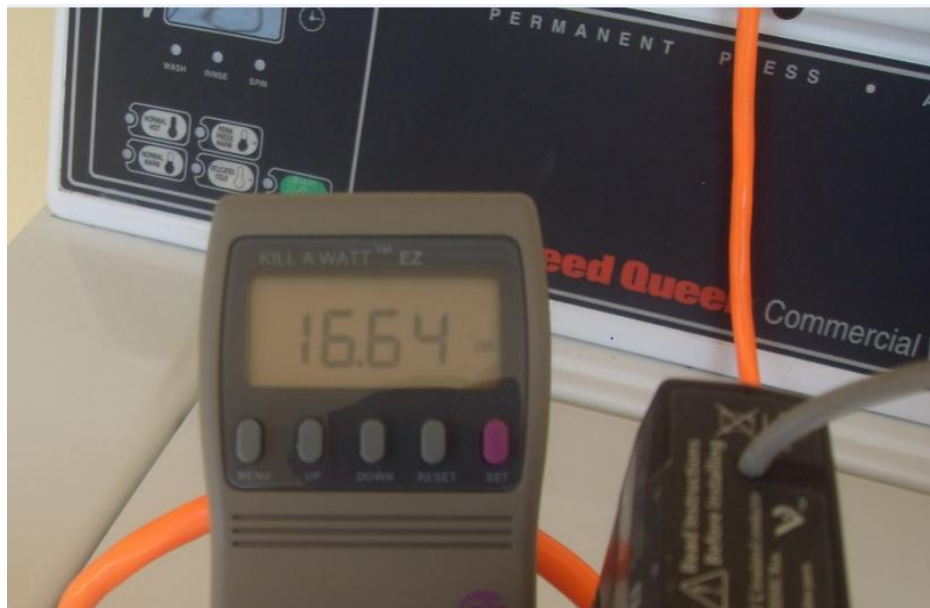




Multifamily Laundry Equipment Operational Data Collection

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Project No. 501010



Prepared for
Southern California Edison

Introduction

Partner Energy performed laundry room energy monitoring and data collection in multifamily sites in the SCE service territory in support of the Southern California Gas Company's Multifamily Energy Upgrade California Pilot Program.

Partner Energy recruited multifamily properties to participate in the laundry energy audit project and coordinated with customers on-site visits to install and collect current sensors, temperature sensors, and data loggers and devices. The intent is to collect data that can be used by others for energy analysis of residential type washing machine and driers for both electrical and hot water usage.

The following properties were visited for data collection:

Property Name	# Washers	# Dryers	Gas/ Electric	Address	City	State	Zip	# units	1 bed room	2 bed room	3 bed room	4 bed room
Rowland Heights Apartments	16	16	Gas	1945 S. Batson Avenue	Rowland Heights	CA	91748	144		112	32	
Lutheran Gardens	6	6	Gas	2431 East El Segundo Blvd	Compton	CA	90222	155	12	36	22	6
Flower Terrace	7	8	Gas	1401 N. Flower Street,	Santa Ana	CA	92705	200	200			
1311 19th st	1	1	Gas	1311 19th st 3	Santa Monica	CA	90404	6		6		
Highland Manor	3	3	Gas	1128 W Highland St.	Santa Ana	CA	92703	12			12	
Compton-Seasons Building	7	8	Gas	15810 S Frailey Ave	Compton	CA	90221	84	50	34		

Methodology and Scope

Data was collected based on the following items

- Trend equipment cycles by measuring amperages by using current sensor and 4 channel logger manufacturer Hobo model UX 120, for each dryer and washing machine for two weeks with 1 minute interval.
- Sample readout per site per dryer or washing machine type for Amperage, power factor, Voltage, by using Kill A Watt type electricity meter.
- Sample trend total weekly kWh per site for one dryer and or one washing machine by using Kill A Watt electricity usage meter.
- Trend temperature sensor installed at outside of the hot water hose with tape to trend a cold or hot water cycle occurrence. The temperature sensor will be trended similar to the current sensors. A rise of temperature during a cycle indicates that the washing cycle was hot or cold.
- Site info; number of units and unit type breakdown, etc.
- Items to be recorded:
 - Laundry Room Hours of Operation
 - Cycle time of each unit
 - Cycles per machine
 - Load Start Times.
 - Energy Consumption of the unit, based on trended amperage and sampled power factor and voltage
 - Manufacturer and Model of Units

A total of six multifamily laundry facilities had energy data logging activities performed. The data collection included recording of electrical current usage in amps, for all washers and dryers in normal cycle operation. In addition sample energy usages in (kWh) were measured during the cycle for a typical washer and dryer. Also spot check data for Amperage, voltage, power factor was readout from the meter. The power factor varied at different load conditions, typically the power factor increases slightly with the power.

These sample meter units were also placed (about 2 to 3 units on average per facility), to record the total kWh usage during a typical 2 week cycle for each facility.

It should be noted some laundry machines run more frequently than others. Another observation was occupants generally pick the longest cycles for washing and drying clothes despite a chance that clothes could potentially be cleaned and dried in shorter cycles.

All collected data was compiled and saved into separate excel files per site.

Issues Encountered

No major issues were encountered, however some of the temperature sensors had come detached from the hot water hose connections at some point during the 2 week cycle giving some errors in temperature rise data. Approximately (2) 4 channel sensors on one of the 4-channel inputs showed errors in the hot water consumption giving constant temperature throughout the 2 week cycle. These were noted in the supplied excel sheets where this occurred. Facility staff was generally cooperative in allowing the 2 week data collection analysis to take place.

Assumptions

It can be assumed that errors of detached and faulty temperature sensors can be addressed by extrapolating the successful trended data for all equipment.

Photo Log

 <p>A close-up photograph of a white nameplate for an Alliance Laundry Systems unit. The nameplate includes the following information: MODEL NO. SWTX21WN, SERIAL NO. 1206042506, LOAD SIZE 14 LBS (6.3 KG), COUNTRY OF ORIGIN: USA, 120 V, 60 Hz, 9.0 AMP, and W/D 2004202. It also features a UL logo and a barcode.</p>	 <p>A photograph of a white 4-channel analog logger device. The device has a green LCD screen displaying four channels of data: 0.158, 0.105, 0.131, and 0.061. Below the screen, there are four ports for connecting sensors.</p>
Temperature sensor	4 Channel Hobo data logger
 <p>A photograph showing a Kill a Watt power meter and a current sensor. The Kill a Watt meter is a grey device with a digital display showing 1664. The current sensor is a black device with orange wires attached. They are being held next to a white laundry unit.</p>	 <p>A photograph of a white nameplate for an Alliance Laundry Systems unit. The nameplate includes the following information: MODEL NO. SWTX21WN, SERIAL NO. 1206042506, LOAD SIZE 14 LBS (6.3 KG), COUNTRY OF ORIGIN: USA, 120 V, 60 Hz, 9.0 AMP, and W/D 2004202. It also features a UL logo and a barcode.</p>
Kill a Watt and current sensor	nameplate
 <p>A photograph showing the setup of the equipment. A Kill a Watt power meter and a current sensor are connected to a white laundry unit. The Kill a Watt meter is displaying 1.00. The current sensor is connected to the laundry unit's power cord. A coiled cable is also visible.</p>	 <p>A photograph showing the 4-channel analog logger installed on the side of a white laundry unit. The logger is connected to the unit's power cord and is displaying four channels of data: 0.003, 0.028, 0.068, and 0.236.</p>
Setup	Logger installed