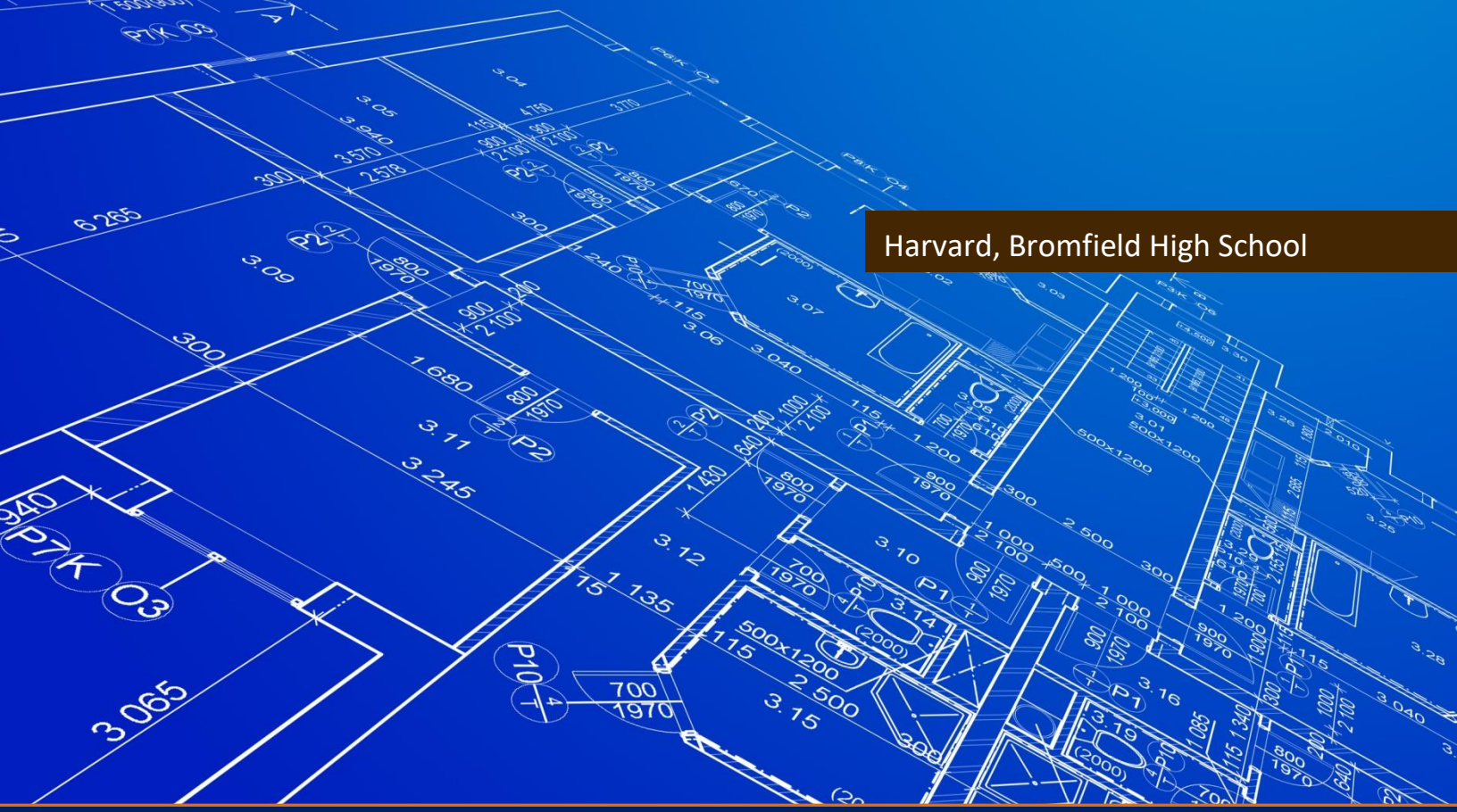


BLUEPRINT

for Better Building Performance

FALL 2016 – SNAPSHOT

October , 2016

PEREGRINE FOCUS

Introduction

This report presents our Fall 2016 snapshot report for Harvard's energy monitoring and building performance initiative at **Harvard's Bromfield High School**. The report builds on our May 11, 2016 initial report and updates our original findings and recommendations.

The report starts with a short update on the building's overall electricity and gas use in fiscal year 2016 (FY2016) compared to the baseline use in fiscal year 2015 (FY2015), as reported by the utility meter. The report then drills down into more detail about energy use based on monitoring data. Following are the key observations that we made as a result of reviewing both utility and monitoring data for winter energy use:

- **Electricity use at Bromfield High School has decreased by about 9%.** Most of the electricity savings occurred during the winter. Installing a new variable speed drive appears to have been a major source of the energy savings. Warmer weather this winter may have also contributed to these energy savings.
- **Natural gas use at Bromfield High School has decreased by about 22%.** The weather-adjusted gas use decreased about 6%. This past winter was significantly warmer in FY2016 than the base year FY2015.

RECOMENDATIONS

The following graphs and charts report identify equipment that can potentially be scheduled more aggressively. Harvard should continue to review opportunities to turn off or turn down this equipment. The following charts and graphs highlight recommendations to reduce energy use for:

a) Major HVAC equipment

b) Old School electrical subpanels

c) Lighting

d) Kitchen equipment

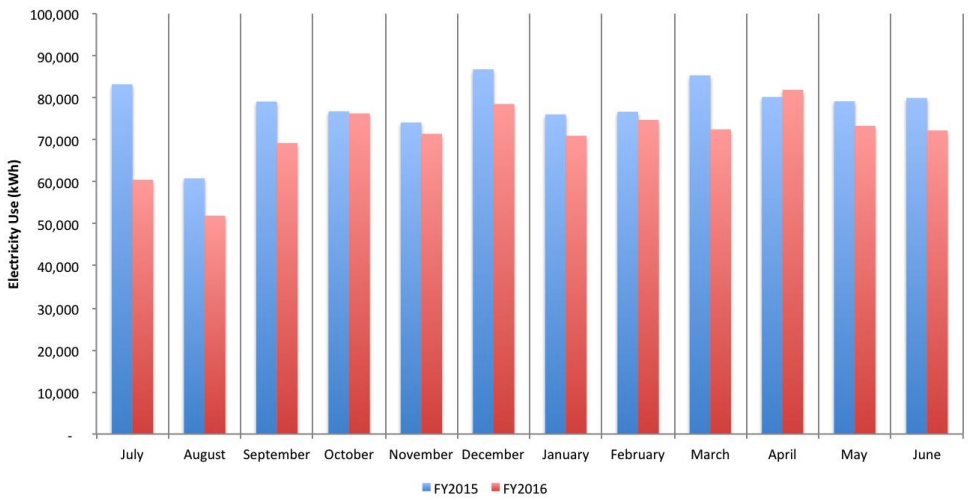
e) Computers

APPENDICES

At the end of the report we include one appendix titled **Appendix A Monthly Electricity Use Grouped by Major Categories.** Appendix A lists each circuit organized by major category group and subgroup. The charts include total electricity use per month per circuit from January 1, 2016 to September 30, 2016.

Utility Data: Total Electricity and Natural Gas Use

Electricity Use **Bromfield High School**

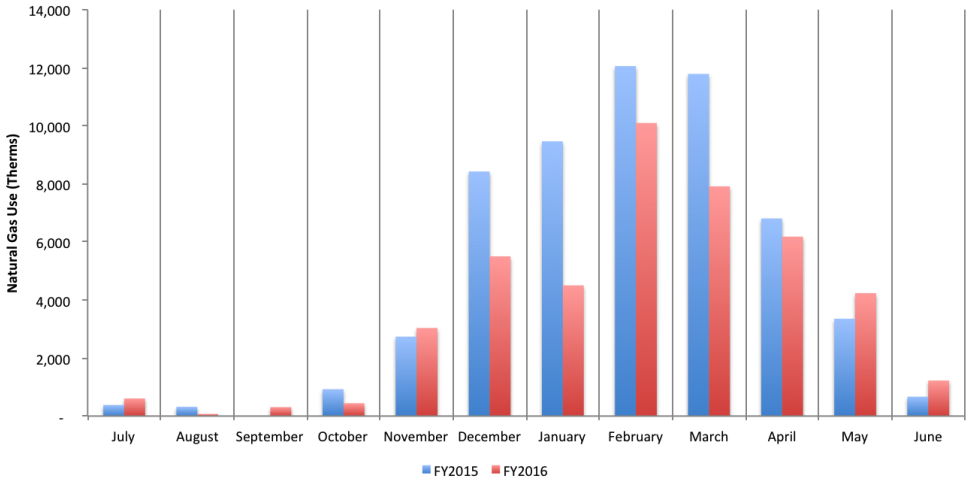


Electricity Use Table

Month of Date	Use (kWh) FY2015	Use (kWh) FY2016	Change (%) FY2016
July	83,192	60,487	-27%
August	60,819	51,932	-15%
September	79,084	69,209	-12%
October	76,758	76,267	-1%
November	74,102	71,406	-4%
December	86,756	78,505	-10%
January	76,021	70,941	-7%
February	76,667	74,721	-3%
March	85,319	72,476	-15%
April	80,182	81,872	2%
May	79,156	73,305	-7%
June	79,946	72,213	-10%
Grand Total	938,002	853,334	-9%
2015/2016 12-month Target		833,282	-5%
Energy Intensity			
kBtu/ Square Foot	17.7	16.1	-1.6

This page presents electricity (top) and gas (bottom) use for the entire building as measured by the utility meters and compares energy use for FY2016 with FY2015. At the bottom of each table, the FY2016 target savings are visible in grey, just below the actual savings. Electricity use shows improvement with a target savings of 5% and actual savings of 9%. While actual gas use appears as a 16% decrease, the weather-adjusted performance sits at the very bottom of the Natural Gas Use table and shows a 6% decrease in gas use. The energy monitoring initiative did not begin until January 2016.

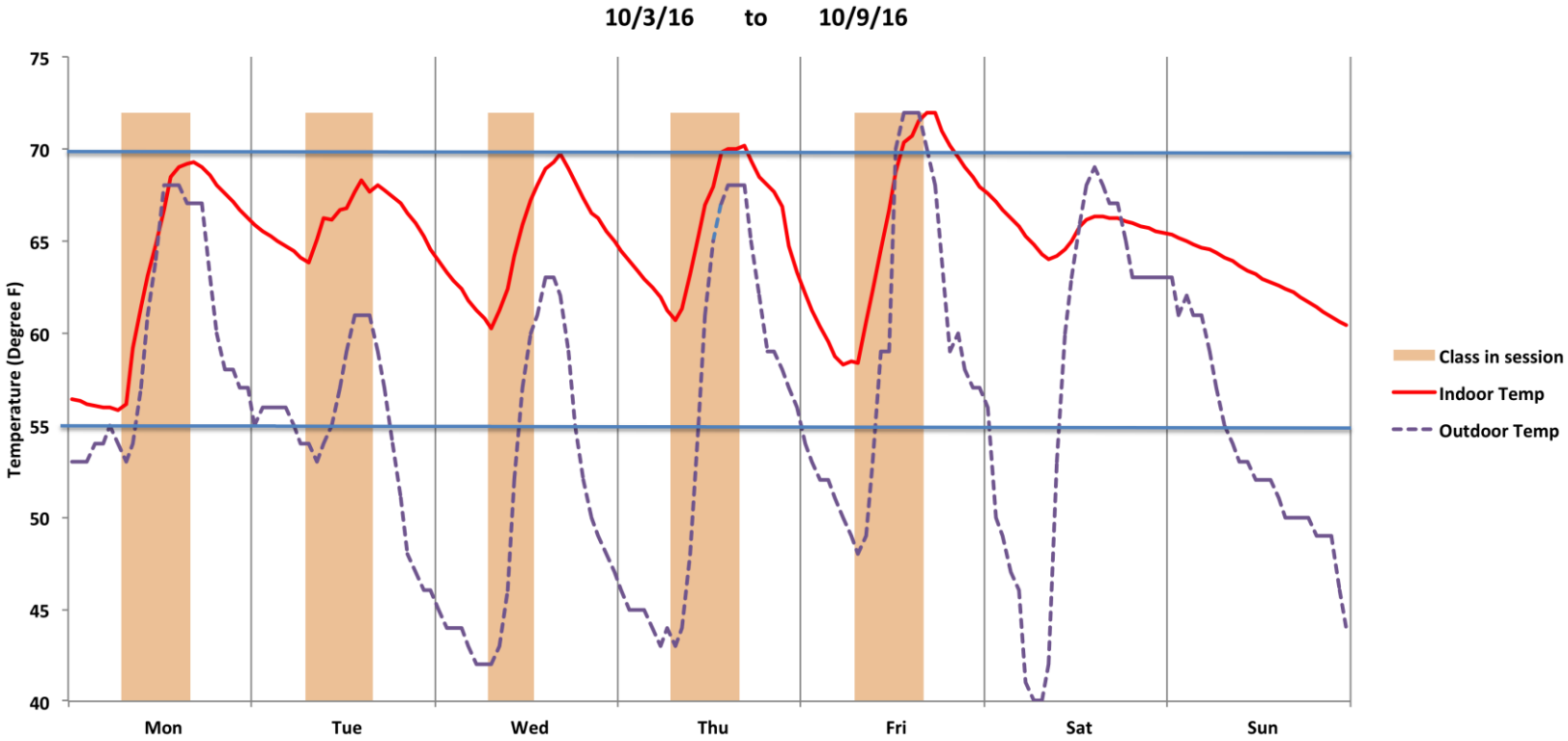
Natural Gas Use **Bromfield High School**



Natural Gas Use Table

Month of Date	Use (Therms) FY2015	Use (Therms) FY2016	Change (%) FY2016
July	382	606	
August	319	72	
September		308	
October	926	442	-52%
November	2,736	3,034	11%
December	8,424	5,502	-35%
January	9,464	4,502	-52%
February	12,056	10,096	-16%
March	11,786	7,914	-33%
April	6,808	6,181	-9%
May	3,353	4,235	26%
June	668	1,223	83%
Grand Total	56,922	44,115	-22%
2015/2016 12-month Target		54,076	-5%
Energy Intensity			
kBtu/ Square Foot	31.5	24.4	-7.1
Weather Adjusted Energy Performance			
Heating Deg Days	6,705	5,526	
BTU/SF/Deg Day	4.7	4.4	-6%

Room 290 Temperature

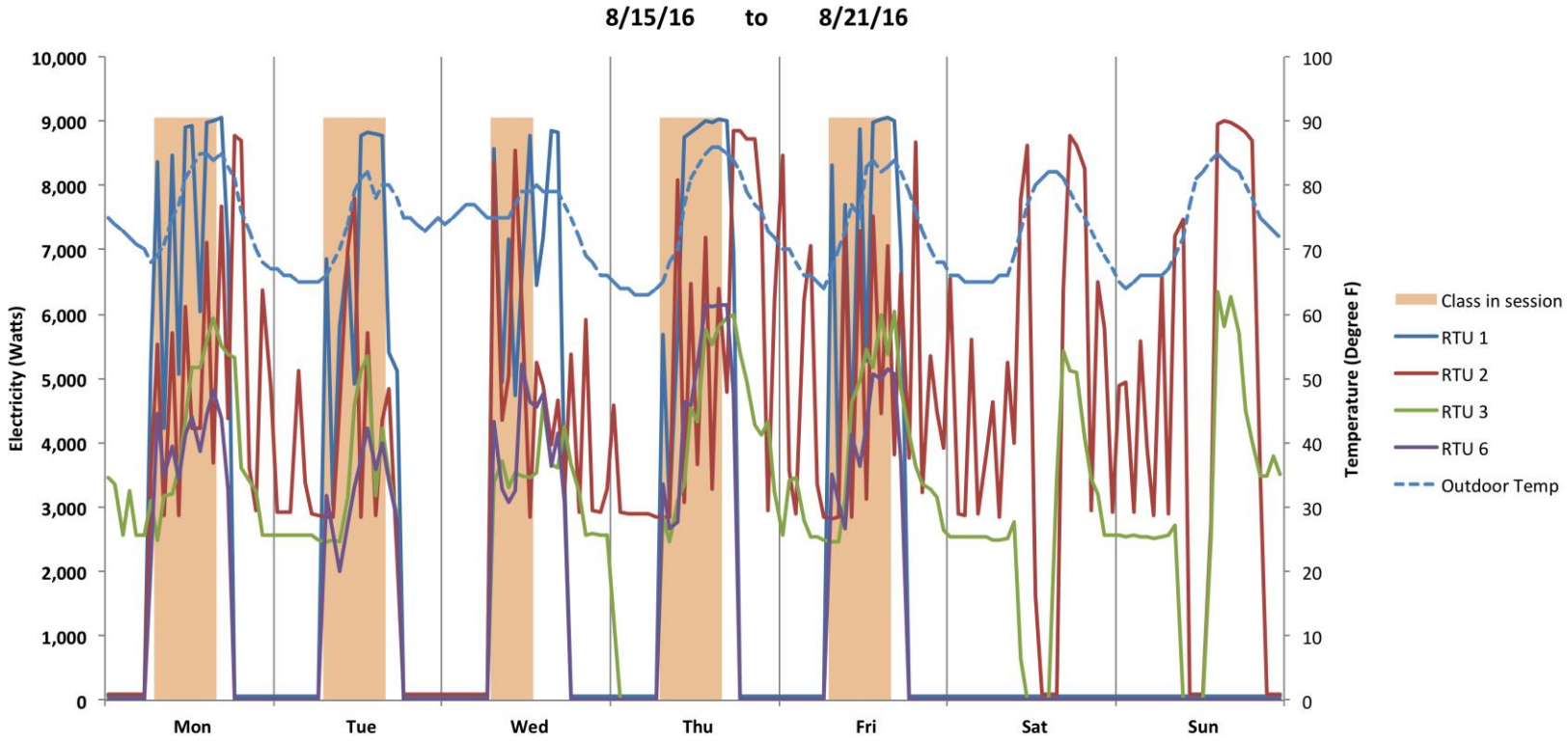


This chart above summarizes the indoor temperatures in classroom 290 for one week in October. The upper blue line represents our recommended target indoor temperature when class is in session. The lower blue line represent our recommended target indoor temperature when class is not in session.

We picked classroom 290 to monitor because it has been difficult for facility management to maintain consistent temperatures in this room. This classroom is located in the far corner of the school furthest away from the boilers. The temperature in the room during the week of October 3 to October 9 fluctuated between a low of 56 over the weekend to a high of about 72 on Friday afternoon. Temperatures remain below the target temperature of 70 Degree F. for several hours each day. The temperature swings in the classroom over the past 9 months have ranged from a low of 56 last winter and this fall on weekends to a high of 88 during the summer.

Temperatures we measured in this classroom are different than temperatures that we experienced in other parts of the building last winter. However, facility management may need to install supplemental heating or repair the existing system in order to reduce overheating in the rest of the building.

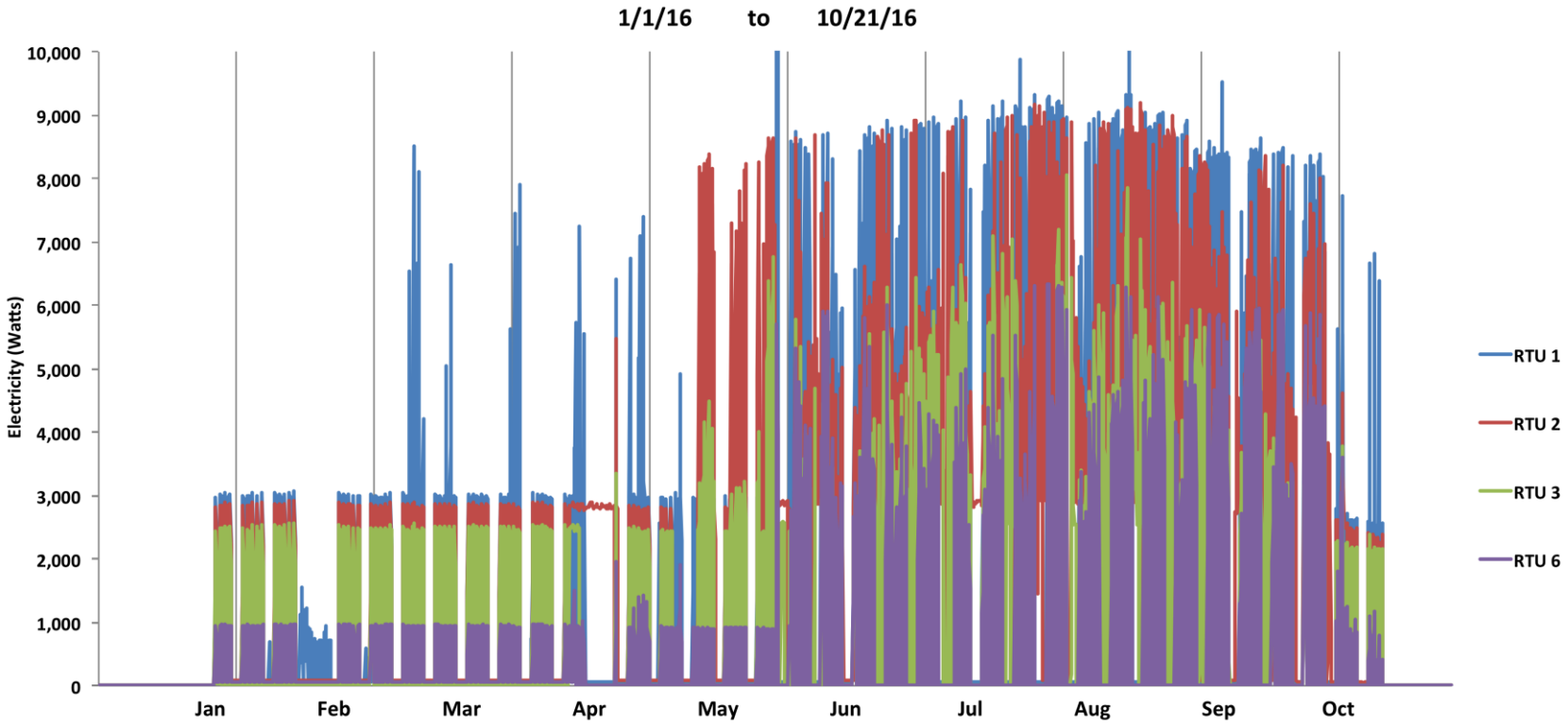
HVAC – Rooftop Units



This chart highlights energy use for the four rooftop units (RTU) we're monitoring that serve the Library. The chart on the following page shows the energy use trends for the past nine months. Condensers in the RTUS run in the summer to provide cooling for the library and irculation fans run year round to distribute conditioned air to the library.

Are the summer hours for the library the same as the winter hours? We've assumed so for this graph. On Tuesday, all the RTUs turn off at night. However, every other night at leat one RTU remains on. What are the control strategies and sensor settings that are used to operate these RTUs and their associated heat recovery units? Harvard should relocated the sPod CO2 remote monitoring sensor to the Library next summer to document indoor environment conditions in the Library and determine if the controls can be reset to operate less often when the Library is unoccupied.

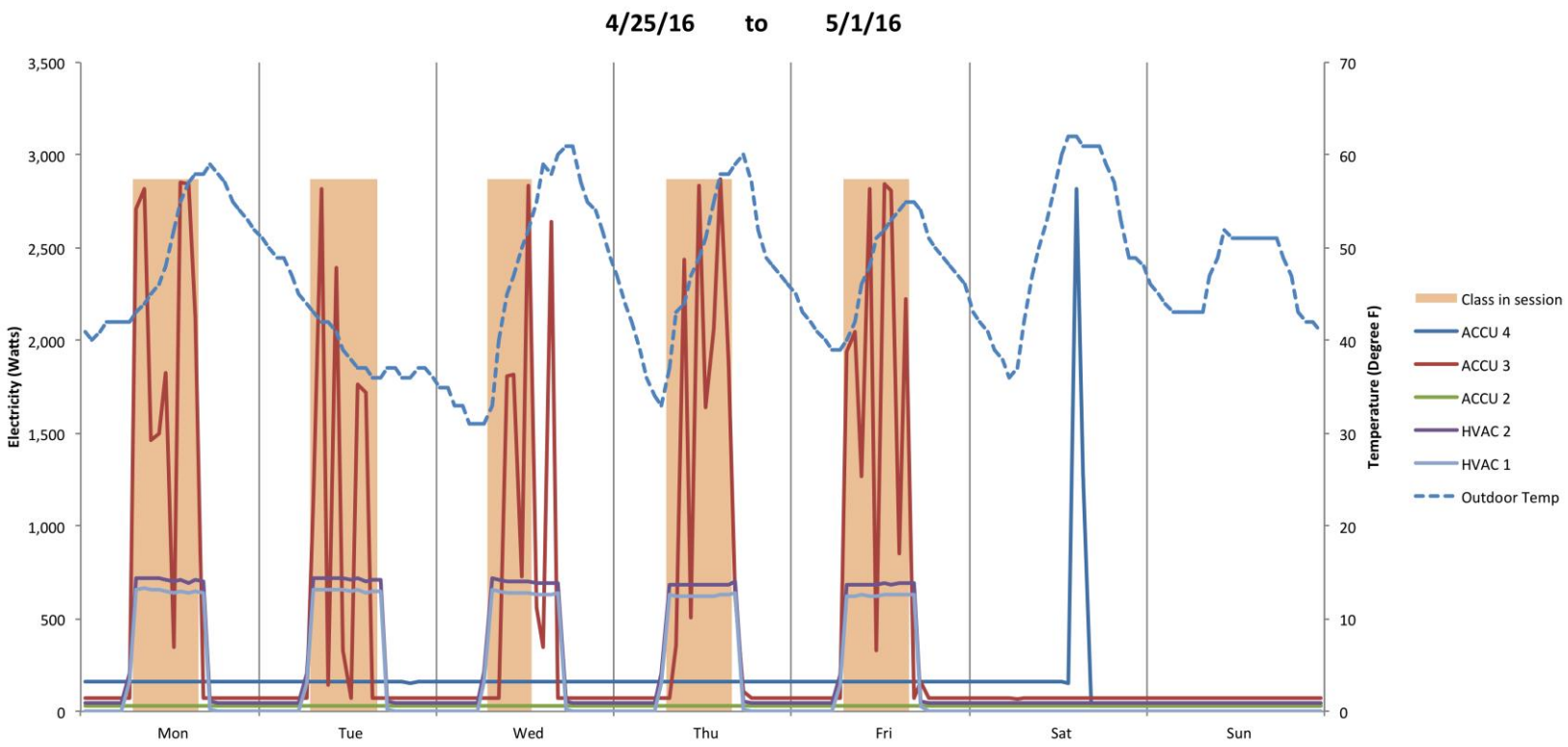
HVAC – Rooftop Units



The Chart above is the 9 month trend profile for the 4 RTUs that serve the library. The table below is the monthly energy use in kWh for these RTUs.

Description	Category	Sub Category	February kWh	March kWh	April kWh	May kWh	June kWh	July kWh	August kWh	September kWh	Total kWh	Electrical Panel
RTU 2 Library	HVAC	Rooftop Unit	537	751	1,114	1,428	1,803	2,778	2,808	1,662	13,000	HPM2
RTU 1 Library	HVAC	Rooftop Unit	601	847	629	865	1,498	1,659	1,816	1,375	9,410	HPM2
RTU 3 Library	HVAC	Rooftop Unit	427	616	468	717	1,226	1,391	2,059	828	7,829	HPM2
RTU 6 Library	HVAC	Rooftop Unit	192	263	183	271	782	811	952	802	4,298	HPM2
		Total	1,758	2,477	2,394	3,281	5,309	6,639	7,634	4,667	34,536	

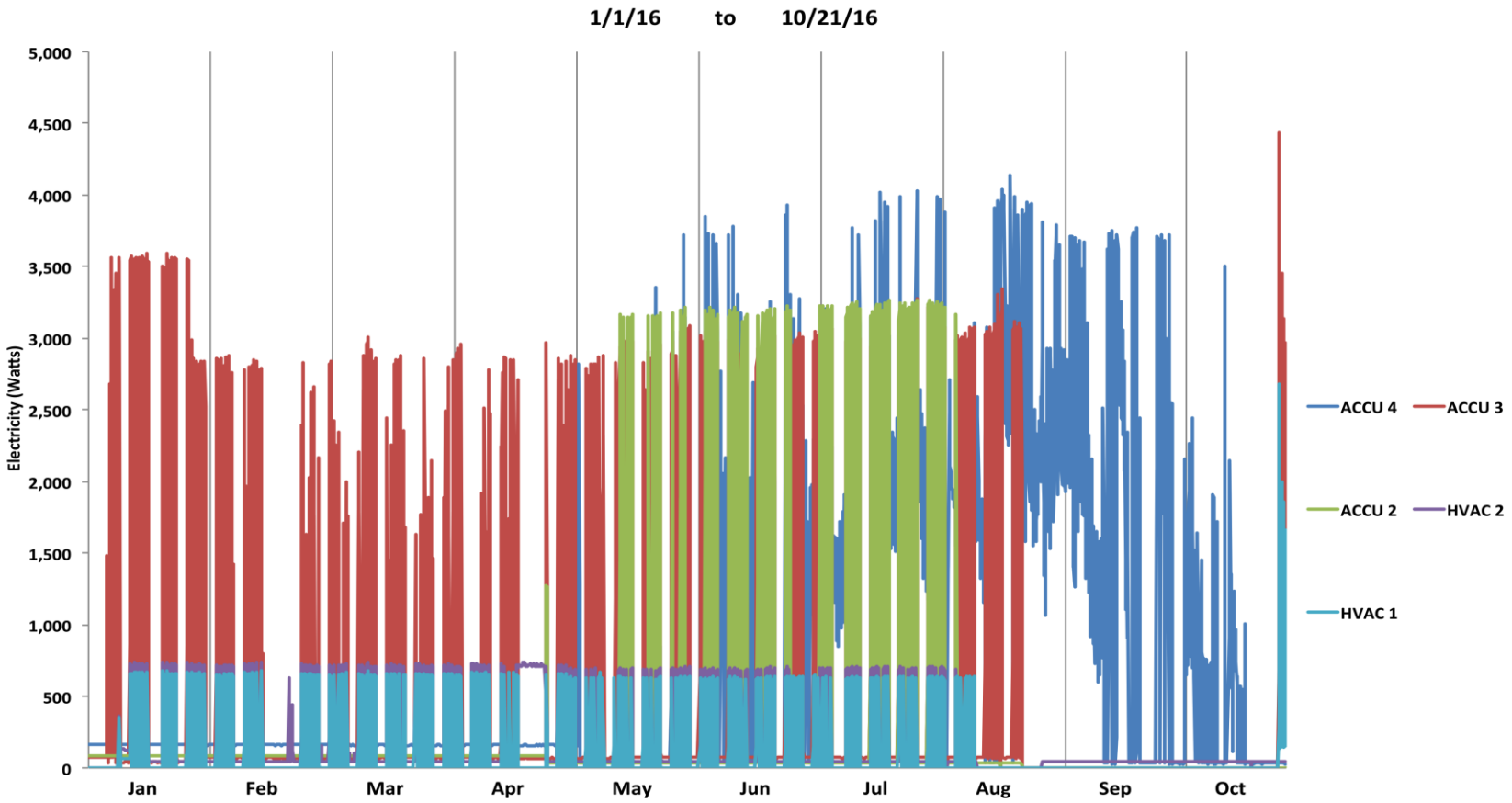
HVAC – Air Cooled Condenser Units and Air Handler Units



This chart highlights energy use for three air cooled condenser units (ACCU) and two air handler units (labelled HVAC 1&2) we're monitoring that serve Zone B classrooms on th upper and lower floors. The chart on the following page shows the energy use trends for the past nine months.

The pattern of energy use in the chart above is consistent with energy use most weeks with the exception of ACCU4. ACCU4 occasionally turns on randomly like it does above on Saturday. In additiona, it ran all summer while the three other ACCUs were off. Are there classrooms in Zone B that are used in the summer? Can these systems be operated using free cooling when the outdoor air is 55 Degree F or less?

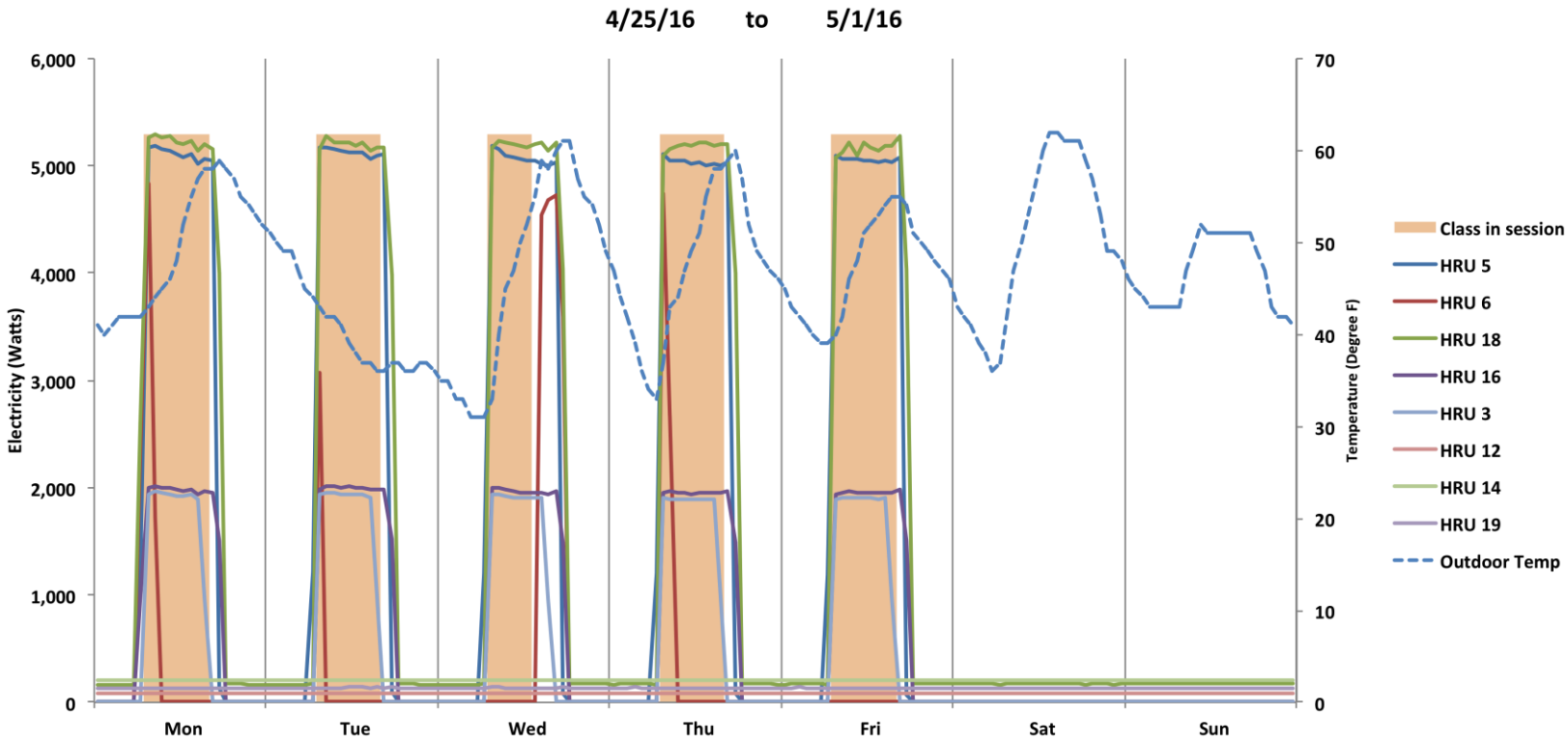
HVAC – Air Cooled Condenser Units and Air Handler Units *Continued*



The Chart above is the 9 month trend profile for 3 ACCUs and 2 AHUs that serve Zone B. The table below is the monthly energy use in kWh for these RTUs and AHUs.

Description	Category	Sub Category	January kWh	February kWh	March kWh	April kWh	May kWh	June kWh	July kWh	August kWh	September kWh	Total kWh	Electrical Panel
ACCU 4 Zone B Classrooms	HVAC	ACCU	119	110	118	117	162	700	1,187	1,586	938	5,037	HPM1
ACCU 3 Zone B Classrooms	HVAC	ACCU	535	290	315	238	519	687	656	400	0	3,642	HPM1
ACCU 2 Zone B Classrooms	HVAC	ACCU	64	60	64	53	258	464	666	32	0	1,661	HPM1
HVAC 2 Zone B Classrooms	HVAC	Air Handler Unit	129	143	191	237	156	145	165	21	32	1,219	LPM1
HVAC 1 Zone B Classrooms	HVAC	Air Handler Unit	100	105	153	109	142	142	128	32	0	910	LPM1
		Total	946	709	840	754	1,237	2,138	2,802	2,071	971	12,469	

HVAC – Heat Recovery Units



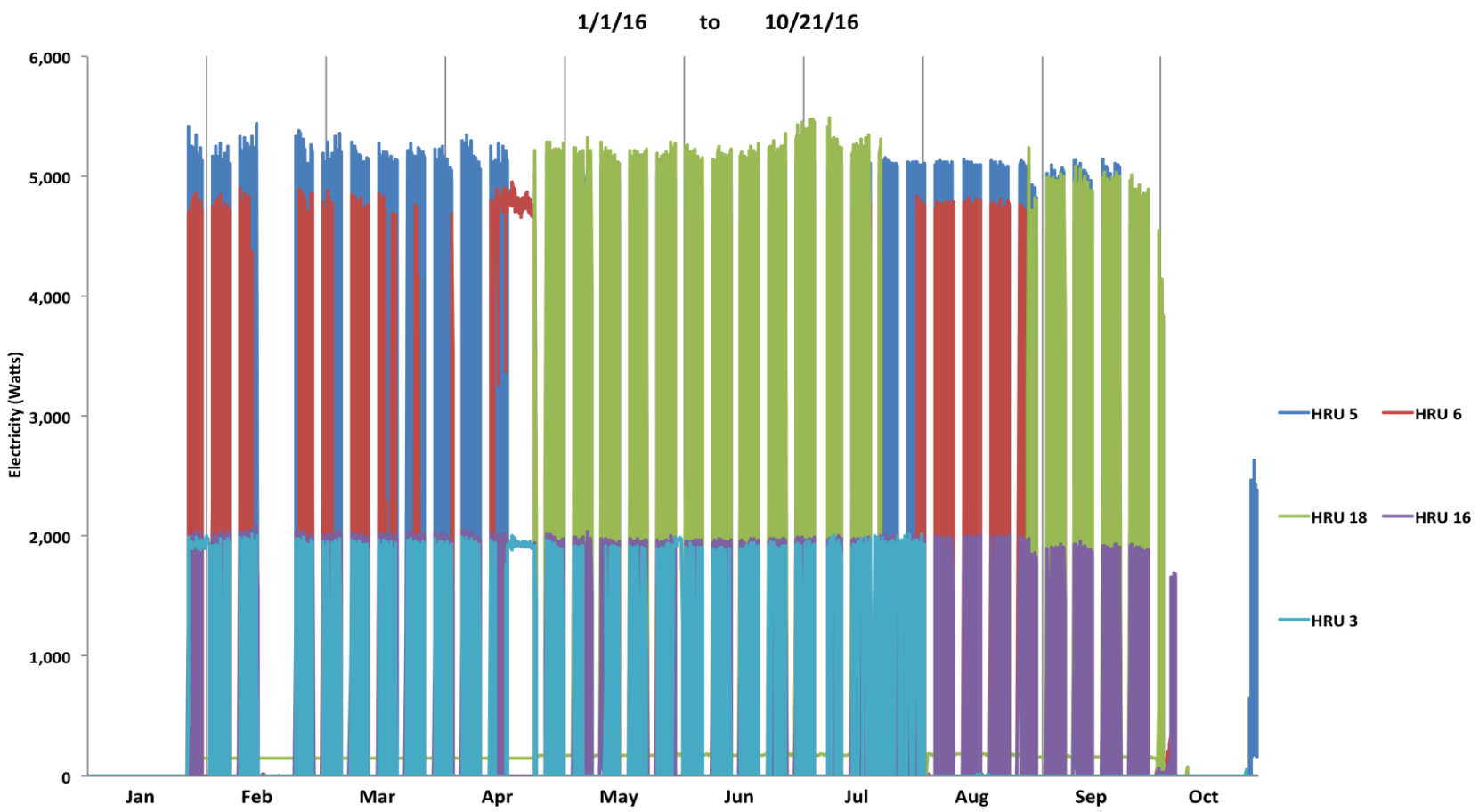
This chart highlights energy use for 8 heat recovery units (HRU) that we're monitoring with the highest monthly energy use. The chart on the following page shows the energy use trends for the past nine months and the table shows the monthly energy use in kWh.

The high school's HRUs are an ongoing maintenance challenge. The chart above summarizes energy use for 8 functioning HRUs. Fvie of the HRUs we're monitoring have flat energy consumption of 80 to 120 watts that indicates they are not functioning properly.

With the exception of HRU6, all the HRUs turn on when school is in session and turn off when school is not in session. Fan speed is set to provide constant volume with associated constant energy use. HRU6 turns on briefly Monday, Tuesday, and Thursday morning and Wednesday afternoon.

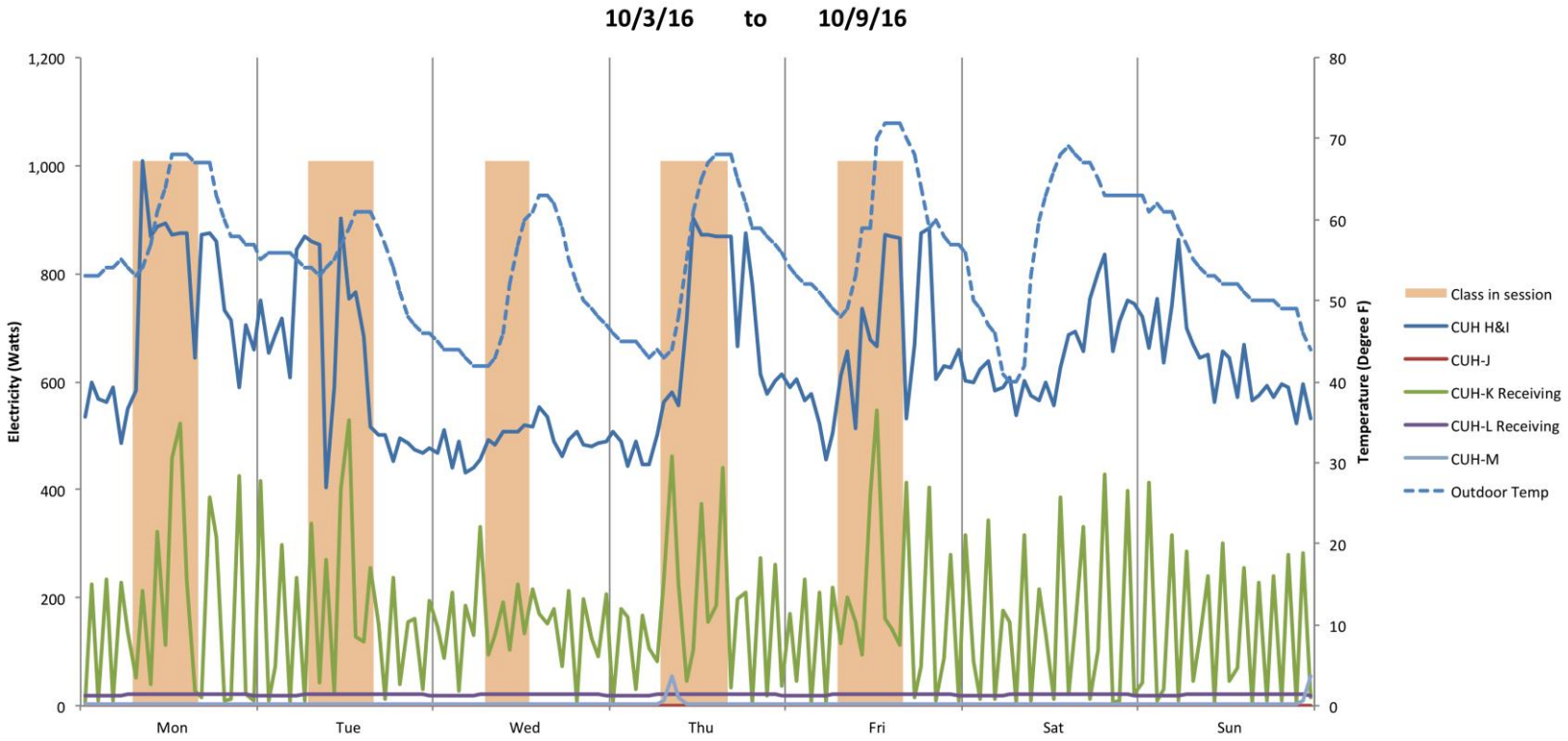
Spot checks of CO2 levels in the school could help give an indication what potential impact the operation of the HRUs might have on building ventilation rates. Earlier sPod CO2 monitoring indicated that ventilation rates were acceptable in Room 290.

HVAC – Heat Recovery Units - *Continued*



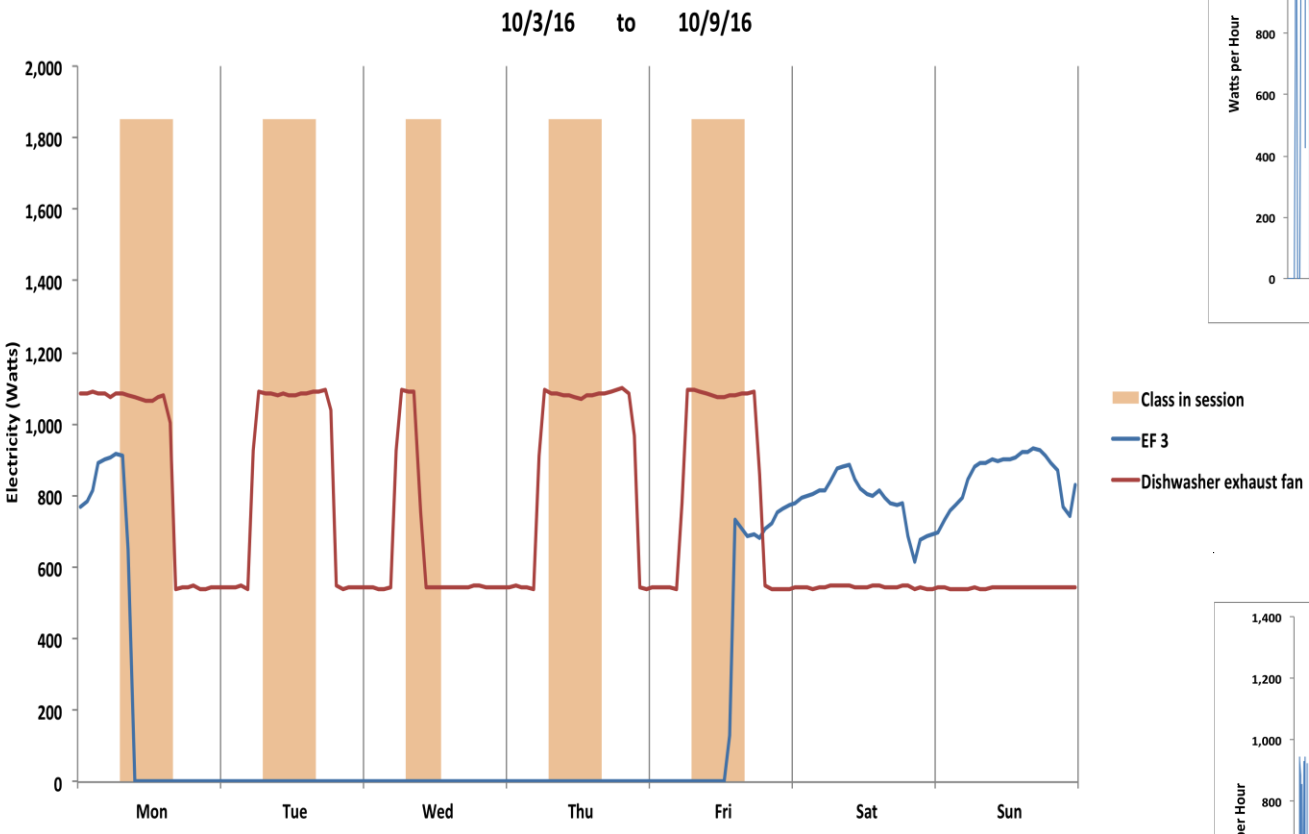
Description	Category	Sub Category	January kWh	February kWh	March kWh	April kWh	May kWh	June kWh	July kWh	August kWh	September kWh	Total kWh	Electrical Panel
HRU 5 B Corridor	HVAC	Heat Recovery Unit	207	839	1,213	861	1,125	1,127	1,033	1,191	617	8,213	HPM1
HRU 6 Library Corridor	HVAC	Heat Recovery Unit	185	667	521	1,278	813	1,116	659	1,168	839	7,246	HPM2
HRU 18 Library	HVAC	Heat Recovery Unit	20	103	111	406	1,330	1,327	711	405	1,004	5,417	HPM2
HRU 16 Library	HVAC	Heat Recovery Unit	78	345	496	353	472	468	424	489	379	3,503	HPM2
HRU 3 Teacher Dining	HVAC	Heat Recovery Unit	249	261	378	541	437	432	567	0	0	2,865	HPM1
HRU 12 Library	HVAC	Heat Recovery Unit	11	59	63	61	87	310	276	322	258	1,449	HPM2
HRU 14 Cafeteria	HVAC	Heat Recovery Unit	29	145	155	150	155	153	155	157	149	1,247	HPM1
HRU 19 Mulitipurpose 394	HVAC	Heat Recovery Unit	18	94	101	98	101	98	99	101	77	786	HPM2
		Total	797	2,514	3,038	3,749	4,521	5,029	3,924	3,833	3,322	30,727	

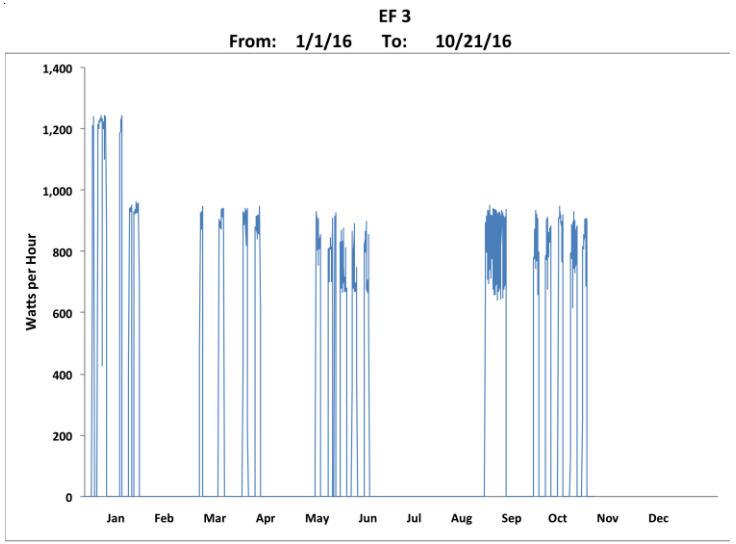
HVAC – Cabinet Unit Heaters

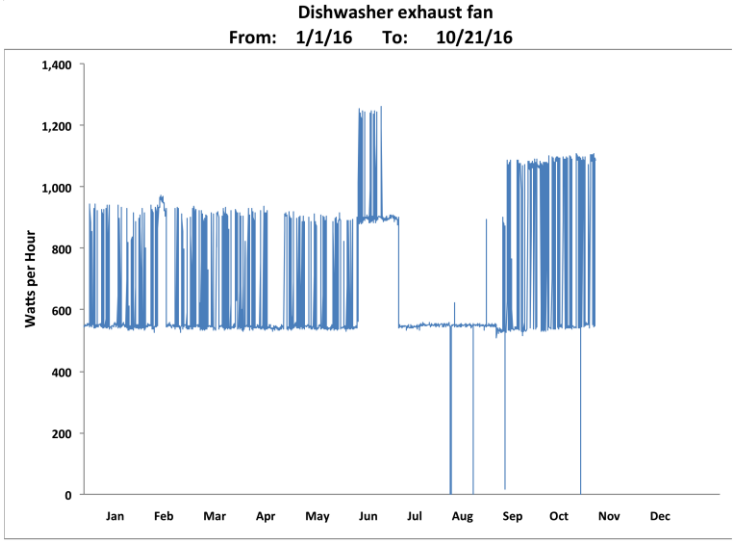


This chart summarizes electricity use for six cabinet unit heaters located in the Kitchen area that we're monitoring.The CHUs use between 10 and 250 kWh per month .The cabinet unit heaters are were turned off between June 15 and September 1.

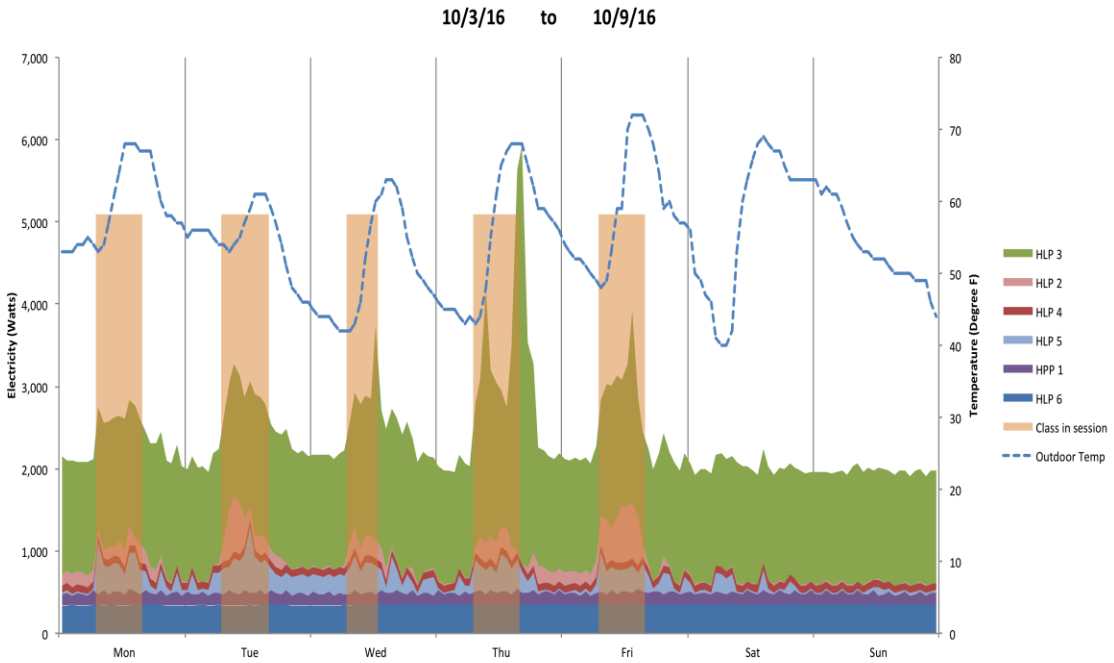
HVAC – Rooftop Exhaust Fans

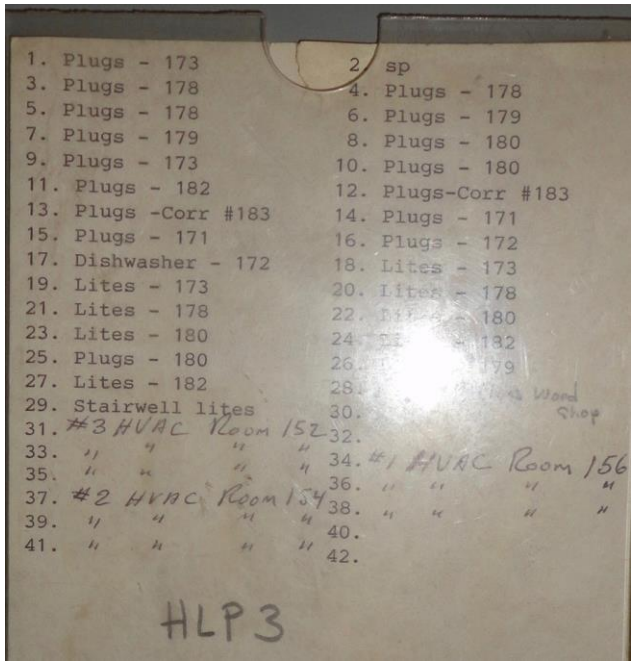






The charts on this page summarize the operation two exhaust fans including EF3 and the dishwasher fan. Does EF3 serve the pottery studio? It's located at the south end of Zone B. Harvard should confirm the control settings for both fans. As the two 9-month chart inserts to right point out, both exhaust fans have unusual load profiles. Does the dishwasher fan need to remain on when the building is unoccupied and why does the energy use increase in June and operate at a higher level than before beginning in September?

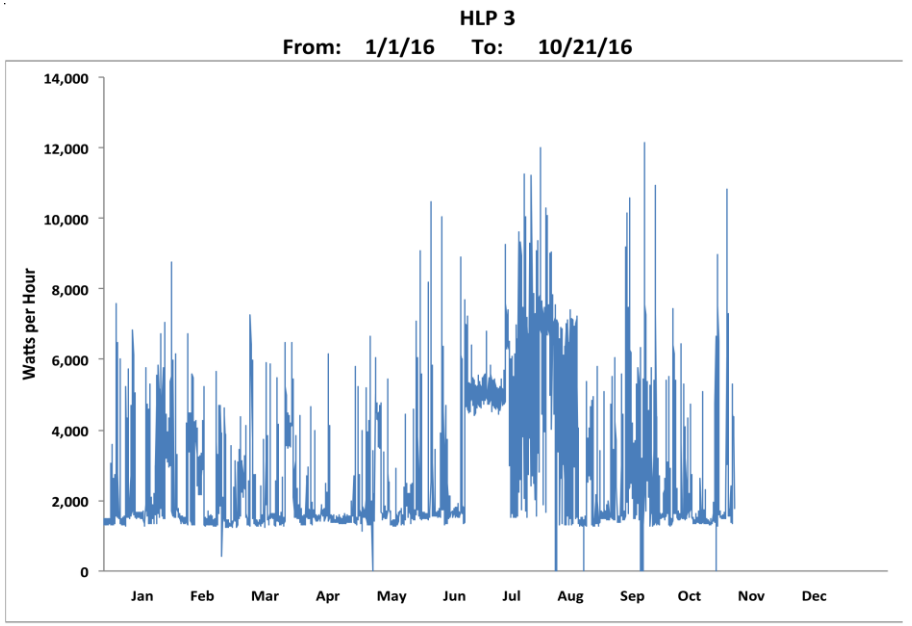




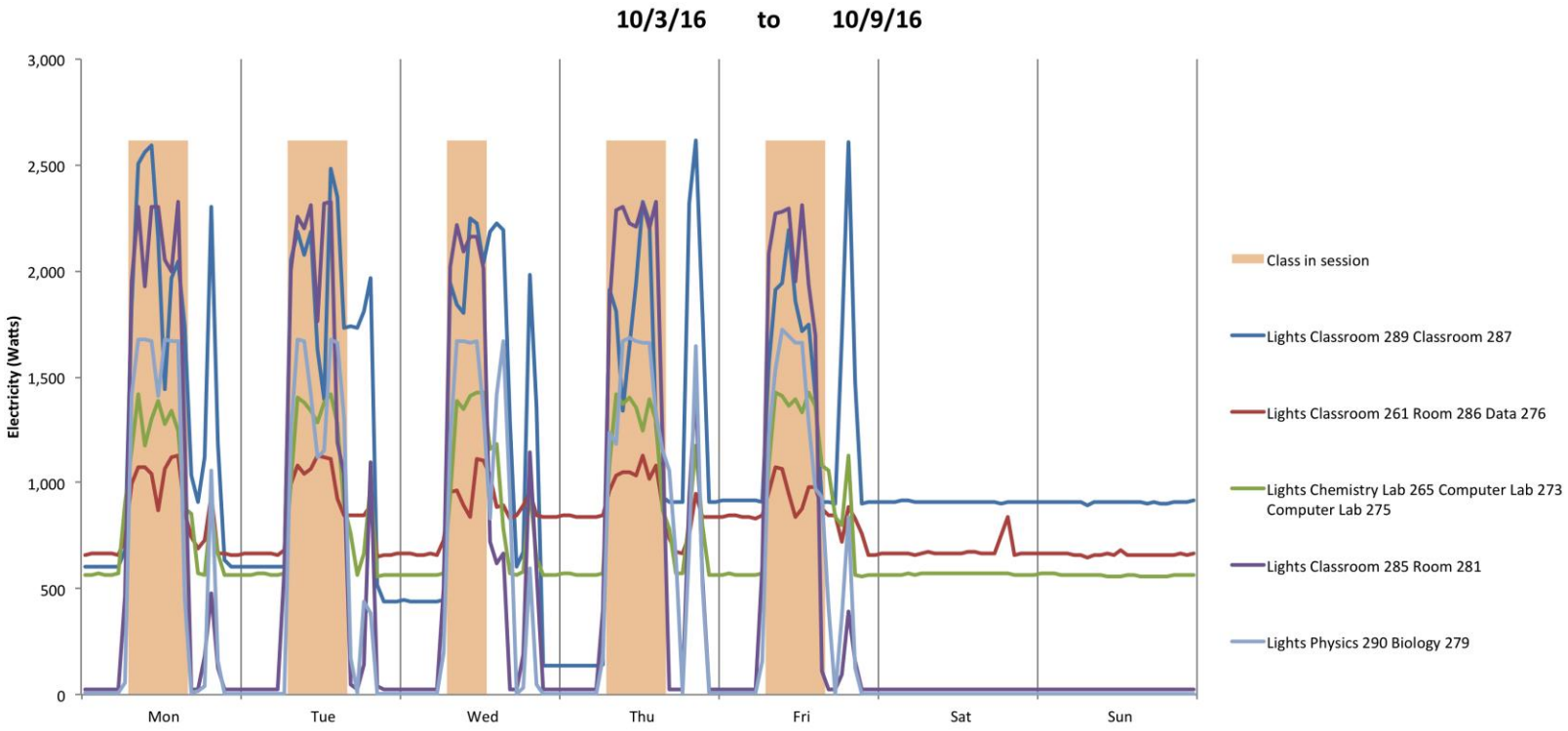
The chart directly above on this page summarizes energy use for six electrical subpanels associated with the older portion of the high school. Energy use for most of the electrical panels is relatively small except for subpanel HLP 3.

The picture in the upper right corner is the index card for subpanel HLP3. Most of these rooms do not appear on the building plans and may not exist anymore. At some point, Harvard should confirm what the breakers connect to and update the index cards on these six subpanels starting with subpanel HLP 3.

The chart to the right summarizes energy use for electrical circuits connected to subpanel HLP 3. Energy use spikes to about 5,000 watts per hour in July. This event should be investigated more closely to determine the cause for this significant constant load.



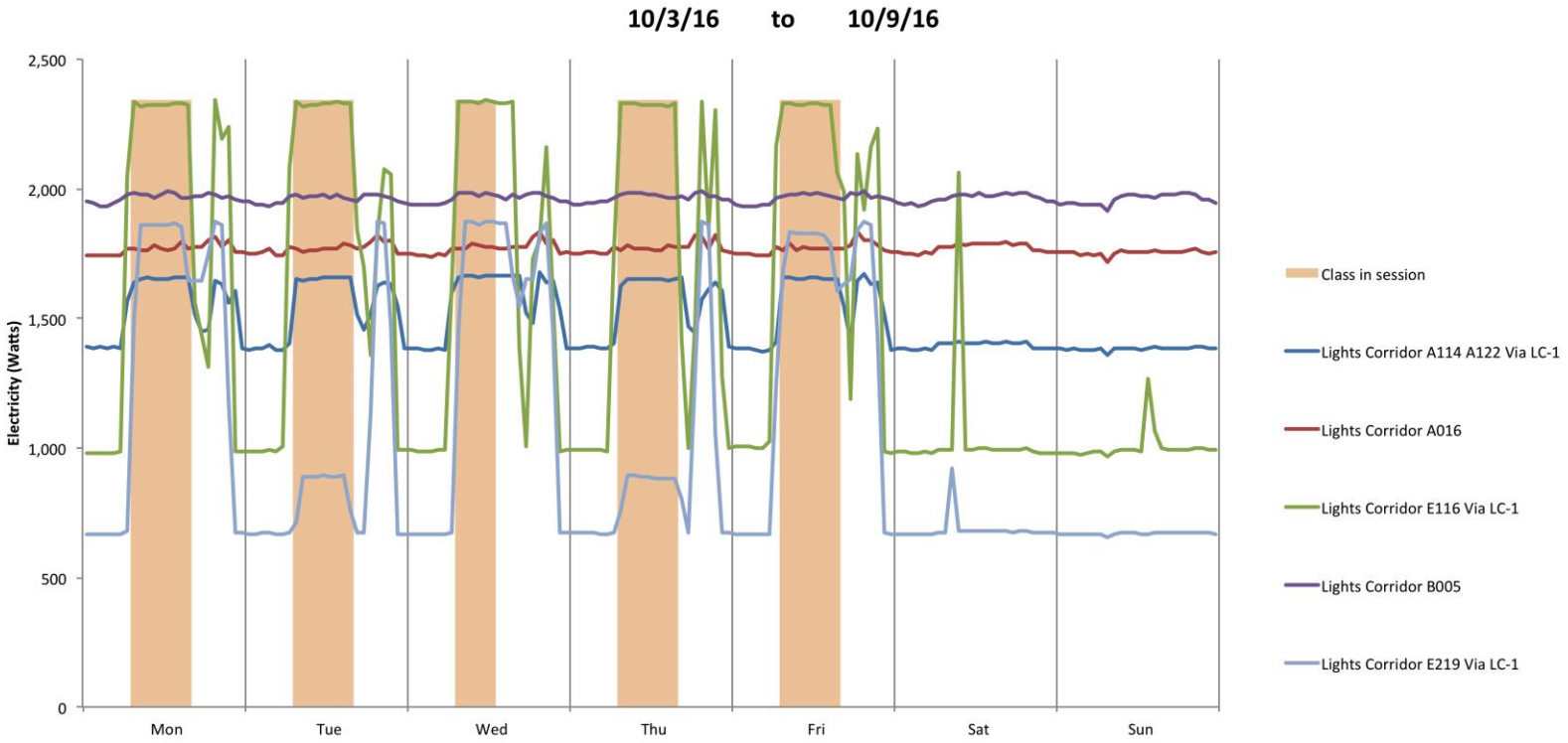
Lighting - Classrooms



This chart and the following two charts summarize energy use for lighting in the school. The first chart represents classroom lighting. The second chart represents corridor lighting, and the third chart represents common area lighting.

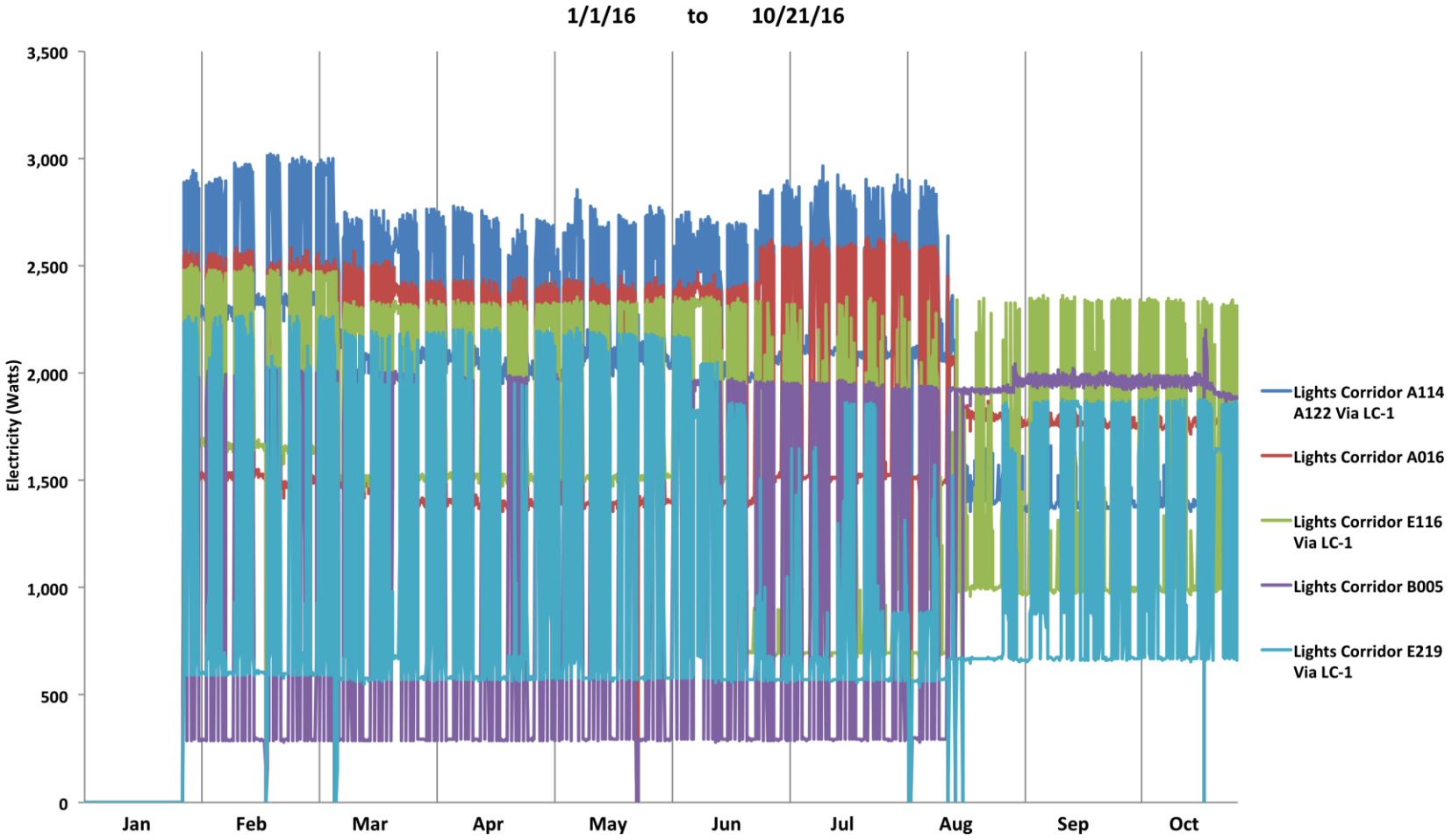
Energy use for the classrooms was relatively flat for the first 9 months of 2016. Energy use decreased during the summer and during school breaks and holidays. This chart is for the classrooms with the highest electricity use that we're monitoring. Three of the classroom lighting circuits have lights that are left on constantly 24/7. Doe these lights need to remain on?

Lighting - Corridors



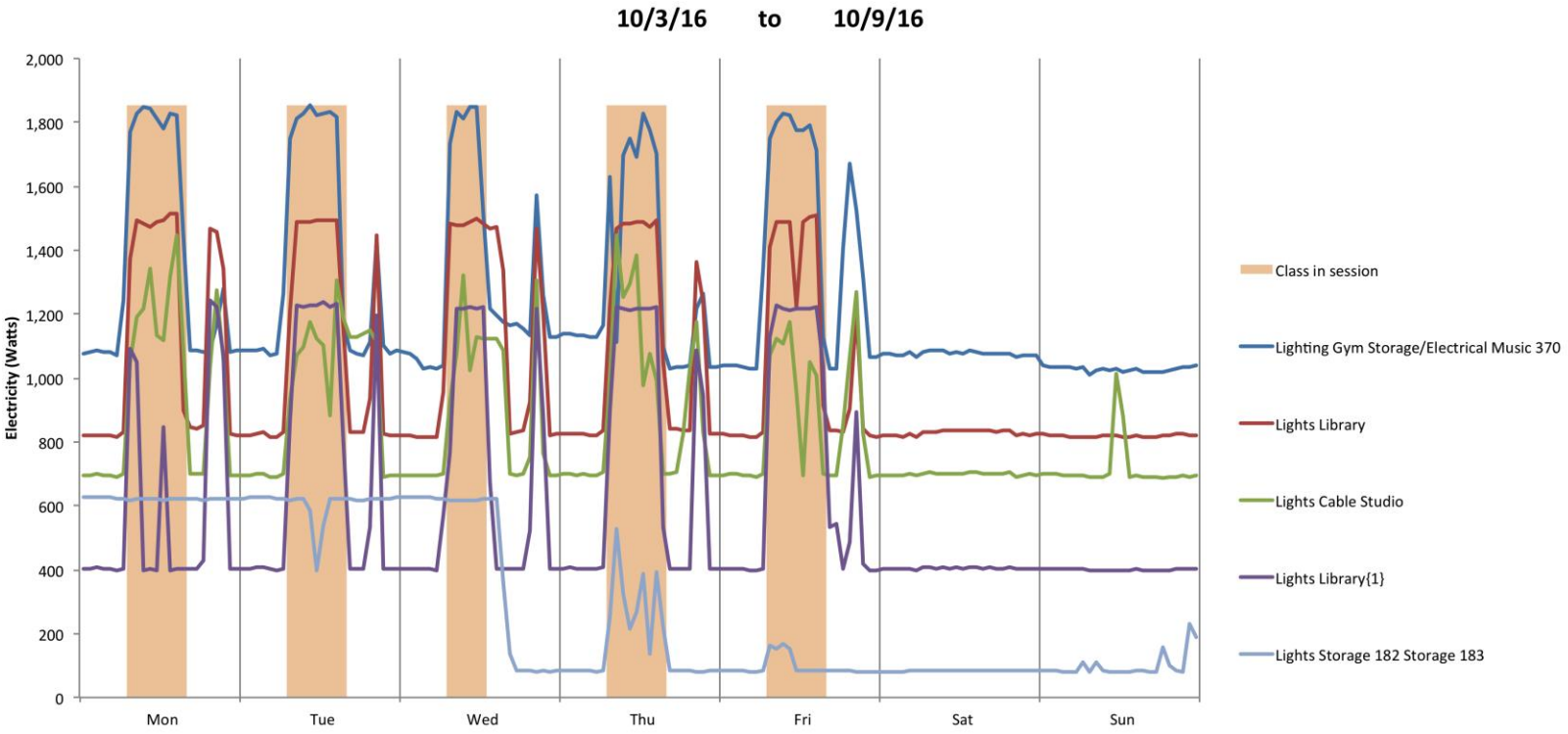
This chart represents lighting in corrdiors and includes the five corridor lighting circuits that we're monitoring with the highest energy use. As the following chart summarizes, the hourly use profiles have changed quite a bit this year. As the monthly data in Appendix A summarizes, the light fixture and schedule changes have decreased monthly energy use between 15 and 40 percent for the top three circuits and increased energy use 1% to 20% for the next two circuits. Additional energy savings may be possible if the corridor lighting can be turned down or turned off when the school is unoccupied.

Lighting – Corridors *Continued*



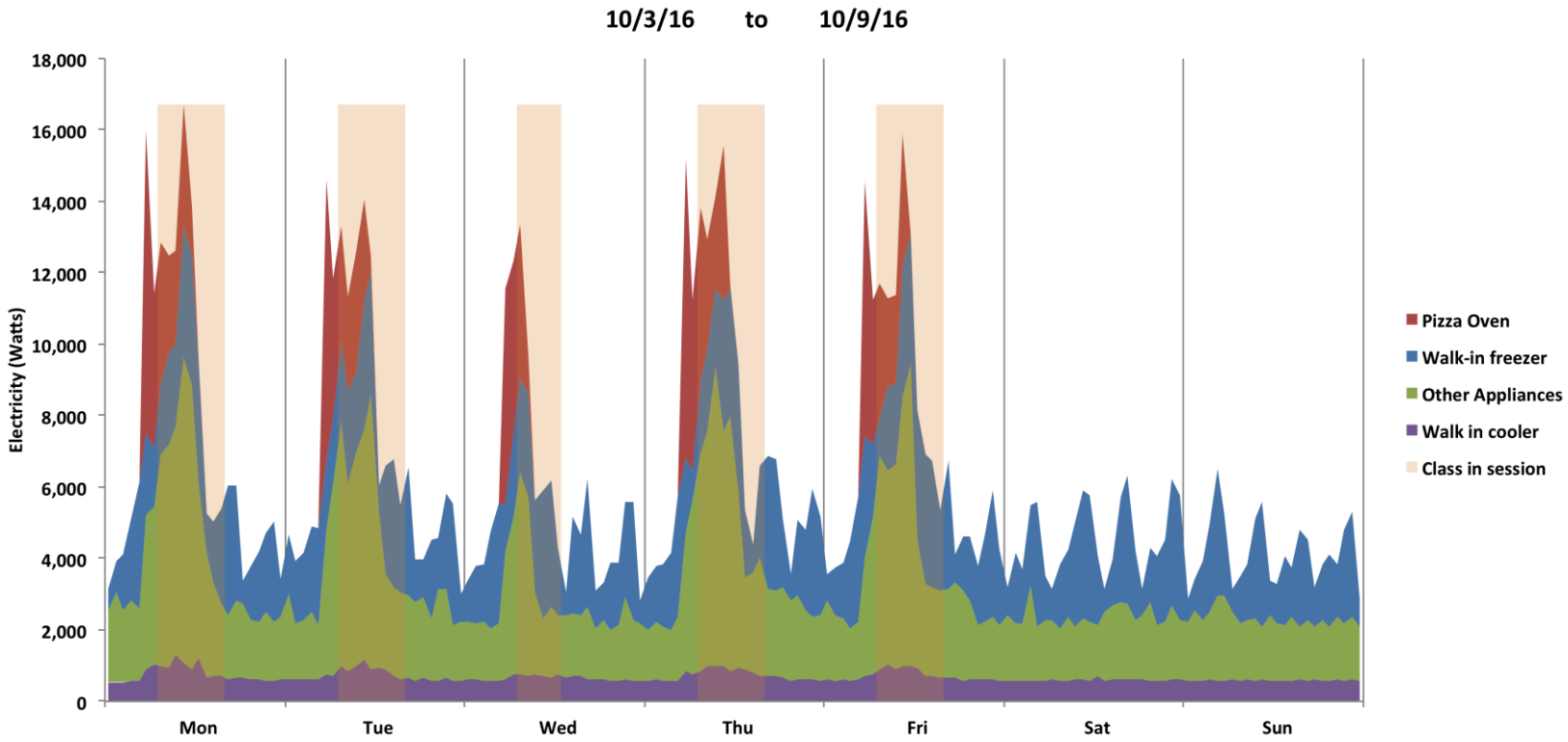
Changes that have occurred with the corridor lighting are fascinating. New light fixtures installed in March lowered energy use in each of the corridor lighting electrical circuits that we're monitoring. However, the most significant changes occur in August and have continued through October. Lighting energy use dropped about 1,500 watts per hour in corridors A114, A122 and dropped about 600 watts per hour in corridor AO16. However, the lights remain on 24/7 in these corridors and in corridor B005. Can corridor lighting be turned off or at least turned down when the school is unoccupied?

Lighting – Common Areas



This chart summarizes energy use for five electrical circuits that serve common areas that we're monitoring. Similar to the classroom and corridor lights, the chart shows that there is an opportunity to save energy by turning lights down or off when the building is unoccupied. Energy use patterns have remained about the same for the first nine months of the year. The lights in storage rooms 182 and/or 183 are left on occaisionally and may be good candidates for occupancy sensor lighting controls.

Kitchen Equipment



This chart summarizes energy use for the two electrical panels in the kitchen that we're monitoring. It is a stacked area chart that shows the cumulative load profile for the kitchen equipment.

The top three energy users in the kitchen include the walk-in freezer, walk in cooler, and the pizza oven. We've lumped the rest of the kitchen equipment into a single categoried call other appliances. Energy use for the walk-in freezer was about 16,444 kWh for the first 9 months of the year. 25% of the energy use was in July and August. Can the walk-in cooler and freezer be cleaned out and turned off in the summer?

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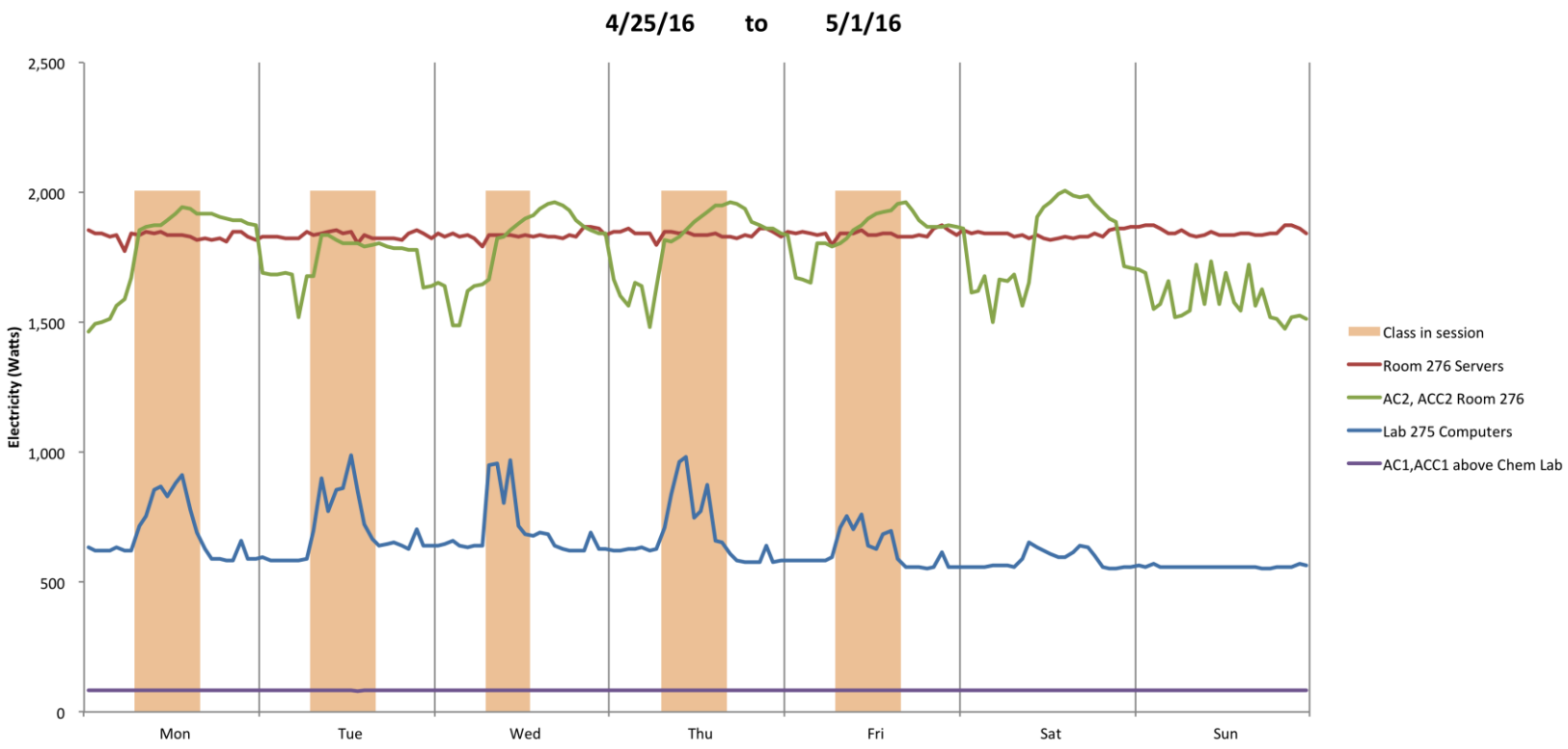
Computers



This chart summarizes energy associated computers in the high school as see through the microcosm of computers connected to the data servers located in room 276. The largest source of energy use for computers is air conditioning. Energy use for the split air conditioning system that serves Room 276 for the first 9 months of 2016 was about 11,561 kWh. We recommend increasing the thermostat setting in the room so the air conditioning doesn't need to run as much. Do AC1 and ACC1 serve a data server room? The energy use for this split air conditioner system is very low.

Energy use for the data servers for the first nine months of 2016 was about 8,400 kWh. The data server load is relatively steady and we assume that turning off or turning down the servers is not an option.

Energy use for the computers located in Room 275 (Computer Lab) for the first nine months was about 5,000 kWh. We recommend working with IT to research smart computer power management strategies that will power down computers at night without compromising system update protocols.

Appendix A Monthly Electricity Use Grouped by Major Categories

The following charts summarize monthly electricity use between January 1, 2016, and September 30, 2016 grouped by major categories and sub-categories. The charts include all the electrical circuits that are being monitored at the high school. Energy use for individual months are color coded by sub-category. Months with higher electricity use are highlighted in red and months with lower electricity use are highlighted in green.

HVAC

Description	Category	Sub Category	January kWh	February kWh	March kWh	April kWh	May kWh	June kWh	July kWh	August kWh	September kWh	Total kWh	Electrical Panel
ACC 2 Data 276	HVAC	AC Condenser	975	754	1,061	1,060	1,212	1,341	1,428	711	1,357	9,899	PPM2
AC 2 Data 276	HVAC	AC Split	190	143	194	189	200	202	204	111	229	1,662	PPM2
AC 1 Prep Room	HVAC	AC Split	51	0	0	0	0	16	200	100	198	565	PPM2
ACC 1 Prep Room	HVAC	AC Condenser	61	57	60	59	60	59	59	30	58	503	PPM2
ACCU 4 Zone B Classrooms	HVAC	ACCU	119	110	118	117	162	700	1,187	1,586	938	5,037	HPM1
ACCU 3 Zone B Classrooms	HVAC	ACCU	535	290	315	238	519	687	656	400	0	3,642	HPM1
ACCU 2 Zone B Classrooms	HVAC	ACCU	64	60	64	53	258	464	666	32	0	1,661	HPM1
HVAC 2 Zone B Classrooms	HVAC	Air Handler Unit	129	143	191	237	156	145	165	21	32	1,219	LPM1
HVAC 1 Zone B Classrooms	HVAC	Air Handler Unit	100	105	153	109	142	142	128	32	0	910	LPM1
CUH H&I	HVAC	Cabinet Heater	348	341	409	390	469	307	0	48	517	2,830	SBKP Sec 1&2
CUH-K Receiving	HVAC	Cabinet Heater	108	104	59	233	210	86	13	17	53	884	SBKP Sec 1&2
CUH-J	HVAC	Cabinet Heater	28	29	33	31	11	0	0	0	0	132	SBKP Sec 1&2
CUH-L receiving	HVAC	Cabinet Heater	15	13	14	14	14	14	14	14	15	127	SBKP Sec 1&2
CUH-M	HVAC	Cabinet Heater	40	28	13	8	4	3	2	3	3	104	SBKP Sec 1&2
HRU 5 B Corridor	HVAC	Heat Recovery Unit	207	839	1,213	861	1,125	1,127	1,033	1,191	617	8,213	HPM1
HRU 6 Library Corridor	HVAC	Heat Recovery Unit	185	667	521	1,278	813	1,116	659	1,168	839	7,246	HPM2
HRU 18 Library	HVAC	Heat Recovery Unit	20	103	111	406	1,330	1,327	711	405	1,004	5,417	HPM2
HRU 16 Library	HVAC	Heat Recovery Unit	78	345	496	353	472	468	424	489	379	3,503	HPM2
HRU 3 Teacher Dining	HVAC	Heat Recovery Unit	249	261	378	541	437	432	567	0	0	2,865	HPM1
HRU 12 Library	HVAC	Heat Recovery Unit	11	59	63	61	87	310	276	322	258	1,449	HPM2
HRU 14 Cafeteria	HVAC	Heat Recovery Unit	29	145	155	150	155	153	155	157	149	1,247	HPM1
HRU 19 Mulitipurpose 394	HVAC	Heat Recovery Unit	18	94	101	98	101	98	99	101	77	786	HPM2
HRU 17 Music 370	HVAC	Heat Recovery Unit	16	86	94	89	94	100	104	104	82	769	HPM2
HRU 15 Cafeteria	HVAC	Heat Recovery Unit	16	85	90	87	90	88	89	90	88	722	HPM1
HRU 13 Library	HVAC	Heat Recovery Unit	12	62	66	64	65	64	65	66	57	521	HPM2
HRU 20 Admin	HVAC	Heat Recovery Unit	18	89	90	6	37	42	111	104	19	516	HPM1
HRU 4 B Corridor	HVAC	Heat Recovery Unit	4	23	26	7	51	68	54	16	16	265	HPM1
HRU 11 Library	HVAC	Heat Recovery Unit	4	19	21	20	21	20	20	21	15	161	HPM2
Dishwasher exhaust fan	HVAC	Rooftop Exhaust	435	451	456	434	452	622	397	419	573	4,237	SBKP Sec 1&2
EF 3	HVAC	Rooftop Exhaust	299	8	104	120	203	105	0	243	119	1,201	HPM1
HVAC node 23,24	HVAC	Node 23,24	47	43	45	44	46	45	46	46	42	403	SBKP Sec 1&2
RTU 2 Library	HVAC	Rooftop Unit	118	537	751	1,114	1,428	1,803	2,778	2,808	1,662	13,000	HPM2
RTU 1 Library	HVAC	Rooftop Unit	120	601	847	629	865	1,498	1,659	1,816	1,375	9,410	HPM2
RTU 3 Library	HVAC	Rooftop Unit	96	427	616	468	717	1,226	1,391	2,059	828	7,829	HPM2
RTU 6 Library	HVAC	Rooftop Unit	42	192	263	183	271	782	811	952	802	4,298	HPM2
		Total	4,786	7,316	9,191	9,751	12,277	15,657	16,170	15,680	12,401	103,230	

Kitchen

Description	Category	Sub Category	January kWh	February kWh	March kWh	April kWh	May kWh	June kWh	July kWh	August kWh	September kWh	Total kWh	Electrical Panel
Walk-in freezer	Kitchen	Appliance	1,301	1,236	1,403	1,406	1,583	1,829	2,085	2,036	1,698	14,577	SBKP Sec 1&2
Cooler fan & lights	Kitchen	Appliance	275	257	276	265	276	174	0	178	265	1,964	SBKP Sec 1&2
Walk in cooler	Kitchen	Appliance	206	201	235	218	291	199	0	202	315	1,867	SBKP Sec 1&2
Freezer lights & door heater	Kitchen	Appliance	119	113	123	133	142	136	154	144	134	1,198	SBKP Sec 1&2
Pizza Oven	Kitchen	Appliance	149	115	180	142	170	84	0	34	173	1,048	SBKP Sec 1&2
Pizza oven	Kitchen	Appliance	149	115	180	142	170	84	0	34	173	1,048	SBKP Sec 1&2
Display cabinet{1}	Kitchen	Appliance	143	111	190	123	158	69	0	7	152	954	SBKP Sec 1&2
Ice maker outlet	Kitchen	Appliance	85	71	96	98	147	112	0	80	146	836	SBKP Sec 1&2
Coffee maker	Kitchen	Appliance	146	111	91	89	105	67	6	30	142	787	SBKP Sec 1&2
Hot food counter{1}	Kitchen	Appliance	74	69	73	71	74	72	73	75	71	652	SBKP Sec 1&2
Hot food counter	Kitchen	Appliance	102	75	107	68	94	47	0	4	112	609	SBKP Sec 1&2
Display cabinet	Kitchen	Appliance	69	49	71	50	71	69	0	3	71	453	SBKP Sec 1&2
Soup serving unit	Kitchen	Appliance	56	41	62	48	64	37	0	3	70	380	SBKP Sec 1&2
Tilting skillet	Kitchen	Appliance	44	37	48	39	40	31	17	18	44	318	SBKP Sec 1&2
Cold food storage	Kitchen	Appliance	15	13	21	16	22	12	0	0	13	113	SBKP Sec 1&2
Oven steamer	Kitchen	Appliance	11	10	11	10	11	11	11	11	10	95	SBKP Sec 1&2
Automatic slicer	Kitchen	Appliance	21	11	10	8	12	10	0	1	7	80	SBKP Sec 1&2
Steamer	Kitchen	Appliance	9	7	11	6	9	5	0	1	9	56	SBKP Sec 1&2
Convector oven	Kitchen	Appliance	6	3	4	8	2	5	0	0	6	36	SBKP Sec 1&2
Kettle	Kitchen	Appliance	2	1	20	0	0	0	0	0	0	24	SBKP Sec 1&2
6 quart mixer	Kitchen	Appliance	17	0	0	0	0	0	0	0	0	17	SBKP Sec 1&2
		Total	2,997	2,645	3,212	2,942	3,441	3,055	2,347	2,861	3,614	27,114	

Lights

Description	Category	Sub Category	January kWh	February kWh	March kWh	April kWh	May kWh	June kWh	July kWh	August kWh	September kWh	Total kWh	Electrical Panel
Classrooms 287,289	Lighting	Classroom	617	655	848	808	866	581	391	355	765	5,886	LPM1
Classrooms 261,286, Data 276	Lighting	Classroom	438	544	621	575	634	592	560	281	575	4,819	LPM1
Chem 265, Computer 273,275	Lighting	Classroom	427	503	580	529	579	525	491	277	571	4,482	LPM1
Classrooms 285,281	Lighting	Classroom	312	315	494	365	425	338	45	130	465	2,889	LPM1
Physics 290 Biology 279	Lighting	Classroom	189	197	310	228	284	221	114	185	354	2,083	LPM1
Unknown{1}	Lighting	Unknown	186	226	248	233	245	227	222	110	240	1,937	LPM1
Classrooms 292,293	Lighting	Classroom	146	129	236	151	188	115	11	40	210	1,227	LPM1
Classrooms 294,295	Lighting	Classroom	136	148	197	149	185	101	85	23	176	1,200	LPM1
Classrooms 290,291	Lighting	Classroom	100	103	178	124	159	122	58	65	157	1,065	LPM1
Gym Storage, Music 370	Lighting	Common Area	702	847	962	884	932	863	798	405	903	7,297	LPM1
Library	Lighting	Common Area	557	664	746	695	756	693	652	395	747	5,905	LPM1
Cable Studio	Lighting	Common Area	481	571	627	581	607	572	523	272	614	4,846	LPM1
Library{1}	Lighting	Common Area	324	385	455	400	457	384	358	256	460	3,479	LPM1
Storage 182,183	Lighting	Common Area	291	469	513	474	284	355	215	78	133	2,810	LPM1
Kitchen Exhaust hood	Lighting	Common Area	35	24	29	24	30	21	0	9	29	201	SBKP Sec 1&2
Corridor A114 A122 Via LC-1	Lighting	Corridor	351	1,825	1,841	1,702	1,743	1,742	1,762	1,279	1,081	13,326	HPM1
Corridor A016	Lighting	Corridor	279	1,404	1,560	1,412	1,426	1,517	1,523	1,379	1,276	11,778	HPM1
Corridor E116 Via LC-1	Lighting	Corridor	284	1,433	1,537	1,419	1,460	1,158	773	926	1,094	10,085	HPM1
Corridor B005	Lighting	Corridor	169	822	1,064	911	917	1,011	871	1,291	1,416	8,472	HPM1
Corridor E219 Via LC-1	Lighting	Corridor	171	751	913	853	990	779	579	593	824	6,453	HPM1
Corridor B143 via LC-1	Lighting	Corridor	231	1,105	828	707	718	709	539	756	835	6,428	HPM1
Corridor B144 B146 via LC-1	Lighting	Corridor	248	1,234	724	605	616	619	556	644	683	5,929	HPM1
Corridor B011 Via LC-1	Lighting	Corridor	115	586	658	633	639	648	630	714	722	5,345	HPM1
Corridor C115	Lighting	Corridor	10	142	314	262	263	234	184	266	311	1,986	HPM1
Stairs	Lighting	Corridor	7	36	39	38	39	38	38	39	38	310	HPM1
		Total	6,805	15,122	16,521	14,761	15,441	14,165	11,978	10,770	14,676	120,239	

Plug Loads

Description	Category	Sub Category	January kWh	February kWh	March kWh	April kWh	May kWh	June kWh	July kWh	August kWh	September kWh	Total kWh	Electrical Panel
Outlet Physics 269	Plug Loads	Classroom	25	22	28	24	29	30	4	6	41	208	PPM2
Outlet Classroom 289	Plug Loads	Classroom	33	19	42	23	22	6	0	1	29	175	PPM2
Outlet Earth Science 285	Plug Loads	Classroom	16	8	27	10	10	4	0	4	47	127	PPM2
Outlet Biology 279{1}	Plug Loads	Classroom	25	16	17	11	9	7	11	0	2	98	PPM2
Outlet Classroom 283	Plug Loads	Classroom	10	10	10	10	10	10	10	5	10	86	PPM2
Outlet Classroom 261	Plug Loads	Classroom	7	7	16	12	15	9	0	2	17	85	PPM2
Outlet Chemistry 265	Plug Loads	Classroom	10	2	8	4	2	3	27	6	5	68	PPM2
Outlet Biology 279	Plug Loads	Classroom	16	15	4	3	3	4	6	8	7	66	PPM2
Outlet General Science 287	Plug Loads	Classroom	6	6	8	5	6	4	4	2	7	50	PPM2
Outlet Biology 293	Plug Loads	Classroom	10	9	11	8	3	1	0	0	5	47	PPM2
Outlet Chemistry Lab 265	Plug Loads	Classroom	9	5	9	6	7	3	1	0	2	42	PPM2
Outlet Earth Science 285{1}	Plug Loads	Classroom	3	3	4	3	4	3	0	3	13	37	PPM2
Outlet Chemistry Lab 265{1}	Plug Loads	Classroom	9	0	0	0	0	0	0	0	0	10	PPM2
Receptacles	Plug loads	Common Area	23	18	4	4	4	4	4	4	4	71	SBKP Sec 1&2
CP Outlet Data 276{5}	Plug Loads	Computer	139	713	759	738	839	769	753			4,710	CPM5
CP Outlet Data 276{2}	Plug Loads	Computer	100	508	558	562	569	561	559			3,418	CPM5
Outlet Computer Lab 275	Plug Loads	Computer	178	165	185	186	199	155	111	28	167	1,375	PPM2
CP Outlet Computer Lab 275	Plug Loads	Computer	24	97	105	84	74	55	3			442	CPM5
CP Outlet Computer Lab 275{4}	Plug Loads	Computer	14	63	70	73	74	42	0			336	CPM5
CP Outlet Computer Lab 275{3}	Plug Loads	Computer	10	48	54	54	52	31	8			257	CPM5
CP Outlet Computer Lab 275{1}	Plug Loads	Computer	13	32	34	49	37	28	10			202	CPM5
CP Outlet Computer Lab 275{7}	Plug Loads	Computer	6	32	34	33	34	33	24			197	CPM5
CP Outlet Computer Lab 275{13}	Plug Loads	Computer	4	22	24	23	24	23	17			138	CPM5
CP Outlet Computer Lab 275{10}	Plug Loads	Computer	4	22	23	22	23	22	21			138	CPM5
CP Outlet Computer Lab 275{11}	Plug Loads	Computer	6	31	1	0	6	49	38			131	CPM5
CP Outlet Computer Lab 275{2}	Plug Loads	Computer	3	15	17	36	32	19	0			121	CPM5
CP Outlet Data 276{3}	Plug Loads	Computer	7	34	36	24	6	6	6			120	CPM5
CP Outlet Computer Lab 275{6}	Plug Loads	Computer	4	18	19	19	19	19	18			115	CPM5
CP Outlet Computer Lab 275{8}	Plug Loads	Computer	3	17	18	17	18	18	17			108	CPM5
CP Outlet Computer Lab 275{16}	Plug Loads	Computer	3	17	18	17	18	17	16			106	CPM5
CP Outlet Computer Lab 275{5}	Plug Loads	Computer	3	13	16	19	14	14	11			90	CPM5
CP Outlet Data 276{6}	Plug Loads	Computer	3	14	15	14	15	14	14			89	CPM5
CP Outlet Computer Lab 275{15}	Plug Loads	Computer	2	11	12	12	12	2	0			51	CPM5
CP Outlet Data 276{1}	Plug Loads	Computer	3	16	13	2	7	2	2			46	CPM5
CP Outlet Computer Lab 275{9}	Plug Loads	Computer	5	24	17	0	0	0	0			46	CPM5
Outlet Computer Lab 273	Plug Loads	Computer	9	3	3	4	4	4	2	1	6	37	PPM2
CP Outlet Computer Lab 275{14}	Plug Loads	Computer	1	6	7	6	7	4	4			35	CPM5
CP Outlet Computer Lab 275{12}	Plug Loads	Computer	5	27	2	0	0	0	0			35	CPM5
CP Outlet Data 276	Plug Loads	Computer	2	11	4	0	0	0	0			17	CPM5
CP Outlet Data 276{4}	Plug Loads	Computer	2	4	0	0	0	0	0			6	CPM5
Outlet Corridors Section B	Plug Loads	Corridor	6	5	3	4	3	4	9	7	6	47	PPM2
Outside plug	Plug loads	Outside	13	12	13	12	13	12	12	13	12	112	SBKP Sec 1&2
Sewage pump	Special	Sewage Pump	3	2	3	2	3	1	0	1	2	17	SBKP Sec 1&2
		Total	776	2,122	2,254	2,138	2,227	1,996	1,722	91	383	13,710	

Electrical Panels

Description	Category	Sub Category	January kWh	February kWh	March kWh	April kWh	May kWh	June kWh	July kWh	August kWh	September kWh	Total kWh	Electrical Panel
HLP 3	Panel	Lights & Plugs	1,667	1,527	1,724	1,162	1,609	2,637	4,154	2,127	1,830	18,437	HPL1
HPP 1	Panel	Lights & Plugs?	403	335	396	396	373	280	126	129	109	2,547	HPL1
HLP 6	Panel	Lights & Plugs	260	241	258	251	257	253	256	262	242	2,279	HPL1
HLP 5	Panel	Lights & Plugs	220	155	203	184	176	164	93	70	111	1,376	HPL1
HLP 2	Panel	Lights & Plugs	158	61	87	66	60	42	13	50	128	665	HPL1
HLP 4	Panel	Lights & Plugs	135	59	48	49	49	53	53	52	61	559	HPL1
		Total	2,842	2,379	2,716	2,108	2,523	3,430	4,693	2,690	2,481	25,862	