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# Energy Management Report

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SANTA MONICA-MALIBU UNIFIED SCHOOL DISTRICT

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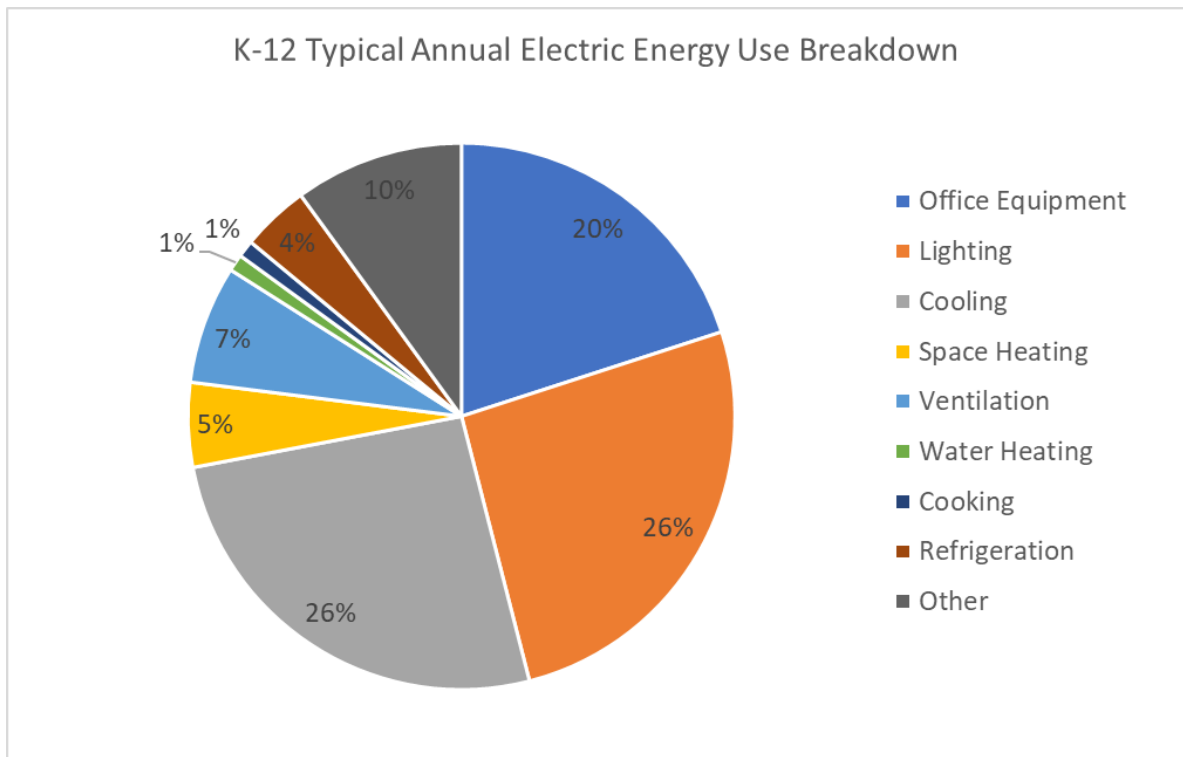
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## The Purpose of This Report

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

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 school representative before implementation. Contact to outside vendors to request changes will not be made until approval from the District.

The pie chart below shows a typical breakdown of annual electric energy use for K-12 schools. Because lighting, HVAC (cooling, heating ventilation), and electric equipment make up most electric use, this is where the focus is placed when trying to reduce overall electricity.



use.

## Section 1: Summary of Findings and Recommended Actions

### Summary of Findings

SitelogIQ performed site walks at Santa Monica-Malibu Unified School District on Thursday September 17, 2020. These site walks were conducted to:

- Walk site with SoCal Gas representative to determine possible reasons for high natural gas consumption at Edison Language Academy.
- Verify occupancy at schools during the distance learning conditions

Overall, the District showed good energy management practices in response to the school closures throughout the District. The following observations and recommendations are opportunities to further improve energy conservations during the District's distance learning conditions.

### Occupancy during Distance Learning

During the site walks, all main energy use areas were observed (classrooms, front offices, cafeterias, kitchens, computer labs, and libraries) to achieve a representative survey of energy use throughout the school. All sites were minimally occupied with front office staff and very few teachers. Based on discussions with administrative staff from site walks during August 18-19, schools were expected to be 30-50% occupied as teachers would have the choice to either teach from home or in their classrooms. Though only a small sampling of schools was visited, this estimate appeared to be an overestimate. For example, at Edison Language Academy, there were no teachers found throughout the campus, while at John Adams Middle School, there were only two teachers in classrooms and three security staff at the front office. At Will Rogers Elementary, approximately 20% of teachers were teaching from their classrooms, which was the highest relative usage out of all sites visited. Santa Monica HS appeared to be sparsely occupied with the exception of construction occurring on the new buildings.

### Findings with SoCal Gas Representative at Edison Language Academy

Following concerns of high historical gas usage Edison Language Academy, the Sustainability Coordinator and SiteLogIQ went on a site walk with a representative from SoCal Gas at this location. The goal was to determine possible reasons for high gas usage at this location and correct if there was a potential misread of the meter.

## Natural Gas Usage by Month and Year

### Total Natural Gas Use by Month and Fiscal Year

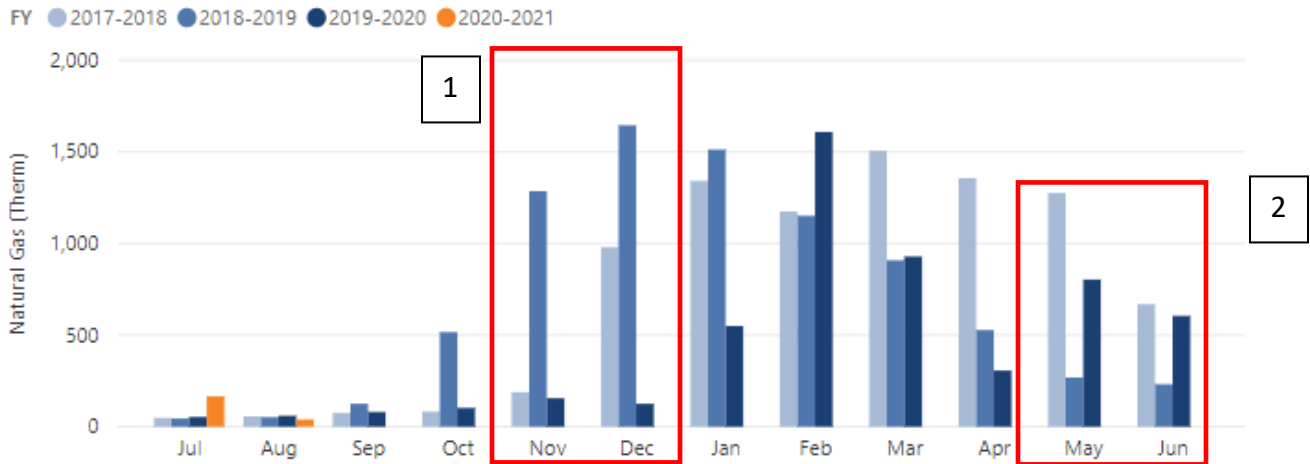


Figure 1. Monthly usage of natural gas energy consumption by fiscal year.

Natural gas energy consumption at Edison Language Academy has been consistently high in comparison to schools of a similar footprint.

1. As seen from the figure above, the highest usage generally occurs between November and February, though usage from year to year appears to be highly variable. For example, in November and December 2018, use was much higher than the November and December of 2017 and 2019. Weather data shows that the heating demand was a lot higher in 2019 than in 2018 during these months. This drastic difference indicates some of the natural gas equipment that may have been turned off entirely during these periods in 2017 and 2019.
2. Natural gas usage was much higher in the months of May, and June 2020, during which the school was closed with minimal activity, and the weather was not cold enough to warrant heating. This indicates most likely that the boiler serving the heating hot water line in the MPR/Cafeteria/Kitchen was in operation.



*Figure 2. Gas meter at Edison Language Academy.*

At the time of the site visit, there was no movement in the meter, indicating that there was little to no immediate usage when the meter was viewed.

### Sources of Natural Gas Usage

There were 3 main sources of natural gas usage at Edison Language Academy.

The first and most significant natural gas user is the heating hot water boiler on the roof of the multi-purpose room (MPR). This unit is sized at 1.2 MBtu and appears to serve the MPR, kitchen, cafeteria, and potentially the adjacent connecting rooms (offices and library). Since the boiler appears to be the largest-sized gas equipment in the school, the high usage during certain months is likely due to use of the boiler use for the space heating of the building. One possibility was the controllability and thermostat dead band assigned to the thermostat system in the kitchen and MPR.



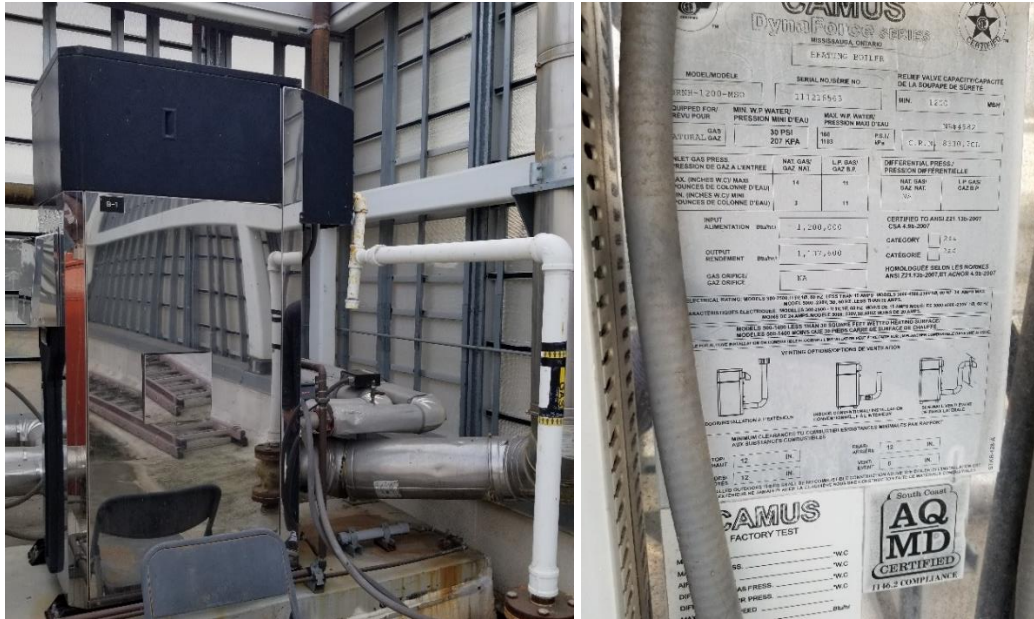


Figure 3. Boiler located on the roof of Edison Language Academy's MPR

The figures below show the thermostat and the range hood located in the kitchen. During the site walks, the thermostat was at a set-point (SP in the photo below) of 70°F. However, there was no indication of whether this was for heating, cooling, or both. Typically, when there is a single set-point on a thermostat controller unit, the system will attempt to keep it within the dead band range defined (e.g., for an SP of 70°F at a dead band of ±2°F, the cooling would turn on at 72°F and the heat would turn on at 68°F. The actual functionality of the thermostat was not confirmed during the site walks, as changing of the SP did nothing to activate cooling or heating.

Additionally, during the site walks, the range hood to exhaust fumes and bring fresh air inside was on, and there was not locatable switch to turn this off. This indicates that these fans are constantly running and bringing in outside air.



Figure 4. Thermostat and range hood in kitchen at Edison Language Academy

One possible explanation for months with increased gas usage is that there is the heating set-point during is not set back to cooler temperatures during off hours to reduce usage (e.g., at night thermostat set-points are changed to 50°F heating/ 85°F cooling). This can cause an issue if the range hood is bringing in cold air during the night. It is therefore imperative that either the range hood is turned off after hours or that thermostats are set back to unoccupied set-points in order to minimize heating and cooling.

The second piece of equipment noted using natural gas is the domestic water heater in the cafeteria. The unit present appeared to be a 100-gallon tank natural gas-fired unit. During the site walks, it was noted that the pressure relief valve (PRV) was leaking, possibly leading to consistent gas usage even while not in use. The unit was turned off during the site walk, which would limit the use of natural gas. However, the PRV would need to be replaced to stop the leak. This would account for between 20-60 therms per month, which is small in comparison to months of high gas consumption.

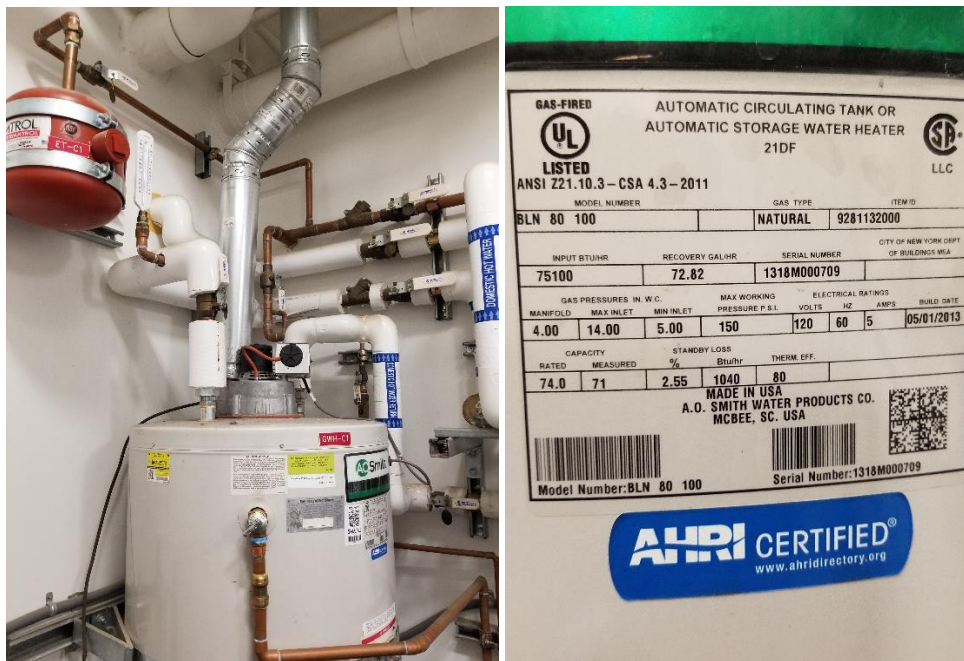


Figure 5. Domestic water heater located in cafeteria

Third, and least significant to the current conditions, is the presence of the gas appliances in the kitchen. During the site walks, the gas valves were open on the appliances with the pilot lights lit. While the usage is little to negligible, these were turned off during the site walks since areas were not being used.





Figure 6. Gas appliance connections in the kitchen.

### Observations and Recommended Action Checklist:

The following was observed during the site walks. **Bolded items are recommended action items given the distance learning conditions observed.**

Location	Check	Observations/Action Items
Edison Language Academy		At the time of the site walks, there did not appear to be any staff (front desk, teachers, or custodial) present at the school. However, since alarms were not set, it is likely that there was at least one person present on campus. Overall, it appears that the total occupancy was very minimal.
		The domestic water heater in the cafeteria was on, with the relief valve leaking consistently. <b>The water heater was turned off during the site walk.</b>
		Heating hot water boiler was used for space heating in at least cafeteria/MPR/ and kitchen areas. This was likely the reason for higher usage during off months in that thermostats within these systems were not being regulated. Thermostats were not capable of turning on the heat during the site walk.
		The exhaust circulation fan in the kitchen was constantly running, and no switch was found during the site walk. This may be leading excessive cooling of the area during the night times, causing heat to be cycled on. <b>It is recommended to check thermostat controls in these locations to ensure that there are schedules set or are turned to set-back set-points so that areas are not heated or cooled during the minimal occupancy.</b>

Location	Check	Observations/Action Items
John Adams MS		At the time of the site walks, there were only two teachers, indicating the majority of teachers are teaching from home in the distance learning conditions.
		<b>Unplug, defrost, and clean out commercial reach-in refrigerator and freezer in the kitchen if not being used for the remainder of the year.</b> Both units were completely empty during the site walks.
Will Rogers Elementary		Approximately 20% of the rooms were being used by teachers for distance learning.
		Milk serving fridges in the cafeteria were plugged in, empty, and running with doors left open. <b>Unless the school is being used as a hub for serving meals, it is recommended to unplug, defrost, and clean out refrigeration units</b>
		The refrigerator and freezer in the breakroom were mostly empty and plugged in and running. <b>It is recommended to unplug, defrost, and clean out one or both of these units.</b>
Santa Monica HS		Approximately 5% of teachers were teaching from their classrooms in the distance learning environment.
		Vending machines next to the Innovation building were unplugged, which was good, though the refrigerated vending machine appeared to be broken.

## Section 2: Pictures and Observations by Site

September 17th, 2020

The visit entailed identifying opportunities to reduce energy consumption during the distance-learning conditions.

### John Adams Middle School



*Figure 7. Commercial Refrigerator and Freezer left plugged in while empty and not being used. It is recommended to have these unplugged, emptied, and cleaned out while occupancy at the school is limited and common areas are not being used.*



*Figure 8. Computers in the library were turned off, and blinds were drawn. This shows good energy management practice.*

### Will Rogers Elementary



Figure 9. Older freezer left on and plugged in. It is recommended to have these unplugged, emptied, and cleaned out while occupancy at the school is limited and common areas are not being used.

### Santa Monica HS



Figure 10. Unplugged vending machines next to the Innovation building at SAMOHI. While this shows good energy management, the Pepsi machine appears to be broken and will need repair.