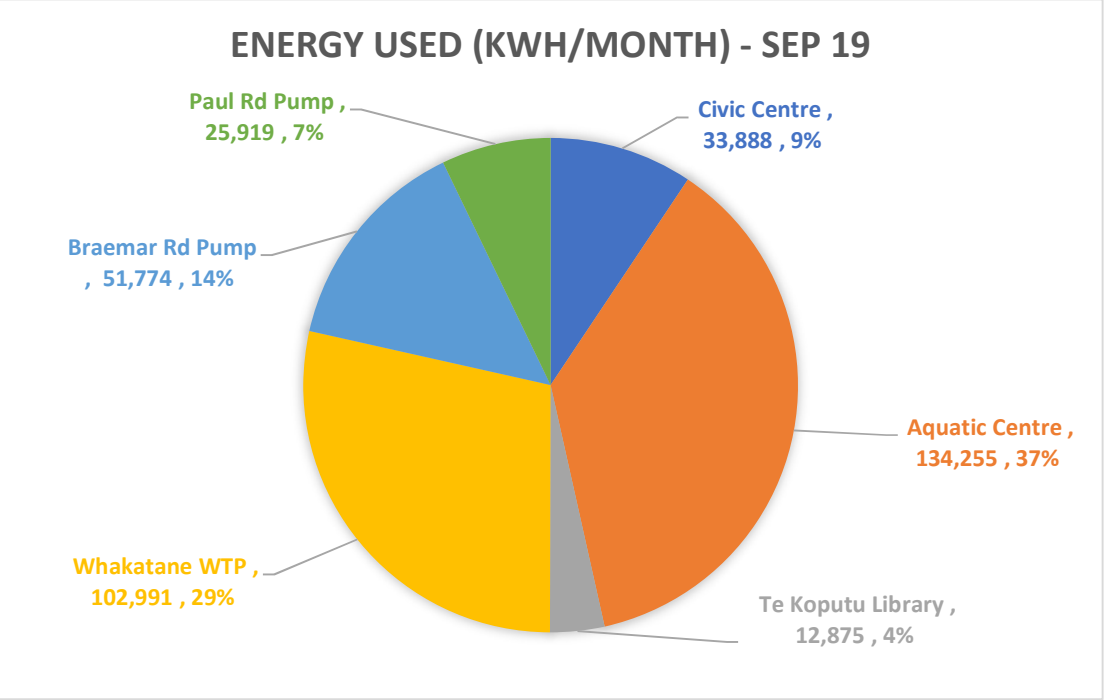
September 2019

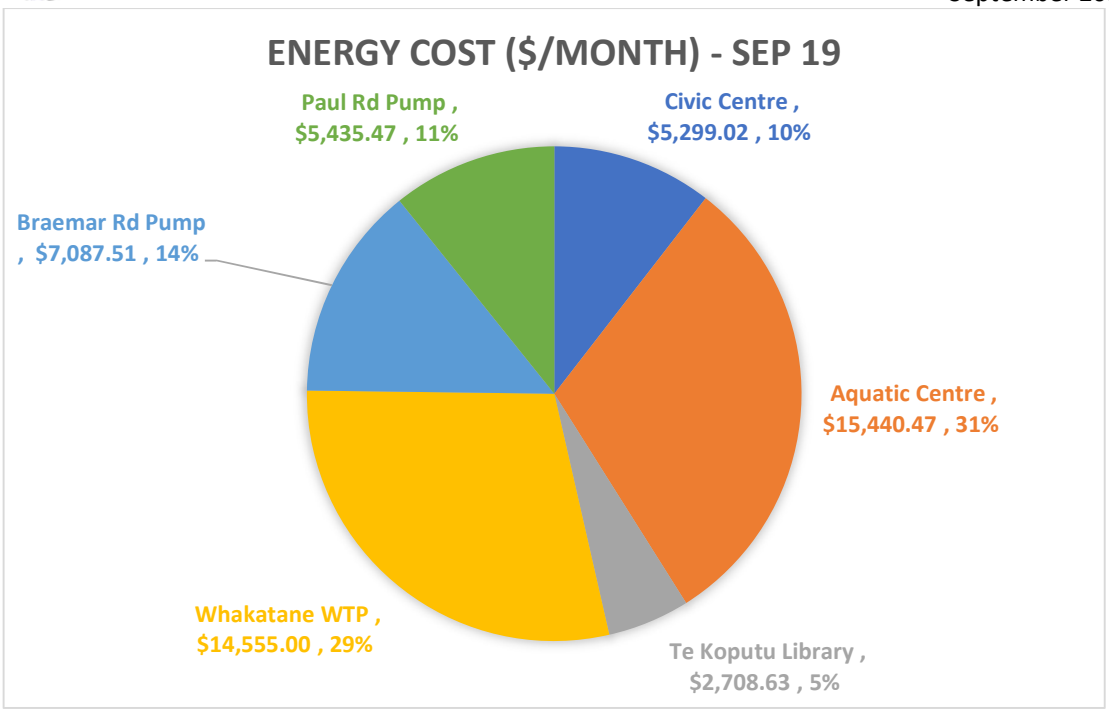
Whakatāne District Council Energy Performance Report

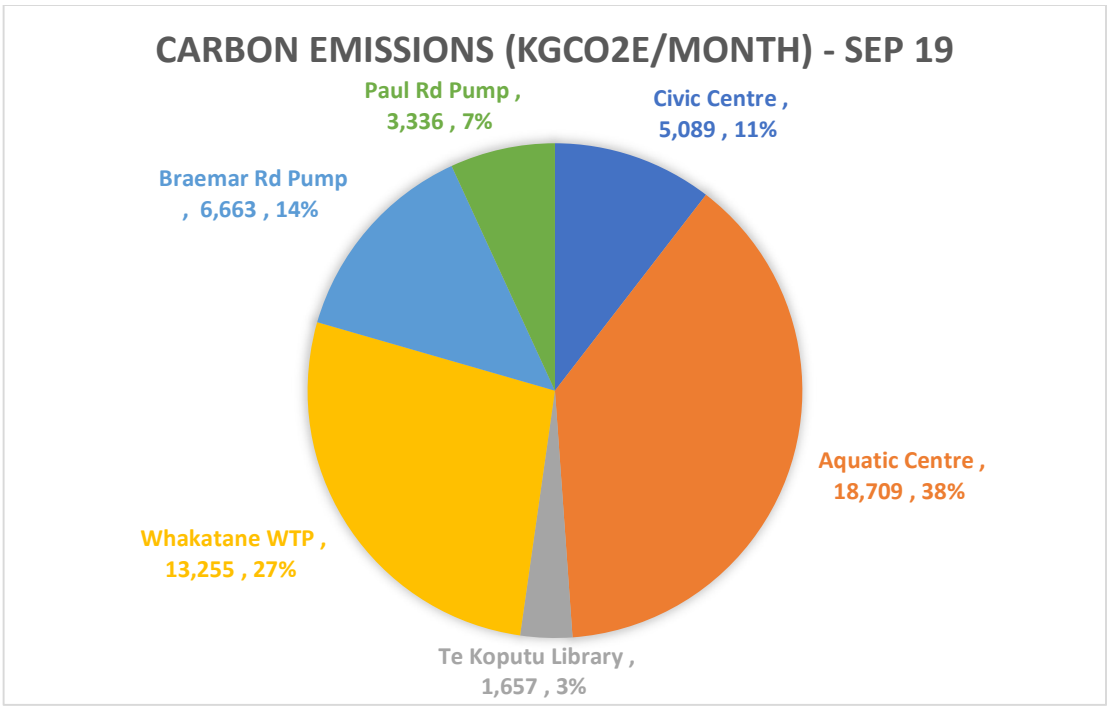
Summary

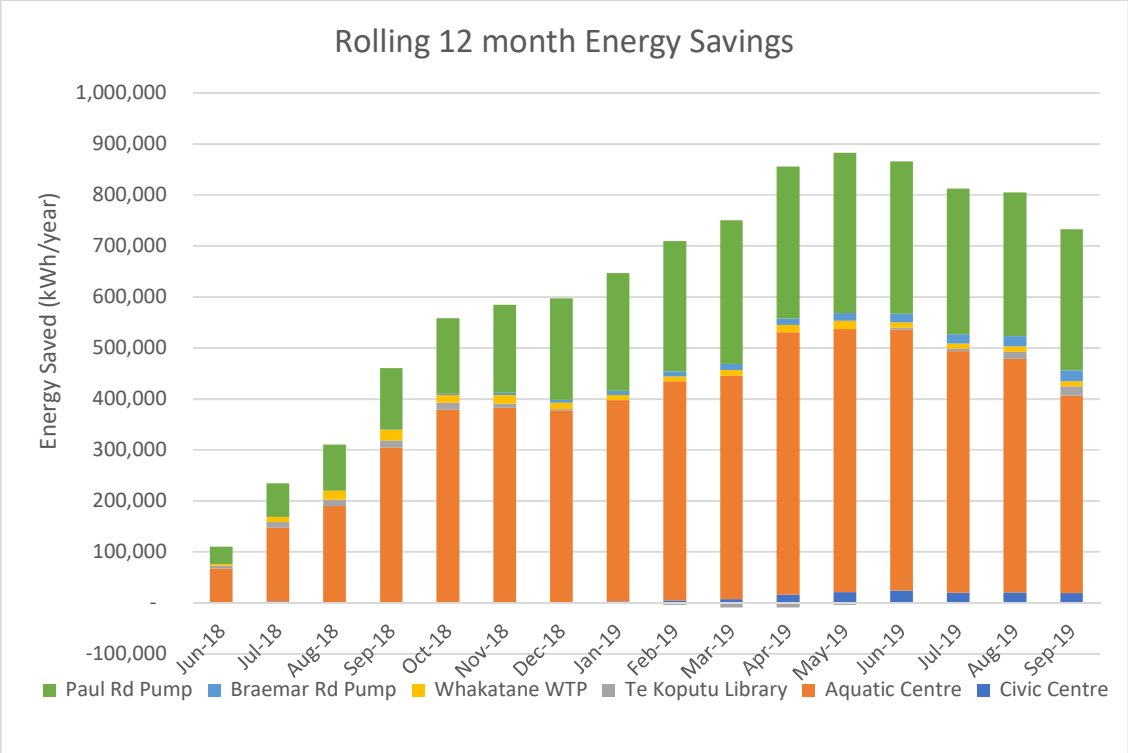
For Whakatāne District Council's six largest energy using sites:

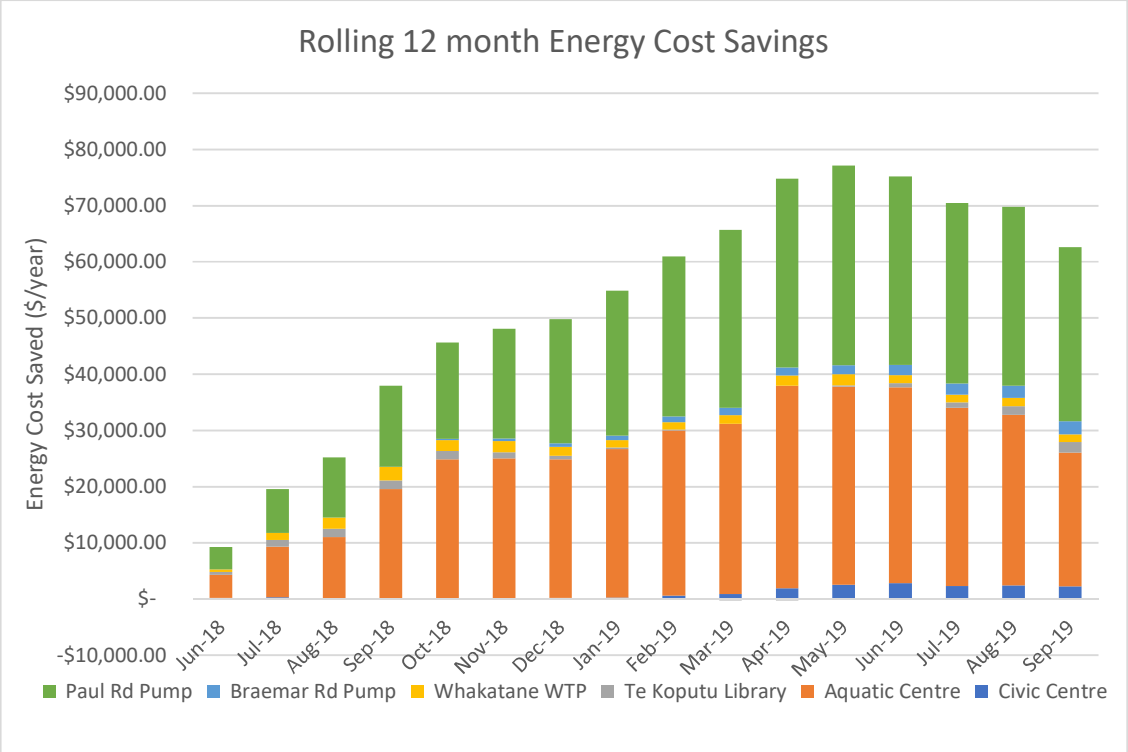
- Total energy used for the month was 371,684 kWh.
- Total energy cost for the month was $50,526 .
- Total carbon emissions for the month were 49,889 kgCO_2e.
- Rolling 12-month energy savings total 804,830 kWh.
- Rolling 12- month energy cost savings total $69,792 .
- Rolling 12-month carbon savings total 147,276 kgCO_2e.

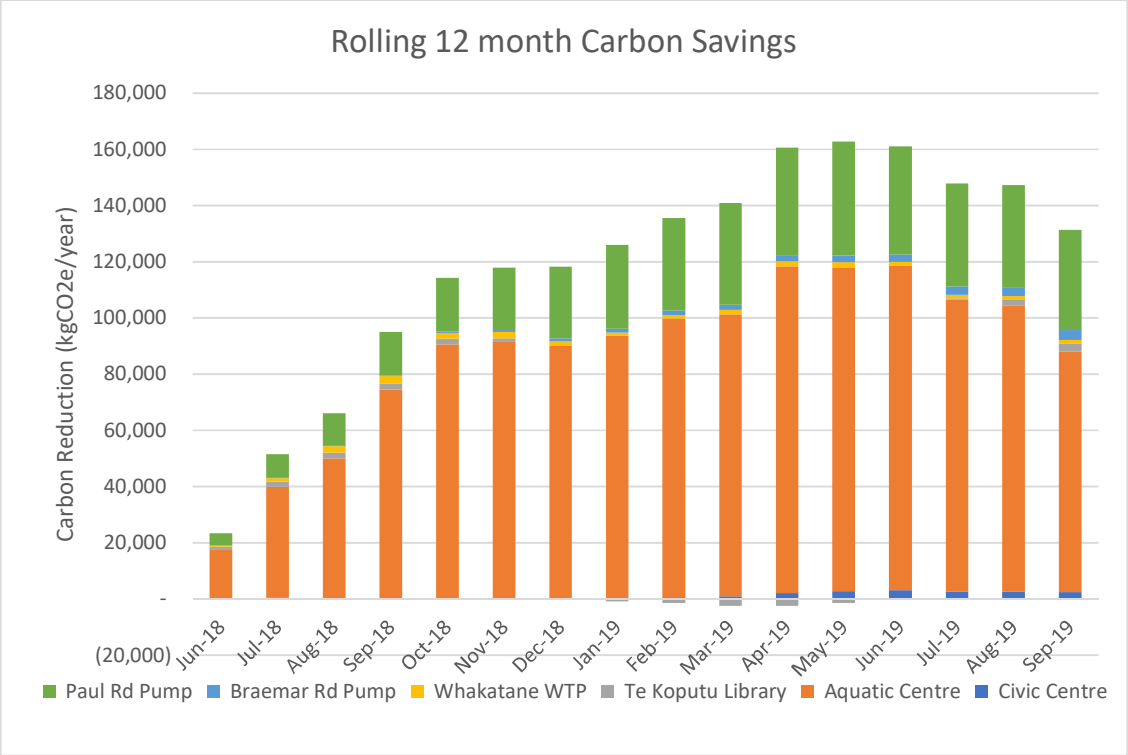



ENERGY COST ($/MONTH) - SEP 19
Paul Rd Pump , $5,435.47 , 11%
Civic Centre , $5,299.02 , 10%
Braemar Rd Pump , $7,087.51 , 14%
Aquatic Centre , $15,440.47 , 31%
Whakatane WTP , $14,555.00 , 29%
Te Koputu Library , $2,708.63 , 5%


CARBON EMISSIONS (KGCO2E/MONTH) - SEP 19
Paul Rd Pump , 3,336 , 7%
Civic Centre , 5,089 , 11%
Braemar Rd Pump , 6,663 , 14%
Aquatic Centre , 18,709 , 38%
Whakatane WTP , 13,255 , 27%
Te Koputu Library , 1,657 , 3%


Rolling 12 month Energy Savings
Energy Saved (kWh/year)
1,000,000
900,000
800,000
700,000
600,000
500,000
400,000
300,000
200,000
100,000
-
-100,000
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Jul-19
Aug-19
Sep-19
Paul Rd Pump
Braemar Rd Pump
Whakatane WTP
Te Koputu Library
Aquatic Centre
Civic Centre


Rolling 12 month Energy Cost Savings
Energy Cost Saved ($/year)
$90,000.00
$80,000.00
$70,000.00
$60,000.00
$50,000.00
$40,000.00
$30,000.00
$20,000.00
$10,000.00
$-
-$10,000.00
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Jul-19
Aug-19
Sep-19
Paul Rd Pump
Braemar Rd Pump
Whakatane WTP
Te Koputu Library
Aquatic Centre
Civic Centre


Rolling 12 month Carbon Savings
Carbon Reduction (kgCO2e/year)
180,000
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
-
(20,000)
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Jul-19
Aug-19
Sep-19
Paul Rd Pump
Braemar Rd Pump
Whakatane WTP
Te Koputu Library
Aquatic Centre
Civic Centre

Civic Centre

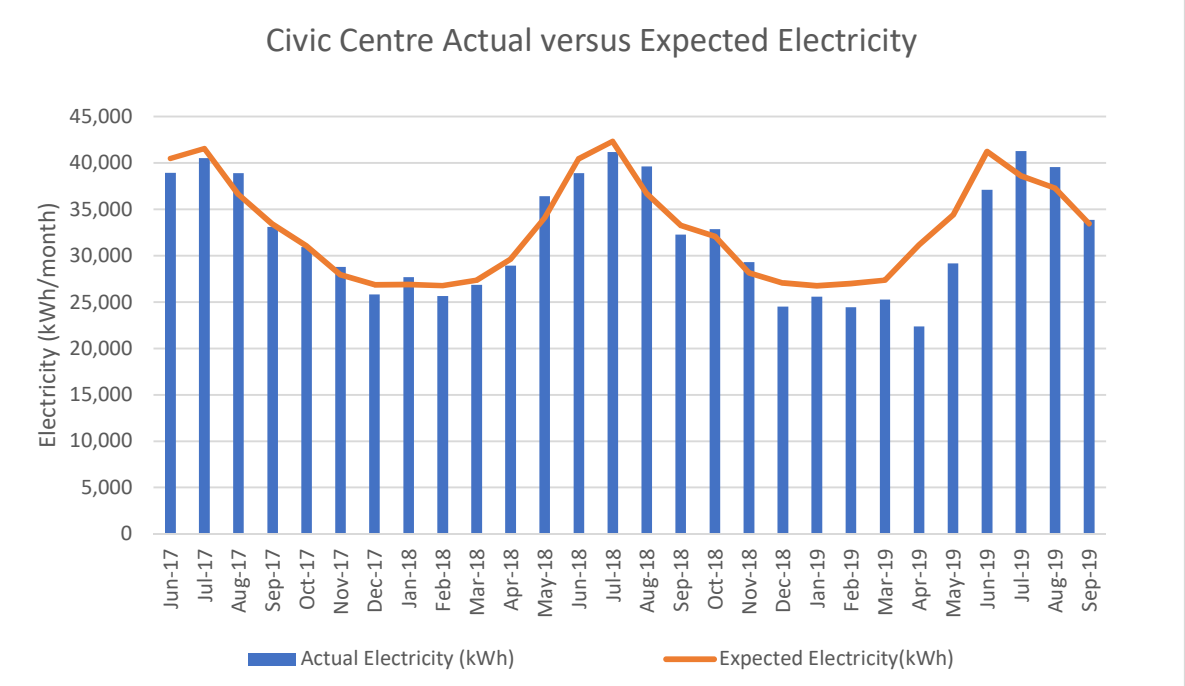
Summary

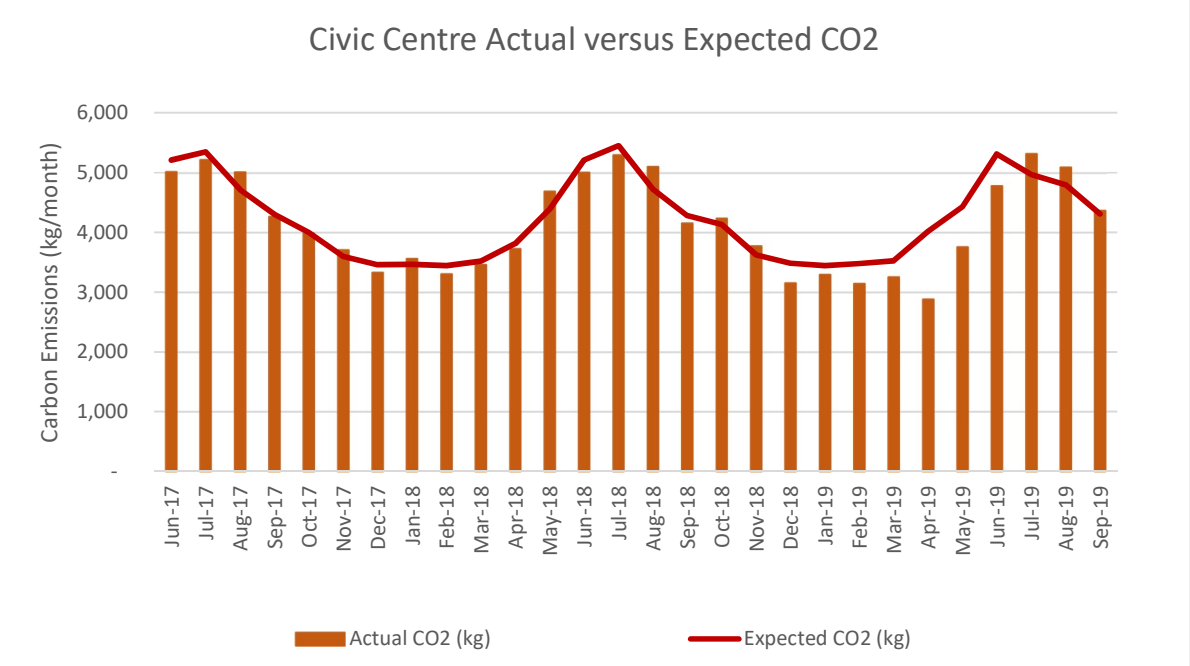
- Electricity savings for the month were -421kWh, an extra 1.3%.
- Energy cost savings for the month were -$46.69 , which is an increase.
- Carbon savings for the month were -54 kgCO_2e, an extra 1.3%.
- Rolling 12-month electricity savings are 19,351kWh, a saving of 5.0%.
- Rolling 12-month cost savings are $2,256.60 .
- Rolling 12-month carbon savings are 2,491 kgCO_2e, a saving of 5.0%.

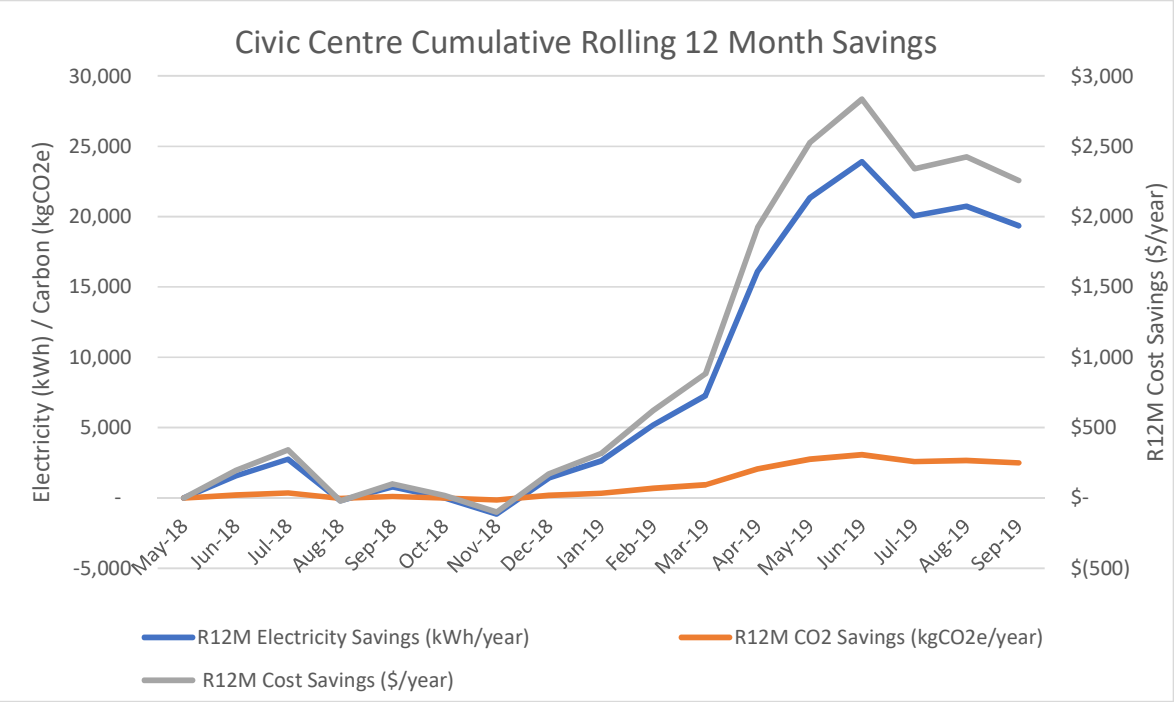
Comments

Expected electricity use at the Civic Centre is derived from ambient temperature; electricity is typically higher in colder months due to heating demands, and lower in warmer months. July and August 2019 were poor months for energy efficiency, with actual electricity exceeding expected electricity. This has occurred in August for the last 3 years. Electricity use in Sep 2019 was similar to expected, exceeding the baseline by just 1.3%.

The Civic Centre had a period of lower than expected electricity use from Dec 2018 to Jun 2019. April 2019 had the lowest use of these months. Due to the reduction during this period, the Civic Centre has saved 5.0% of its electricity in the last 12 months.




Civic Centre Actual versus Expected CO2
Carbon Emissions (kg/month)
6,000
5,000
4,000
3,000
2,000
1,000
-
Jun-17
Jul-17
Aug-17
Sep-17
Oct-17
Nov-17
Dec-17
Jan-18
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Jul-19
Aug-19
Sep-19
Actual CO2 (kg)
Expected CO2 (kg)


Civic Centre Cumulative Rolling 12 Month Savings
Electricity (kWh) / Carbon (kgCO2e)
30,000
25,000
20,000
15,000
10,000
5,000
-
-5,000
R12M Cost Savings ($/year)
$3,000
$2,500
$2,000
$1,500
$1,000
$500
$-
$(500)
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Jul-19
Aug-19
Sep-19
R12M Electricity Savings (kWh/year)
R12M CO2 Savings (kgCO2e/year)
R12M Cost Savings ($/year)

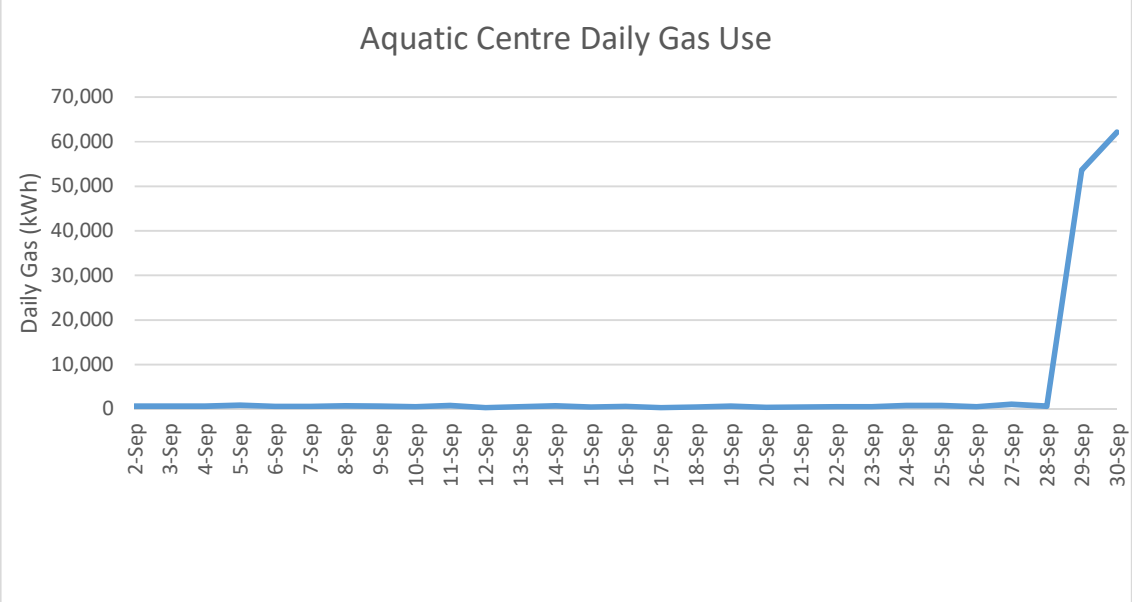
Aquatic Centre

Summary

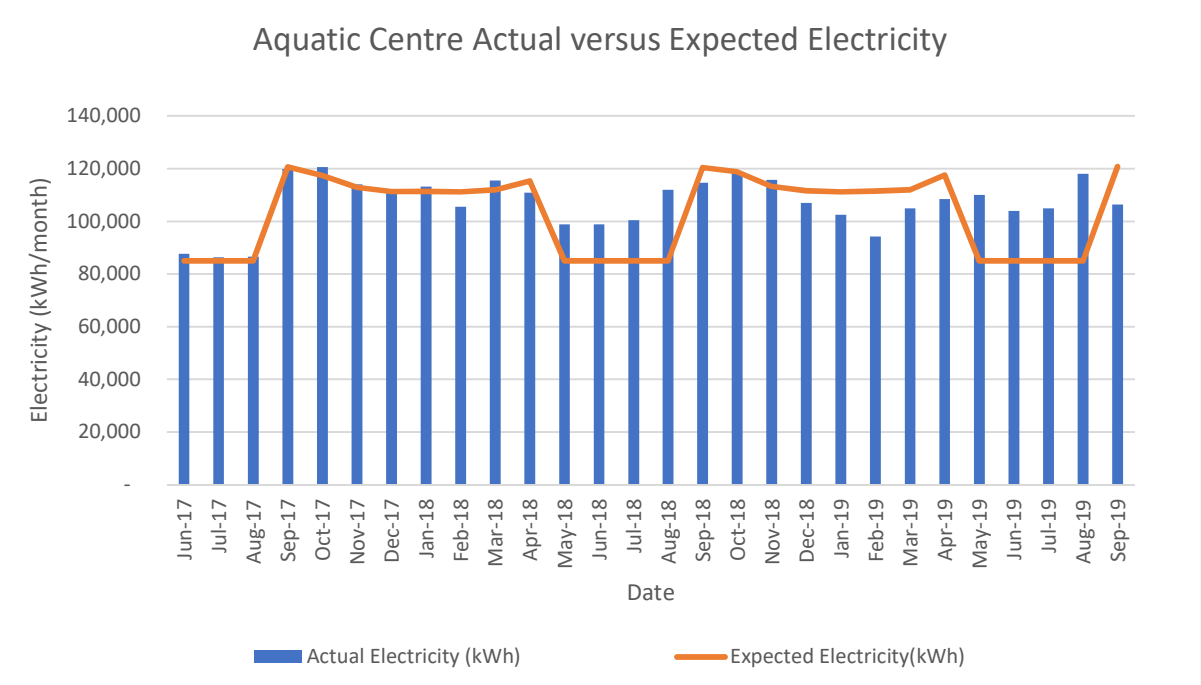
- Electricity savings for the month were 14,340kWh, a saving of 11.9%.
- Natural gas savings for the month were 28,980kWh, a saving of 14.3%.
- Energy cost savings for the month were $1,489.81 .
- Carbon savings for the month were 8,163 $kgCO_2e$, a saving of 13.7%.
- Rolling 12-month electricity savings are -37,581kWh, an extra 3.0%.
- Rolling 12-month natural gas savings are 424,629kWh, a saving of 40.1%.
- Rolling 12-month cost savings are $23,769.10 .
- Rolling 12-month carbon savings are 85,520 $kgCO_2e$, a saving of 22.0%.

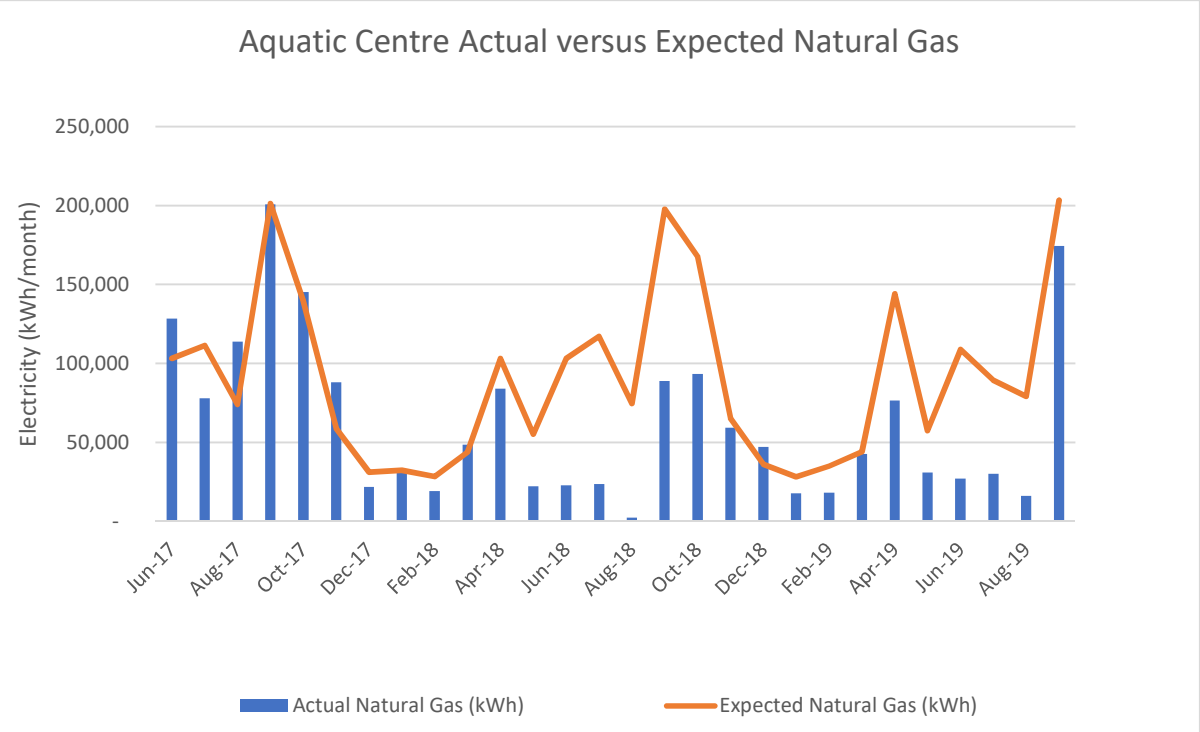
Comments

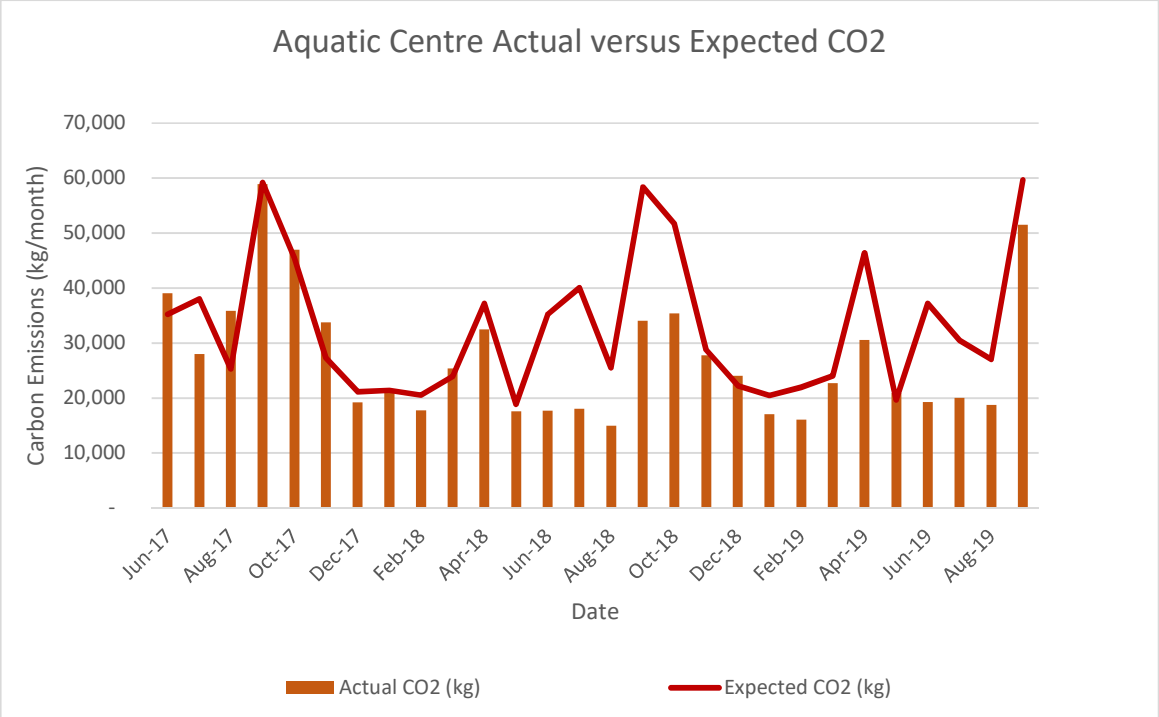
The chart below shows daily gas used by the Aquatic Centre in Sep 2019. There is a large spike towards the end of the month due to heating of the outdoor pool for the beginning of the season. Despite this spike in gas use at the end of Sep 2019, gas use for the month was less than the baseline, which adjusts for ambient temperature. Gas use was, however, significantly higher than Sep 2018.

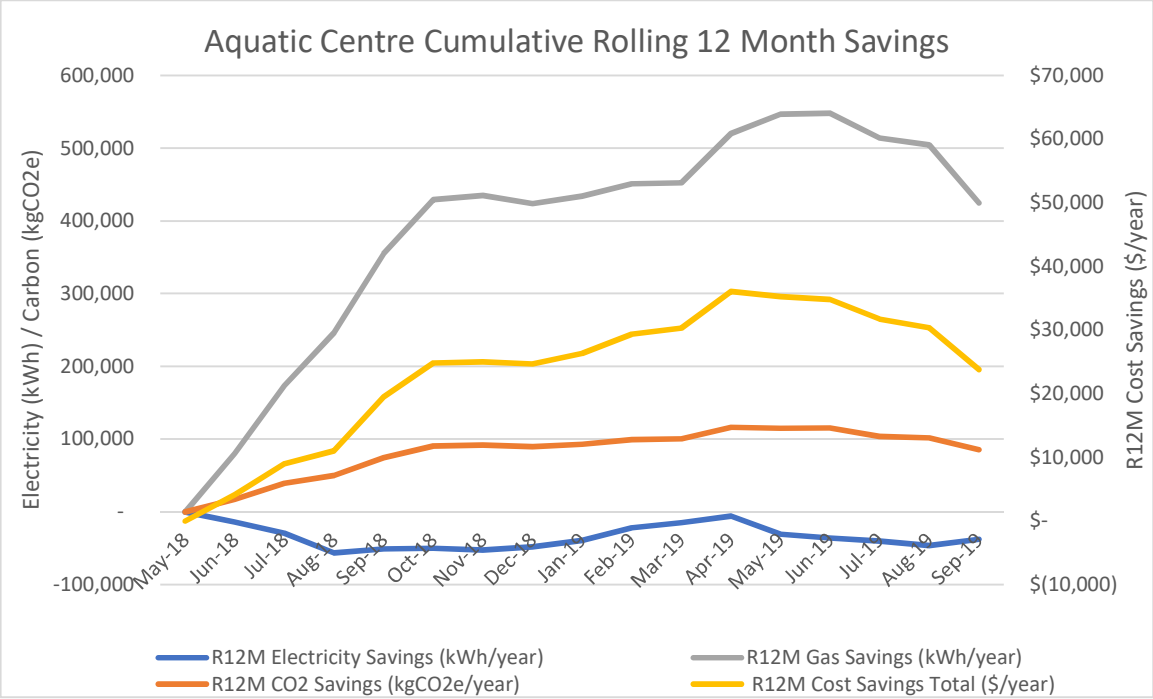


Electricity use was less than expected in Sep 2019. This also adjusts for ambient temperature and has a separate baseline when the outdoor pool is in use. There has been a trend for the last two years of increased electricity when the outdoor pool is not in use (Apr to Aug), and decreased gas use these months. This has significantly reduced carbon emissions and in the last 12 months the Aquatic Centre has reduced carbon emissions by 85.5 Tonnes CO_2e.


Aquatic Centre Actual versus Expected Electricity
Electricity (kWh/month)
140,000
120,000
100,000
80,000
60,000
40,000
20,000
-
Jun-17
Jul-17
Aug-17
Sep-17
Oct-17
Nov-17
Dec-17
Jan-18
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Jul-19
Aug-19
Sep-19
Date
Actual Electricity (kWh)
Expected Electricity(kWh)


Aquatic Centre Actual versus Expected Natural Gas
Electricity (kWh/month)
250,000
200,000
150,000
100,000
50,000
-
Jun-17
Aug-17
Oct-17
Dec-17
Feb-18
Apr-18
Jun-18
Aug-18
Oct-18
Dec-18
Feb-19
Apr-19
Jun-19
Aug-19
Actual Natural Gas (kWh)
Expected Natural Gas (kWh)


Aquatic Centre Actual versus Expected CO2
Carbon Emissions (kg/month)
70,000
60,000
50,000
40,000
30,000
20,000
10,000
-
Jun-17
Aug-17
Oct-17
Dec-17
Feb-18
Apr-18
Jun-18
Aug-18
Oct-18
Dec-18
Feb-19
Apr-19
Jun-19
Aug-19
Date
Actual CO2 (kg)
Expected CO2 (kg)


Aquatic Centre Cumulative Rolling 12 Month Savings
Electricity (kWh) / Carbon (kgCO2e)
600,000
500,000
400,000
300,000
200,000
100,000
-
-100,000
$70,000
$60,000
$50,000
$40,000
$30,000
$20,000
$10,000
$-
$(10,000)
R12M Cost Savings ($/year)
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Jul-19
Aug-19
Sep-19
R12M Electricity Savings (kWh/year)
R12M Gas Savings (kWh/year)
R12M CO2 Savings (kgCO2e/year)
R12M Cost Savings Total ($/year)

Te Koputu Library

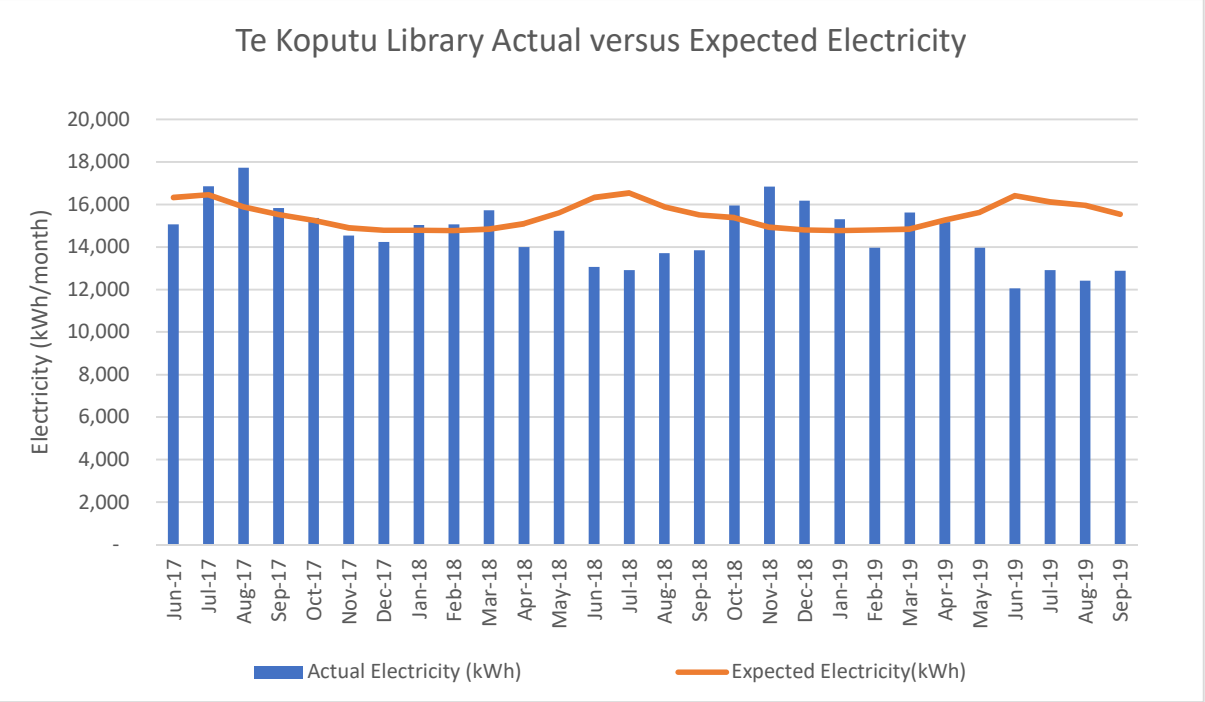
Summary

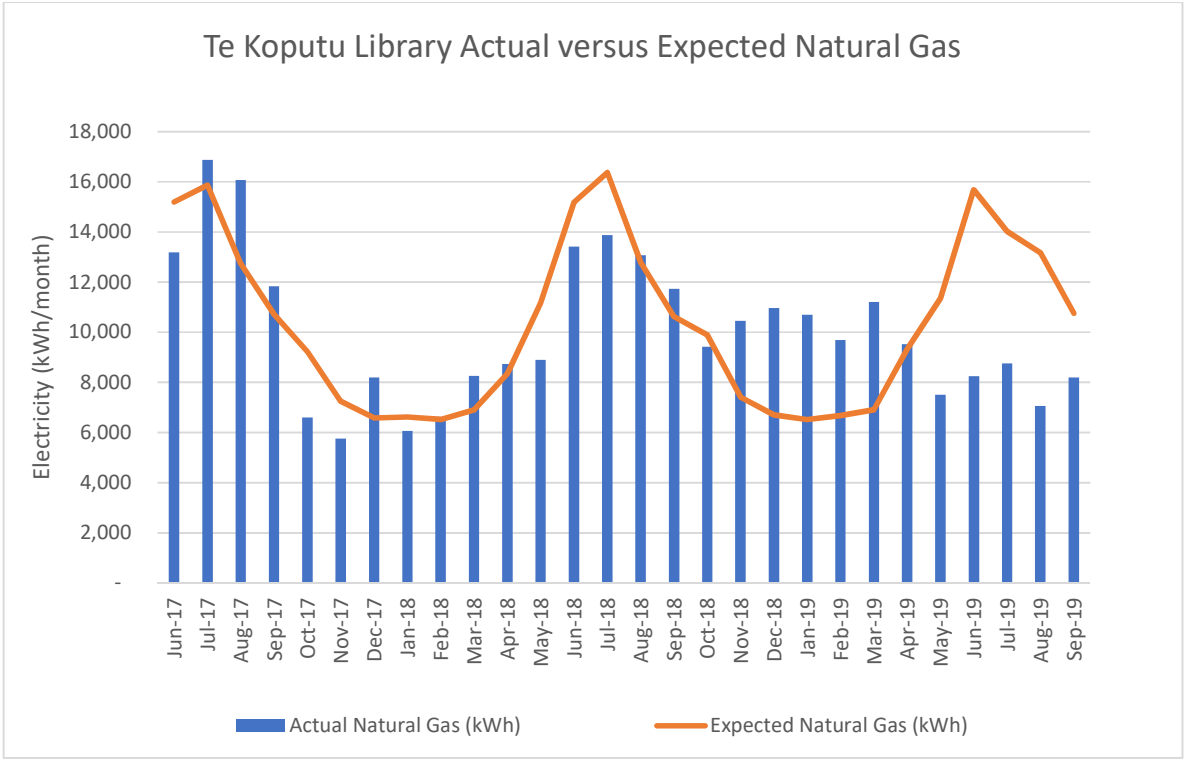
- Electricity savings for the month were 2,656kWh, a saving of 17.1%.
- Natural gas savings for the month were 2,573kWh, a saving of 23.9%.
- Energy cost savings for the month were $299.66 .-$46.69
- Carbon savings for the month were 904 $kgCO_2e$, a saving of 20.8%.
- Rolling 12-month electricity savings are 11,207kWh, a saving of 6.1%.
- Rolling 12-month natural gas savings are 6,678kWh, a saving of 5.6%.
- Rolling 12-month cost savings are $1,939.74 .
- Rolling 12-month carbon savings are 2,943 $kgCO_2e$, a saving of 5.9%.

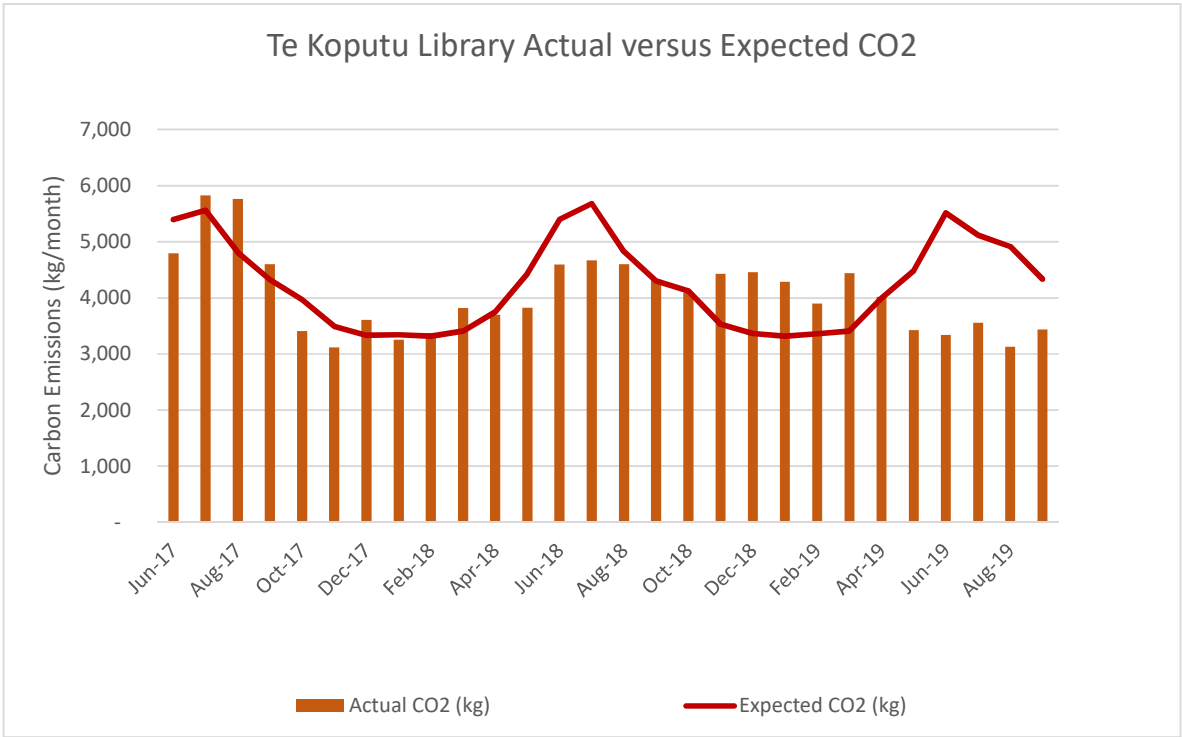
Comments

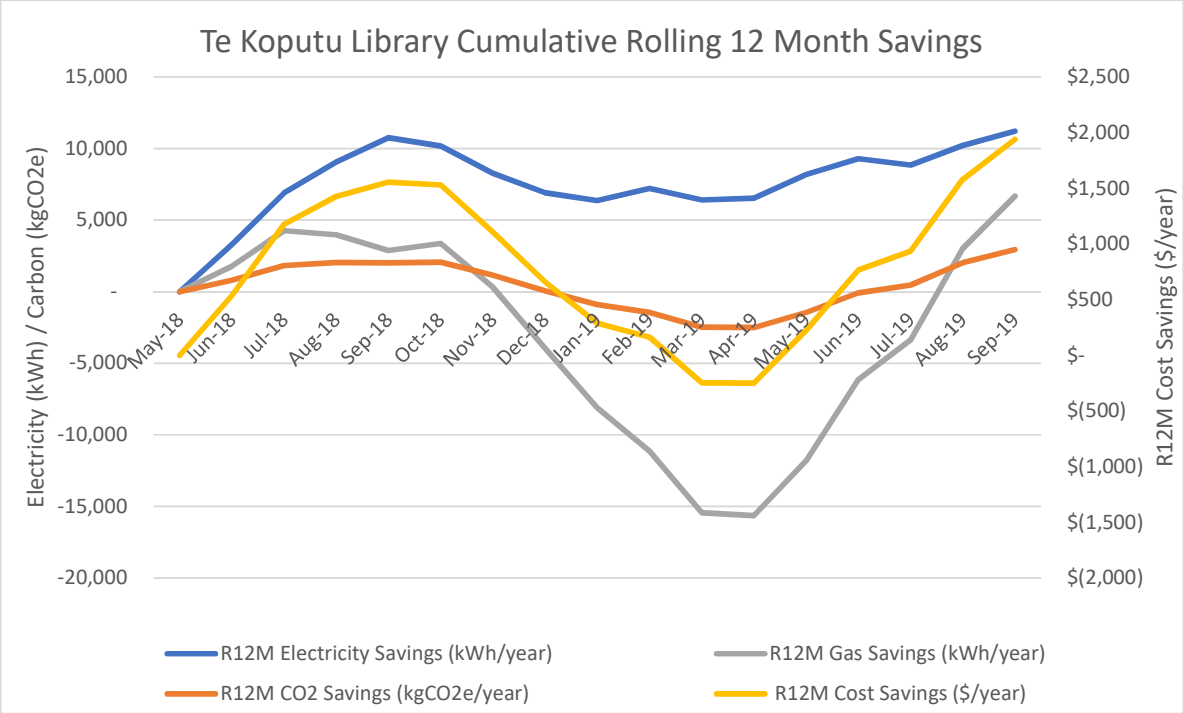
A baseline was set for the Library using energy data (electricity and gas), as well as ambient temperature from Jun 2017 to May 2018. Monthly electricity showed some sensitivity to ambient temperature with higher electricity used in winter months. Since winter 2018, this pattern has changed, with electricity being at a minimum in winter and maximum in summer.

Gas use has showed a similar trend in the last 12 months; gas use was at its maximum in summer and minimum in winter. This should not be the case since gas is used exclusively for heating. Taking daily readings from the gas meter will help understand what is occurring. Taking a reading in the morning and the evening would allow night time gas use to be separated from day time use.




Te Koputu Library Actual versus Expected Natural Gas
Electricity (kWh/month)
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
-
Jun-17
Jul-17
Aug-17
Sep-17
Oct-17
Nov-17
Dec-17
Jan-18
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Jul-19
Aug-19
Sep-19
Actual Natural Gas (kWh)
Expected Natural Gas (kWh)


Te Koputu Library Actual versus Expected CO2
Carbon Emissions (kg/month)
7,000
6,000
5,000
4,000
3,000
2,000
1,000
-
Jun-17
Aug-17
Oct-17
Dec-17
Feb-18
Apr-18
Jun-18
Aug-18
Oct-18
Dec-18
Feb-19
Apr-19
Jun-19
Aug-19
Actual CO2 (kg)
Expected CO2 (kg)


Te Koputu Library Cumulative Rolling 12 Month Savings
15,000
10,000
5,000
-
-5,000
-10,000
-15,000
-20,000
Electricity (kWh) / Carbon (kgCO2e)
$2,500
$2,000
$1,500
$1,000
$500
$-
$(500)
$(1,000)
$(1,500)
$(2,000)
R12M Cost Savings ($/year)
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Jul-19
Aug-19
Sep-19
R12M Electricity Savings (kWh/year)
R12M Gas Savings (kWh/year)
R12M CO2 Savings (kgCO2e/year)
R12M Cost Savings ($/year)

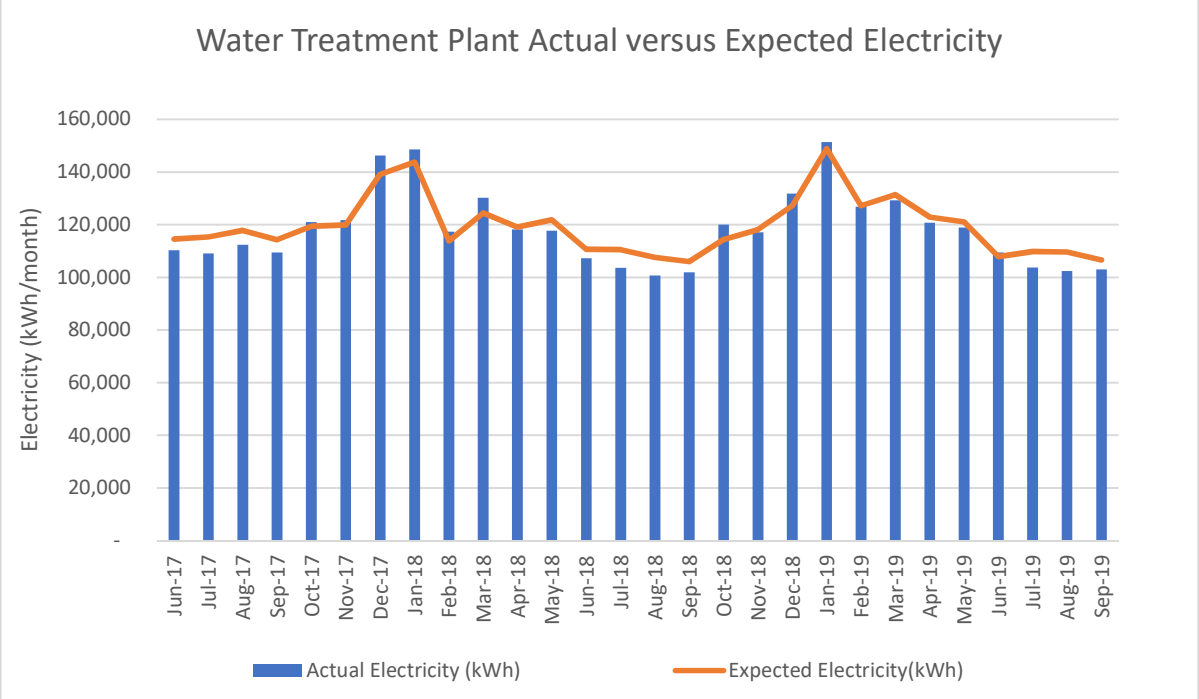
Whakatāne Water Treatment Plant

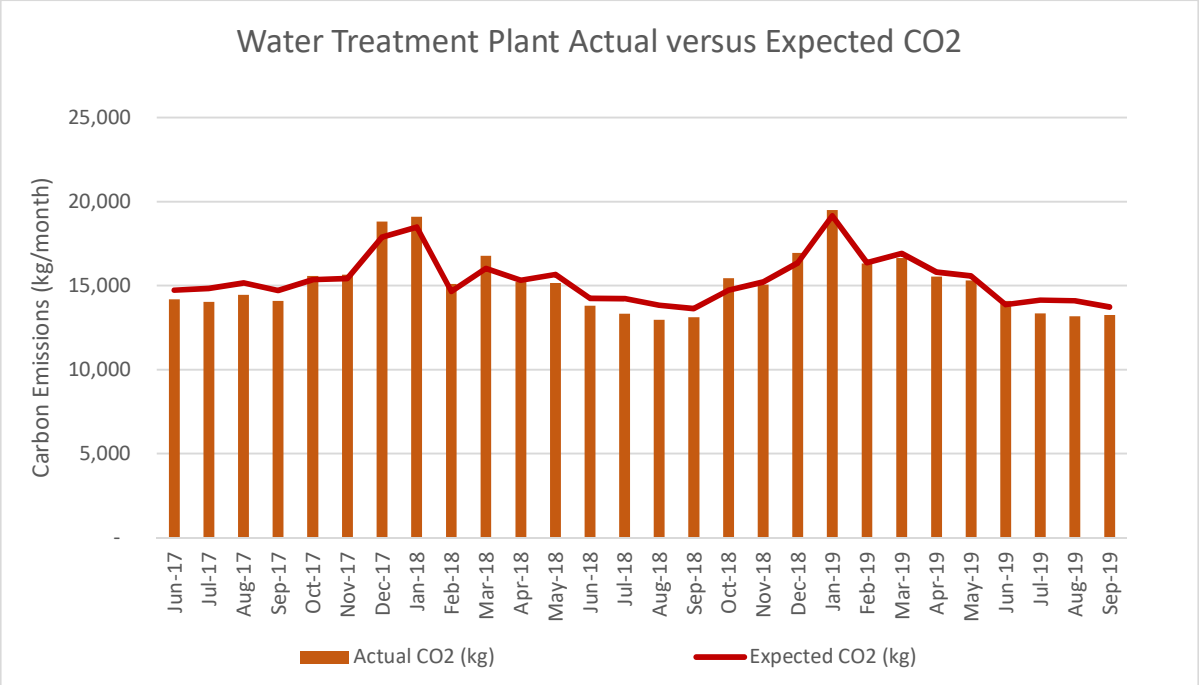
Summary

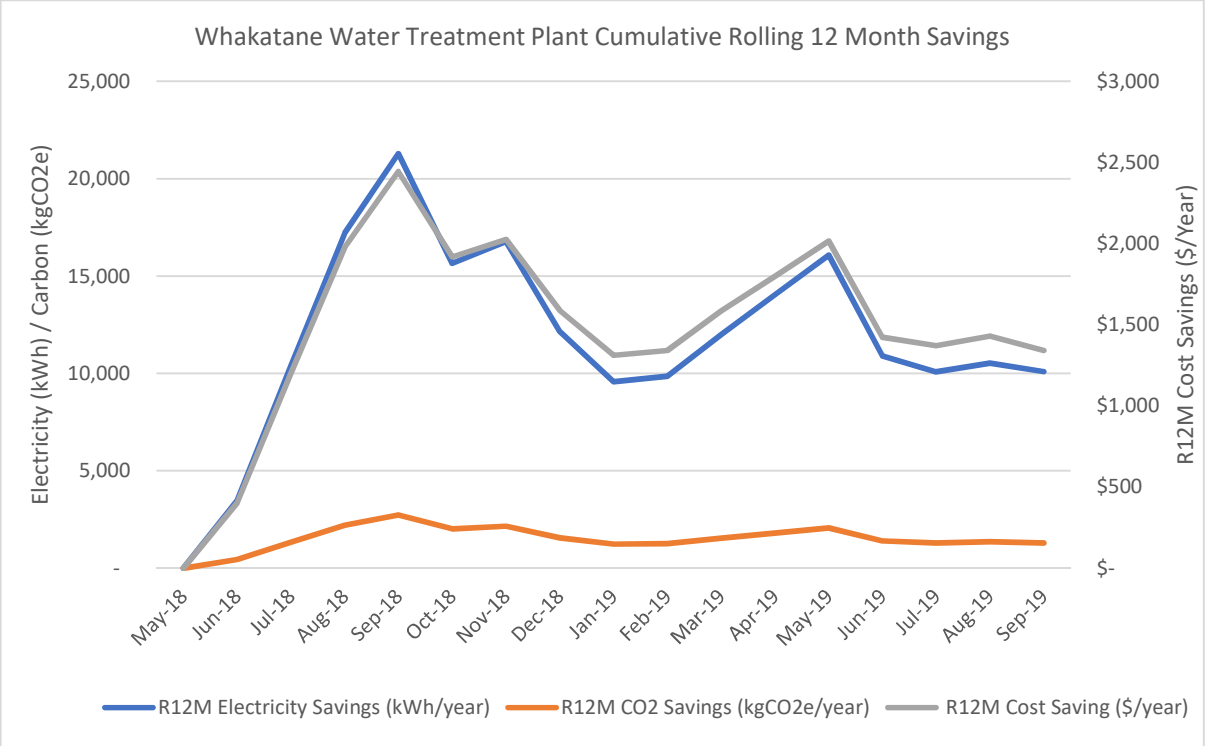
- Electricity savings for the month were 3,644kWh, a saving of 3.4%.
- Energy cost savings for the month were $375.80 .
- Carbon savings for the month were 469 kgCO_2e, a saving of 3.4%.
- Rolling 12-month electricity savings are 10,103kWh, a saving of 0.7%.
- Rolling 12-month cost savings are $1,342.52 .
- Rolling 12-month carbon savings are 1,300 kgCO_2e, a saving of 0.7%.

Comments

The Water Treatment Plant has shown a tendenancy to use less energy than expected during low water demand months and more than expected during high water demand months. Note, expected electricity adjusts for the volume of water supplied per month. This indicates that the pumping configuration during high water demand periods uses more energy per m^3 supplied than during low water demand periods. Sep 2019 was a low water demand month and electricity use was 3.4% below expected.




Water Treatment Plant Actual versus Expected CO2
Carbon Emissions (kg/month)
25,000
20,000
15,000
10,000
5,000
-
Jun-17
Jul-17
Aug-17
Sep-17
Oct-17
Nov-17
Dec-17
Jan-18
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Jul-19
Aug-19
Sep-19
Actual CO2 (kg)
Expected CO2 (kg)


Whakatane Water Treatment Plant Cumulative Rolling 12 Month Savings
Electricity (kWh) / Carbon (kgCO2e)
25,000
20,000
15,000
10,000
5,000
-
$3,000
$2,500
$2,000
$1,500
$1,000
$500
$-
R12M Cost Savings ($/Year)
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Jul-19
Aug-19
Sep-19
R12M Electricity Savings (kWh/year)
R12M CO2 Savings (kgCO2e/year)
R12M Cost Saving ($/year)

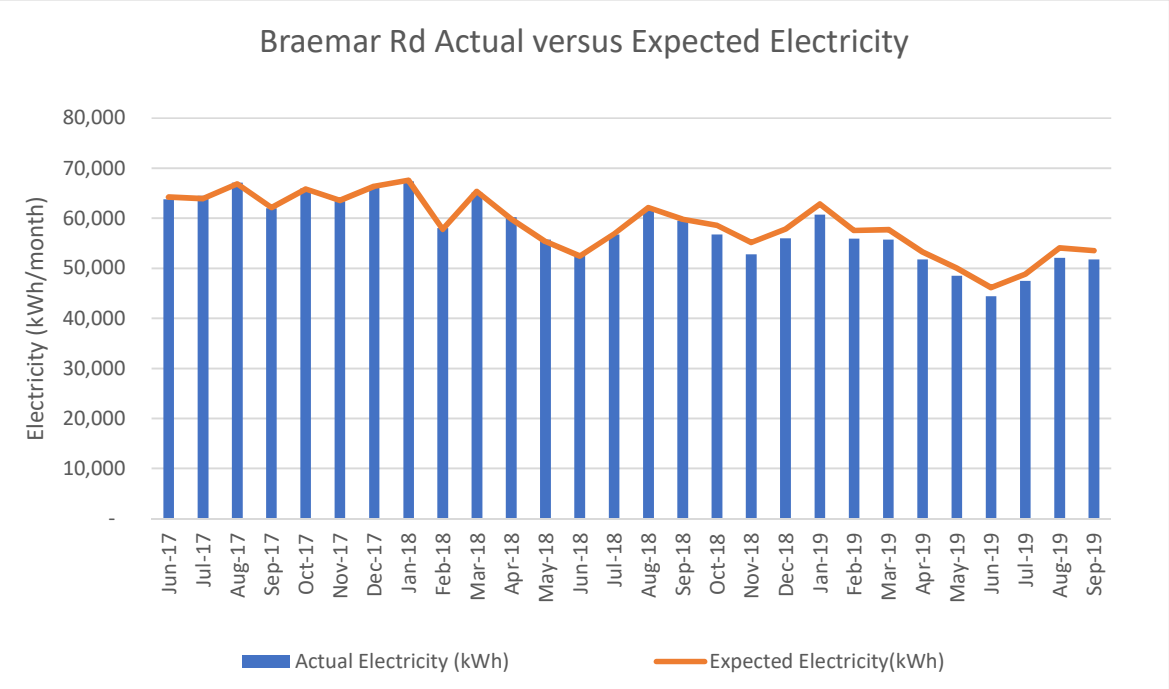
Braemar Rd Pump Station

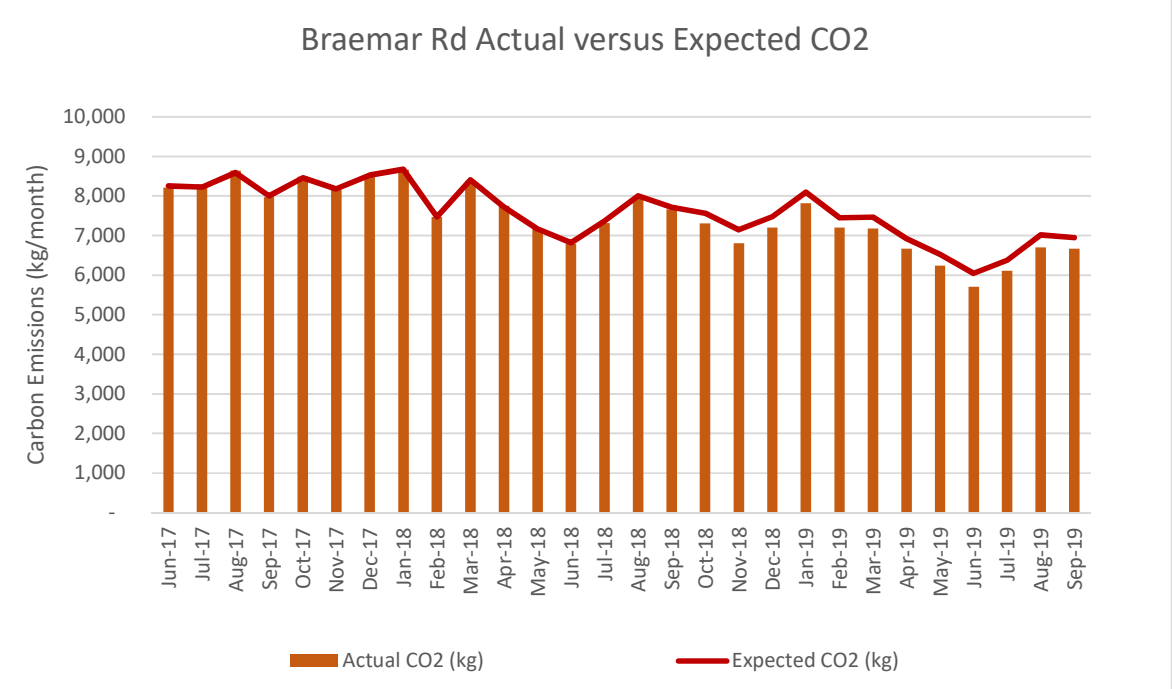
Summary

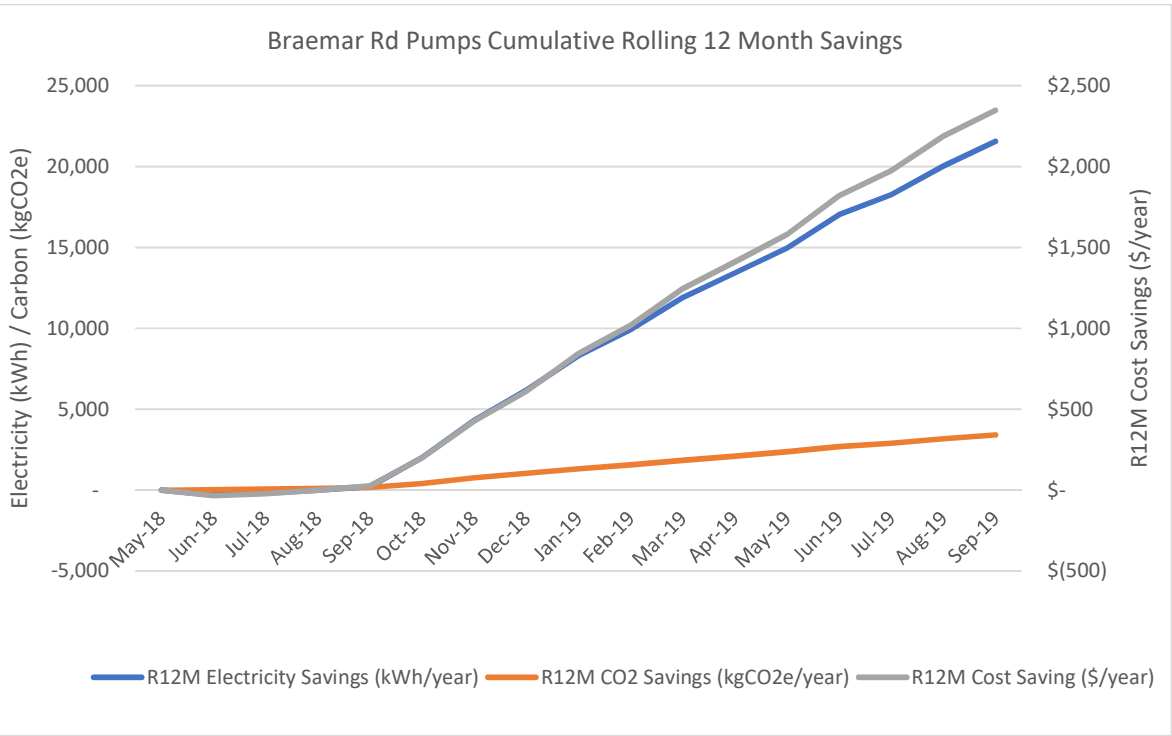
- Electricity savings for the month were 1,747kWh, a saving of 3.3%.
- Energy cost savings for the month were $186.26 .
- Carbon savings for the month were 285 kgCO_2e, a saving of 3.3%.
- Rolling 12-month electricity savings are 21,564kWh, a saving of 3.3%.
- Rolling 12-month cost savings are $2,348.17 .
- Rolling 12-month carbon savings are 3,418 kgCO_2e, a saving of 3.3%.

Comments

Braemar Rd Pump Station began using less energy than expected each month from Oct 2018. Expected energy is based on the volume of water supplied. In Sep 2019, electricity was 3.3% less than expected for the amount of water supplied. Rolling 12-month savings are also 3.3% and this has been achieved consistently each month.




Braemar Rd Actual versus Expected CO2
Carbon Emissions (kg/month)
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
-
Jun-17
Jul-17
Aug-17
Sep-17
Oct-17
Nov-17
Dec-17
Jan-18
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Jul-19
Aug-19
Sep-19
Actual CO2 (kg)
Expected CO2 (kg)

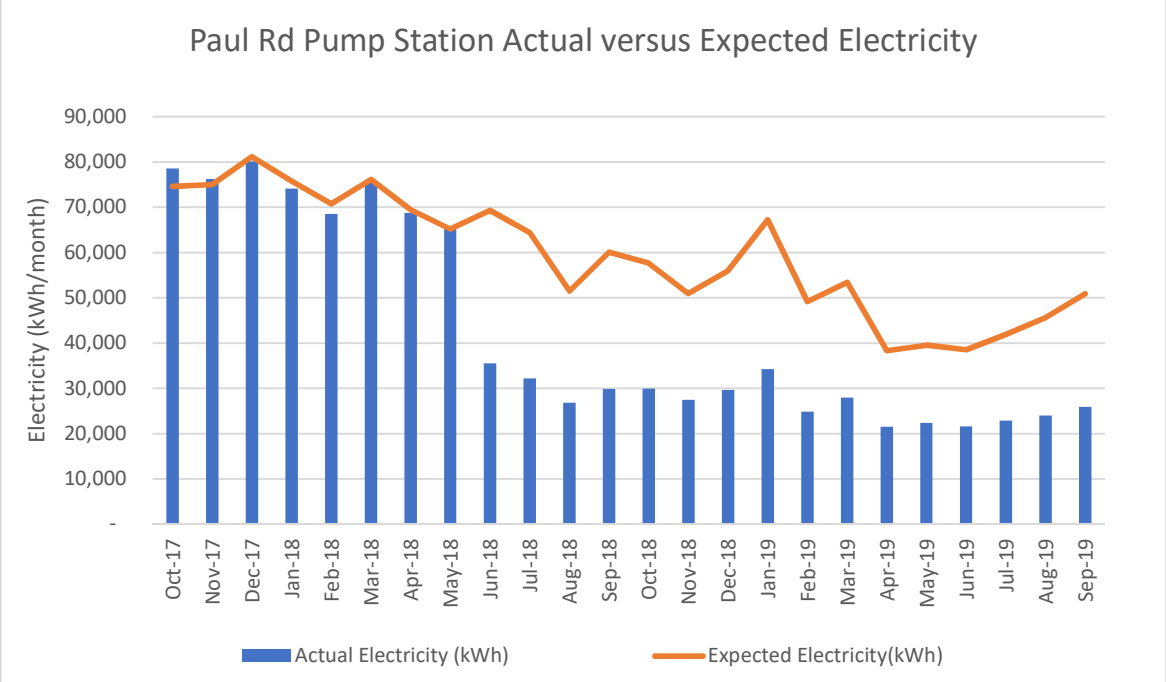

Braemar Rd Pumps Cumulative Rolling 12 Month Savings
Electricity (kWh) / Carbon (kgCO2e)
25,000
20,000
15,000
10,000
5,000
-
-5,000
$2,500
$2,000
$1,500
$1,000
$500
$-
$(500)
R12M Cost Savings ($/year)
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Jul-19
Aug-19
Sep-19
R12M Electricity Savings (kWh/year)
R12M CO2 Savings (kgCO2e/year)
R12M Cost Saving ($/year)

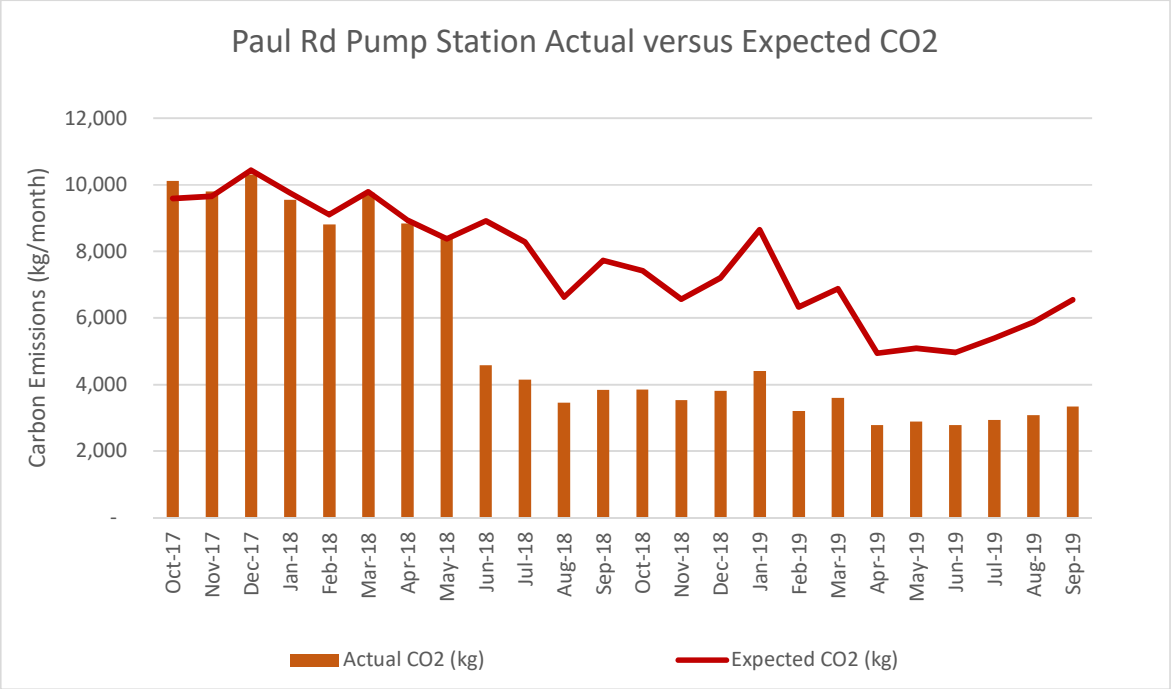
Paul Rd Pump Station

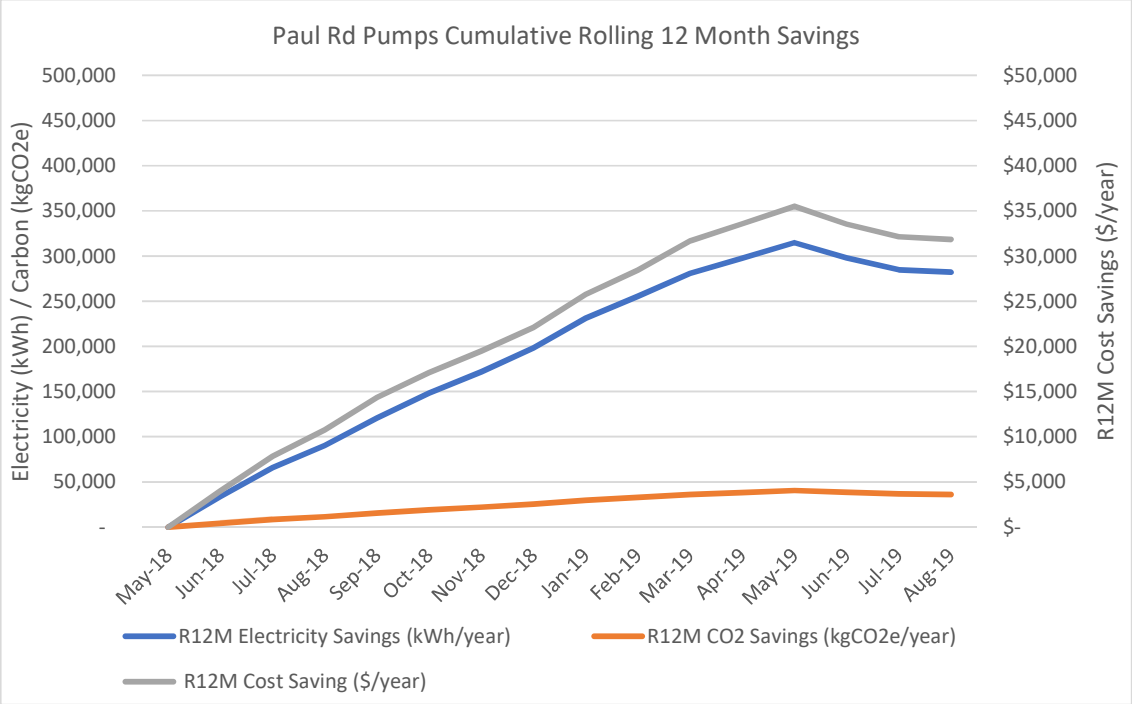
- Electricity savings for the month were 24,933kWh, a saving of 49.0%.
- Energy cost savings for the month were $2,705.15 .
- Carbon savings for the month were 3,212 kgCO_2e, a saving of 49.0%.
- Rolling 12-month electricity savings are 276,799kWh, a saving of 47.0%.
- Rolling 12-month cost savings are $30,959.20 .
- Rolling 12-month carbon savings are 35,666 kgCO_2e, a saving of 47.0%.

Comments

Paul Rd monthly electricity changed significantly from Jun 2018 onwards. This may be due to some of the electrical load (for example the bore pump) being moved to a separate supply. Further investigation is required to understand what has caused this large change.




Paul Rd Pump Station Actual versus Expected CO2
Carbon Emissions (kg/month)
12,000
10,000
8,000
6,000
4,000
2,000
-
Oct-17
Nov-17
Dec-17
Jan-18
Feb-18
Mar-18
Apr-18
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Jul-19
Aug-19
Sep-19
Actual CO2 (kg)
Expected CO2 (kg)


Paul Rd Pumps Cumulative Rolling 12 Month Savings
Electricity (kWh) / Carbon (kgCO2e)
500,000
450,000
400,000
350,000
300,000
250,000
200,000
150,000
100,000
50,000
-
R12M Cost Savings ($/year)
$50,000
$45,000
$40,000
$35,000
$30,000
$25,000
$20,000
$15,000
$10,000
$5,000
$-
May-18
Jun-18
Jul-18
Aug-18
Sep-18
Oct-18
Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Jul-19
Aug-19
R12M Electricity Savings (kWh/year)
R12M CO2 Savings (kgCO2e/year)
R12M Cost Saving ($/year)