# ENERGY MANAGEMENT REPORT

SANTA MONICA-MALIBU UNIFIED SCHOOL DISTRICT

***Santa Monica-Malibu Unified School District***

**PREPARED FOR:**

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# Table of Contents

# Section 1: Observations & Action Items

## The Purpose of This Report

This report is an opportunity to evaluate the current status of energy consumption and costs for the School District and will track the District's performance long term. The report will be provided semi-annually and will serve as a tool to discuss and evaluate performance, review and implement policies, and identify opportunities for making further improvements.

The information presented herein is based on data collected onsite and online. Both utility and solar information is monitored and uploaded to help benchmark each school with fine details including weather effects, school construction, staffing, and scheduling. Energy data is monitored and analyzed for the overall District as well as for each site.

Recommendations are made upon analysis, observation, and experience. Any recommendation requiring changes to equipment, set points, or educational programs will be discussed with the appropriate District representative before implementation. Contact to outside vendors to request changes will not be made until approval from the District.

Additionally, please note that recommendations are made from the perspective of energy management and conservation. If measures are too disruptive or inhibit day-to-day activities, it is advised not to implement the measures or adjust in a way that does not compromise normal productivity. Implementation of these measures should be made at the discretion of the District.

## Observations

The site visits were conducted over three days at various times of the day. On **October 18th, 2018**, site walks were performed at Franklin Elementary and Santa Monica High School (SAMOHI) between 5pm and 7pm while classes were not in session to get a sense of unoccupied usage. **On February 19th and February 21st from 9am-3pm**, site walks were performed during the day while classes were in session to understand general energy behaviors and to see if there were any identifiable equipment or controls issues.

During the night site walks, temperatures ranged from the high 60s to the low 70s. Santa Monica-Malibu USD was outside of normal classroom hours and the schools were occupied only with afterschool activities and childcare. The sites were therefore only running a partially occupied HVAC schedule.

The remainder of the schools were visited on February 19th and 21st during the day. During these site walks, temperatures ranged from the high 40s to the high 50s. The weather was sunny on the 19th, and cloudy with some rain and hail in Malibu on the 21st. SMMUSD was in session during the site walks and was running a normal occupied HVAC schedule.

## Site Observations and Actions

### *Franklin Elementary (Oct 18th, 2018)*

- New air conditioning units were being installed on classrooms which previously did not have any energy-consuming cooling.
- New AC units were controlled with standalone, programmable thermostats. However, since the units had not yet been full commissioned, programming on thermostats had not yet been implemented.
- In the parking lot at Franklin were on at 5pm while it was still light outside. **Action Item: Check timers on parking lot lights to ensure they only used during darkened hours (e.g. 7pm in the summer, 6pm in the fall)**
- **(1) Beverage vending machine** was found at the office without a vending miser.
- The front office and one of the classrooms had Keurig and other coffee makers. The Keurig in the front office appeared to be on standby during the site walk.

### *Santa Monica HS (Oct 18th, 2018)*

- SAMOHI's backstage area of Barnum was fully lit despite most areas being unoccupied. **Action Item: If possible, turn off hallway lights in areas not being used.**
- All exterior lights at SAMOHI in front of and throughout the Innovation building were on and were stated by staff to generally be on until at least 11:30pm.
- Old Technology building had been demolished and the ground leveled for construction of new parking garage structure and building.

### *John Muir Elementary (Feb 19th, 2019)*

- Venstar thermostats were found in the portable classrooms (**Rooms 1 and 2**). Thermostat schedules were set from 6:30am to 5pm at 74°F cooling/69°F heating and without holidays set. **Action Item[1]: Set holidays for spring and summer break of thermostats to limit usage while not occupied. Connect thermostats to wi-fi and add to Venstar Skyport of online control access.**

### *Will Rogers Learning Community (Feb 19th, 2019)*

- Thermostats in workroom and Room 402 showed low battery and were not operable during the site walk. **Action Item: Replace thermostat batteries in both rooms.**
- Multiple doors were left open while the heater was on. Since the thermostats at the school are located next to the doors, they are especially susceptible to the temperature difference between the outside air and room temperature.

[1] Action Items recommended to the District are in **bold font**

*John Adams Middle School (Feb 19th, 2019)*

- Thermostats in Library showed low battery and were not operable during the site walk. **Action Item: Replace thermostat batteries in Library.**
- (2) Beverage vending machines were found without a vending miser.

*Grant Elementary School (Feb 19th, 2019)*

- (2) Wall pack light fixtures were on during the day (see Section 2: Site Pictures for locations). **Action Item: Adjust timers so that exterior lights are only operating at night when needed.**

*Edison Language Academy (Feb 19th, 2019)*

- Thermostat in Library set to "hold" 72°F for heating. **Action Item: Set programming so that thermostat only operates during the weekdays from 7am-3pm.**
- **All exterior canopy lights on during the daytime** outside of rooms 200-205. **Action Item**: **Repair or recalibrate photocells and timers so that exterior lights only operate at night when needed.**

*McKinley Elementary School (Feb 19th, 2019)*

- (1) Small Chefman mini refrigerator found in classroom. This refrigerator uses about 230 kWh ($30/year) per year to cool the equivalent of about 6 six cans of soda.
- Several thermostats in classrooms were updated with the incorrect date and time.

*Lincoln Middle School (Feb 21st, 2019)*

- (2) canopy fixtures were on during the day. **Action Item: Adjust timers so that exterior lights are only operating at night when needed.**
- Hallway and classroom doors were left open while the boiler system was running in the main office/classroom building.
- (3) vending machines were found throughout the school. (1) beverage vending machine near the gymnasium was unplugged and not used, while (2) vending machines were plugged in and operational in front of the office building.

*Roosevelt Elementary School (Feb 21st, 2019)*

- Thermostat in Room 35 had a low battery and was not operational at the time of the site walk. **Action Item: Replace thermostat batteries in Room 35.**
- Thermostats in Auditorium and Library had notification for filter replacement. **Action Item: Check filters in these areas or check filter change schedules and replace filters if necessary.**
- Several arrays of lights were on for safety purposes in longer hallways, while others were not. **Action Item: Given that there was significant daylight, and the corridors without lights on were adequately lit, it if recommended to turn the hallway lights on only during the night when needed.**
- (2) Mini fridges were found in Rooms 35 and 23.

*Webster Elementary School (Feb 21st, 2019)*

- Office door was left open while heater was running at 85°F heating. **Action Item: Encourage closing doors throughout the school while heater is on or lowering heating set-point**
- Multipurpose Room/Cafeteria had lights on while unoccupied and there was enough daylighting.

*Juan Cabrillo Elementary School (Feb 21st, 2019)*

- Classrooms have a large amount of window area but are not retrofitted with AC units. This leads to stuffiness and overheating in the spring and summer. **Action Item: Add curtains or shades to block sunlight during the warmer months to reduce radiant heat from the sun. While there will still be infiltration through the insulation, shade will reduce radiant heat and keep the room cooler. This works to reduce energy in AC-retrofitted classrooms as well.**

*Malibu High School (Feb 21st, 2019)*

- **Approximately (12) vending machines** were found throughout the school without vending misers.
- Exterior lights throughout the school were found to be on during the daytime while there was significant daylight. **Action Item: Repair photocells or tune so exterior lights are only operating at night when needed.**
- (1) Venstar thermostat was found in Administrative Office in portable building without holidays programmed. **Action Item: Program holidays into thermostats so that HVAC units are not running while the campus is unoccupied.**
- Thermostats in the following areas were not operational at the time of the site walks:
  - Room 103
  - Faculty Workroom (Room 101)
  - New Gym
  - Old Gym Office and Gymnasium areas

*Point Dume Marine Science (Feb 21st, 2019)*

- School had recently undergone power outage due to fires. Thermostat settings had been reset so that time, schedules, and set-points were off. **Action Item: Reprogram thermostats so that program runs only while schools are occupied.**

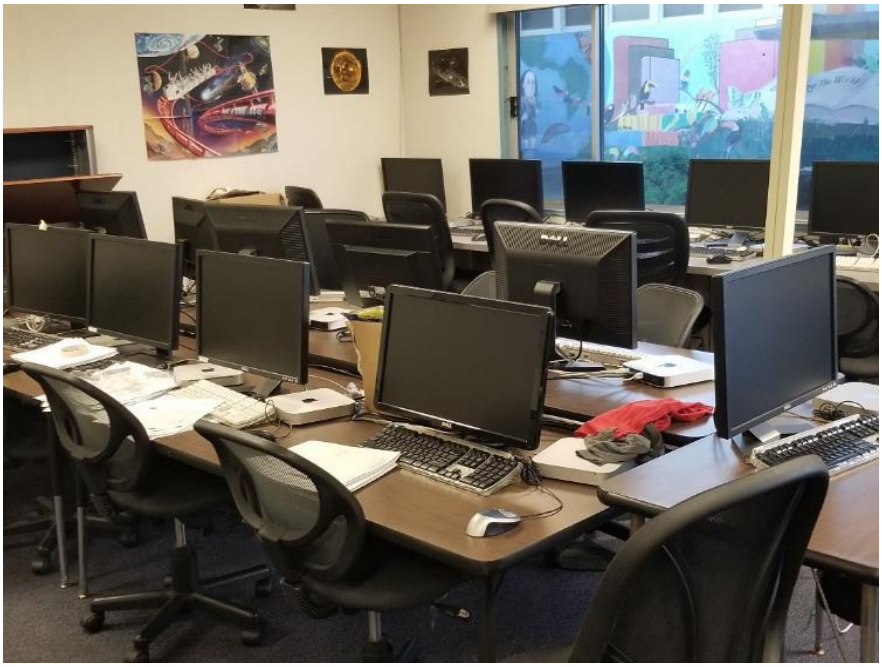
## General Recommendations

- **Confirm holidays are set** on the Energy Management System and programmable thermostats to run unoccupied set-points during extended breaks (spring, summer, winter). **Turn off** older manual thermostats.
- **Add curtains or window shades to rooms** with large amounts of window area**.** During the summer and fall, these rooms tend to heat up quickly due to a mixture of leak through the window insulation and radiant heat through the glass. This can be limited using shades or curtains.
- **Turn off lights in cafeterias with significant window area** through which sufficient outdoor lighting can come through.
- Ensure that programmable thermostats are set with appropriate schedules, not low on batteries, and have all the proper set-points limited accordingly.
- **Contact vendor** of Districtwide vending machines to check for possibility of **retrofitting older units with Occupancy-Sensing Vending Misers.** These can save up 50% of energy usage from these machines.
    - When running constantly with compressors at full speed, vending machines can use between **2,500-4,400 kWh/year to keep product cold, ($500-$900 per year)**.
- **Restrict or limit use of mini-fridges and coffee makers in individual classrooms for personal use**. Confining food storage to common break areas with full-size refrigerators and more foot traffic allows for better energy use.
    - Each mini-fridge (~1.7-4.4 cu. ft) can use between 240-320 kWh per year **($50-65/year per unit**).
    - A full-sized refrigerator (~18 cu. ft) uses between **400-450 kWh for more than 4 times the storage space.**
- **Move heat emitting plug loads (printers, copiers, desktop computers, etc.) away from thermostats.** The proximity of these items leads to the thermostat sensing a higher temperature and overuse of the cooling system.
    - Keurig Coffee makers draw between 200-400W of power to maintain the temperature of the heating coils. If on standby throughout the day (8 hours/day, 5 days/week), the Keurig uses between **300-600 kWh/year per unit ($60-120/year per unit)**.
- **Set power settings on desktop computers** in computer labs so that they enter "standby" or "sleep" mode after a period of inactivity. Additionally, ensure that computers and unused plug loads (refrigerators, chargers, etc.) are **emptied and unplugged during extended breaks**.

# Section 2: Site Pictures

## 10/18/2018 – Franklin Elementary

*Exterior parking light on with adequate daylight.*



*Computer lab with all computers turned off. This is highly encouraged at the end of the day.*


*Keurig on standby after all staff had left for the day. It is recommended to turn these off at the end of the day so that the machine is not constantly using electricity throughout the night.*

## 10/18/2018 – Santa Monica High School (SAMOHI)

*Lights on in entire backstage while unoccupied. Though there was an event in the theater, it is recommended to turn off lights in areas that are unoccupied.*

*Construction site of new Technology building and parking lot.*


*Vending machines throughout Santa Monica HS without occupancy vending misers.*

## 02/19/2019 – John Muir Elementary/SMASH Alternative

*Vending machines throughout Santa Monica HS without occupancy vending misers.*



*Venstar thermostats in Rooms 1 and 2 without holidays scheduled.*

## 02/19/2019 – Will Rogers Learning Academy

*Exterior lights on throughout the school.*


*Doors left open while the heater was running. This was a common occurrence throughout the school.*

*Lights and projectors left on in empty classrooms.*

*Thermostat in office next to copier not working properly due to low battery.* ***It is recommended to change the battery on this unit or replace it.***

## 02/19/2019 – John Adams Middle School (JAMS)

*Classroom with shades on windows. This is recommended, especially in the fall and summer, in rooms with a large window to wall ratio to reduce radiant heat.*


*Thermostat in Library not working properly due to low battery.* ***It is recommended to change the battery on this unit or replace it.***

## 02/19/2019 – Grant Elementary School

*Mini fridges in classrooms for individual use.*

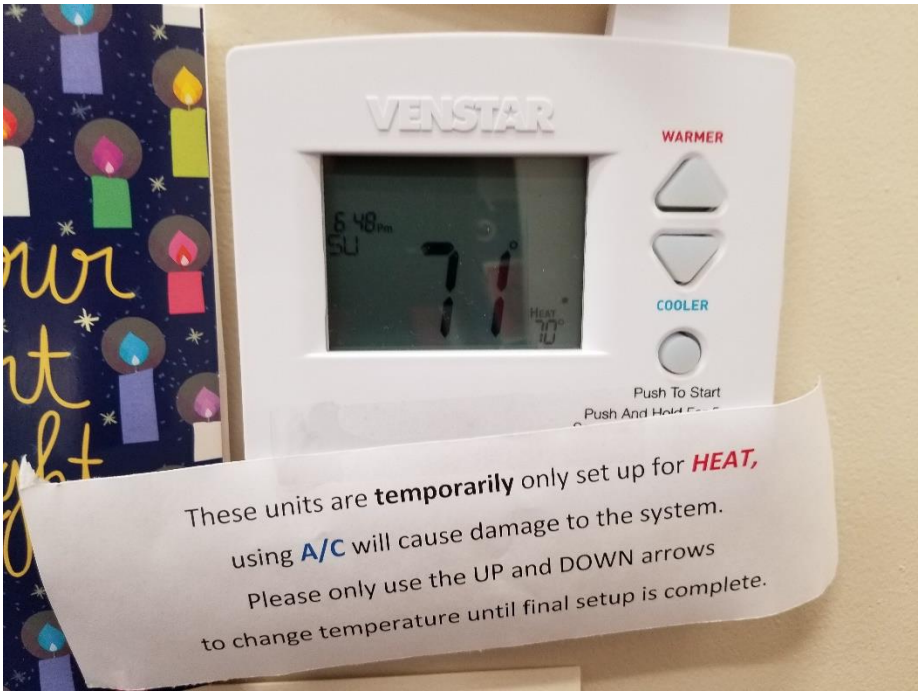

*Exterior lights on during the day due to a possible issue with the timer or photocell.*

## 02/19/2019 – Edison Language Academy

*Projectors left on while classrooms were empty.*

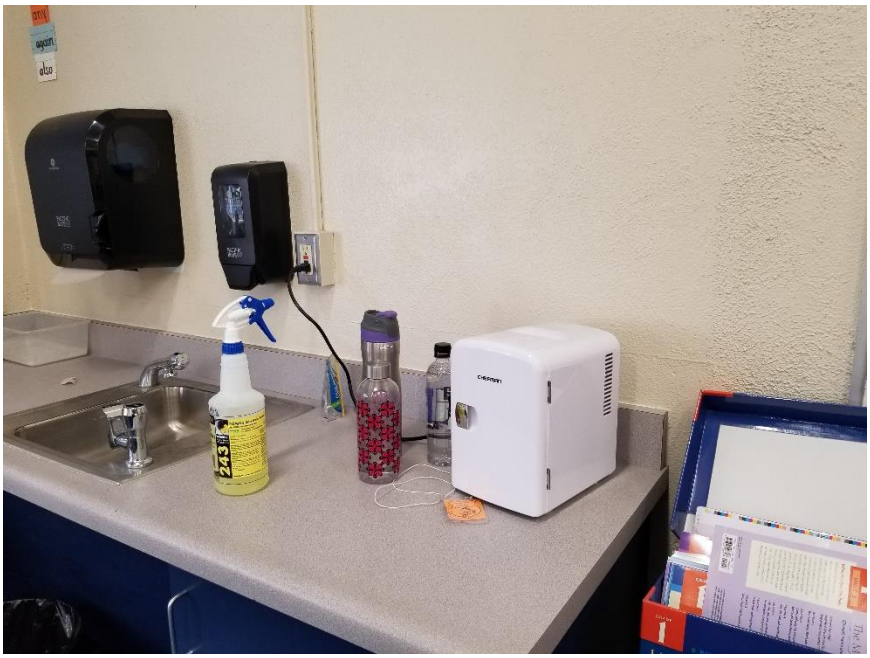
*Exterior lights on during the day due to a possible issue with the timer or photocell.*

## 02/19/2019 – McKinley Elementary School





*Thermostats programmed on the wrong date and time. If a thermostat is running a program, it is recommended to check at regular intervals that time and dates are correct.*



*Very small Chefman mini-fridge in classroom. This refrigerator has a very small capacity and only has enough storage room for (6) regular (12-Fl oz) beverage cans. It uses an average of 230 kWh/year (or $30/year)*

## 02/21/2019 – Lincoln Middle School


*Vending machines at Lincoln Middle School without vending miser retrofits.*


*Exterior canopy lights on during the day due to a possible issue with the timer controls*

## 02/21/2019 – Roosevelt Elementary School

*Exterior canopy lights on during the day. It was the mentioned that in the longer hallways, lights are left on for safety purposes. However, there were other lights that were not on and daylight appeared to adequate. It is therefore recommended to turn off these lights during the day.*

## 02/21/2019 – Webster Elementary School

*Office backdoor left open while the heater was set to 85°F. It is suggested to close doors while the heater is running or turn down the set-points to more reasonable levels.*

*Lights left on in Multipurpose Room/Cafeteria with large windows and curtains. This room could save significant energy in that during the winter, curtains can be opened so that electrical light is not necessary and during the summer and fall, curtains can be closed to block out radiant heat and save on cooling.*

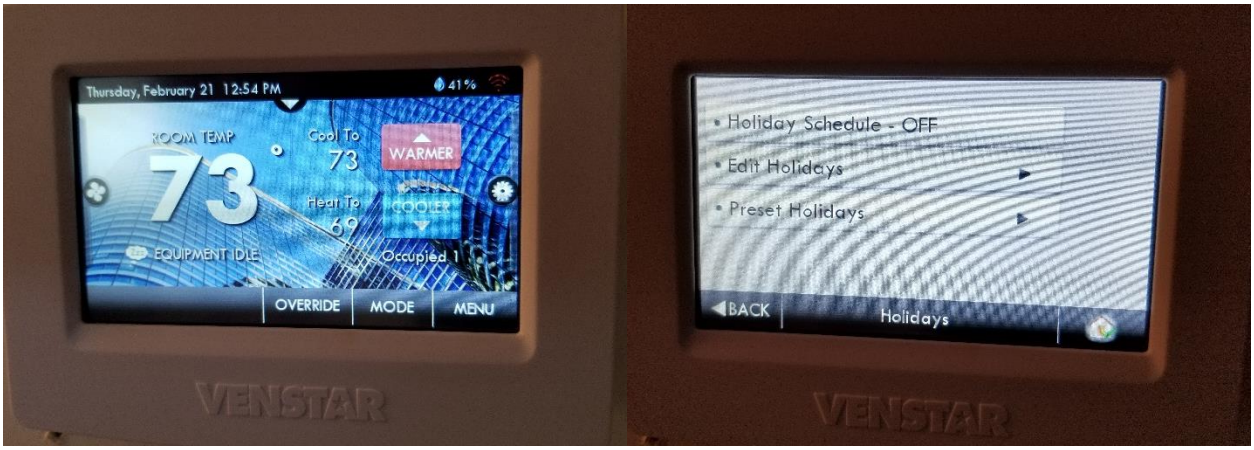
*Recently retrofitted exterior lights with photocell sensors.*

## 02/21/2019 – Juan Cabrillo Elementary

*Cafeteria with large windows and curtains. This room could save significant energy in that during the winter, curtains can be opened so that electrical light is not necessary and during the summer and fall, curtains can be closed to block out radiant heat and save on cooling.*

*Classrooms with large windows but without curtains. During the fall and summer, these classrooms tend to heat up due to the large window area. It is recommended to add curtains to save on cooling during the warmer months.*

## 02/21/2019 – Malibu HS

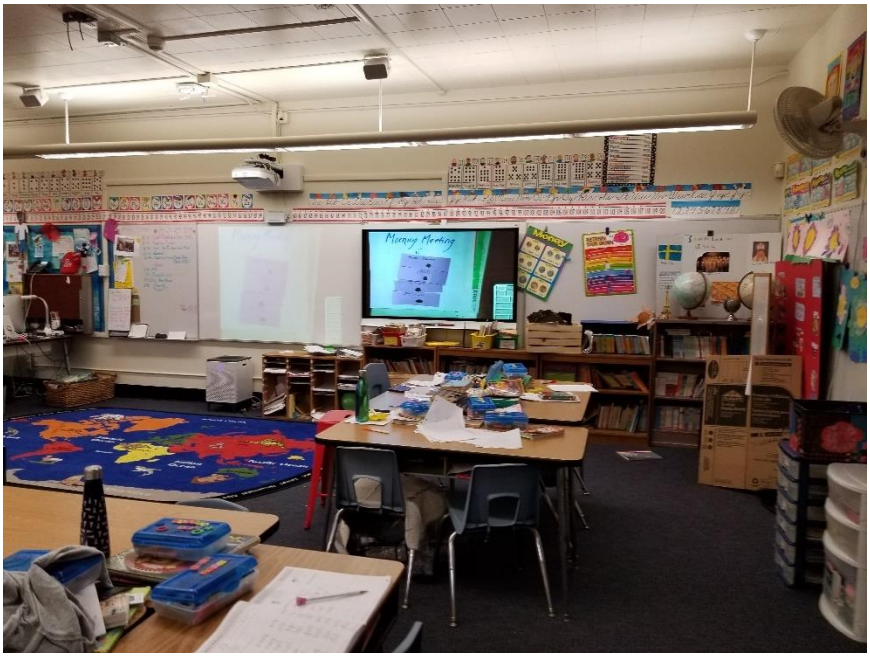



*Venstar thermostats in Admin Offices (portable building) not connected to Wi-Fi and without holiday schedules programmed.*

*Exterior lights on during the day outside of cafeteria and classroom buildings, possibly due to broken photocell or timer controls.*


*Thermostat in Faculty workroom not working properly.* ***It is recommended to change the battery on this unit or replace it.***

## 02/21/2019 – Point Dume Marine Science Academy



*Television and projector on while room was unoccupied.*

# Additional Information Needed

To expand the trend data and analysis of the District's energy usage, the following pieces of information are necessary:

## Next Steps

The following items will be completed upon gathering appropriate information:

- Submit all qualified sites for EnergyStar certification once EPA hold on certification has been lifted.