SANTA MONICA-MALIBU UNIFIED SCHOOL DISTRICT

Energy Management Training

Presented by

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IES Indoor Environmental Services

sitelogiQ

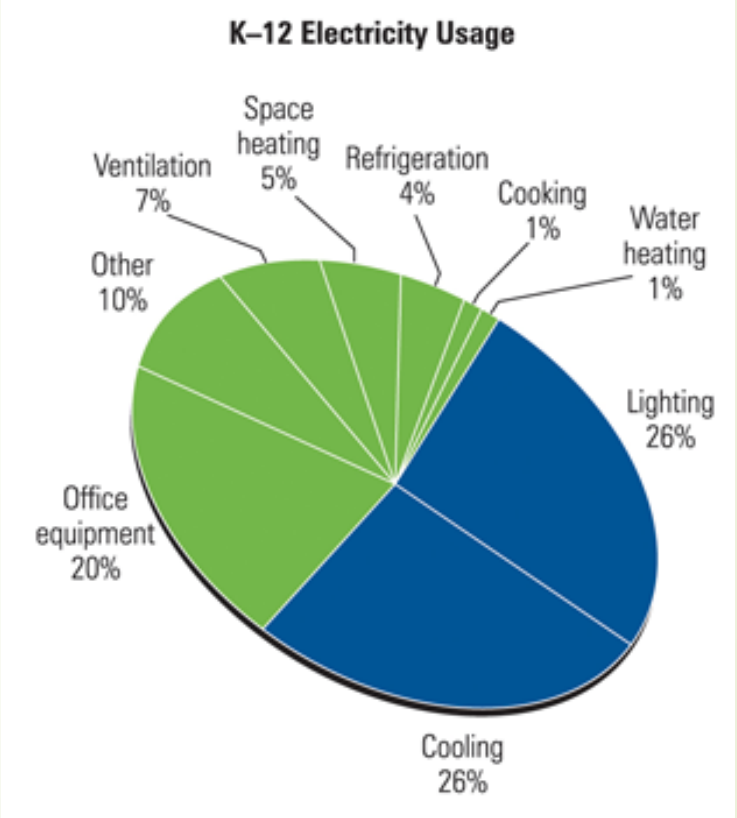
Efficiency Powered by Intelligence

Agenda

- 3 Ways to Reduce Energy Use
- District's Energy Overview
- Current and Future Utility Rates
- Observations from Last Site Visit – Behavioral Measures
- A Look at Controls-based Measures and Other Things to look for…
- SMMUSD Site Walk Quiz
- Basic Preventative Maintenance
- Questions and Discussion

Typical Energy Use in our Schools

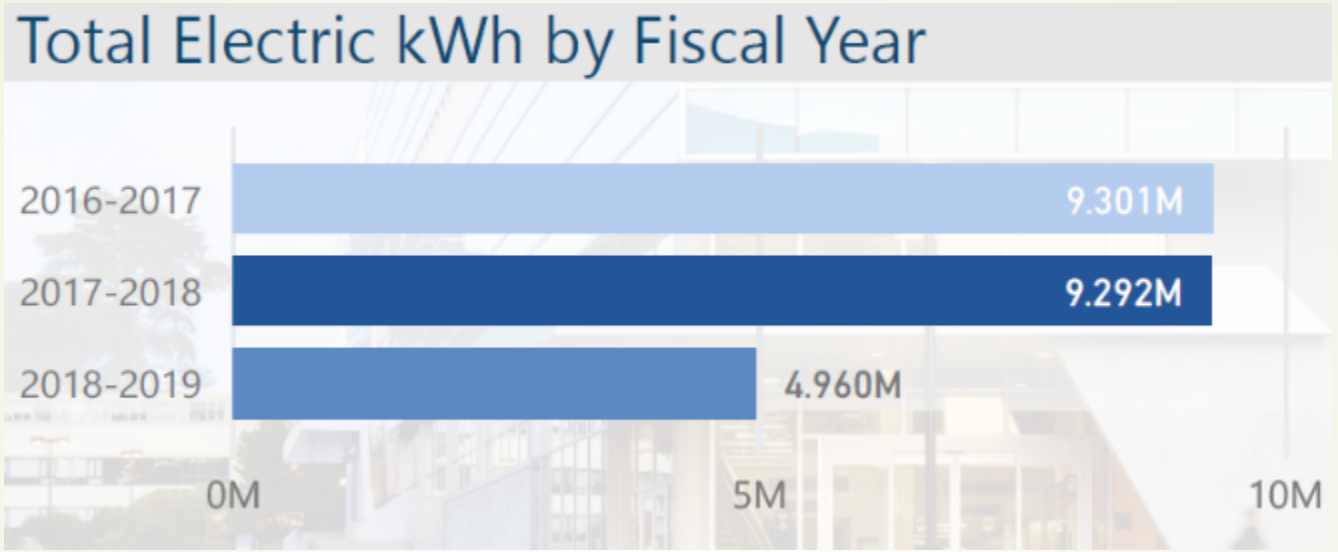
- The average public school building is 62 years old.
- Lighting, Cooling, and Office Equipment account for nearly 70% of school total energy use.
- Office Equipment constitute one of the top three electric energy end uses, after lighting and cooling.
- The cost of energy is one of the few things that can be reduced without negatively affecting classroom instruction.

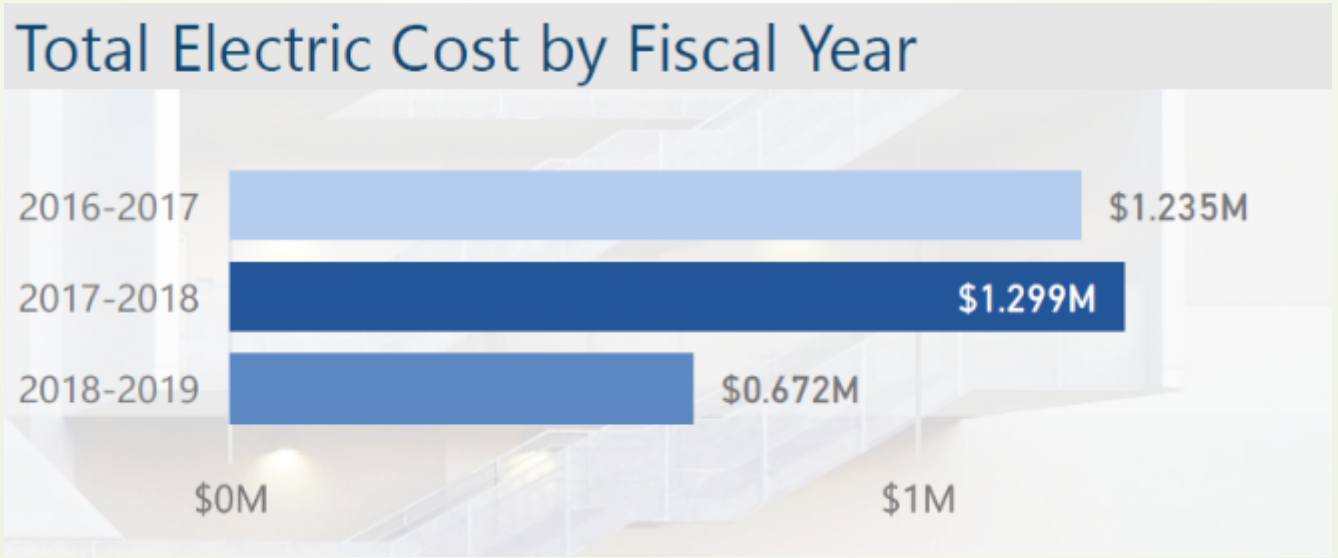


3 ways we can Reduce Energy Usage and Costs

- HVAC Controls
- Preventative Maintenance
- Behavioral Measures

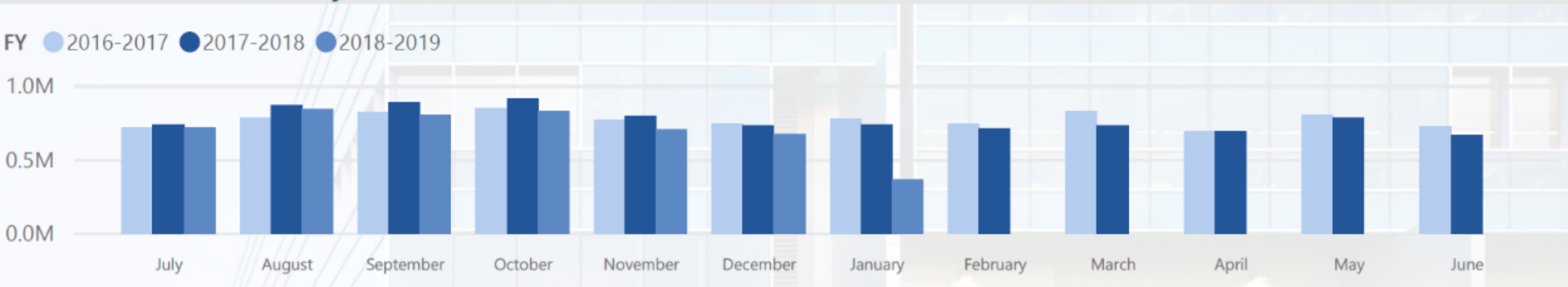
District Energy Overview - Annuals



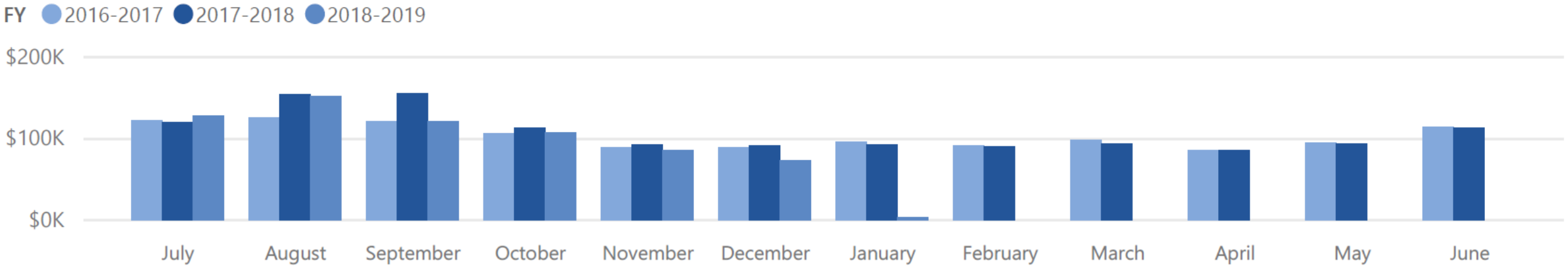


District Energy Overview – Monthly Profile

Total Electric kWh by Month and Fiscal Year

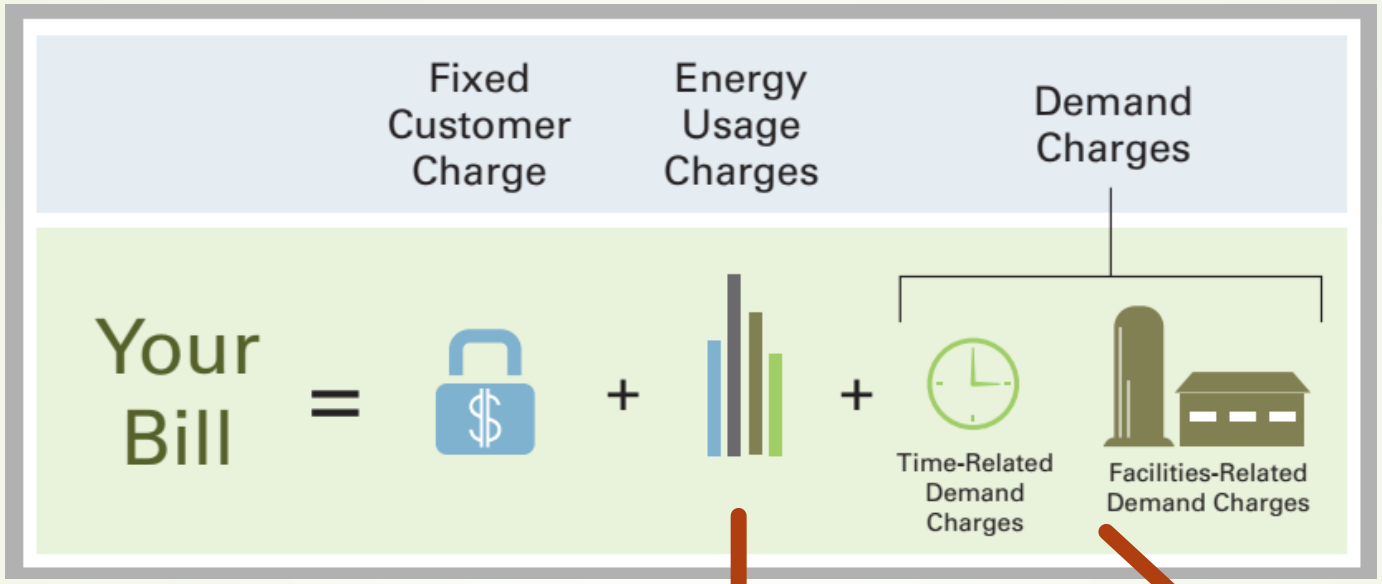


Total Electric Cost ($) by Month



*Please note that cost data is based on bills and the period they are delivered by the utility. Therefore, cost data for December and January does not yet represent the month's full electric utility cost.

How Billing is Determined

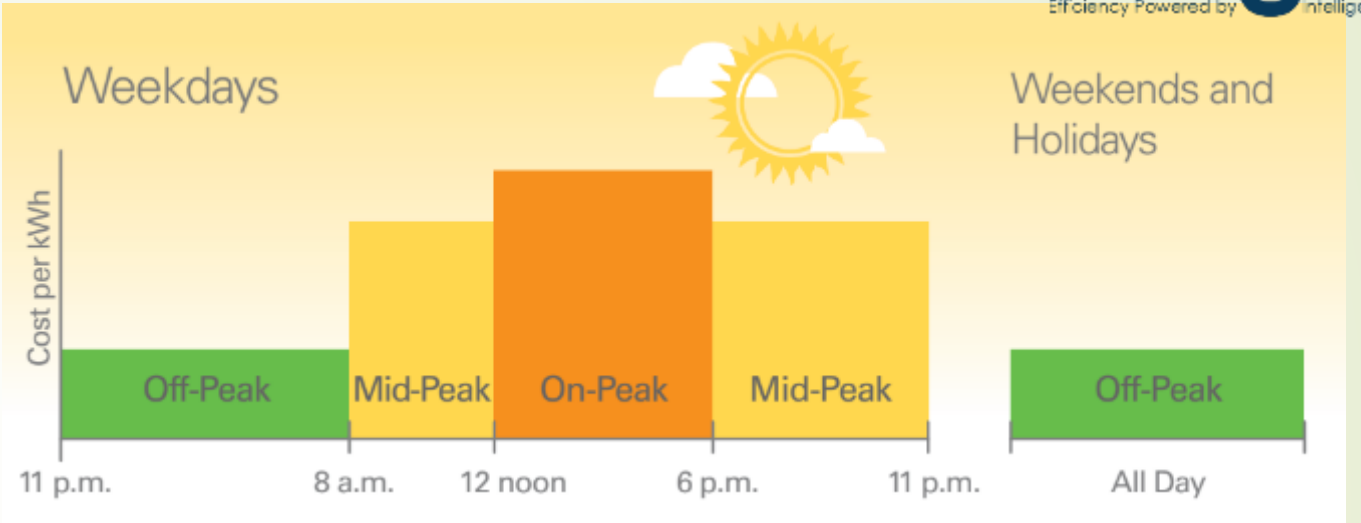


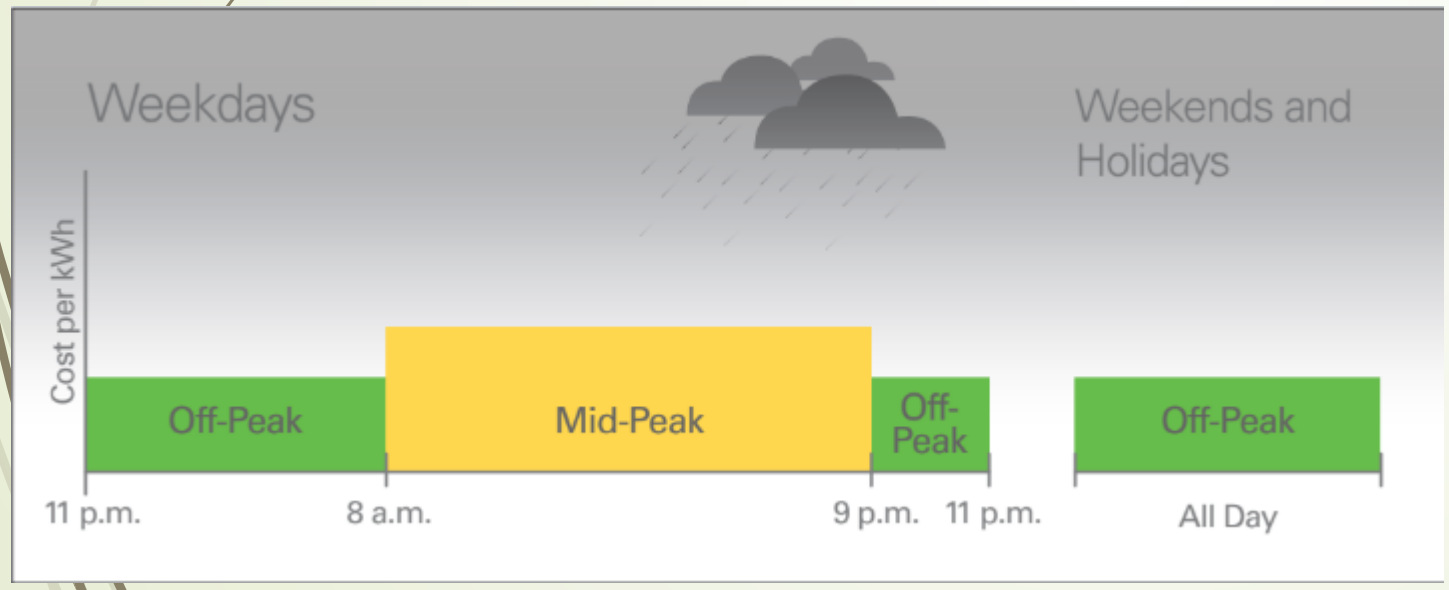
Total Energy Used

Energy Demands (Supply Needs)

Current Time-of-Use Utility Rate Structure

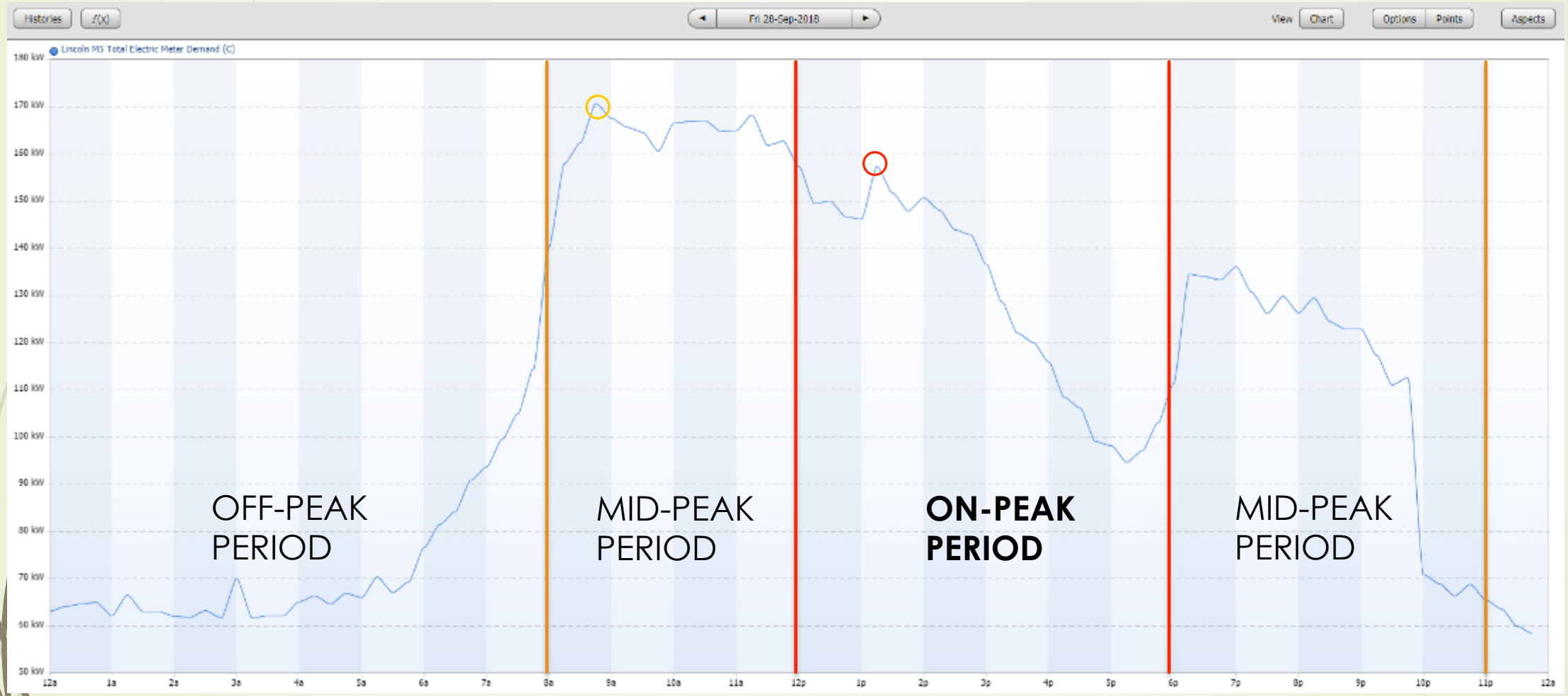
Summer Season
From June 1st to October 1st





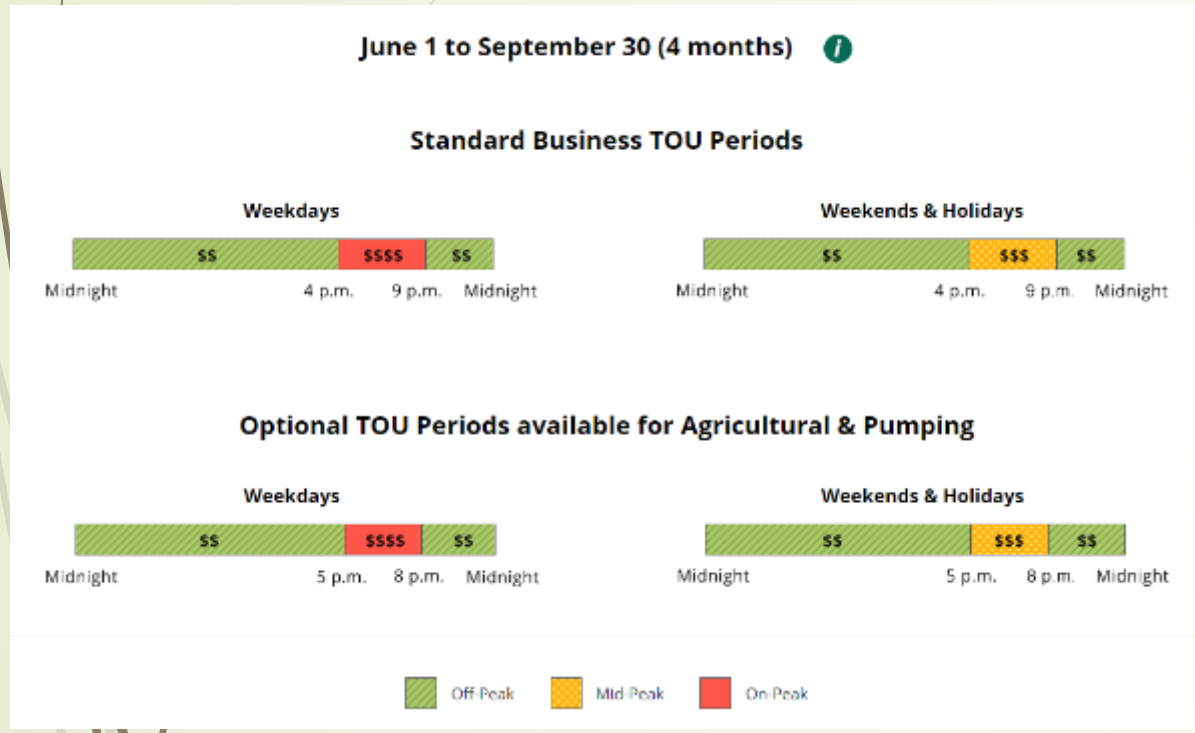
Winter Season
From October 1 to June 1

Power profile under current rate

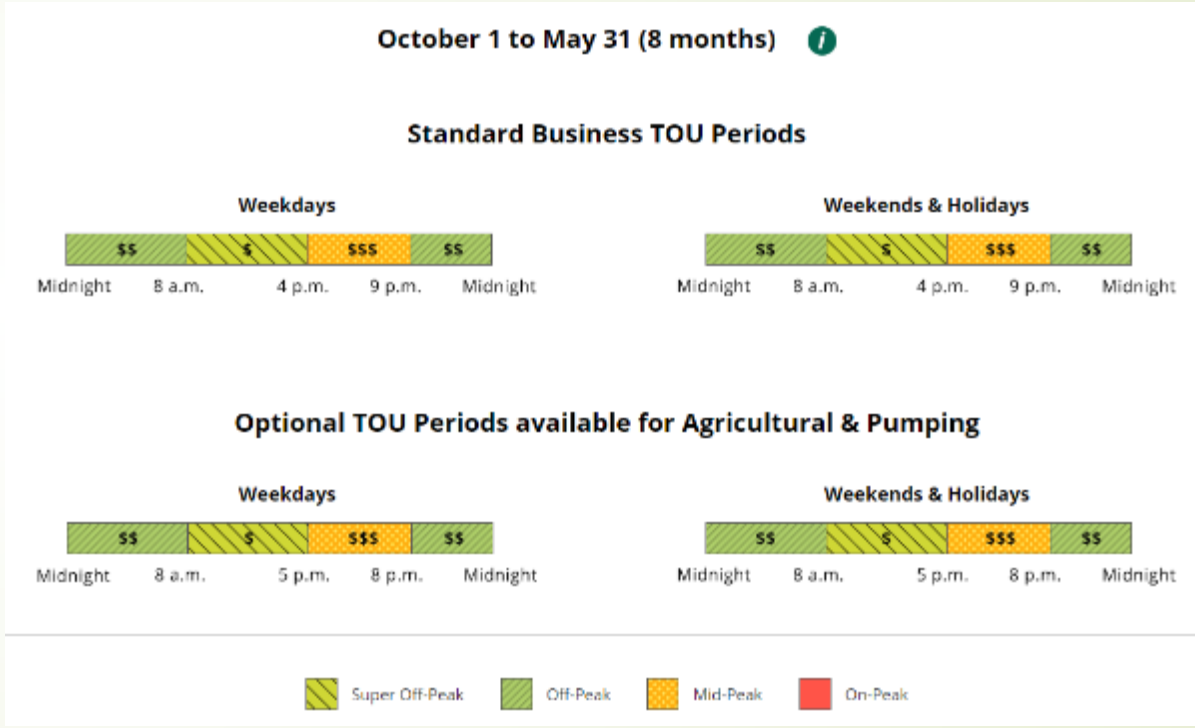


New Utility Rate Structure Starting March 2019

Summer Rates



Winter Rates



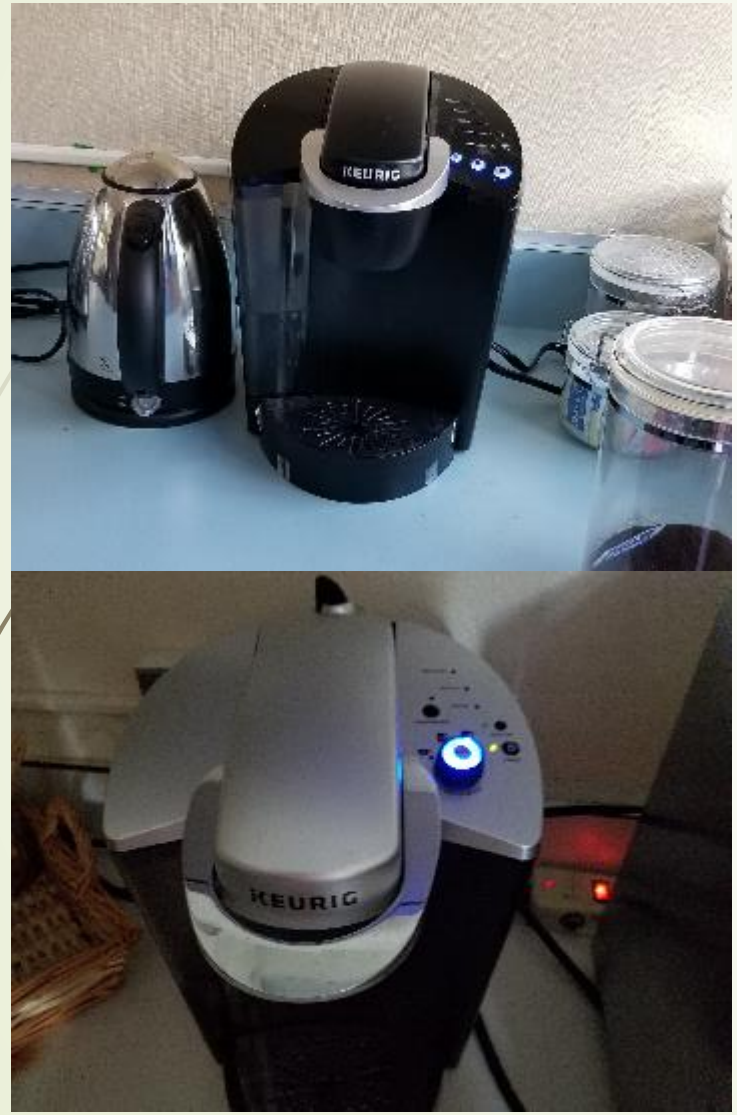
Power Profile under new rate

Why do we care?

- BIG SAVINGS if energy usage shifted to off-peak hours
- Change HVAC Schedules to off-peak demand costs if possible.
  - Use computer labs in the mornings and battery powered tablets in the afternoon
  - Charge equipment during Mornings or after school before 4pm
    - Examples: Tablets, Maintenance Carts, Walkie Talkies
    - Turn off charging station before lunch and Turn on charging stations before leaving for the day. (Applies to any charging equipment)

Observations during Last Site Walks

Site Observations



Multiple Keurigs were found classrooms throughout the District for personal use

Keurigs on standby use between 200-400W to maintain temperature of the heating coils.

Annually, this means **300-600 kWh/year** or **$75-150/year PER COFFEE MAKER** if on for 8 hours a day

Site Observations

Lights and projectors left on in empty classrooms

It may not seem like much energy, but it adds up!

Site Observations

And… on the outside.

Exterior lights on during the day

Site Observations

Doors left open while AC running

If you see a door open and hear a compressor running…

Close the door!

Behavioral Measures for Energy Conservation

- Make sure doors are closed while HVAC is running
- Turn lights off when room is empty
- Make sure projectors and computers are OFF at end of day
- Exterior lights should only be on when needed
- Turn off Keurigs and coffee makers when not in use

Other Energy Saving Items to look out for…

Other Energy Saving Items to look out for…

Vending machines without occupancy-sensing misers.

Other things to consider…

Vending machines without misers.

These use 2,500 to 4,400 kWh/year, equating to **$550-1,000** per unit per year.

Vending Misers save up to 50%.

Other Energy Saving Items to look out for…

Watch out for thermostat tampering!!!

Other Energy Saving Items to look out for…

- Too many high power plug loads in one outlet!!!
- Annual Energy Cost per Toaster (15-minute per day): $25-40/year
- Annual Energy Cost per Mini-fridge: $50-200/year

Other Energy Saving Items to look out for…

Modern reach-in storage refrigerators use between **1,400-2,000 kWh ($250-$400) per year**
Reach-in storage freezers use **3,500-5,000 kWh ($700-$1000)**.

Controls and Other Measures for Energy Conservation

- Add Vending Misers to Vending machines
- Look out for thermostat tampering
- Watch of excessive plug loads in outlets
- Unplug un-used refrigerators and freezers during breaks
  - Consolidate food products to one refrigerator & one freezer during break

QUIZ TIME!

What's the issue here?

What about here?

Here?

Last, but not Least…

Preventative Maintenance helps…

- Equipment run more efficiently and effectively
- Maximize the life of the equipment
- Keep everyone safe
- Reduces YOUR workload in the long run
- Saves energy!!!

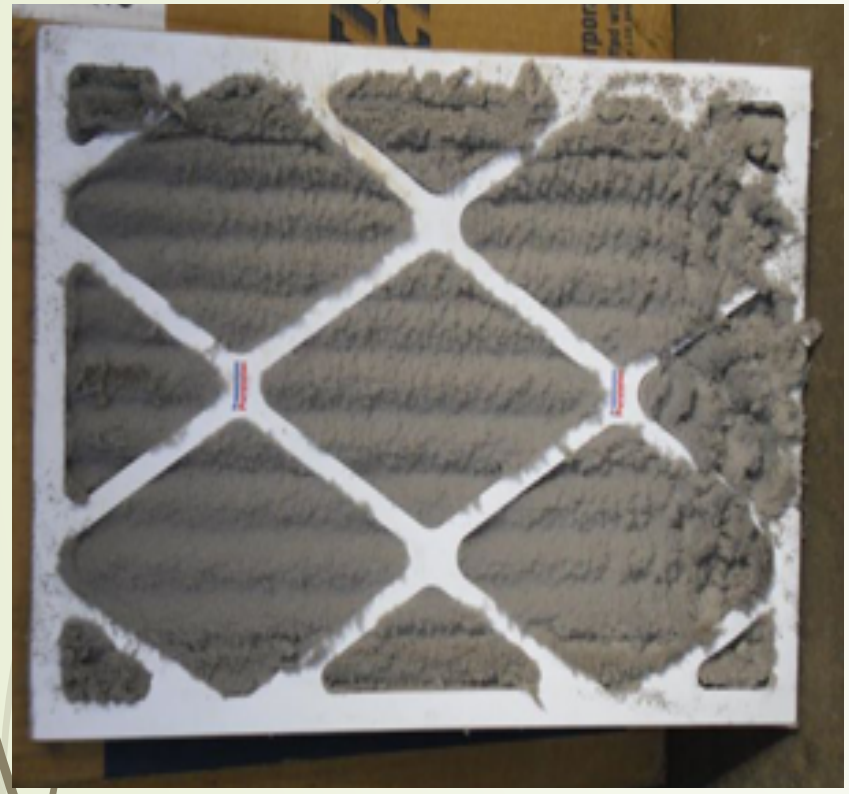
Lighting maintenance

PREVENTATIVE LIGHTING MAINTENANCE

Haphazardly maintained fixtures can fail to deliver energy savings and lower light quality.

- Confirm that exterior timers and photocells are functioning correctly. Make seasonal adjustments if necessary (longer nights during winter, shorter nights during summer)
- Inspect regularly and replace any burned-out lamps, ballasts, and/or drivers with new, like for like.
- Ensure that each replacement lamp has the same color temperature (i.e. 3500K, 4100K, 5000K).
- Ensure that each replacement ballast/driver has the same power/ballast factor (i.e. low, mid, or high).
- Consider group re-lamping. To create your re-lamping schedule, calculate lamp life and how often lamps are used. Group re-lamping should be done at 70% - 80% of rated life.
- Re-aim adjustable lighting as necessary.
- Lamps, reflectors, and lenses should be cleaned periodically as an accumulation of dirt will affect light distribution and performance.
- Since lighting elements can contain mercury or lead, it's imperative to safely store used bulbs until they can be removed by a certified vendor.

Filters



- HVAC Filters function to:
  - Remove contaminants from the air passing through the system
  - Protect HVAC equipment from dust that can increase operating costs
  - Play a role in the energy consumed to operate the system.
- Energy usage is based on the speed of the airflow: the lower the filter's resistance, the lower the energy consumption will be.

Dirty Evaporator (Cooling) Coil

- Evaporator coil in an AC unit collects dust and debris from outside air, blocking the intake and reducing air flow
- Reduced air flow across the coil means less air is being cooled, reducing the unit's capacity
- If air flow slows down too much, the condensate on the coil surface may actually FREEZE, completely blocking the coil.
- Freezing results from the rate of release of refrigerant into the evaporator coil, which was designed for sufficient volume of air to be moving across the coil to keep from freezing

Regular Maintenance Tasking Sheets

Maintenance Schedule

	HVAC Packaged Unit Occupied	J	F	M	A	M	J	J	A	S	O	N	D
1	Check Coil Condition		x			x			x			x	
2	Check Control Setpoints		x			x			x			x	
3	Change Air Filters		x			x			x			x	
4	Check Reversing Valve (HP)		x			x			x			x	
5	Check Condensate Pan/Drain		x			x			x			x	
6	Check Belts		x			x			x			x	
7	Check Fan Operation		x			x			x			x	
8	Check for Proper Fan Rotation		x			x			x			x	
9	Check Contactor & Points		x			x			x			x	
10	Check & Calibrate Safeties		x			x			x			x	
11	Check Evaporator Temperature Differential		x			x			x			x	
12	Check Electrical Connections		x			x			x			x	
13	Check Economizer Operation		x			x			x			x	
14	Check Motor Operation		x			x			x			x	
15	Check Heating Section		x			x			x			x	
16	Check Drive Condition		x			x			x			x	
17	Check for Bearing Play		x			x			x			x	
18	Inspect Alignment		x			x			x			x	
19	Lubricate As Required		x			x			x			x	
20	Replace Belts as Needed Annually					x							
21	Wash Condenser Coils w/Chem					x							

Work Needed:

Inspections are limited to Manufacturer access panels