Braunstone Town Council

Carbon Audit

BRAUNSTONE TOWN COUNCIL

January 2022

Completed by Ben Dodd and Associates

on behalf of Braunstone Town Council for the Policy and Resources Committee

Acknowledgements:

The Consultants wish to acknowledge the assistance and guidance provided by several companies and organisations in the compilation of this Carbon Audit. These include:

Braunstone Town Council, Run by the Sun Ltd, Blaby Electrical, and Heatspec Ltd.

Consultants' Note:

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Glossary and Definition of Terms

CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide equivalent
t/CO_2e	Tonnes of Carbon Dioxide equivalent
$kgCO_2e$	Kilogram (unit) of carbon dioxide equivalent
EV	Electric Vehicle
EVCP	Electric Vehicle Charge Point
HVAC	Heating Ventilation and Air Conditioning
MWh	Mega-Watt hour
PV	Photovoltaic (solar panels generating electricity)
REGO	Renewable Energy Guarantee of Origin certificate
WPD	Western Power Distribution

1. Executive Summary

Background

Braunstone Town Council adopted a Climate Change and Environmental Strategy in September 2021 aiming to be carbon neutral by 2030 and to embed climate and environmental awareness in all its decision making. In practical terms this commits the Town Council to emitting no more CO_2e into the atmosphere that it removes by some other means. Through the implementation of the Strategy the Council will provide both leadership and delivery, inspiring others to take similar ambitious carbon reduction activities.

The results of the Carbon Audit will not only contribute to the decarbonisation of the Council's building and transport operations, but also has the potential to offer cost benefits through investment, along with social benefits for staff and Councillors working together to implement change.

With eight years to become carbon neutral Braunstone Town Council have commissioned this Carbon Audit to provide a route map to decarbonise their buildings and transport operations.

The Audit is commissioned specifically for the Policy and Resources Committee to make informed choices as they put the capital plan in place, allowing work to begin in 2022.

At the start of the process, a current carbon baseline for the Council's buildings and transport will be calculated through primary data supplied by the Council. The buildings energy usage will be benchmarked and where possible compared to previous Display Energy Certificates (DEC) for existing buildings.

Once the baseline has been established the Audit will investigate and recommend several measures to reduce the Town Council's carbon footprint. These suggested interventions will be ranked in order of CO_2e savings together with a financial cost to implement the individual measures.

It is envisaged that carbon offsetting will be required, and the Audit will assess options and suggest the most relevant actions.

2. Summary of Findings

True carbon reduction is expensive, and a significant capital investment is required to implement the type of interventions that Braunstone Town Council need to reach Net Zero by 2030. In terms of building-related emissions, presently there is very little opportunity to decarbonise natural gas and therefore the electrification of heat is currently the only practical solution in this context.

This Audit has mainly focused on the electrification of heat and the potential for generating renewable (zero carbon) electricity from rooftop solar PV. Similarly, within the transport sector, electrification is currently the only viable alternative to petrol and diesel cars.

The total carbon footprint of Braunston Town Council from transport and buildings

1. Braunstone Town Council's total carbon footprint from Transport and Buildings is currently estimated as 133 t/CO_2e per annum. This includes staff and Councillor transport, the Council's fleet of vehicles and the emissions from the use of electricity and gas within the Council buildings.

2. Emissions from transport totalled 13 t/CO_2e per annum and the emissions from buildings (gas and electricity) totalled 120 t/CO_2e per annum.

3. Within the total emissions from buildings, heat, and cooking in the form of gas accounted for 74% whilst electricity accounted for 26% of emissions.

4. Within the total emissions from transport, staff travel and Council vehicles account for 97% of emissions, whilst Councillor travel accounted for 3% of the total emissions from transport.

Practical Interventions to reduce Braunstone Town Councils carbon footprint

1. The Audit identified a potential carbon reduction of 55 t/CO_2e, equivalent to a 41% reduction of the Town Council's carbon footprint, for its building and transport operations. Once interventions are implemented, the new carbon footprint is estimated at 78 t/CO_2e per annum.

2. A 24 t/CO_2e reduction can be achieved through the generation of renewable electricity by the installation of rooftop solar PV (including the Shakespeare Pavilion) and a further 13.8 tCO_2e reduction was identified from the installation of a hybrid air source heat pump system at Thorpe Astley Community Centre.

3. As Mossdale Depot is currently heated by electricity, a 23.68 kWp solar PV system would totally decarbonise the building, as it would generate more electricity than the building uses. LED installation at Mossdale Meadows would reduce the carbon footprint by a further 0.4 t/CO_2e per annum.

4. In addition, the Audit has identified the potential to totally decarbonise Thorpe Astley Community Centre through a hybrid air source heat pump, solar PV and the purchasing of renewable electricity.

5. The Audit identified a further 6 t/CO_2e reduction by purchasing renewable electricity, which would totally decarbonise all the electricity consumed. Care needs to be taken choosing an authentic renewable energy supplier and it is worth noting that the price of purchasing renewable energy is usually higher than a price associated with a normal tariff.

6. A further reduction of 5.7 t/CO_2e could be achieved by the electrification of the fleet of vehicles, 2.8 t/CO_2e from an electric car share scheme and 2.2 t/CO_2e by staff and Councillor's walking, cycling, or working from home.

7. To achieve this overall 41% reduction in carbon emissions (55 t/CO_2e) it would need an estimated investment of £250,000 for the installation of solar PV, the installation of a hybrid air source heat pump system at Thorpe Astley Community Centre, LED lighting at the Mossdale Depot and the purchase of a second hand electric car and charge point at the Civic Centre. These estimated costs have been based on market prices mainly through quotations provided by local companies

8. With the price of electricity set to rise substantially in 2022, the investment in solar PV will provide significant savings to the Council's electricity bills and mitigate further price increases in the future.

9. Electricity generated by the PV panels will be used during the day replacing the previously imported electricity, and if battery storage technology is installed the systems will be able to supply some of this renewable electricity at night.

10. The electrification of the Council's fleet of vehicles was investigated and a 'like for like' approach was taken to identify opportunities for replacing the petrol and diesel vehicles with hybrid or full electric models.

11. Currently there are few hybrid or full electric vehicles which would be suitable to replace the existing vehicles. New electric and hybrid pick-up truck models from Ford will become available in the UK in the next couple of years, so it would be worth adjusting the length of any new lease arrangements to make the most of this future carbon saving opportunity. Full fleet decarbonisation could be achieved by 2026.

Total decarbonisation and carbon off-setting

1. Once all the PV solar and the hybrid air source heat pump system have been installed there will still be carbon emissions from gas (75.5 t/CO_2e) and travel (2.2 t/CO_2e) that will need to be decarbonised.

2. As decarbonising gas is currently difficult, the Council, might consider offsetting. Several energy suppliers offer a carbon offsetting option, which is a way to compensate for emissions by funding an equivalent carbon dioxide saving elsewhere either locally (such as via funding the installation of PV on local housing) or further afield in other parts of the world.

Implementation

As part of the installation of the rooftop solar PV, a structural survey would be required. When installing the hybrid air source heat pump system at Thorpe Astley Community Centre a heat loss calculation for the building will be needed. This will accurately assess the heating demand and ensures the heating system is correctly sized for the Community Centre.

Recommendations

- Install all the solar PV identified through this Audit. This will provide significant future financial savings that could be reinvested in further reducing the Council's carbon footprint.
- The Mossdale Meadows Depot will be partially decarbonised by the solar PV array. Insulate the roof internally and upgrade the electric heating.
- Install LED lighting at Mossdale Meadows Depot
- Encourage walking, cycling, and working from home
- Purchase renewable electricity to help decarbonise buildings and transport
- Decarbonise Thorpe Astley Community Centre heating through a hybrid air source heat pump
- Replace the existing diesel pick-up trucks once the current leases have expired, with hybrid or full electric vehicles when they are available
- Consider installing EVCPs at the Mossdale Meadows Depo, the Civic Centre, and Thorpe Astley Community Centre
- Consider an electric car share scheme
- Do not proceed with the proposed biomass heating system at Mossdale Meadows Depot which is currently set out in the Capital Plan
- Consider the installation of smart meters and ensure gas and electricity meters are read monthly for all five buildings. This will allow ongoing analysis of the buildings energy performance and will provide accurate consumption figures for reviewing the Carbon Audit in 2024.

3. Calculating and benchmarking the existing carbon footprint

3.1 Background and Methodology

COVID 19

The Carbon Audit has taken place in a national pandemic which started in December 2019. All efforts have been made to secure 12 months of substantiated energy data prior to COVID 19 for each data set and where possible compare it to a 12-month post COVID 19 data set to provide the most robust synopsis of the Council's carbon footprint.

Calculating CO_2e emissions

To take into account the emission of other greenhouse gases (GHG) when calculating the level of CO_2 emissions, scientists have devised an equivalent measure – 'CO_2e' which literally means carbon dioxide equivalent. When the term 'kg/CO_2e' is used later in the audit, this means it is measuring the carbon dioxide equivalent in kilograms which then can be converted to tonnes 't/CO_2e'. This term for measurement is used within the government greenhouse gas reporting conversion factors[1] and has been adopted within this audit.

Gathering data on Town Council transport

Currently Braunstone Town Council employ 20 people in a combination of full time and part time positions. They are currently supported by 21 Councillors. Staff work across five sites and the Councillors mainly use the Civic Centre for Council business.

For the purposes of this study, anonymous postcodes of all Braunstone Town Council staff and Councillors were provided by the Council. It was agreed to use the Civic Centre as the destination of all staff and Councillors.

The length of each journey was measured between the postcode provided by the Town Council and the postcode of the Civic Centre. Therefore, a round trip to work was twice the length from home to work. Individuals were asked by the Town Council to provide information on their mode of transport to work and how many times a week they travelled. When travelling by private car, individuals indicated the type of fuel they used in terms of petrol, diesel, hybrid or electric.

To equate the number of miles travelled in a petrol, diesel, hybrid or electric car to the equivalent carbon emissions, the audit references the national government greenhouse gas reporting conversion factors 2021.

1.https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2021

Within these conversion tables it provides a conversion factor for different fuels which can be multiplied by the miles travelled to calculate the carbon emissions from individual journeys to the Civic Centre. All the cars within the audit and therefore the conversion tables were assumed to be of a medium size. Figures are rounded to provide clarity.

Braunstone Town Council operate four vehicles primarily for the upkeep of the parks and green spaces. They range from pick-up trucks, a tractor, and a sit-on mower. The carbon footprint of each vehicle was calculated through the type of vehicle and the annual mileage.

The mileage for the two pick-up trucks was obtained from the governments MOT database. Utilising the MOT database[2] in this way, it provided real mileage up to the 21st of December 2021. This provided a very accurate mileage; however, the mileage is taken from a year within the COVID 19 pandemic and may not reflect a normal year.

As there was no MOT data for the tractor or sit-on mower, the Council estimated the hourly usage of the tractor (500 hours) and the ride on mower (250 hours) which was converted into miles driven. It has been estimated that both vehicles would travel on average 10 miles per hour, given there will be time when the vehicles are operational but not moving, and the tasks they are undertaking.

The conversation factor for a dual purpose 4x4 was used for both pick-ups and the tractor whereas the petrol ride-on petrol mower was benchmarked against a medium car.

Gathering energy data on Town Council buildings

Energy usage data from the 2019 calendar year was collected from gas and electricity bills from four of the five Council buildings. To ensure the accuracy of the energy data accessed through the bills, only the actual meter readings were used. There was some difficulty gathering this data, as the majority of meter readings were estimated.

The government greenhouse gas conversion tables previously documented, were used to calculate the CO_2e emissions from the electricity and gas consumed in the Council's buildings. The 2019 energy data sets provided usage figures, but the actual cost of energy was calculated using tariff rates from 2021 to provide a more realistic estimation of the cost of energy.

The Shakespeare Pavilion is newly constructed in 2021 and will start a full year of operation in 2022. The architect provided estimates for the energy usage for gas and electricity. Although the figures supplied by the architect have been used in the Audit, the consultants opinion is that the estimated gas usage is very high considering the building has been designed to modern standards. Furthermore the estimated gas usage does not correspond to comparison data of similar buildings. As a result of this estimate, the CO_2e related to the Pavilion is more than the Library, the Civic Centre and Thorpe Astley Community Centre combined.

2.https://www.gov.uk/check-mot-history

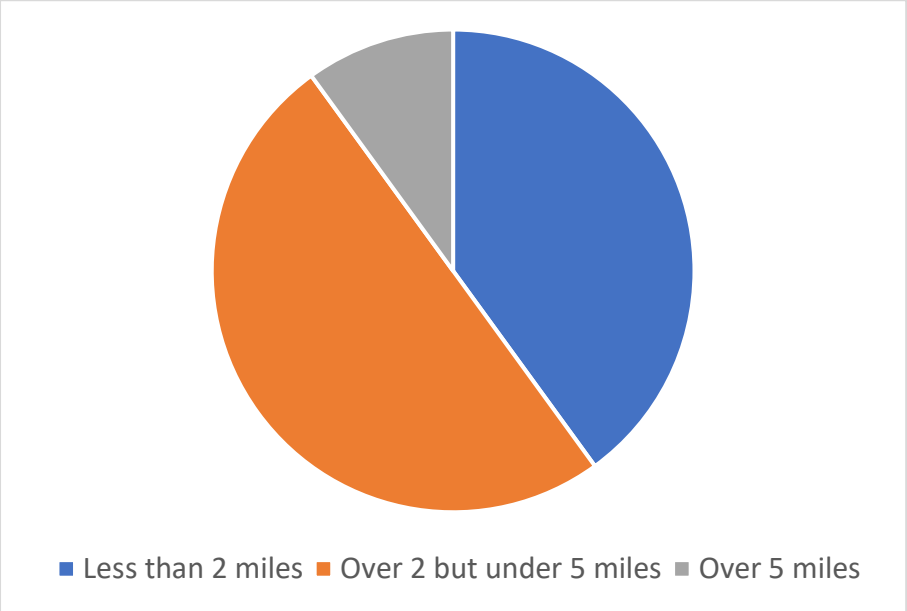
3.2 Travel related carbon footprint from staff and Councillors

Staff travel emissions

- Annually staff travel is responsible for 7.5 t/CO_2e
- Staff travel to work by either driving, using taxis, walking, or cycling
- No hybrid or electric cars are used
- Staff are predominately local with 90% travelling under 5 miles to work
- Two members of staff living the furthest distance away from the Civic Centre are responsible for 38% of staff travel emissions
- Five members of staff (25%) cycle and walk to work

The distance to work is a major factor in calculating carbon emissions. Staff working for Braunstone Town Council live relatively close to the Civic Centre. In Figure 1 it shows that 40% of staff live less than two miles away, and 50% of staff live over two miles but under five miles away, whilst the remaining 10% live over 5 miles away. The average distance to work is 3.1 miles.

Figure 1: Distance travelled to work by Staff



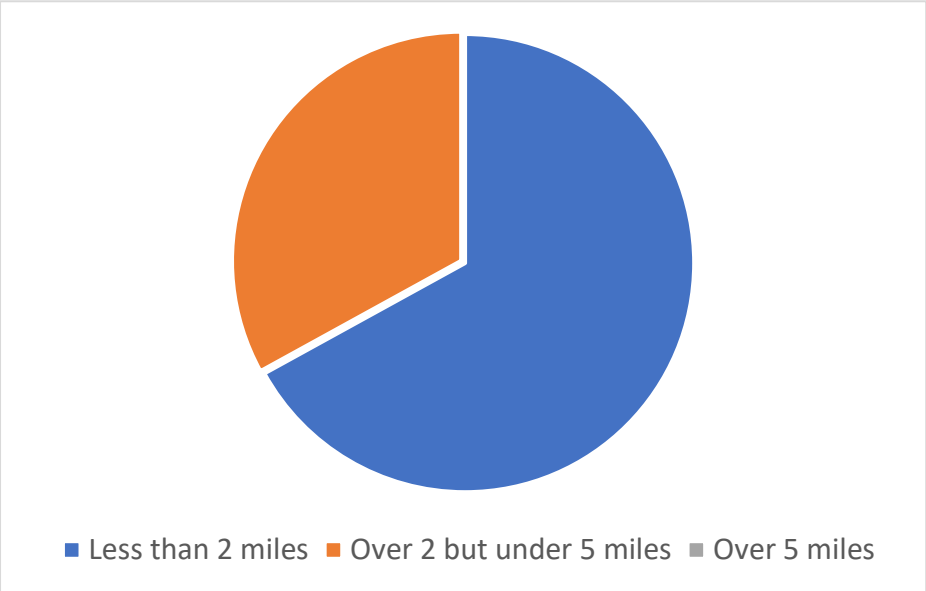
Councillor travel emissions

- Annual Councillor travel is responsible for 0.3 t/CO_2e
- Councillors travel to work/meetings by driving, walking, or cycling
- Two Councillors use hybrid/electric cars
- Councillors are predominately very local with 67% travelling less than 2 miles
- Six councillors living the furthest distance away from the Civic Centre and are responsible for 78% of the total travel emissions

- Five councillors (24%) travel to work by cycling and walking

Generally, Councillors live much closer to Braunstone Civic Centre than staff. In Figure 2 it shows that 67% of Councillors live less than two miles away, and the remaining 33% live over two miles but under five miles away. No Councillor lives over 5 miles from the Civic Centre. The average distance for a Councillor to travel to the Civic Centre is 1.3 miles.

Figure 2: Distance travelled to work by Councillors



Combined Staff and Councillor Emissions

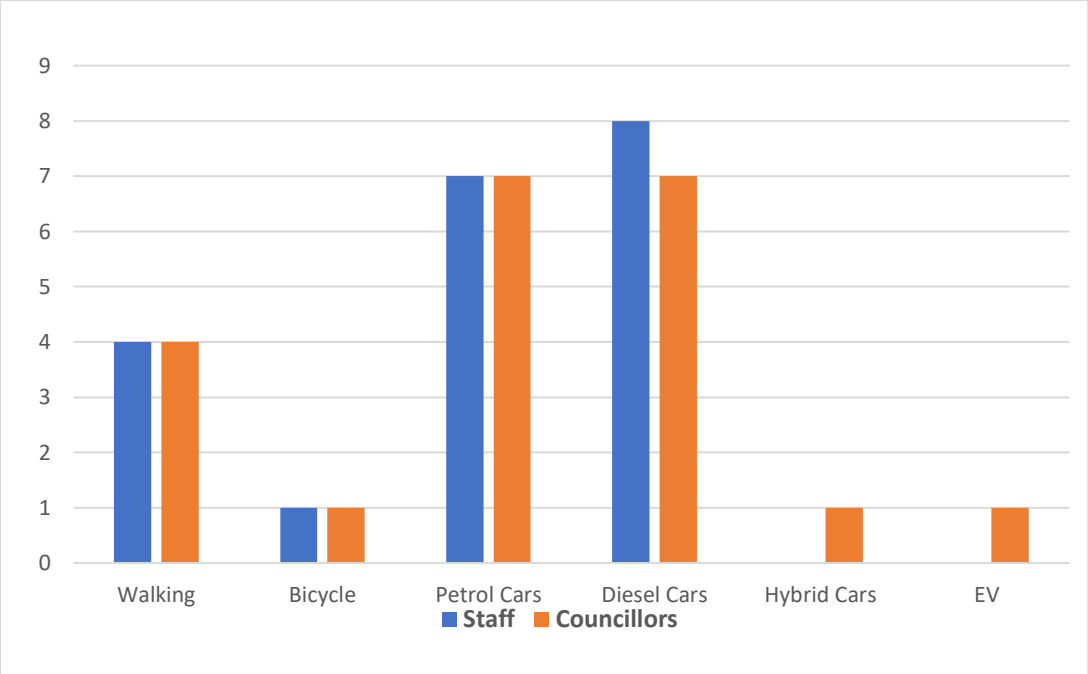
Headlines

- Councillors and staff travel are responsible for a combined 7.8 t/CO_2e emissions
- Councillors and staff travel to work by driving a diesel or petrol car, a hybrid car, an electric car, taxis, walking or cycling
- Only Councillors have adopted Hybrid/Electric vehicle technology
- Out of a total of 41 individuals travelling to the Civic Centre, 27% have no carbon emissions i.e., walk, cycle, or use an electric vehicle. This figure rises to 29% if the hybrid car was included and used electricity for the journey.
- On the flipside, 71% of individuals use petrol or diesel cars for their transport
- No one uses public transport, and this may generally reflect the proximity of most individuals to the Civic Centre
- Councillors and staff are predominately very local with over half travelling less than two miles and 94% travelling less than five miles.

Modes of Transport by Staff and Councillors

Staff and Councillors choose very similar modes of transport to travel to the Civic Centre. In Figure 3 it shows the different modes of transport chosen by Councillors and staff in terms of walking, cycling, and driving (petrol, diesel, hybrid, and electric cars). It shows an almost identical set of figures. The slight difference is one less diesel car is driven by Councillors and that two individual Councillors have adopted one hybrid and one electric car.

Figure 3: Modes of travel to the Civic Centre



The main difference between staff and Councillor transport emissions is that in general Councillors live closer to the Civic Centre than staff, and that staff are making approximately 5,000 trips to work per year, whereas Councillors are making just under 400 trips to the Civic Centre per year.

3.3 The carbon footprint from the fleet of vehicles

The fleet of vehicles have a total carbon footprint of 5.7 t/CO_2e and this figure is broken down into individual vehicles in Table 1. The pick-up trucks account for over 3 t/CO_2e which equates to 58% of the total fleet emissions.

Table 1: CO_2e emissions from Town Council vehicles

Vehicle Make/Model	Engine Size	Registration	Manufacture	Fuel	Annual Mileage	Fuel Emissions Factor (kg CO2e)	Total Emissions (kg CO2e)
Ford Ranger Pick-Up (Diesel)	Super XL 2.2 TDCi	BT17 GHH	Jun-17	Diesel	3908	0.32793	1282
Ford Ranger Pick-Up (Diesel)	Super XL 2.2 TDCi	BJ67 0WM	Dec-17	Diesel	6025	0.32793	1976
Holland Tractor T5.75	3387cc	FJ19 GEK	Apr-19	Diesel	5000	0.32793	1640
Shibaura ride on mower	1662cc	FX67 BYH	Jan-18	Petrol	2500	0.30231	756
Totals					**17433**		**5653**
				Total Carbon Emissions in Tonnes			**5.7**

Combined carbon footprint for Council Transport

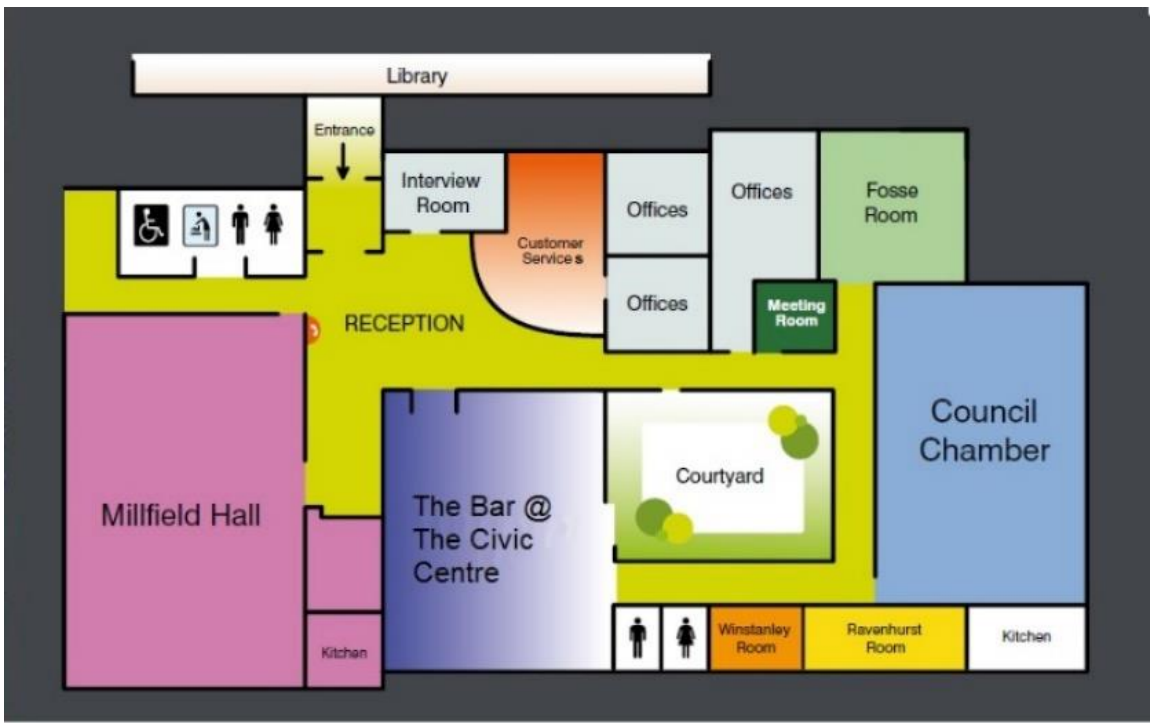
Overall emissions from Braunstone Town Council staff, Councillors and the fleet of vehicles are estimated at 13.5 t/CO_2e. The most substantial emissions are related to staff travel, the pick-up trucks, and the tractor.

3.4 Braunstone Civic Centre

Braunstone Civic Centre is the largest building owned by Braunstone Town Council. It is a single-storey brick and block building constructed shortly after the Town Council was established in 1977. Since then, the building has been subject to several upgrades and extensions to increase its utility and capacity including:

- Extension & alterations to provide committee rooms, bar, store & lounge (1983).
- Single storey front, side & rear extns & new access (1996)
- Installation of four heating and air conditioning units (2016)

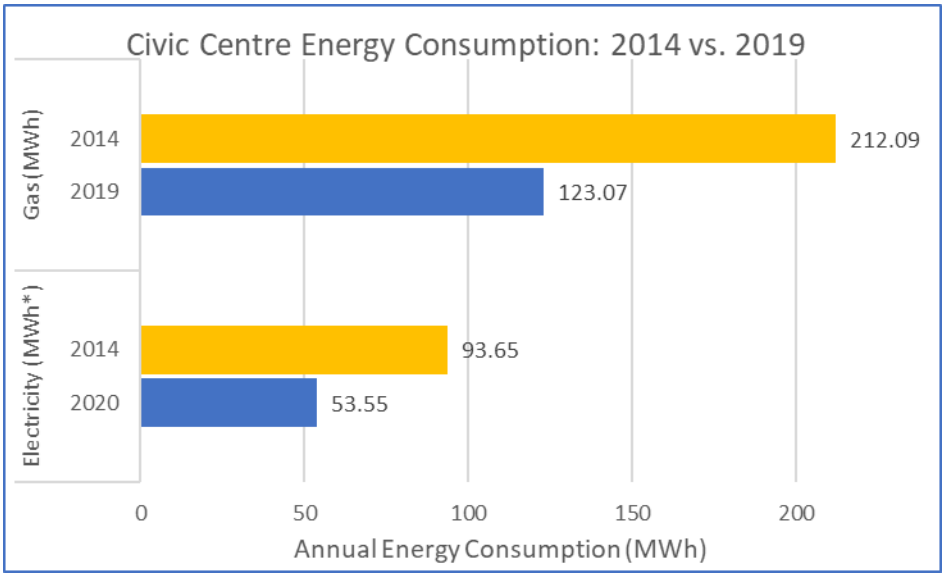
Today, the building is a multi-functional venue comprising offices, meeting rooms, a function hall, café-bar, and toilet facilities (see floor plan below).



Energy consumption

Electricity and gas consumption data for the Civic Centre are shown below in Figure 4. The data relates to the years 2014 (taken from the building's official DEC assessment data at https://www.gov.uk/check-energy-performance-public-building and 2019 which are taken from energy bills provided by the Town Council.

Figure 4: Comparison of Civic Centre gas and electricity consumption for 2014 and 2019



The data indicates that the building's energy consumption has decreased significantly since 2014, with gas and electricity consumption reduced by 42% and 43% respectively. This could be the result of several factors:

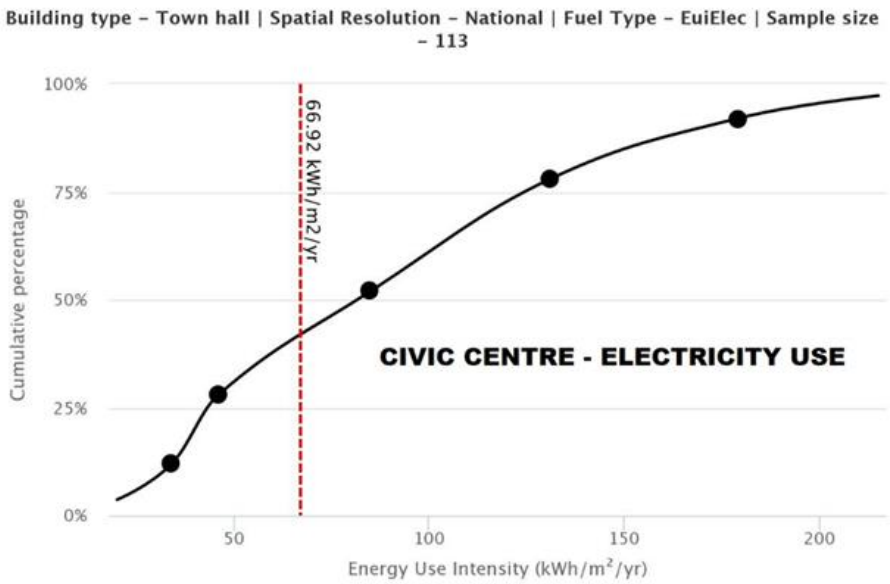
1. Improvements may have been made since 2014 in terms of the control of room heating and cooling of the building, hot water heating, mechanical ventilation and/or lighting controls.
2. New, more efficient heating and/or power plant have been installed since 2014, such as improved heating, ventilation and air conditioning equipment, or new energy efficient lighting.
3. The occupancy (usage) of the building could have decreased since 2014, resulting in a reduced need for heating, cooling, and electricity. Note that the data used in this analysis precedes the period of covid-related lockdown.
4. The insulation levels within the building's walls and roof voids have improved, or the building's original windows have been replaced by more efficient units.
5. The data used by the DEC assessor in 2014 could have been erroneous. This is unlikely, but possible.

Energy benchmarking

The Civic Centre's most recent Display Energy Certificate dates from its assessment carried out in 2014. At that time, the building's gas and electricity consumption was assessed as being typical for a building of its type, which at the time was defined as a "Dry Sports and Leisure Facility with Heating and Mechanical Ventilation". However, this building category does not accurately reflect the design or usage of the Civic Centre building, which obviously is not predominantly a sports facility. Therefore, in the current analysis, we benchmark the building's energy performance against the Chartered Institution of Building Services Engineers (CIBSE) 'Civic Centre' category, which comprises data from 113 local authority buildings across the UK collated by the UK government.

Figures 5 and 6 show the results of the analysis, including the performance of the Civic Centre compared to the other 113 local authority 'town hall' buildings in the CIBSE database. In terms of the building's electricity use, the Civic Centre is relatively efficient in comparison with its peers with an electricity Energy Use Intensity (EUI) of 67kWh/m2 compared with a typical value of 85 kWh/m2 for this building type. However, there is scope to further improve the electrical efficiency of the building in order to approach the 'good practice' benchmark EUI figure of 46 kWh/m2, a value which only the 25% most efficient buildings in the town hall category achieve.

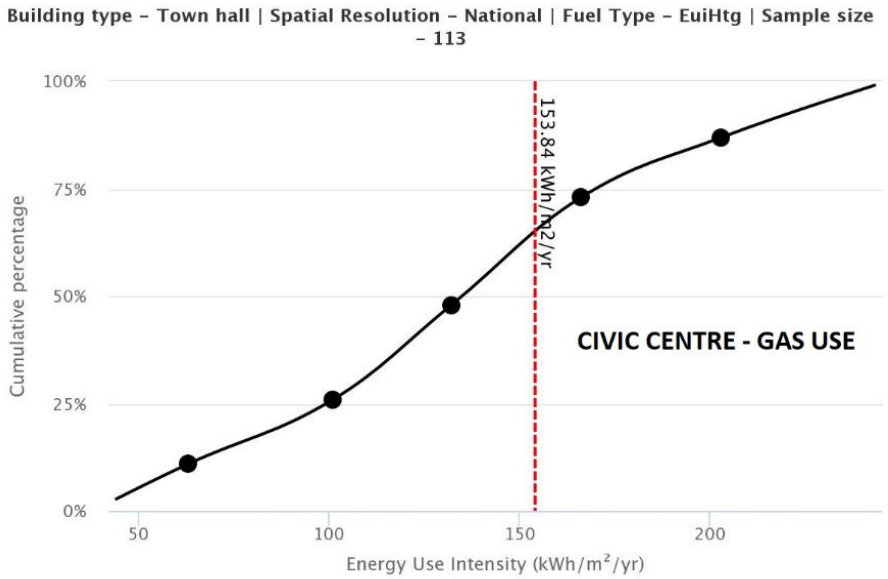
Figure 5: Civic Centre electricity usage compared to the CIBSE database



Building Type	Good practice electricity	Typical practice electricity	Source
Town hall	46	85	DEC

In terms of gas consumption, the Civic Centre's performance is less positive. Its actual EUI value of 154 kWh/m2 compares to a 'typical' value of 132 kWh/m2, and a 'good' value of 101 kWh/m2, a figure around 1/3 lower than the buildings current performance. Thus, there is significant potential to improve the gas consumption of the building in terms of space heating and hot water end uses.

Figure 6: Civic Centre gas usage compared to the CIBSE database



Building Type	Good practice fossil fuels	Typical practice fossil fuels	Source
Town hall	101	132	DEC

3.5 Thorpe Astley Community Centre

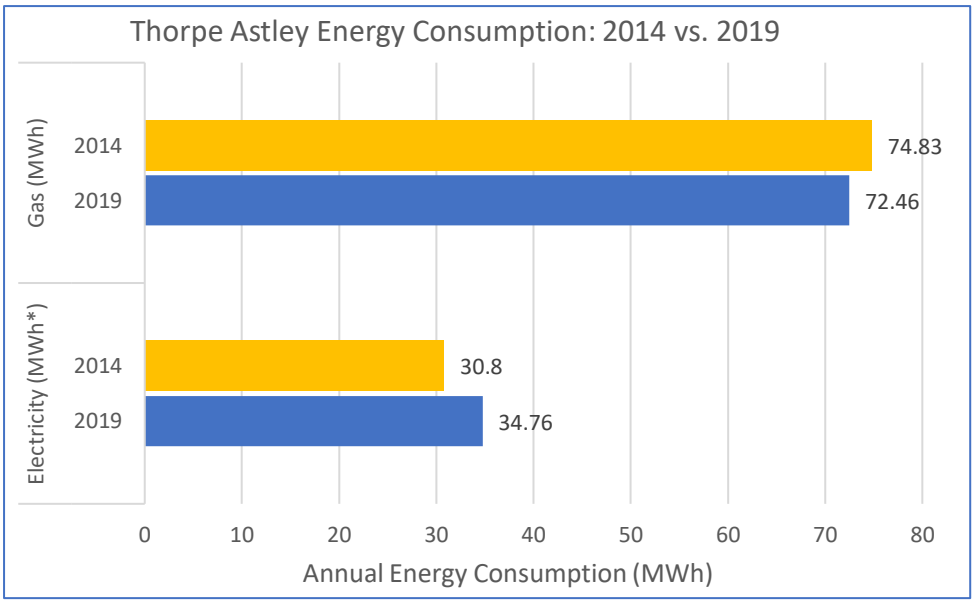
Thorpe Astley Community Centre is a multi-purpose building constructed during 2009 using a rendered block, facing brick and masonry cedar-clad construction. It is designed to accommodate local community focussed services, including pre-school groups, primary health GP facilities, meeting rooms and changing rooms for use by local sports teams (see floor plan below). Adjacent to the building are several floodlit sports pitches and a 65-space car park.

Although the Community Centre was originally intended to incorporate a ground-source heat pump system, a standard gas-fired heating system was eventually installed due to budget constraints and cost over-runs during the building's procurement process. However, the originally specified under-floor heat distribution system has been retained, along with a hybrid ventilation strategy which involves forced-air ventilation of the main hall and adjacent activity room, with the remainder of the building being naturally ventilated and incorporating roof mounted passive 'wind catchers'.

Energy consumption

Electricity and gas consumption data for Thorpe Astley are shown below in Figure 7. The data relates to the years 2014 taken from the building's official DEC assessment data at https://www.gov.uk/check-energy-performance-public-building and 2019 which are taken from energy bills provided by the Town Council.

Figure 7: Comparison of Thorpe Astley Community Centre gas and electricity consumption for 2014 and 2019



The data indicates that in 2019 the building was performing broadly in line with energy usage measured during its DEC assessment in 2014. However, it should be noted that gas consumption data measured during the Covid lockdown period in 2020 indicates a significant increase in gas use of 42%, even though 2019 was 4.5% colder than 2020 (expressed in terms of Heating Degree Days – HDDs). This observation is counterintuitive given the assumed reduced usage of the building during lockdown, and could be the result of several factors, including a lack of oversight in terms of heating control, forced air ventilation, or recirculating hot water systems left constantly running, or the windows left open during the winter period.

Energy benchmarking

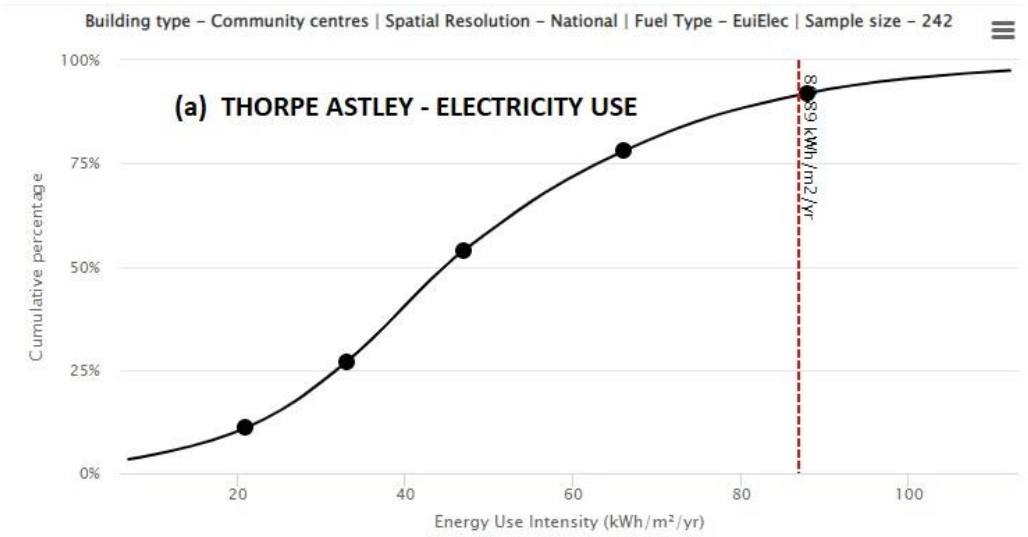
Thorpe Astley's most recent Display Energy Certificate dates from its assessment carried out in 2014. At that time, the building's gas and electricity energy performance was assessed as being better than for a building of its type, which at the time was defined as a "Dry Sports and Leisure Facility with Heating and Mechanical Ventilation". However, this building category does not accurately reflect the design or usage of the Thorpe Astley building, which obviously is not predominantly a sports facility. Therefore, in the current analysis, we benchmark the building's energy performance against CIBSE's

'Community Centre' category, which comprises data from 242 local authority buildings across the UK collated by the UK government.

Figures 8 and 9 show the results of the benchmark analysis using the building's data for the year 2019 and includes a comparison of the Community Centre's performance compared to the other 242 buildings in the CIBSE database.

In terms of the building's electricity use, Thorpe Astley's performance is very poor in comparison with its peers, with an electricity Energy Use Intensity (EUI) of 87kWh/m2 compared with a typical value of 47 kWh/m2 for this building type. This indicates that there is significant scope to improve the electrical efficiency of the building to attain the 'typical practice' benchmark EUI figure of 47 kWh/m2, or even to approach the 'good practice' value of 33 kWh/m2 – a 62% improvement which is feasible target given the relative recent construction of the building.

Figure 8: Thorpe Astley Community Centre electricity usage compared to the CIBSE database

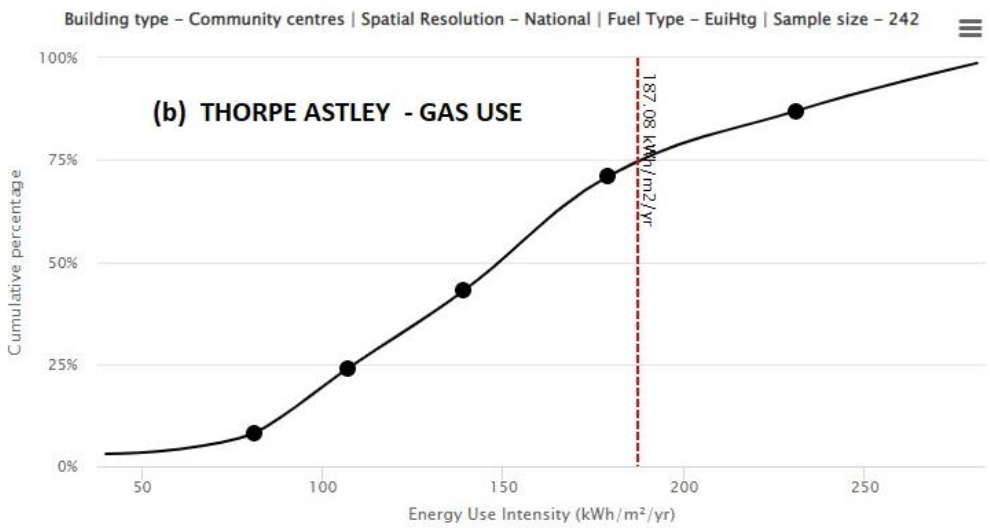


Building Type	Good practice electricity	Typical practice electricity	Source
Community centres	33	47	DEC

In terms of gas consumption, Thorpe Astley's performance is also poor. Its actual EUI value of 187 kWh/m2 compares to a 'typical' value of 139 kWh/m2, and a 'good' value of 107 kWh/m2. Thus, potential savings in space heating and hot water energy of up to 43% are achievable based on an efficient gas boiler system. Furthermore, given that the original design of the building incorporated a heat pump system, and that the related underfloor heating distribution system is still operable there is significant potential to

improve the CO_2e emissions for the building if a heat pump system or a hybrid heat pump plus high efficiency gas boiler is retrofitted.

Figure 9: Thorpe Astley Community Centre gas usage compared to the CIBSE database



Building Type	Good practice fossil fuels	Typical practice fossil fuels	Source
Community centres	107	139	DEC

3.6 Shakespeare Pavilion

The Shakespeare Pavilion was newly constructed in 2021 and will start a full year of operation in 2022. The architect provided estimates for the energy usage for gas (270,000 kWh) and electricity (18,000 kWh). Although the figures supplied by the architect have been used in the Audit, it is worth mentioning that when the building was benchmarked the estimated energy usage is excessive which significantly effects the carbon footprint.

Through the architects estimates, the current carbon footprint for the Pavilion is 45% of the total building emissions. The main problem is the estimated high gas usage, which is more than the combined gas usage of all the other buildings.

The benchmark data for the new buildings of the same types below, yields the following gas and electricity consumptions (assuming a floor of 360m2 measured from Google maps):

- Dry sports centre (local): Elec = 23,040 kWh Gas = 56,880 kWh
- Combined centre: Elec = 34,560 kWh Gas = 95,040 kWh
- Community centre: Elec = 11,880 kWh Gas = 38,520 kWh

In terms of function, the Pavilion would be closer to a community centre rather than a sports centre. If that is the case the Pavilion would cut its energy usage by 231,480 kWh from gas and 6,120 kWh from electricity. If this was the case the carbon footprint which has been calculated using the architect's estimates would drop from 54 t/CO_2e to 10 t/CO_2e per annum. This is hugely significant and would reduce the overall building carbon footprint from 120 t/CO_2e per annum to an estimated 76 t/CO_2e per annum.

It is essential that the energy usage of the Pavilion is monitored closely in the next 24 months to provide valid energy data for the next carbon audit in 2024.

3.7 Braunstone Town Community Library

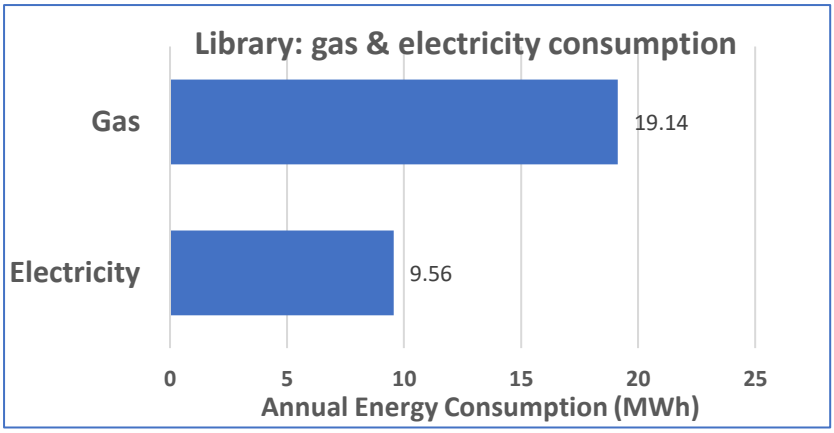
Braunstone Town Library was constructed during 2007 as a separate annex adjacent to the Civic Centre. Designed by Pick Everards architects, it is a compact building of 185m2 floor area comprising a mono-pitch roof and brick-faced block construction.

The building is heated via a standard gas-fired system and given its limited size and inherent design with regards natural window openings, the building does not include a forced air ventilation system. The design also includes excellent provision of natural light within the building, which in practical terms mitigates the need for excessive artificial lighting except for during the winter period.

Energy consumption

Electricity and gas consumption data for the library are available for the years 2019 (gas) and 2020 (electricity) respectively. As such, it should be noted that electricity data may not be representative of a typical year, given the usage constraints associated with the Covid-19 pandemic restrictions. The data is presented here to provide an insight into the relative performance of the building, especially in relation to other buildings within this study as well as its peers across the country.

Figure 10: Gas and electricity consumption at the Library



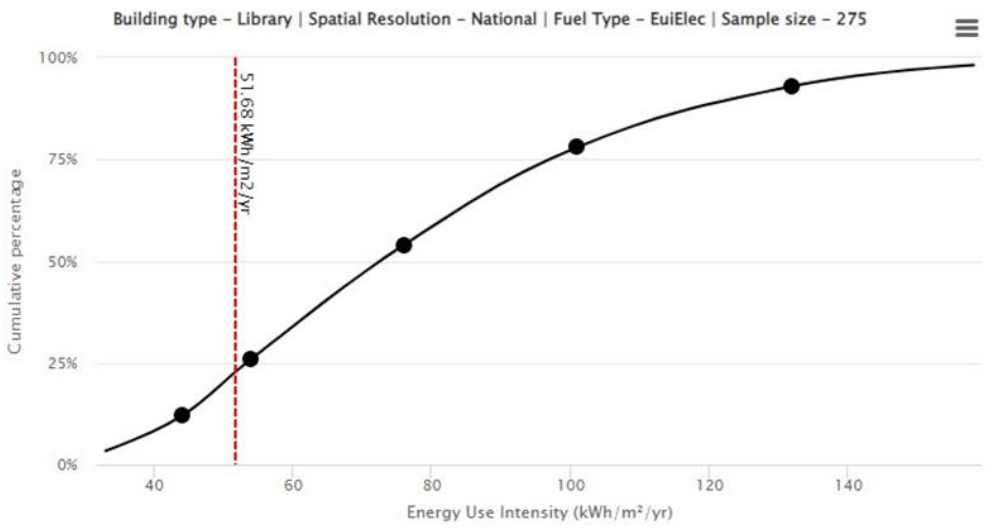
The relatively low gas and electricity consumption values reflect the much smaller footprint of the Library in comparison with the Civic Centre and Thorpe Astley buildings respectively. Given this relatively small building footprint, an Energy Performance Certificate (EPC) is required rather than a more comprehensive Display Energy Certificate (DEC), and so it is not possible to carry out a comparison of the current energy performance of the building with historical data obtained during its previous energy certification assessment.

Instead, we have carried out a benchmarking exercise (below) in which the building's performance is compared with 275 other library buildings across the UK.

Energy benchmarking

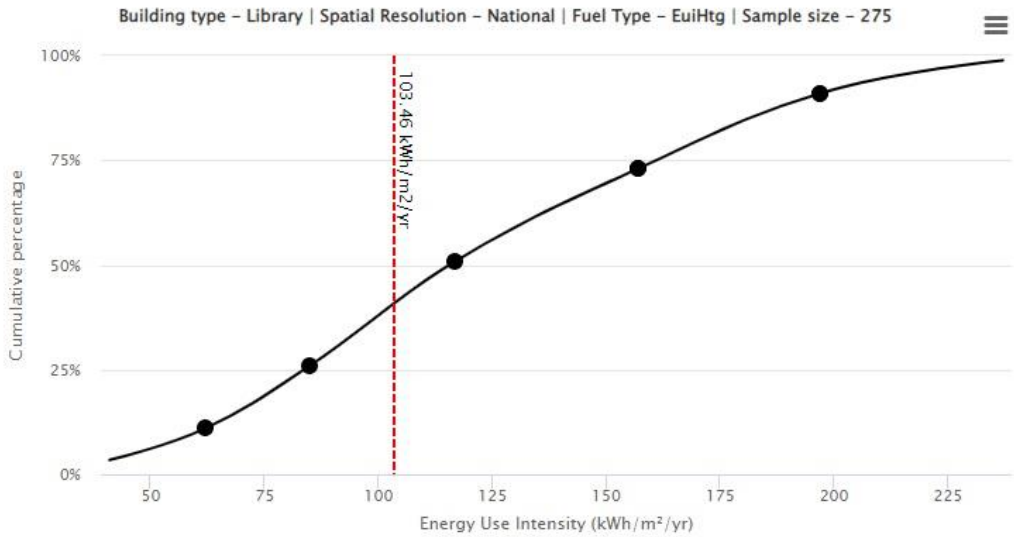
Figures 11 and 12 (below) show the results of the benchmark analysis using the building's data for 2018-19.

Figure 11: Library electricity usage compared to the CIBSE database



Building Type	Good practice electricity	Typical practice electricity	Source
Library	54	76	DEC

Figure 12: Library gas usage compared to the CIBSE database



Building Type	Good practice fossil fuels	Typical practice fossil fuels	Source
Library	85	117	DEC

The very low electricity consumption in comparison with its peers (Figure 11 - 51.7 kWh/m^2) reflects the efficient operation of the building's electrical systems (predominantly lighting) and the use of natural ventilation, rather than forced air ventilation or air conditioning. As such, any improvements in energy performance should be focussed on heating energy consumption.

Figure 12 shows that the relative gas consumption of 103.5 kWh/m^2 is marginally better than the typical value for this building type. Given the relatively recent construction of the building (and thus a more thermally efficient design in comparison with older buildings), there appears to be some scope to improve the gas heating efficiency of the building to approach or surpass the 'good practice' EUI value of 85 kWh/m^2, meaning a heating efficiency improvement of at least 20%.

3.8 Mossdale Meadows Depot

Mossdale Meadows is a unique building specifically used for Council vehicles and grounds maintenance. It is currently powered entirely by electricity and consumes 14,924 kWh of electricity which equates to 3.4 t/CO_2e.

4. Reducing CO_2e emissions from Transport

4.1 The potential for walking, cycling and remote working

With smaller journeys of two miles or less there is the opportunity to reduce CO_2e emissions by walking and cycling. There are currently six staff and nine Councillors (Figure 13) who are currently using cars to travel two miles or less to the Civic Centre. This emits just under 3 t/CO_2e which is 38% of staff and Councillor travel emissions. This demonstrates how several small journeys can impact on a Net Zero target.

Delving deeper into the data, one person walks two miles (a four-mile round trip) whilst everyone else walks or cycles one mile or less. Out of the fifteen people driving, eleven people (73%) drive a mile or less with four (27%) driving two miles or less. It is worth considering that although it might seem sensible to think that the length of journey would have an influence on transport choices, this is not always the case as personal circumstances may dictate how a journey is taken.

Figure 13: Reduction in CO_2e through walking, cycling or electric driving

Braunstone Town Council	People travelling two miles or less	Numbers walking, cycling or EV	Numbers Driving	Driving Emissions t/CO2e
Staff	10	4	6	1.99
Councillors	15	6	9	0.86
Total	**25**	**10**	**15**	**2.85**
Potential reduction in t/CO2e by walking, cycling and EV				2.85

Working from home or remote working

The COVID-19 pandemic and the resulting stay-at-home orders have led to significant changes in the way people work. One of these changes involves increased use of video conferencing as a means of communicating or holding work meetings. It may be possible to further reduce the Council's carbon footprint in this way. However, many of the staff employed by Braunstone Town Council are by the very nature of their job customer focused and 'hands on'.

Staff travel and employment practices

To achieve carbon neutrality by 2030, Braunstone Town Council will need to embed climate and environmental awareness across all its activities and decision making. When considering employing staff and appointing Councillors, it would be worthwhile to include within the recruitment process the carbon footprint of potential employees and Councillors in relation to where people live and any practical action that could mitigate their carbon footprint.

4.2 The potential for an electric vehicle car share

Electric vehicle car share for staff

It might be worth considering providing electric cars for staff, on the understanding that the driver needs to car share with a minimum of one other member of staff. It has the potential to provide a financial benefit to staff and the ability to create closer working relationships within the workforce.

Electric car sharing has the advantage over car sharing with petrol/diesel cars, as the extra mileage taken to accommodate another person is carbon free if renewable energy is used to charge the vehicle.

Sixteen members of staff commute to work using petrol or diesel cars, which together emits 7.5 tonnes of CO_2e. Mapping ten staff journeys of three miles or more, travelling by car, it was possible to see that journeys were being made from very different geographical locations. This made it difficult to match staff journeys as there was little proximity to each other. It was also made more complicated as five staff members, work four days or less.

Two of the longest journeys by staff into work by car, are 14 miles and 7 miles. Together a round trip of 42 miles. There is potential for a car share, as they both work five days a week. If the car share used an electric vehicle the savings would equate to 2.8 tonnes of CO_2e per year which is equivalent to driving 10,000 miles. This car share would have positive financial benefits to both drivers. As this is a significant amount of CO_2e reduction (37%) in terms of transport, and this potential car share merits further investigation.

This option might work with a smaller or second-hand electric car as the maximum length of the journey into work would be less than 40 miles, well within the range of a first-generation electric car such as a Nissan Leaf 24kWh with a real-world range of 55 to 125 miles[3].

An electric car sharing scheme could be instigated in tandem with the installation of electric charge points at key locations so staff can charge the cars, whether the cars are part of a car share scheme or privately owned.

3. https://ev-database.uk/car/1019/Nissan-Leaf-24-kWh

Electric vehicle car share for Councillors

A similar exercise mapped seven Councillor journeys of three miles to the Civic Centre. Note there are no journeys over three miles. All Councillors drive the three miles. One Councillor drives an electric car, one a hybrid car, one a diesel car and four Councillors use petrol cars.

Although several Councillors live in proximity, they come to the Civic Centre for business meetings which generally happen 20 times a year. The combined CO_2e emissions for these five Councillors (excluding the Councillors using hybrid and electric cars) is 0.17 tonnes annually and equates to 57% of Councillor transport emissions.

If several staff and Councillors shared cars, this Audit demonstrates that the CO_2e savings would be insignificant compared to staff travel and Town Council building emissions. However, reaching net zero requires individual actions and any CO_2e savings are beneficial to reach that goal.

The potential cost associated with staff car sharing

New electric cars are currently expensive, but there are opportunities to reduce this initial capital outlay by either purchasing a second-hand car, leasing a second-hand car, or leasing a new car.

An internet search provided a good example of market prices. A second-hand first-generation Nissan Leaf was selling for £7,295.

Example: 2013 Nissan Leaf

If a car like this was purchased and utilised as a car share which was mentioned previously, the annual cost of carbon reduction over three years would be £868 per tonne (8.4 tonnes saved over 3 years, divided into the capital cost of £7,295).

Leasing a second hand like this example is another option and it is quoted as £183.07 per month, but there is no indication of what is included in the terms of the lease, such as any limitation on mileage, servicing and MOT and any upfront costs are not known.

If the same car was leased for 3 years, it would cost £6,590 and provide an annual cost of carbon reduction of £784 per tonne. If the car was purchased and run for 5 years, the annual cost of carbon reduction would fall to £521 per tonne.

A further internet search on a comparison website, indicated the cost of leasing a new Nissan Leaf for the car share, with the required mileage limit would be in the region of £329 per month. The lease is over 4 years and would provide an annual cost of carbon reduction of £1,410 per tonne.

4.3 The potential for electric vehicles in the existing fleet

Pick-up trucks

Currently the Council lease two pick-up trucks and they and account for over 3 t/CO2e annually. The lease for both vehicles expire in 2022. One lease expires in June 2022 and the second lease expires in December 2022. This provides the Council a potential opportunity to replace the pick-up trucks with vehicles that are less polluting. However currently there are no electric pick-up trucks in the UK market[4] which would replace the existing vehicles on a like for like basis.

New electric models by manufacturers such as Ford[5] and VW are expected from 2024[6].

It may be sensible to adjust the length of any new lease to around three years, allowing the Council to decarbonise the pick-up trucks in 2025/6.

Example: Ford Ranger / Volkswagen Amarok hybrid electric pickup truck

As with so many electric vehicles the initial price may be high and therefore prohibitive. It is worth noting that the estimated average length of journey per day made by a Council pick-up truck is 40 miles (annual number of working days in 2022 divided by the annual mileage). This may open the door to the potential of a hybrid pick-up truck which may be driven solely on electricity. This hybrid option may be more economical and is worth considering.

4.https://www.parkers.co.uk/vans-pickups/best/electric-pickups/
5.https://topelectricsuv.com/news/ford/ford-ranger-hybrid-details/
6.https://www.autocar.co.uk/car-news/new-cars/ford-f-150-lightning-563bhp-electric-pick-truck-revealed

Ride-on mower

The ride-on mower was purchased in July 2018 and currently there are no plans to replace it in the near future. There are several ride-on electric mowers available but currently this tends to be promoted towards a domestic market. When the time comes to replace the mower, it is hoped that the commercial market would be well established and the cost of purchasing an electric mower may have reduced.

Tractor

The Council use one tractor and the lease expires in 2024. Currently there are several electric tractors on the market and by the time the lease expires in 2024 the market will have grown further. An example of what is currently on the market is provided below[7].

Example: John Deere zero emission compact utility tractor

This example electric compact tractor is based on the John Deere 1R Series. A key feature of this machine is it is powerful, allowing more than 10,000 m² of lawn to be mowed with one battery charge lasting 4.5 hours. In addition to high performance, and benefits from very low maintenance costs.

4.4 The installation of electric vehicle charge points (EVCP)

With current Government policy banning the sale of petrol and diesel vehicles from 2030 there will be a huge increase in the need for EVCPs. Installing EVCPs at Braunstone Town Council premises could bring benefits for the Council, staff and potentially the wider local community.

Three phase electricity

All the Council buildings are supplied with three phase electricity. A three-phase power connection provides a greater power density than a single-phase circuit using the same amperage, keeping wiring size and cost lower. This allows the electricity provider to supply more power in the most cost-effective way.

7.https://www.deere.co.uk/en/agriculture/future-of-farming/

Three phase electricity can also be split back down to single phases to allow for the existing equipment in the property to be used. This might require some electrical works to be completed in the plant room, so that the property is using the electricity in a balanced way over all three phases.

Once inside the building a three-phase supply can be used to power three phase equipment (such as a fast 22kW EVCP - using the same sized wires for a single phase EVCP the maximum power rating is 7kWh). In other words, a home charger on single phase provides a maximum of 7kW, whilst a three-phase supply can power a larger EVCP.

This provides an opportunity to install fast charging points and allow staff, residents, or other visitors to charge their cars at a faster rate than they can at home. The Council could charge different electricity prices for staff and residents and make a financial surplus from the EVCP.

EVCPs with solar PV

By installing EVCPs to a building that hosts a solar PV array, it is possible that a proportion of the vehicle charging will be provided by carbon free solar generation during the day. The greater the excess amount of solar generation that is produced, after self-consumption by the building, the larger this proportion of carbon free electricity could be used to charge the vehicles.

Community EVCPs

To take financial advantage of any excess solar generation a staff or community EVCP might be considered. At Thorpe Astley Community Centre for example, the estimated export of electricity from the proposed solar PV array, is modelled at 40% of the total generation. If this amount of electricity was exported to the national grid it might earn the Council a rate of £0.06/kWh. If, instead, this energy is sold to staff or local residents via EVCPs the same units of electricity could be sold for at least three times that amount, or more.

A 7kWh EVCP, which charged cars for three hours a day would use approximately 7,500kWh per annum. If sold at £0.25/kWh this generates an income of £1,900. If only 50% of this is 'free' solar generated electricity, and a margin of £0.06/kWh is maintained on the other electricity supplied then the Council would earn an annual income of approximately £1,200 from the EVCP.

The large car park with an adjacent residential area at the community centre may be an ideal location. Several EVCPs could be installed in the car park and utilise the three-phase supply of electricity to install fast (22kW) chargers, allowing quicker charging times that are available from home. This approach would support the community as they increase the take up of electric cars and enable access to charging facilities for residents and staff who lack off-street parking.

The idea of community EVCPs is speculative, but if outside funding (e.g., through regional or national government for the roll out of EVCPs) was made available for the installation of EVCPs this could provide an additional service to the community and provide income to the Council at little expense.

Incidentally when the site visit was made to the community centre there was one electric vehicle in the car park.

The Civic Centre and Library

The Library exports the majority of the electricity generated from the solar PV, whereas the Civic Centre will self-consume all the solar PV generation. As the Civic Centre building is adjacent to the Library there could be the possibility of utilising the electricity generated from the Library for the EVCPs for both buildings.

However, on inspection of the carpark adjacent to the Library, there is no obvious place to locate the EVCPs without significant expense. Alternatively, the smaller dedicated Civic Centre car park could be used for a car share EVCP but would not benefit from electricity supplied by the solar PV installation.

Powering a fleet of electric vehicles

Housing a new fleet of electric vehicles at the Mossdale Meadows Depot would negate the need for fuel storage at the Depot and provide significant cost savings for the Council.

The building is connected to a three-phase electricity supply and therefore it can accommodate several electric vehicle charging points inside the building. If vehicles were charged at night a 7kW charging point may well be sufficient. If the fleet remains with four vehicles, two double socket chargers would be required. As technology develops a faster charger might be required and this could also be accommodated at the Depot.

If any of the vehicles are not being used during the day, charging them in the day would be more cost effective as it could utilise free electricity generated by the solar PV array. Careful management of the fleet would maximise this financial benefit.

5 Reducing CO_2e emissions from buildings

5.1 The Civic Centre

The benchmarking analysis indicates that significant efficiency improvements are possible for the Civic Centre building if a methodical and targeted approach is adopted. Potential savings are especially apparent in terms of space heating and hot water-related energy consumption, with priority areas listed below:

Optimisation of the heating and hot water system

Given that the current gas boiler was installed relatively recently (and should therefore be operating in line with the latest condensing boiler efficiency standards which exceed 90%), the potential for efficiency savings relate mainly to improvements in the control and operation of the system including:

- Optimising boiler flow and return water temperatures in relation to outside temperature to ensure that the boiler always operates in its condensing (efficient) mode. This could include the installation of a 'weather compensation' system which matches the flow temperature of the water to outside conditions. If weather compensation is already present, then its operation should be checked at the boiler's next service visit.

- Ensuring that heat emitter (radiator) controls are operating effectively, including heating turn-down for unoccupied rooms. Standard radiator thermostat valves should be present as a minimum; however, their use and operation are often poor, and the replacement of current mechanical radiator thermostat valves with timed programmable units could be considered. This is especially useful where the current radiator thermostat valves are difficult to access for manual adjustment.

- Checking the insulation levels of the hot water tank and the timings of its operation. Although a relatively minor end user of energy in the building, it is relatively simple to check the insulation level and condition of the tank, and to ensure that water is heated only during periods when it is required. This could include switching off at weekends if hot water is not required.

- Ensuring that the gas heating and the retrofitted air-conditioning systems are operating appropriately. It is quite common for air conditioning systems to 'work against' the building's heating system by operating at the same times, so it is important to ensure that both the heating and air conditioning control systems are correctly adjusted to preclude this.

- Retrofitting of a ground or air source heat pump system. Where appropriate, the installation of a correctly designed and operated heat pump system can result in efficiency savings. However, in the case of the Civic Centre, not only would this

involve improvement to the energy efficiency of the building fabric to ensure efficient operation of the system, but also the replacement of a relatively new gas boiler, along with the replacement of the current radiator system with larger area heat emitters. This is because the current radiators are designed to operate at a flow temperature in excess of 60^{o}C compared to a heat pump which operates at typically 45-50^{o}C.

Optimisation of electrical systems

Given that our benchmark analysis indicates that the building's electrical performance is relatively efficient, we concentrate below only on measures that can be implemented to enable the building to move towards 'best practice' electrical efficiency.

- Ensure that all lighting luminaires comprise the most up-to-date units, including high efficiency LED units where possible.

- Install or optimise lighting control, including motion sensors where appropriate

- Adjust and optimise operation of the building's retrofitted air conditioning system. This is especially important given the sizes of the building's split-system air conditioning units, and the potential for high electrical consumption if they are not operating optimally. It is recommended that the suppliers or installers of the system are engaged to assess the current performance of the system compared to the building requirements and the adjustment of the system to enable optimal operation to be attained (for example in relation to indoor temperatures or CO_2e levels). Technical data for the units and their positions are shown in Appendix 7.

- Ideally, it is also important that ongoing operation of the building's integrated HVAC system is the subject of ongoing monitoring, either by the engagement of an external facilities manager or energy consultant or by an appropriately trained employee of the council.

5.2 Thorpe Astley Community Centre

Energy efficiency improvements

Significant efficiency improvements are possible for Thorpe Astley Community Centre in terms of electrical and space heating-related energy consumption. It is evident that aspects of both the design and control of the heating system could be improved significantly including:

- Optimising gas boiler flow and return water temperatures in relation to outside temperature to ensure that the boiler always operates in its condensing (efficient) mode. This could include the installation of a 'weather compensation' system which matches the flow temperature of the water to outside conditions. If weather compensation is already present, then its operation should be checked at the boiler's next service visit.

- Consider replacing or augmenting the current gas boiler-based system with an air source heat pump platform. This approach is feasible at relatively low cost given the presence of existing underfloor heating distribution, which is designed to run at the lower temperatures required by heat pump systems than standard gas boiler radiator systems. Also, given the relatively low cost of air-source compared to ground source heat pumps, it is feasible to include a new highly efficient gas boiler in the retrofit as part of a hybrid system to provide a 'peak heating supply' during particularly cold periods. This aspect should be part of a design study carried out as part of any retrofit contract.

- Ensuring that the heating and mechanical ventilation systems are operating appropriately to prevent these systems 'working against' each other. This can include assessment of the viability of retrofitting heat recovery technology to the existing ventilation system to ensure that the energy in the building's heated air is recycled rather than being expelled to the outside of the building.

- Checking that the hot water recirculation system is working correctly to prevent unnecessary heat loss, and that the insulation levels of the hot water tank and the timings of its operation are appropriate. Although usually a relatively minor end user of energy in the building, it is relatively simple to check these aspects, and to ensure that water is heated only during periods when it is required. This could include switching off at night or during weekends if hot water is not required.

Optimisation of electrical systems

Measures that could be implemented to enable the building to move towards a higher level of electrical efficiency include:

- The building's lighting systems appeared to be of efficient design which is to be expected given the relatively recent construction of the building. However, it is advisable to check that luminaires comply with the most recent efficiency standard, and that occupant motion sensors are present where appropriate.

- Ensure that operation of the building's integrated ventilation system is as specified by the manufacturer or contractor. During the site visit for this study which was carried out on a relatively cold morning of around 5^{o}C, it was evident that the mechanical ventilation system was operating concurrently with the building's heating system, potentially resulting in elevated heat loss. In such cases, it is recommended that the suppliers or installers of the ventilation system are engaged to assess the current performance of the system compared to the building requirements and adjustment of the system to enable optimal operation to be attained.

Finally, given the relatively small size of the building, it may be feasible to disable the mechanical ventilation system altogether and to rely on either manual window opening for ventilation or on automatically adjusted windows controlled by temperature sensors. This option removes the possibility of a future ventilation control dysfunction but requires the input of an experienced ventilation consultant to assess its viability.

Air Source Heat Pumps

An air source heat pump is a low-carbon way of heating buildings. It operates rather like a fridge in reverse taking heat from the outside air which is absorbed into a fluid. This fluid then passes through a heat exchanger into the heat pump, which raises the temperature using a compressor and then transfers that heat to water.

Air source heat pumps look like air-conditioning units. Their size depends on how much heat they'll need to generate.

The pump uses electricity to run, but it will use less electrical energy than the heat it produces. This is called Coefficient of Performance, or CoP. So, if you put 1kWh of electrical energy into a system you will generate more than 1kWh of heat energy. Typically, a heat pump has an average CoP of 3 meaning for 1kWh of electricity you will get 3kWh's of heat. The actual ratio of 'electricity in' to 'heat out' will change over the course of the year.

The heat it generates is at a lower temperature than a conventional heating system, so the air source heat pump is most effective if they have a large surface area in which to release the heat. Typically, this is achieved with larger radiators or underfloor heating.

It is proposed through this Carbon Audit to install an air source heat pump at Thorpe Astley Community Centre. The building was selected due to several factors:

- Underfloor heating is already installed at the Centre which reduces the capital cost of installation

- A new gas boiler at the Civic Centre was installed in November 2021
- The Shakespeare Pavilion has just been built and needs to operate for a couple of years to calculate a realistic carbon footprint
- Overall, the Library has the lowest carbon footprint from gas which is estimated at 3.51 t/CO_2e per annum, whereas the Community Centre has a gas carbon footprint of 13.8 t/CO2e per annum
- Mossdale Depot would carry on using electricity for heating and could be totally decarbonised through a combination of solar PV and purchasing electricity from a renewable source

The heating system proposed would be a hybrid gas boiler and air source heat pump system. This allows the heating system to have a gas backup which can be called upon when servicing the air source heat pump. It also provides peace of mind, in that if the air source heat pump breaks down the gas system would still be available to provide heat and hot water.

To receive the maximum benefits from a heat pump, it must be correctly sized for the Centre and the building must be suitably insulated. If these important factors are overlooked it could result in wasted energy, increased electricity bills and unnecessary heat loss.

To double check the size of the system required, the Council are advised to commission a heat loss assessment which will identify the right size of heat pump to be installed. This specialist assessment will provide insights into other improvements that might be required to ensure the building is as energy efficient as possible before installation.

5.3 The Library

Given the current high efficiency of the building's electrical consumption, we focus primarily here on heating-related efficiency improvements. Relatively simple aspects for attention include the optimisation of gas boiler flow and return water temperatures in relation to outside temperature to ensure that the boiler always operates in its condensing (efficient) mode. This could include the installation of a 'weather compensation' system which matches the flow temperature of the water to outside conditions. If weather compensation is already present, then its operation should be checked at the boiler's next service visit.

Correct operation of boiler and radiator thermostatic controls should also be checked, including ensuring that night-time set back of the heating system is operational. Where access to radiator thermostats is difficult, battery-operated automated radiator thermostats could be considered.

These aspects are especially important given that the building's heating indicates a 20% higher gas consumption during the lockdown period of 2020 than prior to lockdown. This suggests that there is significant scope to improve oversight of the heating boiler and

radiator thermostat control systems in order to match appropriate internal temperature set-points to actual occupancy periods.

In terms of the library's electrical systems, the lighting appears to be of efficient design and the luminaires are scheduled to be replaced by LEDs.

5.4 Mossdale Meadows Depot

Installation of a biomass heating system

Currently in the Town Council Capital Plan there are a number of proposals to help decarbonise and reduce energy costs at Mossdale Meadows Depot which includes:

1. *'Installation of bio-fuel boiler at Mossdale Pavilion for heating the Sports Facilities and Parks Depot. There is no heating at the premises. There are electric heaters for the staff room at the Depot, which are inefficient and a higher risk for fire. The Town Council has to pay at the Waste Disposal site to tip hedge and tree cuttings, which could be reused to fuel heating system'.*

2. *'Purchase of a woodchipper. To enable the installation of a bio-fuel boiler at Mossdale Depot and Sports Changing Rooms. To reduce waste and waste tipping costs to tip hedge and tree cuttings, which could be reused to fuel heating system in pavilion. Chippings can also be used to make natural pathways'.*

The consultants have extensive knowledge of procuring, installing and the management of biomass heating systems. Although the installation seems a reasonable proposition from the viewpoint of solving the heating, the disposal of hedge/tree cuttings and reduction of CO_2e, there are a number of critical issues which need to be considered beforehand:

- Currently the heating requirements for the Depot are modest and cost the Council an estimated £2,000 per year. A capital-intensive heating system like biomass is disproportionate for the amount of heating required.

- The capital investment in the installation of a biomass boiler (woodchip) and heating system will be in excess of £100,000. The silo for the woodchip would be an additional capital expense and so would a commercial chipper.

- Woodchip needs to be a certain quality and moisture content to run the boiler efficiently. The wood needs to be seasoned for a year before use. It is unclear where the hedge/tree cuttings would be stored. The wrong type of chip can cause a build-up of clinker in the combustion chamber and is often the cause of frequent break downs. Theoretically hedge trimmings could be use but it is extremely difficult to assure the quality and the moisture content required.

- There is no subsidy in the form of a Renewable Heat Incentive which would help make it slightly more viable. This means that the heat produced is very expensive when labour (required every day the boiler is operating), maintenance and servicing contracts, the production of the woodchip chip, and the disposal of ash are taken into consideration.

Insulation

The Capital Plan also sets out further work to be undertaken at the Depot:

3. *Roof Insulation at Mossdale Depot and Sports Changing Rooms. There is currently no central heating at the premises, with electric heaters for the staff room at the Depot. The building is not energy efficient and needs to be both in the short and long term to reduce energy use and costs.*

Installing insulation would prevent heat loss and will help with the overall energy efficiency of the building. However, there are spaces such as the garage where heating is less important and spaces where more heat is required such as the office.

Space heating

Staff mainly use the staff room/office for admin, a place for refreshment and to dry coats. The primary source of heat is an electric radiator which is situated in close proximity to the main door. It would be sensible to look at partitioning spaces so the heating is more efficient, and the space reflects the purpose it is being used for e.g., a separate area for coats to dry, a larger space for refreshment and a dedicated space for admin. Internal doors would help with heat retention, separating the spaces that require heating from the spaces which may require less heating.

Heating system

Rather than installing a different heating system such as biomass at the Depot, electric heating should be retained. The installation of solar PV, which is outlined in the next section, will significantly reduce current electricity consumption. This makes financial sense and assists with the decarbonisation of the Depot.

The addition of Solar PV to the roof of Mossdale would also provide carbon free electricity to heat the hot water for the changing rooms. Excess solar generation could be diverted to immersion elements in the hot water tank, raising its temperature during the week. It might require further tank insulation, but it would be possible to heat the majority of the hot water requirement in this way.

5.5 Solar PV roof systems and associated battery technology

As part of the Carbon Audit, a survey of the Council buildings was conducted in November 2021. Part of the survey specifically looked at the potential of installing solar PV on the roofs of the buildings. The buildings surveyed were:

- Braunstone Town Civic Centre
- Braunstone Town Community Library
- Thorpe Astley Community Centre
- Mossdale Meadows Depot
- Shakespeare Park Pavilion

Specific attention was taken to:

- Overall property design
- Property usage (and therefore energy usage) and patterns of usage
- Orientation, angle, and size of the roofing areas
- The design of the roofing areas, and state of repair
- Shading issues
- Property and roof access
- The type of electricity supply
- Location of the switchboard within the properties

The survey confirmed that all the properties are suitable for the addition of solar PV, indeed Shakespeare Park Pavilion already has a PV array installed. All the properties are supplied by a three-phase connection, and have electricity plant rooms, or areas adjacent that would be suitable for housing the solar inverters and other electrical equipment required with the installation of solar PV.

Solar PV installation on the Shakespeare Park Pavilion

Modelling the sizes of the solar PV arrays

Each building is unique and requires a bespoke solar PV array to maximise the potential for electricity generation. A 'SolarEdge Designer' software program was used to model each

property for the solar PV arrays. This software allows the outline of the building to be picked up from Google Maps, so that an accurate rendering can be used to populate with solar modules. The orientation and angle of the roof are also input into the program, which can then calculate annual PV solar generation using solar irradiance data for the location.

Design at Thorpe Astley Community Centre

The annual energy (electricity) use of the buildings was also entered into the software and broken down into day and night use where available. This, combined with an approximation of the energy usage patterns (i.e., times of day/week) and the cost of electricity enables the program to calculate current electricity costs and potential cost savings. Exported solar energy can also earn some income for the Council, and this was modelled at 6p/kWh. However, if the generated electricity is used on site, it replaces the imported electricity which is currently costing the Council approx. 15p/kWh and therefore is more financially attractive.

A 370Wp solar PV module was used in the analysis, as well as SolarEdge inverter and optimiser. Using this technology maximises the electricity generation over the lifetime of the systems, which in turn maximises the CO_2e savings.

Battery Storage

Finally, the software allows for the inclusion of a battery storage system to be added. A battery storage system improves the self-consumption of solar PV electricity generation and can be seen as the battery size is altered, allowing for a battery size to be chosen that allows for the best cost /performance ratio. Where a storage battery could be seen to be of benefit it was included in the design.

The storage battery can benefit the installation in two district ways:

1. By storing excess carbon free solar generated electricity for use at a later time in the building e.g., events and activities after the sun has set. This increases the buildings self-consumption of solar generated electricity, further lowering the carbon footprint.

2. The electricity supply market is undergoing rapid changes. It is now possible, with some electricity suppliers to recharge at different tariffs across the day and night.

This can enable batteries to be charged on a cheap tariff overnight in the winter months, when there is far less solar generation, and then be discharged during periods of high daytime tariffs. This type of flexible electricity charging is expected to be offered by more and more suppliers in the future.

Building Report Summaries

Braunstone Civic Centre

The Civic Centra is the largest consumer of electricity but is the most problematic in terms of the roofing areas with regards to the addition of solar PV. Most of the roofing areas are small and have an unusual design. This may make the structural survey more difficult and some of the roofs are facing the wrong way in terms of maximising the electricity that could be generated.

Because of the high electricity usage within the building, it is estimated that 99% of the solar generation will be self-consumed on site. This gives the building the best performance with regards to cost savings compared to the installation costs.

Community Library

The Library has a large, pitched, south facing roof area that would be very suitable for a solar PV array.

Thorpe Astley Community Centre

This building has a large, gently pitched roof area that could support an array of solar modules and has a much higher electricity use that the Library. The addition of a storage battery gives the best self-consumption figures, resulting in just over 50% of the buildings electricity being supplied by the solar array annually. The solar system could possibly be expanded even further to use the higher roof area, which has a shallow (approximately 5-degree pitch) facing North.

Mossdale Meadows Depot

This building houses the parks department vehicles and a small office. It has a corrugated cement board type roofing that would be suitable for a solar PV array. However, the older portion, housing the changing rooms and associated areas is likely to be covered with a corrugated asbestos roofing material. For the purposes of this report the asbestos area has not been used. Again, a battery storage solution improves the self-consumption of the system.

Shakespeare Park Pavilion

The Pavilion is a brand-new building. There are no existing electricity usage figures that can be used, but the architect estimated that 18,000kWh would be used annually. The building already has a solar PV system that was installed as part of the construction. From a visual inspection it is estimated that the solar PV array is approximately 10kWp.

There are large roof areas that would be useful for additional solar modules. The Pavilion should already be the best performing building of Council's portfolio as it will have been constructed to meet the latest building standards. It is suggested that time is taken to allow for a picture of the building energy performance to build up over the first few years of operation before suggesting any further alterations to reduce emissions.

Guarantees and Warranties

PV solar systems have an expected life of over 25 years. The figures used in any cost analysis are based on a 25-year lifespan, but in reality, good quality solar modules would have a useful life more than 30 years, which further improves savings.

Any solar module that is certified for installation in the UK will have a minimum 10-year product warranty, and a 25-year output warranty (that guarantees at least 80% of the original rated output after 25 years). Some manufacturers offer increased warranty specifications. The solar modules used in the example solar designs for Braunstone Town Council are from REC Solar[8].

Their products have a 20-year product warranty (increasing even further to 25 years if installed by an REC trained installer) and a 25-year output warranty that guarantees at least 86% of original rated output.

The SolarEdge inverters are supplied as standard with a 12-year product warranty. This can be increased to 20 or 25 years within the first 6 months of operation for a small extra fee; typically, £300 to £500 per inverter depending upon size and warranty extension length. The SolarEdge solar optimisers that sit beneath each solar panel have a 25-year warranty as standard.

Most storage battery systems will have a 10-year product warranty, which will also guarantee a minimum battery performance. This is often a guarantee of the battery capacity still being at least 60% (or more) of the original capacity after 10 years, or after a nominated amount of electrical power has passed through the battery, which is typically equivalent to the battery having been fully charged and discharged every day for 10 years.

In practice Li-ion storage batteries[9] from market leading companies such as the BYD batteries used in the solar designs are outperforming their warranties and could be expected to have a useful life of up to 20 years.

All the approved mounting systems and cables are manufactured for outdoor use, and are resistance to temperature, UV light and typical airborne chemicals such as salts, ammonias, and acids. These installation components also have a life expectancy in excess of 25 years.

8.https://www.recgroup.com/en

Notwithstanding the impressive product warranties, it is best practice to have commercial solar arrays inspected on an annual basis. Regular inspection ensures that all the solar mountings and cables are in good condition and can provide year on year comparative data to help spot when any faults might have occurred. In addition, an annual inspection can also ascertain whether the solar array would benefit from cleaning, which will be dependent on local conditions and the actual installation design. An annual maintenance budget is included in the SolarEdge 25 year predicted cost savings analysis.

Overall Summary

Solar PV Generated Energy

In total the carbon audit has identified the potential for solar PV systems to be installed across 4 of the 5 buildings in the Council's property portfolio.

It is estimated that these systems could reduce the electricity imported by 40%, giving a saving of £9,200 per annum against the current electricity costs. However, it should also be noted that energy prices are expected to rise throughout the year, and the higher the price of electricity, the higher the savings. Currently the Council's electricity tariff is lower than the average, but if the electricity price doubled the savings would also double to £18,400 per annum.

The costs of installing these PV arrays are significant. Market pricing has been very stable for the last three years. There are currently inflationary pressures, due mainly to increased raw material and shipping costs, so installed costs could rise. It is also possible that installation costs will rise in line with electricity prices, as solar PV becomes more economical in terms of the savings associated with the electricity generated.

9.http://www.windandsun.co.uk/products/Batteries/Lithium-Ion-Batteries/BYD-Lithium-Ion-Batteries#.YeQKxf7P2Uk

6. Braunstone Town Council's new carbon footprint

At this point it is worth saying that Braunstone Town Council could theoretically decarbonise all their building and transport operations by offsetting emissions. This would be extremely economical at around £1,000 per annum. However, the consumption levels for electricity, petrol, diesel, and gas would remain the same.

The Council could decarbonise its operations by purchasing renewable electricity from an energy supplier and offset the remaining emissions from gas and transport emissions. Once again this fails to tackle the actual emissions and the Council will still be reliant on fossil fuels.

The Carbon Audit sets out a different path to decarbonise the Council's operations. The purchasing of renewable electricity is still vital, but it provides quantifiable carbon reduction through specific actions and the installation of low carbon technologies. It will require a financial commitment, but this commitment will reflect the Town Council's ambition to be carbon neutral by 2030.

The existing carbon footprint of Braunstone Town Council is 133 t/CO_2e. With the interventions suggested to reduce electricity, gas, and transport emissions the new carbon footprint would be estimated at 78 t/CO_2e which is a 41% reduction. The following sections provide the background to the new carbon footprint.

6.1 Transport

Staff and Councillors travel

The electric car share would save 2.8 t/CO_2e. For shorter journeys to the workplace of two miles or less. The electricity for the car share would be decarbonised through the Council purchasing renewable electricity from a new energy supplier. A further 2.5 t/CO_2e could be saved if staff and Councillors walked, cycled, used a hybrid or electric car, or worked from home.

Existing fleet of vehicles

The electrification of the Council's fleet of vehicles can be achieved in the next four years, which will provide the decarbonisation of the pick-up trucks, the tractor, and the ride on mower. Currently there are few hybrid or full electric vehicles which would be suitable to replace these existing vehicles.

Three of the four Council vehicles are leased. All the leases expire shortly. Electric and hybrid pick-up truck models from Ford will become available in the UK in the next couple of years, so it would be worth adjusting the length of any new lease arrangements to make the most of this future carbon saving opportunity. When the lease for the tractor expires it

could be possible to lease an electric tractor, otherwise take out a shorter lease to allow for the electrification at a later date. The ride on mower which is owned outright by the Council can be electrified when replaced. It should be possible to electrify the whole fleet by 2026. To decarbonise all the electricity the vehicles, use, the Council will need to purchase renewable electricity from a new energy supplier. Currently the emissions from transport are 13 t/CO_2e, and with the interventions this is reduced to an estimated 2.7 t/CO_2e per annum.

6.2 Buildings

Carbon footprint reduction through the installation of solar PV

Utilising the electricity bills pre Covid, and estimates from HSSP Architects, the current electricity consumption for Braunstone Town Council is estimated as 130,792 kWh per annum. This gives a current carbon footprint for electricity usage as an estimated 31 t/CO_2e. The solar PV arrays are estimated to save of 24 t/CO_2e per annum.

Self-consumption and the export of electricity

From the Carbon Audit, the installation of solar PV modules can contribute to a major reduction in the carbon footprint of the Town Council in addition to significantly reducing overall energy bills. This reduction in t/CO_2e accounts for all the estimated electricity generation, some of which is self-consumed, and some is exported.

During the day, the electricity generated can replace the electricity which would normally be supplied through the National Grid and therefore decarbonises this consumption. However, the installation of solar PV will not achieve carbon neutrality in terms of the electricity generated for self-consumption. If the electricity generated and exported was factored into the carbon footprint the Council would need to decarbonise a further 6.5 t/CO_2e (from a starting point of 31 t/CO_2e) to achieve Net Zero for its use of electricity. This can be achieved by purchasing renewable electricity (see 6.3) from a new energy supplier.

It is worth noting the CO_2e footprint of the manufacturing of the solar systems. The REC Solar 370Wp modules utilised for the solar designs have a certified carbon footprint value of 450kg per kWp. This gives a carbon payback of less than 2.5 years.

To summarise, the addition of PV and the purchase of renewable electricity from a new energy supplier will totally decarbonise electricity saving 31 t/CO_2e annually.

Gas

Currently the Council's carbon footprint from gas is 89 t/CO_2e. Through the Carbon Audit, it has identified that the installation of an Air Source Heat Pump at Thorpe Astley Community Centre will reduce the carbon footprint of gas by an estimated 13.8 t/CO_2e, leaving a further 75.5 t/CO_2e to decarbonise.

6.3 Purchasing renewable energy

Gas

While electricity is more straight forward to decarbonise, gas on the other hand is more difficult. There is 'green' gas on the market, and this generally refers to biomethane, which is made when organic materials like food waste decompose and release methane, in a process called anaerobic digestion. This biomethane gas is then captured and fed into the national gas grid.

The availability of green gas is currently limited, so the best way in which to eliminate the carbon footprint from gas, is using renewable electricity to replace it – hence the recommendation to install the hybrid air source heat pump at Thorpe Astley Community Centre which starts this process.

Green Energy

Green energy is electricity and gas that is generated from renewable sources instead of fossil fuels like coal and natural gas. The main renewables used are wind power (on-shore and off-shore), solar power, wave and tidal, biomass, hydroelectric and geothermal.

If Braunstone Town Council wants to reduce its carbon footprint but are not in a financial position to install solar PV and the hybrid air source heat pump at Thorpe Astley Community Centre, the next best thing would be to switch energy supplier to one with green credentials offering 100% renewable electricity and potentially green gas.

Almost every electricity supplier has a 'green' tariff aimed at customers who want to buy renewable energy. These tariffs are labelled as green if some or all the units of electricity that the customer buys are 'matched' by units of energy that have been generated from a verified renewable energy source. However, the actual percentage of renewable energy purchased by a supplier and passed onto a customer through a 'green' tariff varies enormously.

Renewable Energy Certification

For every mega-watt hour (MWh) of renewable electricity generated a Renewable Energy Guarantee of Origin certificate, known as a REGO, is assigned to it. But crucially, the certificate and the electricity don't have to be sold together, and this allows some electricity retailers to claim they're selling renewable energy, when really, they're doing nothing of the kind.

The opportunity arises because some energy companies are not interested in buying green energy per se, merely in buying the cheapest units of electricity and selling it on. At certain times - e.g., midday when it's very windy - renewable energy can be the cheapest on the market. So, they may buy the electricity, but decline to purchase the REGOs that come with it, because those certificates each carry an additional small cost.

This means that these REGOs are now available to be sold separately to other energy suppliers, who then 'match' them to units of energy that they sell to the public. They can

then claim to have a '100% renewable' tariff when it is in fact no different from the general energy mix supplied by the grid.

Critics refer to this practise as 'greenwash'; the end-customer believes they are supporting renewable energy generation, but their supplier has merely bought up unwanted REGO certificates and is using a market mechanism to undercut genuinely green suppliers and hasn't invested in any new renewable capacity at all.

Green tariffs

The greenest tariffs come from suppliers that buy renewable electricity and its accompanying REGO certificates directly from renewable generators, such as UK wind or solar farms, via a mechanism called a Power Purchase Agreement, and which never separates the REGO from the original units of generation.

Energy suppliers that offer these genuinely green tariffs generally carry higher costs of operating than greenwashed or mixed-tariff providers. This is because they must invest in detailed forecasting and demand management processes to ensure that the renewable energy generation is matched as closely as possible to actual customer demand. They tend to also include smaller and community-owned generators within their generation portfolio, giving them higher administrative overheads compared with other suppliers.

These additional costs are recognised by Ofgem, who provide a certificate of exemption from the energy price cap to three companies whose operating models provide significantly greater support for the development of the renewables industry.

For this reason, the Energy Saving Trust and the Centre for Sustainable Energy consider three companies to have the greenest tariff. These are Good Energy, GEUK and Ecotricity. Further detail about these companies are highlighted below, together with a relatively new supplier called Octopus Energy which offers a 100% renewable electricity tariff. All these energy suppliers offer a slightly different approach to the supply of renewable energy.

It is important to mention that this is not an endorsement of these companies, but they are included within the Carbon Audit to provide examples of different green tariffs and the benefits they could offer Braunstone Town Council.

- **Ecotricity**

Established back in 1995, Ecotricity has 200,000 customers and is one of the longest standing renewable energy companies in the UK. They guarantee 100% green electricity. It generates 20% of the renewable energy it sells and the other 80% is sourced through certified green generators. Their profits are invested into further renewable projects such as wind and solar farms and they own a grass-fed green gas mill in Reading which is estimated to provide green gas to 4,000 of their customers.

We approached Ecotricity Home@ecotricity.co.uk on behalf of Braunstone Town Council to ascertain the price of renewable electricity but unfortunately, they did not return the emails.

- **Good Energy**

Established in 1997, Good Energy like Ecotricity has 200,000 customers. They guarantee 100% green electricity. Good Energy provide a carbon neutral gas, made up of 10% green gas with the remainder carbon offset with projects managed by Climate Care.

We approached Good Energy sme-support@goodenergy.co.uk on behalf of Braunstone Town Council, but due to the current volatile energy market we had a disappointing response:

'Unfortunately, we are not taking on any new customers at the moment due to the current energy crisis. My apologies that we can't do this at this moment in time but please keep an eye out on our website for any changes to this in the future'.

- **Green Energy UK**

Green Energy (UK) Ltd, also known as GEUK, was founded in 2001, and sells 100% Ofgem-certified green and renewable electricity and gas, to homes, businesses and organisations in England, Wales, and Scotland. GEUK is the only energy supplier in the UK to offer 100% green gas which is from anaerobic digestion.

We approached GEUK hello@geuk.com on behalf of Braunstone Town Council to ascertain the price of renewable electricity and gas, but unfortunately their response was disappointing:

'We do supply commercial supplies but at the moment we have stopped taking on any new ones. Just with the price increases of the industry, it's not something were able to do at the moment'.

- **Octopus Energy**

Octopus Energy is just five years old, but in that short time it has grown to supply energy to two million homes. They offer a tariff with 100% renewable electricity and carbon offsetting for gas through a Brighton-based charity Renewable World which specialises in carbon reduction projects.

We approached Octopus Energy hello@octopus.energy on behalf of Braunstone Town Council to ascertain the price of renewable electricity, specifically for the Thorpe Astley Community Centre. They provided a unit day rate of 38.59p per kWh and a unit night rate of 29.53p per kWh exclusive of VAT.

This quote seems to reflect the increase in electricity prices and is twice as expensive than the Town Council's current electricity tariff supplied by British Gas (Library invoice October 2021). Once the energy market has stabilised it would be useful to revisit these energy suppliers and obtain competitive quotes.

6.4 Carbon offsetting

Carbon offset schemes allow individuals and companies to invest in environmental projects which are usually around the world, to balance out their own carbon footprints. The projects are usually based in developing countries and most commonly are designed to reduce future emissions. For instance, this might involve rolling out clean energy technology. Other schemes work by soaking up CO_2 directly from the air through the planting of trees.

Some people and organisations offset their entire carbon footprint while others aim to neutralise the impact of a specific activity, such as taking a flight. To do this, the holidaymaker or businessperson visits an offset website, uses the online tools to calculate the emissions of their trip, and then pays the offset company to reduce emissions elsewhere in the world by the same amount – thus making the flight "carbon neutral".

Offset schemes vary widely in terms of the cost, and a typical fee would be around £8 for each tonne of CO_2 offset. At this price, a typical British family would pay around £45 to neutralise a year's worth of gas and electricity use. In the case of Braunstone Town Council this would cost £960 (£8 x 120 tCO2e) annually to offset their electricity and gas emissions and a further £104 (£8 x 13 t/CO2e) to offset the transport emissions.

If Braunstone Town Council decided to offset carbon emissions in this way, it would be sensible to ensure that the offsetting is reputable. The voluntary offset market has developed various standards, which are like the certification systems used for fairly traded or organic food. These include the Voluntary Gold Standard (VGS) and the Voluntary Carbon Standard (VCS). VGS-certified offsets are audited according to the rules laid out in the Kyoto protocol and must also show social benefits for local communities. The VCS, meanwhile, aims to be just as rigorous but without being as expensive or bureaucratic to set up, thereby allowing a greater range of innovative small-scale projects.

It is worth stressing that carbon offsetting has its critics:

Greenpeace: *The big problem with offsets isn't that what they offer is bad – tree planting or renewable energy and efficiency for poor communities are all good things – but rather that they don't do what they say on the tin. They don't actually cancel out – offset – the emissions to which they are linked. Offsetting projects simply don't deliver what we need – a reduction in the carbon emissions entering the atmosphere*[10]*.*

Friends of the Earth: *The real and credible solutions to the environmental emergencies we face are clear. We must rapidly stop using fossil fuels*[11]*.*

Greta Thunberg: *'fossil fuel companies and banks are trying to give polluters a free pass to keep polluting*[12]*'.*

10.https://www.greenpeace.org.uk/news/the-biggest-problem-with-carbon-offsetting-is-that-it-doesnt-really-work/
11.https://policy.friendsoftheearth.uk/insight/dangerous-distraction-offsetting-con
12.https://www.bloomberg.com/news/articles/2021-11-03/thunberg-attacks-offsets-as-greenwash-as-anger-builds-at-cop26

7. Potential sources of funding for Braunstone Town Council

Braunstone Town Council has limited access to grants because of its constitution. Town Councils are often not eligible for grants as some funders will only support registered charities or small to medium enterprises (SME). This puts the Town Council at a disadvantage when actively looking for financial support for their net zero ambitions. In the long term, it may be worthwhile to consider the establishment of a charitable body to access funds which could specifically support the community services at Thorpe Astley Community Centre, the Library and potentially the Pavilion. Two examples are highlighted below:

Examples of grants that are not eligible through Town Councils but are eligible through a registered charity include:

1. **BIFFA Award** (under the Community Buildings grant)

Biffa Award[13] gives grants to projects that benefit communities living near landfill sites. To check eligibility for an application from the Town Council, the postcode of Thorpe Astley Community Centre was entered in the 'postcode checker' and the Council fits this criteria. However, having spoken to the Grants Officer she said that Parish and Town Councils are unable to apply.

This is unfortunate as the fund could have supported the installation of the Air Source Heat Pump and there are few charitable organisations that would fund this work. The criteria under the Community Buildings theme includes those which improve buildings at the heart of their communities – such as village halls, community centres and church halls. They can include building refurbishments and internal works to kitchens, toilets, roofs, flooring, window, doors, and heating systems.

2. **The Morrison Foundation** offers grants up to £25,000

The Morrisons Foundation[14] awards grants to UK registered charities to support projects which make a positive difference in local communities. Applications are accepted and reviewed on a continual basis, there is no deadline for requests to be submitted. The Foundation's donations are only available for charities registered with the Charity Commission.

It is even more frustrating as the Town Council have little to no direct access to central government funding for low carbon capital grants such as the Public Sector Decarbonisation Scheme. Over £1 billion has already been spent through this scheme on capital energy efficiency and heat decarbonisation projects within public sector but Parish and Town Councils are not eligible.

Similarly with the Green Belle initiative in Leicester and Leicestershire which provides grants of £10,000 for SMEs to install low carbon measures and increase their energy efficiency. These grants are not available to Town Councils.

13.https://www.biffa-award.org/community-buildings/
14.https://www.morrisonsfoundation.com/about-us/

It is worth noting that the generally grant giving organisations provide funding for community activities rather than capital works. With more national emphasis on carbon reduction there will be more funding opportunities in the future.

Thinking about electric vehicle charging points, it would be worthwhile talking to Leicestershire County Council to see whether it would be possible for several chargers to be installed at the Civic Centre and Thorpe Astley Community Centre. This might help Leicestershire County Council to roll out the electric charge points.

Local Grants

SHIRE Grants 2021/22

Grants of up to £3,000 are available for community groups and organisations to deliver local projects and activities to improve Leicestershire's environment. Braunstone Town Council have already applied for a SHIRE grant to support the installation of LEDs in the Library. It would be worth considering a further application[15].

Leicestershire and Rutland Community Foundation

The Foundation[16] is a charity which helps local individuals and companies to give money, in a tax efficient way, directly to local needs. The Foundation has several grants that the Town Council could apply for. The Chief Executive is very approachable and may welcome local environmental initiatives and signpost the Town Council to funding opportunities.

One potential fund, 'The Making Local Life Better Fund' is made up of money from many local private donor funds that the Community Foundation attracts and manages. Between them, donors fund a wide range of needs, but all aim to support local people and local communities. Grants are available for organisations such as Parish Councils through a rolling programme, working in Leicestershire and Rutland for up to £3,000 and must be spent within a year of receiving the grant.

Leicestershire Funding Toolkit

The Leicestershire Funding Toolkit[17] is a free searchable database of funding opportunities, hosted on Voluntary Action Leicestershire's website. The Funding Toolkit contains details of hundreds of local, regional and national funding opportunities for not-for-profit organisations operating in Leicestershire.

The toolkit is primarily aimed at the voluntary sector, but highlights new funding opportunities, some of which the Town Council could apply to. It is a free service, and once the Council registers you will receive regular updates on potential grants and funding opportunities.

15.https://www.leicestershirecommunities.org.uk/grants/environment-grant.html
16.https://www.llrcommunityfoundation.org.uk/our-grants/apply-for-a-grant/
17.https://www.idoxopen4community.co.uk/leicestershire

National Grants

National Lottery
Parish and Town Councils are eligible for National Lottery funding and could be looked at as a source of funding for electric cars/greening transport if a community car sharing scheme was established. The electric car could be utilised for a staff car share as outlined previously and made available to the community during the day. The Awards 4 All programme offers grants of up to £10,000.

Other funding opportunities will be available from the National Lottery and it is worth keeping an eye on new funding programmes.

Severn Trent Community Fund
The fund has supported projects in Leicestershire and Braunstone Town Council would be eligible as their water service is supplied by Severn Trent Water. The grant programme is currently being reviewed but, in the past, there were three sizes of grant that Braunstone Town Council could apply for:

- £2,000 to £10,000
- £10,001 to £75,000
- £75,001 to £250,000

If you are applying for £10,000 or less, match funding is not mandatory. However, if your secure match funding it is likely to help your application be successful, so its encouraged. Depending on how the fund is reviewed, currently capital costs for improving a site or a building are eligible.

This might be worth exploring as a joint bid with the National Lottery Awards 4 All.

17. https://www.tnlcommunityfund.org.uk/funding/programmes/national-lottery-awards-for-all-england