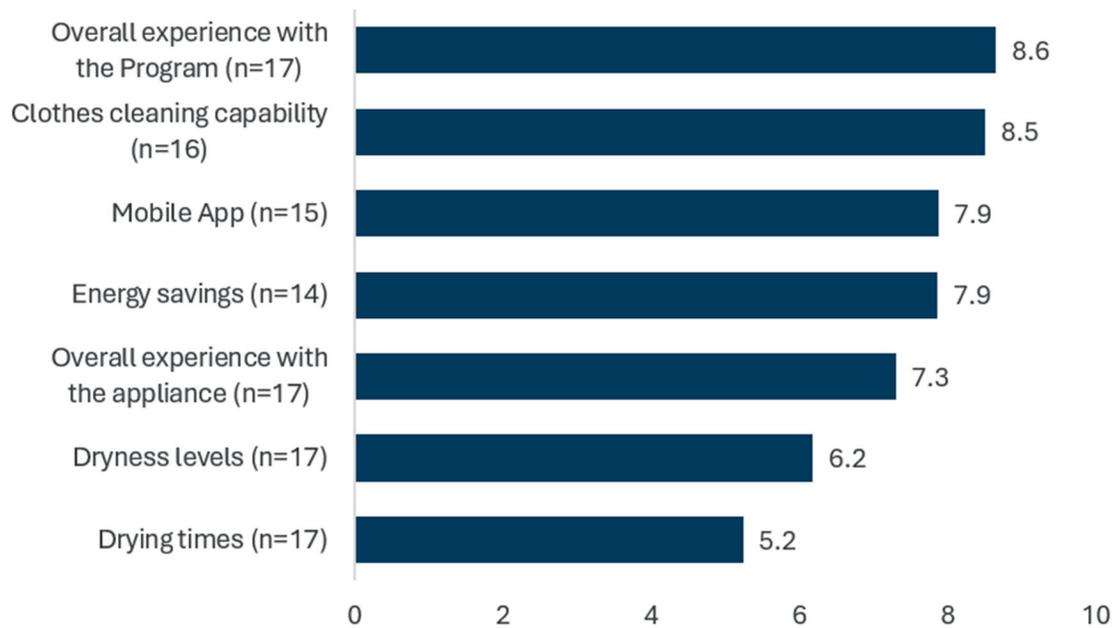


Figure 6. Participant Satisfaction. Source: Participant Survey “Please rate your level of satisfaction with different aspects of the Combo Heat Pump Washer Dryer, using a 0 to 10 scale where 0 is “extremely dissatisfied” and 10 is “extremely satisfied”. Where something is not relevant to your experience, please select “N/A”.”

When asked about the likelihood a participant would recommend the pilot combo appliance to a friend or family member, the majority (71%) stated they would be somewhat or very likely to recommend (Figure 7). Participants who stated they were not at all or not too likely to recommend the appliance (5 of 17 respondents) also rated their satisfaction with drying times and dryness levels as a six or lower.

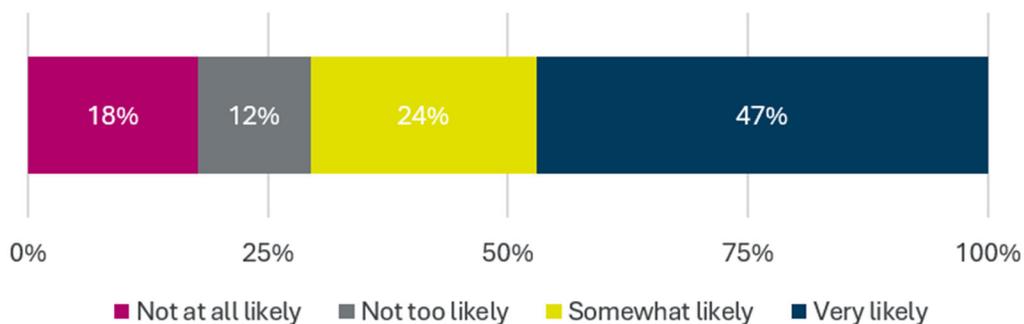


Figure 7. Participant Likelihood to Recommend Pilot Appliance. Source: Participant Survey “How likely would you be to recommend the Combo Heat Pump Washer Dryer to a friend or family member?” n=17

Only one respondent stated they would be more than moderately likely to purchase the pilot appliance with no rebate at all and pay the full price of \$2000 (Figure 8). Two respondents stated they would be extremely likely to purchase if the rebate covered half the appliance cost. The “extremely likely to purchase” response jumps to 9 out of 17 respondents when the rebate scenario is \$1500 or 75% of the cost.

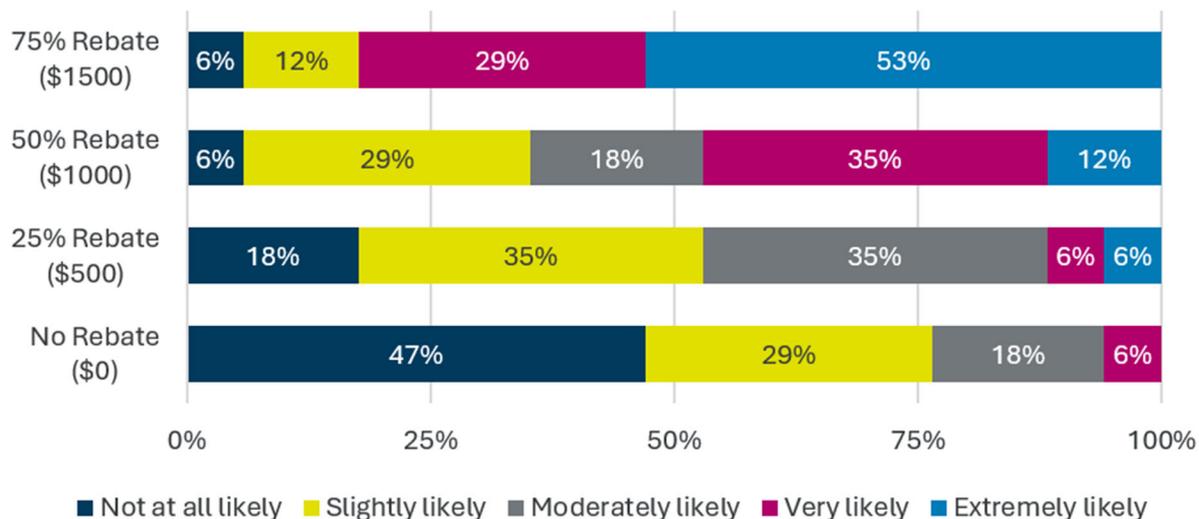


Figure 8. Likelihood to Purchase Under Different Rebate Scenarios Source: Participant Survey “If you had not participated in the Heat Pump Washer/Dryer Pilot Program and were looking to purchase a new washer and/or dryer for a full purchase price of \$2000, what would have been your likelihood to purchase the Samsung Heat Pump Combo Washer/Dryer appliance or similar under the following rebate scenarios?” n=16

## CONCLUSIONS

The insights gained through Georgia Power’s pilot of the Samsung Ventless All-in-One Combo appliance point to a potential win/win technology for both consumers and utilities. In terms of scaling these measures from pilot to program, our study found a clear opportunity to improve all-in-one combo marketing. To support broader adoption of the technology with improved consumer satisfaction, messaging should be dialed in on the product features that drive the highest satisfaction – the convenience of the app, the space-saving nature of the combination appliance, energy efficiency, and the ease of use.

A pleasant user experience is important for any home appliance, but for washers and dryers it’s essential. This study found that pilot participants were using their laundry equipment nearly daily. Unlike other measures – like insulation or even HVAC systems which are hidden in the basement or attic and are mostly invisible to household inhabitants – laundry equipment facilitates one of nearly every household’s most ubiquitous chores. This means that any home appliance looking to break into the market will need to elicit a consumer experience that is at least as good as, if not better, than the alternative.

Current campaigns focus on the speed of the laundry cycle. The manufacturer website advertises an approximately 90-minute wash and dry cycle, yet none of our pilot participants experienced such short combination cycle times. In fact, most experienced cycles that lasted considerably longer, sometimes more than three times longer. This messaging will likely leave consumers feeling disappointed and frustrated because expectations aren’t met. Instead, marketing should focus on the overall streamlined laundry workflow that’s achievable with a combo unit. Pilot results also showed the “set it and forget it” capability of the combo appliance increased overnight laundry usage, which translates to an additional peak demand win for utilities.

Energy savings achieved by the combo units as compared to standard laundry equipment are evident in the results of the metering study at 599 kWh per household on average. This achievement of the appliance is also not clearly communicated in consumer messaging. Manufacturer mentions of energy savings focus only on additional energy saving cycle options available within the combo unit, expressing the savings relative to the combo unit itself. Thus, combo appliance users can't easily tell how the differences in the laundry experience translate to energy reduction and bill savings. Utilities aiming to increase adoption of this type of technology should explain the energy savings capabilities in consumer-friendly terms that acknowledge the increased cycle time.

Targeting the marketing and messaging around this combo laundry appliance will support increased customer satisfaction and broader adoption. Utilities should help bridge the messaging gap by emphasizing real-world benefits in consumer-friendly terms, including honest cycle time expectations.

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