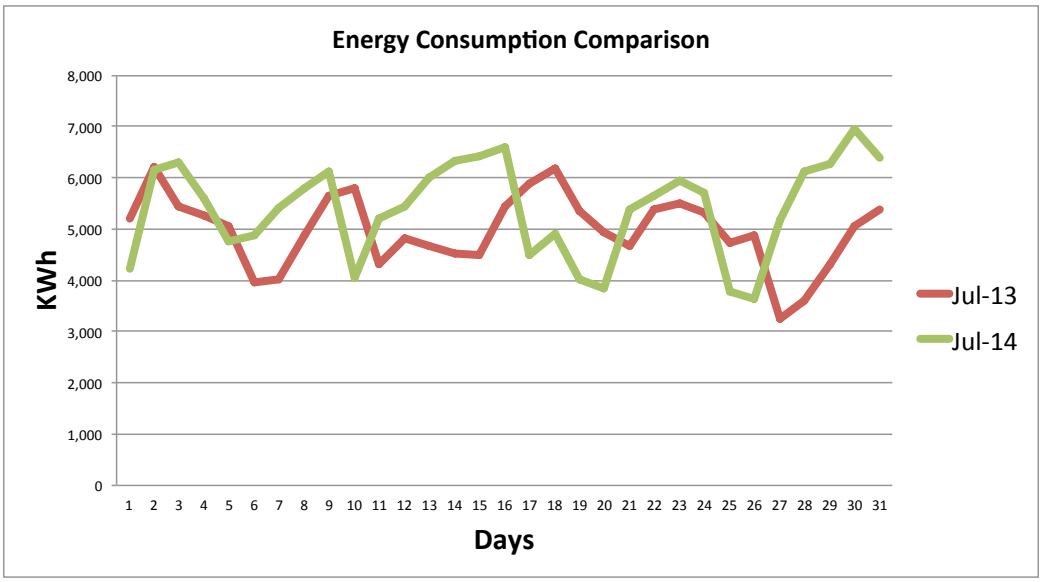
This is an analysis to show the efficiency achieved in energy consumption since the installation of Black Hawk in April 2014 at Kings University College, Edmonton, AB.

Figure 1 shows a comparison in energy consumed (in KW.h) during July 2014 and July 2013. As July 2014 has been significantly warmer than the previous year, it is difficult to be conclusive about the electricity savings achieved from the pattern in this chart.

Figure 1



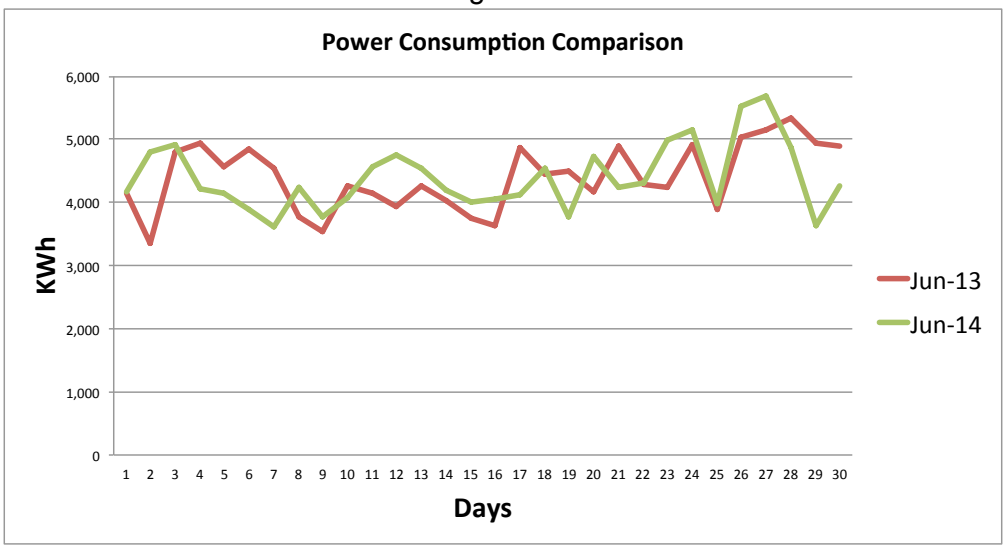
Hence, we now move towards our Ordinary Least Squares (OLS) regression results using the actual Heating Degree Days (hdd) and Cooling Degree Days (cdd) for both periods in Table 1. Power consumption (in KW.h) is denoted by the dependant variable in the model i.e. KW.h. The R-squared shows the explanatory power of independent variables used in the model which is around 60.6% for July 2013 and 82.4% for July 2014. We can also observe that both, the constant and cdd variables in the model are statistically significant at 1% level. The decrease in just the constant coefficient from 4,221 in July 2013 to 4,161 in July 2014 suggests that even in the presence of extreme weather conditions this year, the Black Hawk has been efficient in decreasing the daily power consumption levels by at around 1.4% from the same previous year period.

Table 1. Regression Results

	Jul-13	Jul-14
VARIABLES	kwh	kwh
hdd	33.61	-133.2
	(70.85)	(93.53)
cdd	307.7***	385.8***
	(56.14)	(43.37)
Constant	4,221***	4,161***
	(263.4)	(247.4)
Observations	31	31
R-squared	0.606	0.824
Standard errors in parentheses		
*** p<0.01, ** p<0.05, * p<0.1		

Figure 2 shows a comparison in energy consumed (in KW.h) during June 2014 and June 2013.

Figure 2



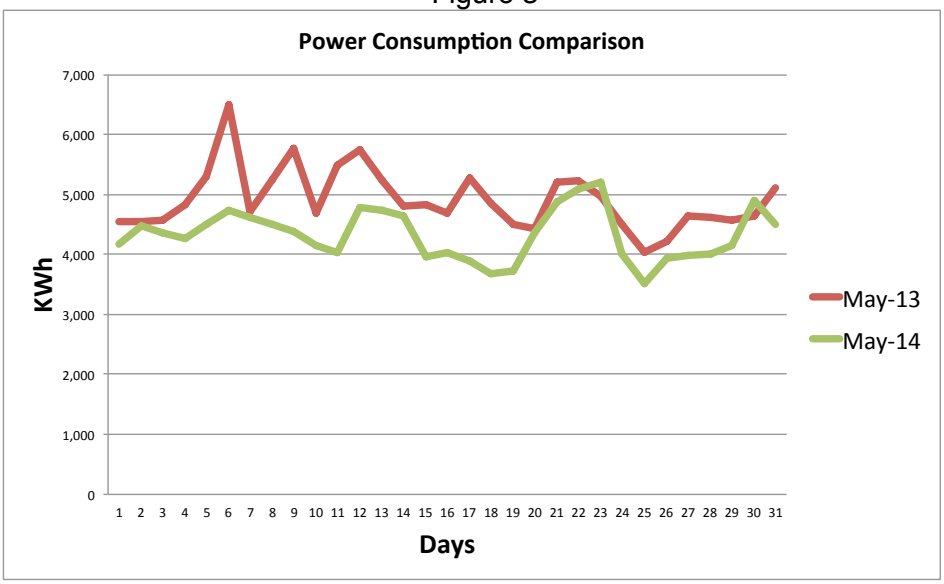
Our Ordinary Least Squares (OLS) regression results in Table 2 are using the actual Heating Degree Days (hdd) and Cooling Degree Days (cdd) for both periods. Power consumption (in KW.h) is denoted by the dependant variable in the model i.e. KW.h. The R-squared shows the explanatory power of independent variables used in the model which is around 65% in June 2013 and 67.9% in June 2014. We can also observe that both, the constant and cdd variables in the model are statistically significant at 1% level. The decrease in just the constant coefficient from 3,939 in June 2013 to 3,684 in June 2014 suggests that the Black Hawk has been efficient in decreasing the daily power consumption levels by approximately 6.5% from the same previous year period.

Table 2. Regression Results

	Jun-13	Jun-14
VARIABLES	kwh	kwh
hdd	13.49	47.32
	-45.01	-35.08
cdd	304.9***	376.6***
	-50.35	-51.79
Constant	3,939***	3,684***
	-170.3	-168.4
Observations	30	30
R-squared	0.65	0.679
Standard errors in parentheses		
*** p<0.01, ** p<0.05, * p<0.1		

Figure 3 shows a comparison in energy consumed (in KW.h) during May 2014 and May 2013.

Figure 3



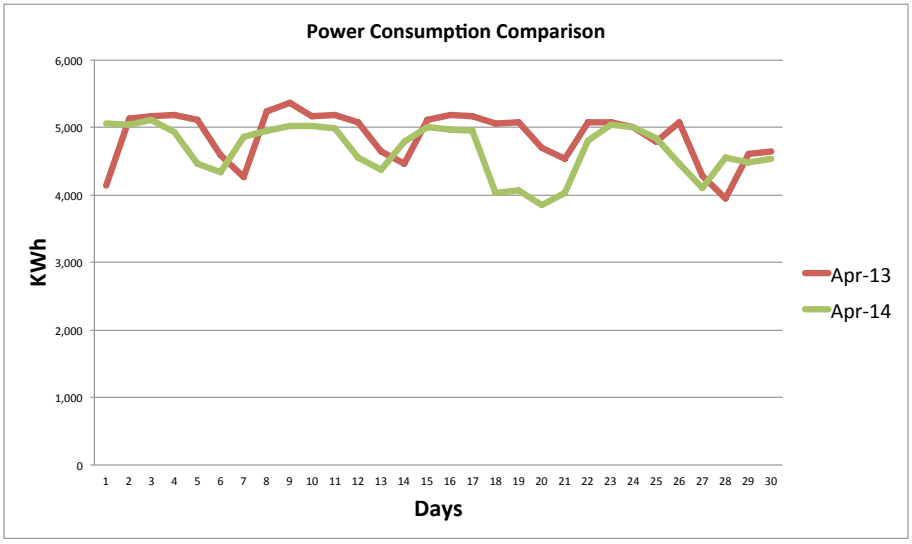
Our Ordinary Least Squares (OLS) regression results in Table 3 are using the actual Heating Degree Days (hdd) and Cooling Degree Days (cdd) for both periods. Power consumption (in KW.h) is denoted by the dependant variable in the model i.e. KW.h. The R-squared shows the explanatory power of independent variables used in the model which is around 69.8% in May 2013 and 56% in May 2014. We can also observe that both, the constant and cdd variables in May 2013 along with the hdd variable in May 2014 in the model are statistically significant at 1% level. The huge decrease in the constant coefficient from 4,496 in May 2013 to 3,742 in May 2014 suggests that the Black Hawk has been efficient in decreasing the daily power consumption levels by at least 16.8% from the same previous year period.

Table 3. Regression Results

	May-13	May-14
VARIABLES	kwh	kwh
hdd	-2.715	51.43***
	(25.2)	(14.95)
cdd	267.6***	344.2***
	(37.6)	(57.64)
Constant	4,496***	3,742***
	(151.6)	(140.3)
Observations	31	31
R-squared	0.698	0.56
Standard errors in parentheses		
*** p<0.01, ** p<0.05, * p<0.1		

Figure 4 shows a comparison in energy consumed (in KW.h) during April 2014 and April 2013.

Figure 4



Our Ordinary Least Squares (OLS) regression results in Table 4 are using the actual Heating Degree Days (hdd) and Cooling Degree Days (cdd) for both periods. Power consumption (in KW.h) is denoted by the dependant variable in the model i.e. KW.h. The R-squared shows the explanatory power of independent variables used in the model which is around 3.4% in April 2013 and 13% in April 2014. We can also observe that the constant variable for both periods in the model is statistically significant at 1% level. The decrease in the constant coefficient from 4,574 in April 2013 to 4,263 in April 2014 suggests that the Black Hawk has been efficient in decreasing the daily power consumption levels by at least 6.8% from the same previous year period.

Note: Only 40 of the 140 kVAR overall capacitance was installed in April 2014. On May 1, 2014, all additional capacitance was added.

Table 4. Regression Results

	Apr-13	Apr-14
VARIABLES	kwh	kwh
hdd	18.01	30.07*
	(18.45)	(15.23)
cdd	214.2	103.2
	(439.9)	(202.6)
Constant	4,574***	4,263***
	(309.5)	(222.4)
Observations	30	30
R-squared	0.034	0.13
Standard errors in parentheses		
*** p<0.01, ** p<0.05, * p<0.1		

Analyzing the audit data available at this time, we can say that electricity consumption savings per month post the installation of Black Hawk at Kings University College stands at an average of about 7.9% over the period of April - July 2014.

Annual consumption from July 1, 2013 to June 30, 2014 stood at 1,805,136.91 kW.h. Estimated annual energy savings over the period based on these test results would be 142,606 kW.h. Estimated annual GHG savings are 92.7 tonnes.