BESS Energy & Carbon Report

School A – Financial Year 2018/19

As part of the BESS Energy for Schools project, this report is produced for business managers to provide data that they can use to compare energy and water use over a five-year period. The report summarises how the school's energy (electricity and gas) and water use has changed, how this has affected its carbon footprint and utilities costs, and how the school is doing compared to other schools in Leicester.

Using gas, electricity and water in schools creates greenhouse gas emissions. These emissions are causing climate change and need to be drastically reduced to limit their negative impacts on the environment. Although there are multiple greenhouse gases that contribute to climate change, for the purpose of this report we discuss them using a measure of carbon dioxide equivalent (CO_2e). This allows us to give a single figure rather than individual amounts of each different gas. The figures in this report were calculated using the UK Government's published conversion factors which allow us to work out the CO_2e produced from a given amount of gas, electricity or water use. These are provided by the Department for Business, Energy and Industrial Strategy (BEIS) and are available at: www.gov.uk/government/collections/government-conversion-factors-for-company-reporting [1]

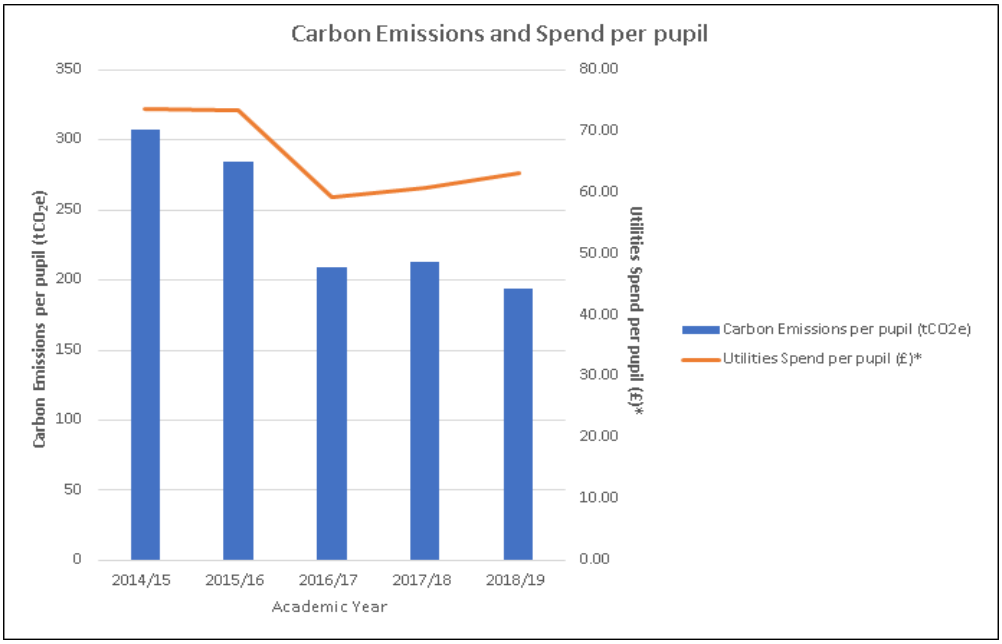
Until recently, Leicester City Council aimed to cut its carbon emissions by 50% by 2025, compared to a 2008/09 baseline. Following the city council's climate emergency declaration, the council is now working towards Leicester being a carbon neutral city and a new target is currently being agreed and will be shared with schools in due course.

Summary

Summary of school utility use, carbon emissions and average spend

DEC rating[2]	D	88			
DEC expiry date[3]	30/10/2020				
	2014/15	**2015/16**	**2016/17**	**2017/18**	**2018/19**
Pupils	414	409	408	396	386
Internal floor area (m^2)	2,187	2,187	2,187	2,187	2,187
Carbon emissions (tCO_2e)	127,153	116,584	85,424	84,540	74,780
Carbon emissions per pupil (tCO_2e)	307	285	209	213	194
Utilities spend per m^2 (£) *	£13.94	£13.72	£11.05	£11.03	£11.16
Utilities spend per pupil (£) *	£73.66	£73.37	£59.25	£60.90	£63.20
Leicester average utility spend per m^2 (£) - primary					£11.38
Leicester average utility spend per pupil (£) - primary					£55.44

*Utility spend includes electricity, gas and water. Average prices per unit; electricity 11p per kWh, gas 2.3p per kWh, water 252.0p per m^3



As the graph above shows, carbon emissions at School A have decreased over the last five years. The biggest cause of this decrease was that electricity from the grid became lower carbon over this period. Another factor was the reduction in the school's gas use. See below for more detail about both. Spend per pupil has increased, but this is perhaps due to a decreasing number of pupils and could be investigated to find out why this is the case. School A's consumption of electricity, gas and water is detailed below; alongside the carbon dioxide equivalent (CO_2e) emissions resulting from this consumption. Data from the previous four years is provided for comparison where available.

Electricity

	2014/15	2015/16	2016/17	2017/18	2018/19	% change (last 12 months)
Electricity consumption (kWh)	117,995	132,746	124,809	121,856	110,070	- 9.7
Spend (£)	£13,133	£14,859	£13,895	£13,842	£14,079	+ 1.7
Spend per pupil (£)	£31.72	£36.33	£34.06	£34.96	£36.48	+ 4.3
Leicester average per pupil (£)					£28.18	
Spend per m^2 (£)					£6.44	
Leicester average per m^2 (£)					£5.24	
Carbon emissions (tCO_2e)	54,536	54,698	43,878	34,494	28,134	- 18.4

Electricity use in School A has steadily decreased since 2015/16 with a 9.7% decrease between the 2017/18 and 2018/19 financial years. Carbon emissions have also decreased with a 18.4% decrease between the 2017/18 and 2018/19 financial years. This is partly due to the grid being decarbonised through increased use of renewable energy. Spending has fluctuated over the past five years and shows an increase in spending of 1.7% between the 2017/18 and 2018/19 financial year. This may be due to having fewer pupils but a similar energy use or a change in electricity prices.

These changes between the 2017/18 and 2018/19 financial years show a reduction in electricity use in the school. Reflect on how you have made these reductions and share with the school.

Reflections

Gas

	2014/15	2015/16	2016/17	2017/18	2018/19	% change (last 12 months)
Gas consumption (kWh)	384,703	325,539	216,555	264,917	246,716	- 6.9
Gas spend (£)	13,377.36	10,621.23	6,245.44	7,092.66	7,140.04	+ 0.7
Spend per pupil (£)	£33.31	£25.97	£15.31	£17.91	£18.50	+ 3.3
Leicester average per pupil (£)					£19.01	
Spend per m^2 (£)					£3.26	
Leicester average per m^2 (£)					£3.58	
Carbon emissions (tCO_2e)	70,958	59,899	39,881	48,734	45,359	- 6.9

On purely consumption gas use in School A has steadily decreased since 2015/16 has decreased with a 6.9% decrease between the 2017/18 and 2018/19 financial years. Carbon emissions have also decreased with a 6.9% decrease between the 2017/18 and 2018/19 financial years. Spending has fluctuated over the past five years but with a decreasing trend, however there was an increase in spending of 3.3% between the 2017/18 and 2018/19 financial year. This may be due to having fewer pupils but a similar energy use or a change in gas prices. These figures also do not consider external temperatures e.g. in colder winters, more gas will be used.

Without considering external temperatures, these changes show a reduction in gas use in the school. Reflect on how you have made these reductions and share with the school.

Reflections

Water

	2014/15	2015/16	2016/17	2017/18	2018/19	% change (last 12 months)
Water consumption (m^3)	1,576	1,889	1,583	1,247	1,224	-1.8
Spend (£)	£3,983	£4,527	£4,031	£3,182	£3,177	-0.2
Spend per pupil (£)	£9.62	£11.07	£9.88	£8.04	£8.23	+2.4
Leicester average per pupil (£)					£8.23	
Spend per m^2 (£)					£1.45	
Leicester average per m^2 (£)					£2.49	
Carbon emissions (tCO_2e)	1,658	1,987	1,665	1,312	1,288	-1.8

Water consumption should be managed to monitor spending, but it also has a carbon footprint of its own, due to the energy used to bring it up to drinking quality standards, distribute it, and to treat it after use. Water conservation is not only important for reducing carbon emissions but because fresh water is a limited resource which changes to the climate will impact through increased drought and insecurity. Reducing water use and identifying issues is essential to the conservation of water for the future.

Water use in School A has steadily decreased since 2015/16 with a 1.8% decrease between the 2017/18 and 2018/19 financial years. Carbon emissions have also decreased with a 1.8% decrease between the 2017/18 and 2018/19 financial years. Spending has fluctuated over the past five years but with a decreasing trend, however there was an increase in spending of 0.2% between the 2017/18 and 2018/19 financial year. Spend per pupil has increased but this may be due to there being fewer pupils but a similar water use.

These changes show that there has been fluctuating reduction in water use in the school, but it is decreasing over time. Reflect on how you have made these reductions and share with the school.

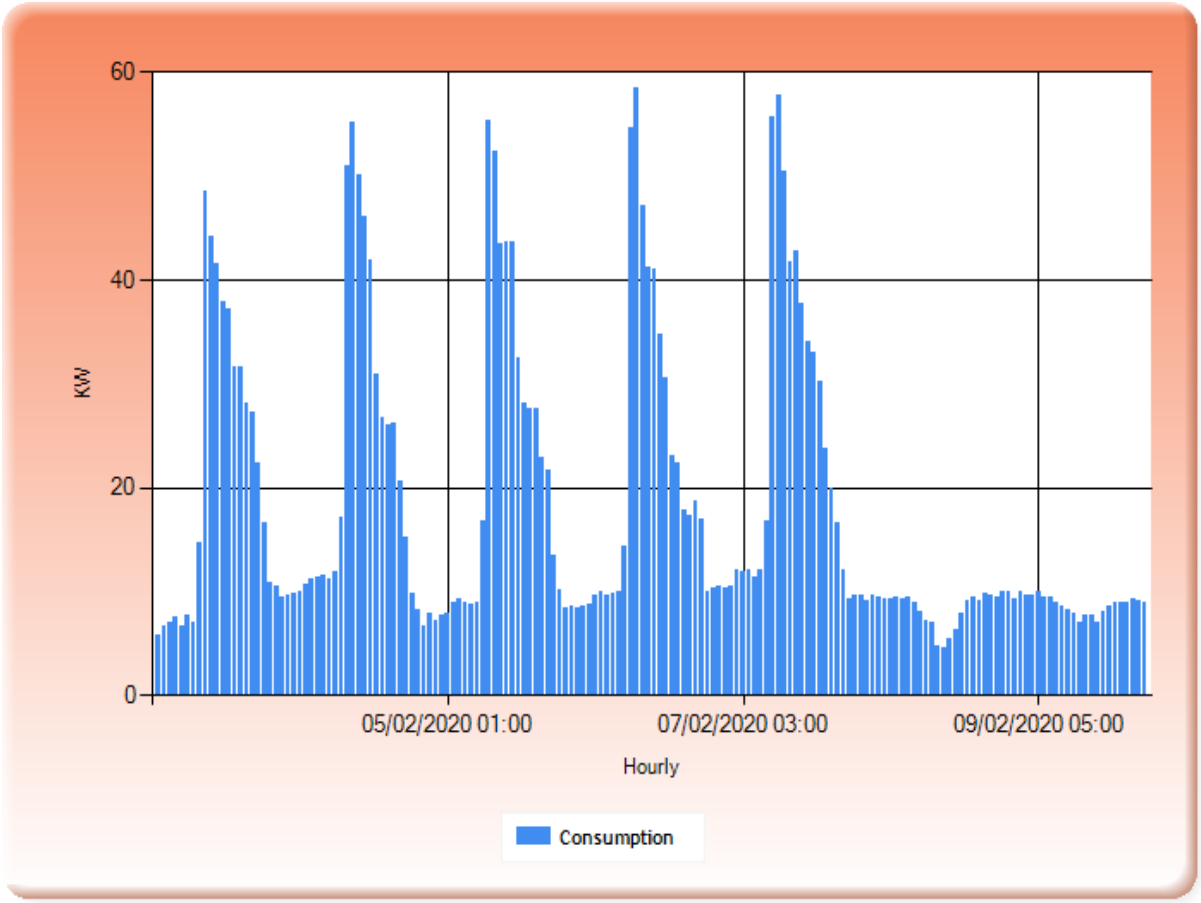
Reflections

Smart metering

Smart metering using DynamatLite is available to all schools and allows you to track your own meter readings. With the smart meter, you can see the direct impact your behaviour has on your usage.

The graphs in this section are taken from a term-time week in your school.

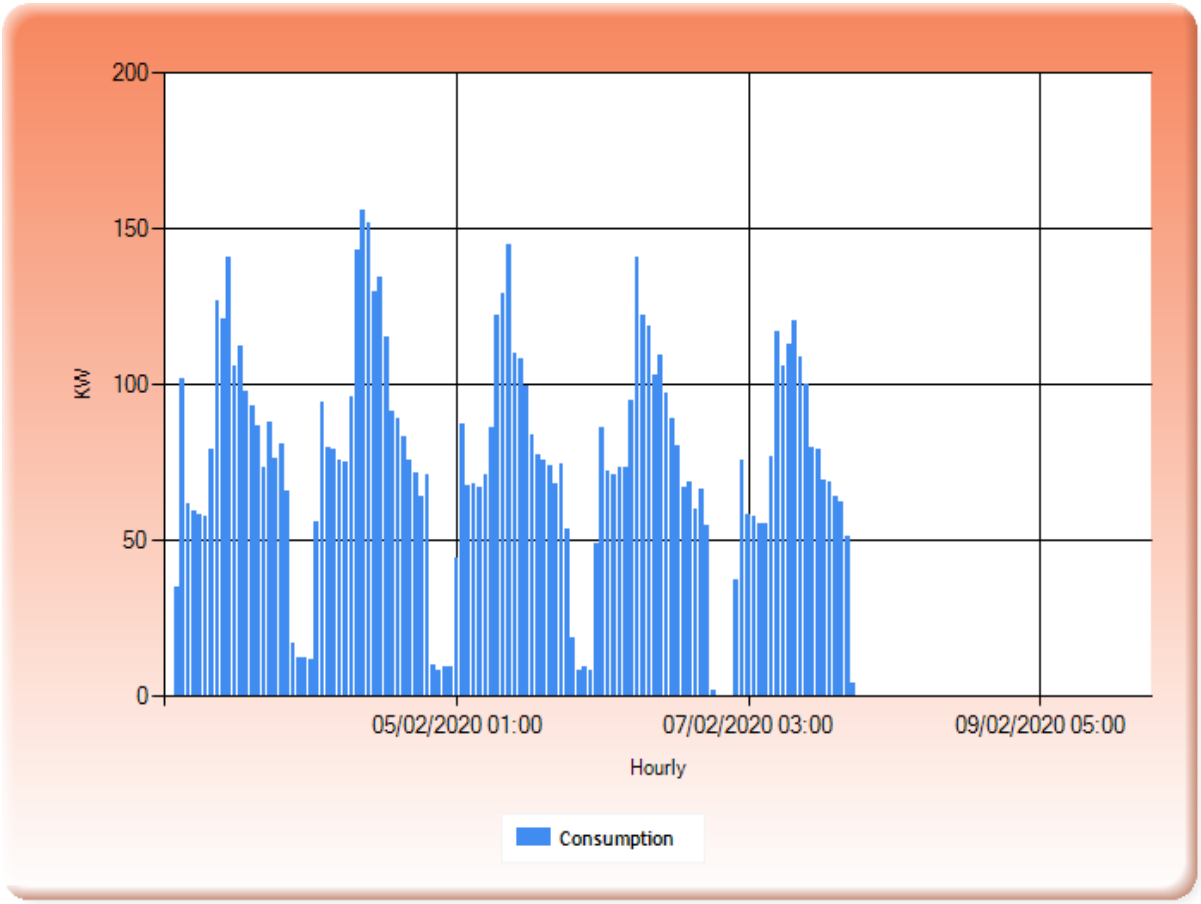
Typical week profile - electricity



The graph above shows a profile of electricity use in the school for a one week's use (week commencing 3 February 2020). From the graph it can be seen that:

- The typical electricity base load is in the region of 7 – 9 kW which is quite high. This accounts for electricity used by essential appliances such as fridges and freezers. However, as the base load varies, it implies that some equipment may be shut off some nights but not others. The school could investigate whether this is the case and see if there are any opportunities to reduce it.
- Spikes in electricity use reach up to 59 kW. Electricity use tends to be highest in the morning and then decreases throughout the day.

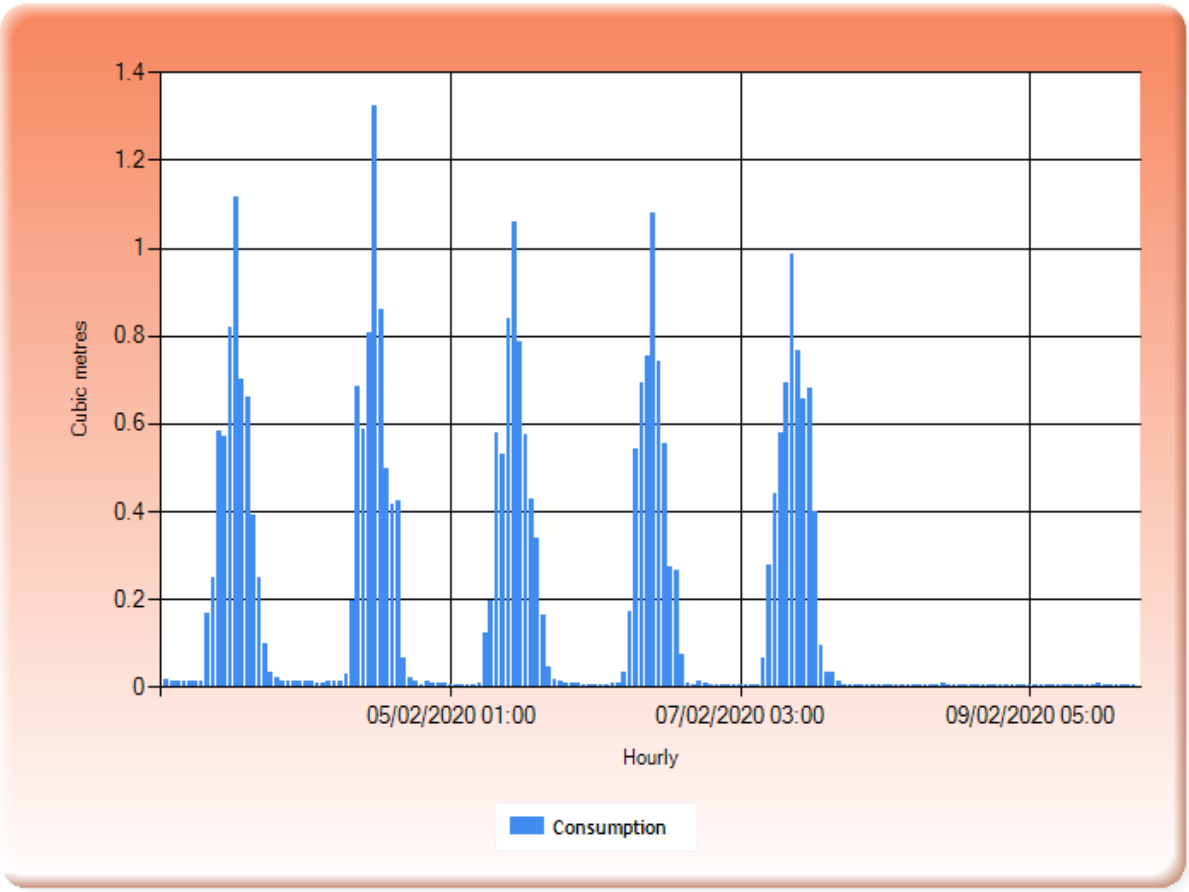
Typical week profile - gas



The graph above shows a profile of gas use in the school for a one week's use (week commencing 3 February 2020). From the graph it can be seen that:

- During this week there appears to be gas used overnight. Ideally there should be no requirement for heat in the evenings, weekends or during the summer months. However, this is not always possible due to several reasons, for example use of frost protection. Unless frost protection is active, gas use overnight should be investigated. There is rarely any gas use at weekends.
- Spikes in gas use reach up to 156 kW. Peaks in gas use are highest around mid-morning (10.00-11.00am).

Typical week profile – water



The graph above shows a profile of water use in the school for one week's use (week commencing 3 February 2020). From the graph it can be seen that:

- A good water profile should show no base load as there should be no consumption when the building is unoccupied. However, dripping taps, faulty urinal controls and leaks often mean that water is being used 24/7. The water profile shows that the base load is approximately 0.015 m^3 per hour; this may be due to dripping taps, faulty urinal controls and leaks and should be investigated.
- Spikes in water use are typically between 1.0 and 1.3 m^3. Peaks in water use are consistently highest at midday.

Further information

This information is also available for School A to access on DynamatLite, where it is available for each week:

Link: dynamatlite.dynamatplus.co.uk

Username: Username123 **Password**: password123

School energy supply

School A currently procures its energy from Total Gas and Power for electricity and ESPO for Gas. You pay 13.0 p/kWh (day rate) and 9.9 p/kWh (night rate) for electricity and 2.0215/kWh for gas. Switching energy supplier can sometimes help you to get a better deal.

You could investigate switching your electricity supply to a renewable tariff. This can help support new renewable generating capacity to be built if you choose a supplier who is committed to investing some of their income in new solar, wind or other supplies to meet new customer demand.

Outlook

The information in this report can be used to help School A address its energy use and carbon emissions, and to develop an action plan for your school.

For information on how to use this information, share it with students, and make changes in your school, get in touch with Leicester City Council's Environmental Education team at:

Eco-Schools@leicester.gov.uk

If you have a query about the figures in this report, please contact us at:

BESS.energy@leicester.gov.uk

Climate Emergency Declaration

On 1 February 2019 Leicester City Council declared a Climate Emergency. The declaration is an acknowledgement that:

- Climate change is happening and threatens the wellbeing of everyone in Leicester and worldwide.
- The speed and scale of global and local action to tackle the problem needs to be dramatically increased.

In its declaration, the Council committed to developing a new action plan to address the emergency through our own services and projects to work with partners to become a carbon neutral city. We also want to inspire others to join us and act too. We are encouraging all schools to declare a climate emergency. Further information can be found at schools.leicester.gov.uk/climate-emergency.

Endnotes

1. The annual factors used in this report correspond to the financial year which had the spring and summer terms. For example, 2015 conversion factors were used for the 2014/15 financial year. Conversion factors can change year on year due to 'decarbonising the grid' through increased use of renewable technologies and for other reasons. Further details can be found here www.nationalgridet.com/working-together/our-environmental-future/contribution-to-decarbonisation
2. A DEC rating shows the energy performance of a building based on actual energy consumption as recorded over the last 12 months within the validity period. The rating is a numerical indicator of the actual annual carbon dioxide emissions from the building. This rating is shown on a scale from A to G, where A is the lowest CO_2 emissions (best) and G is the highest CO_2 emissions (worst).
3. Where the building has a total useful floor area of more than 1,000m², the DEC is valid for 12 months. Where the building has a total useful floor area of between 250m² and 1000m², the DEC is valid for 10 years.