



CARBON FOOTPRINT REPORT 2021

**Assessment of Thatcham Town Council's carbon
footprint for the calendar year 2021**

Assessment period 1st January 2021 to
31st December 2021

Report compiled by
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Executive Summary

An assessment of the greenhouse gas emissions (GHG) for Thatcham Town Council over the period of 1st January 2021 to 31st December 2021 is reported. This is the second carbon footprint report prepared for Thatcham Town Council. The first report was prepared by the company Carbon Footprint Ltd for the calendar year 2019.

Current Performance (year 2021)

- Thatcham Town Council GHG footprint is 8.9 tonnes
- Site Utilities (Gas and Electricity) account for 95% with electricity consumption dominating GHG at 86% of total.
- 'Grey' fleet car usage accounts for the remaining 6%

Management Guidance

- In comparison to year 2019 the GHG footprint has reduced by 6.0 tonnes (40%)
- Whilst 2021 has been impacted by Covid resulting in reduced usage of community halls the reduction in GHG footprint indicates good discipline is being maintained in using energy only when facilities are in use.
- The transition to using 'grey' fleet cars (private vehicles used for business travel) has reduced the GHG emissions by 1.1 tonnes of CO₂
- The largest single electricity demand is associated with the public toilets. Checks should be put in place to ensure water heating and lighting is switched off during out-of-hours periods.
- An anomaly is observed for the Town Council Offices. Whilst the electricity consumption is flat relative to 2019, the relatively small gas usage has increased very significantly (53%). Further investigation is recommended, and regular readings should be conducted.
- The two installations of solar panel systems save 3.4 tonnes of CO₂

This report includes an analysis of the Greenhouse Gas Emissions for Thatcham Town Council which is dominated by usage of utility services – electricity and gas – that contribute to 95% of the Councils GHG.

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Introduction

The report defines the Green House Gas (GHG) emissions for Thatcham Town Council. The GHG is a broader measure of the carbon footprint that includes emissions such as CO2 and additional gasses that contribute to climate change.

The report identifies the GHG emissions for Scope 1, 2 and 3. Scope 1 and 2 emissions are mostly associated with direct emissions, whilst Scope 3 are associated with indirect emissions. The contributions for each that are under the Council's operational control are described in the following table.

Scope 1	Gas consumed on site	Company van travel (fleet vehicle)
Scope 2	Primary consumption of electricity	
Scope 3	Electricity transmission & distribution	Employee business travel

Table 1: Summary of Scope 1,2,3 – noting that from November 2020 the Council no longer maintains its own fleet vehicle

The report is structured as follows. Firstly, the methodology is provided which enables the Council to replicate this approach and update its GHG emissions on an annual basis. The results are then presented for each of Scope 1, 2 and 3. The report then provides key observations followed by recommendations for future carbon reductions.

Methodology

The calculation for the GHG is dependent on accurate meter readings – electricity and gas – at the location of each premises under the management of the Council. These readings are then multiplied by the carbon intensity associated with each energy resource, available from public tables maintained by UK government (Department of Business, Energy & Industrial Strategy) updated annually.

A similar approach is used for vehicle usage: record the number of litres consumed of each of petrol and diesel over the year and multiply by the relevant carbon intensity for the fuel.

The reporting is provided for Scope 1,2 and 3 separately however for the Council the most important measure is the total GHG emissions which is the summation of each.

The formal approach is as follows:

Step	Resource
1. Record the meter reading for calendar year for each premise under the Council's management	Meter readings from utility company or direct reading representing calendar year period. Units of kilowatt-hours [kWh].
2. Record each of litres of petrol and diesel consumed by employees conducting business travel	Employee business expenses and reporting. Units of litres.

3. Electricity: Extract the “total kg CO2e per unit” for appropriate year.	https://www.gov.uk/government/collections/government-conversion-factors-for-company-reporting Tab: “UK Electricity” where CO2e represents carbon dioxide equivalent.
4. Gas: Extract the “total kg CO2e per unit” for Natural Gas, kWh, net CV.	https://www.gov.uk/government/collections/government-conversion-factors-for-company-reporting Tab: “Fuels”
5. Petrol: Extract the “total kg CO2e per unit” for “Petrol (average biofuel blend)” litres.	https://www.gov.uk/government/collections/government-conversion-factors-for-company-reporting Tab: “Fuels”
6. Diesel: Extract the “total kg CO2e per unit” for “Diesel (100% mineral diesel)” litres.	https://www.gov.uk/government/collections/government-conversion-factors-for-company-reporting Tab: “Fuels”
7. For each meter reading multiply the number of units consumed by the CO2e for each unit.	
8. For each of petrol and diesel, multiply the number of litres consumed by the CO2e per litre.	

Table 2: Process to calculate GHG

The final stage is to collate the total CO2e from each premise and transport in suitable formats for presentation.¹

Results

For completeness and to support comparison with previous years, the following tables contain entries that commence from year 2019 which was the first year in which a carbon footprint report was prepared.

Year of meter reading	Public Conveniences	Thatcham Market	Town Council Offices		Burdwood Community Centre		Frank Hutchings Community Hall		The Moors Workshop	The Moors Sports Pavilion	London Road Cemetery	Lighting	Grey fleet car		Vans	
	Electricity	Electricity	Electricity	Gas	Electricity	Gas	Electricity	Gas	Electricity	Electricity	Electricity	Electric.	Diesel	Petrol	Diesel	Petrol
2019	7394	6610	5458	879	3805	1435	7133	4480	2238	5303	1685	3973	21.5	0	588.2	0
2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2021	7928	3916	5320	1346	2261	785	4301	2060	2105	3088	205	0	62	156	0	0
2022																

Table 3: All contributing demand units (units of kWh for gas and electricity, and litres for petrol and diesel, steps 1-2)

	Elec Scope2		Elec Scope3		Gas	Petrol	Diesel	Date published
	[kgCO2e/kWh]	[kgCO2e/kWh]	[kgCO2e/kWh]	[kgCO2e/kWh]	[kgCO2e/kWh net]	[kgCO2e/litre]	[kgCO2e/litre]	
2019	0.26	0.022	0.18	2.21	2.59		28-Jul-20	
2020	0.23	0.02	0.18	2.17	2.55		17-Jul-21	
2021	0.21	0.019	0.18	2.19	2.51		24-Jan-22	
2022			not available at time of report preparation					

¹ This report is provided with an Excel spreadsheet from which graphics and tables used in this report can be extracted.

Table 4: Carbon intensity figures (steps 3 – 6) extracted from public tables issued by UK government

	Scope 1			Scope 2		Scope 3			Overall Total kg CO2e
	Company Van Travel	Site Gas	Sub Total	Electricity Generation	Sub Total	Electricity Transmission & Distribution	Employee owned car (grey fleet)	Sub Total	
2019	1526	1249	2775	11144	11144	946	56	1002	14921
2020	0	0	0	0	0	0	0	0	0
2021	0	768	768	7017	7017	621	498	1119	8904
2022	not available at time of report preparation								

Table 5: Calculation of kgCO2e with sub-totals for Scope and Overall Total (steps 7-8)

Summary:

- In 2021 the total GHG emissions for Thatcham Town Council is 8.9 tonnes of CO2 equivalent.
- Of these emissions, Scope 1 and Scope 2 together contribute 7.8 tonnes of CO2.
- Scope 3 contributes a further 1.1 tonnes of CO2.

Key Observations

Breakdown of total GHG footprint for 2021

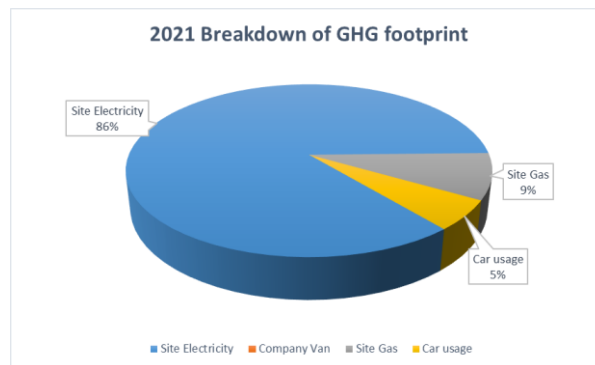


Figure 1: Breakdown of total GHG emissions

Observations:

- Following the termination of a company van fleet hire in November 2020, the three remaining contributions in year 2020/21 to the GHG are electricity (sites and lighting), gas (heating and hot water), and private cars used by employees for business travel.
- Electricity (sites and lighting) dominates the GHG footprint accounting for 86% of all emissions.

Year on Year Comparison of major GHG contributors

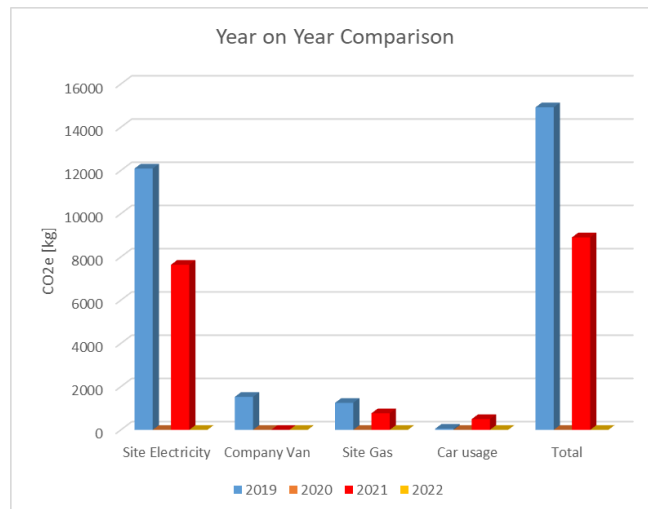


Figure 2: Year on year of CO2 broken down by major contributors

Observations:

- The Total GHG have reduced from 14.9 tonnes of CO2e in 2019 (reference year) to 8.9 tonnes in 2021, a reduction of 6.0 tonnes and 40%.
- The dominance of electricity as a driver for CO2e emissions is apparent.
- The electricity consumption has reduced by 37% and gas has reduced by 39%.

Year on Year Comparison of Electricity Consumption

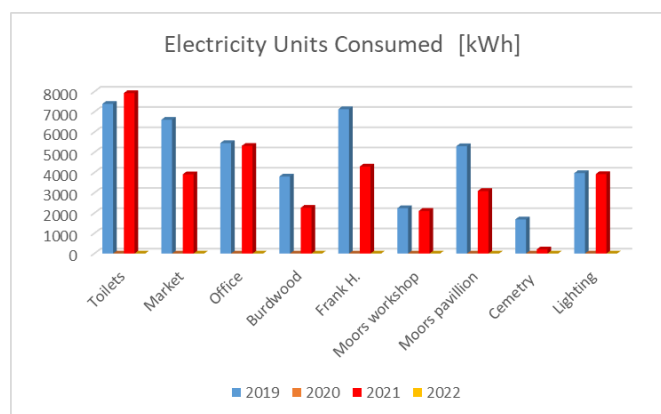


Figure 3: Premises and lighting consumption of electricity

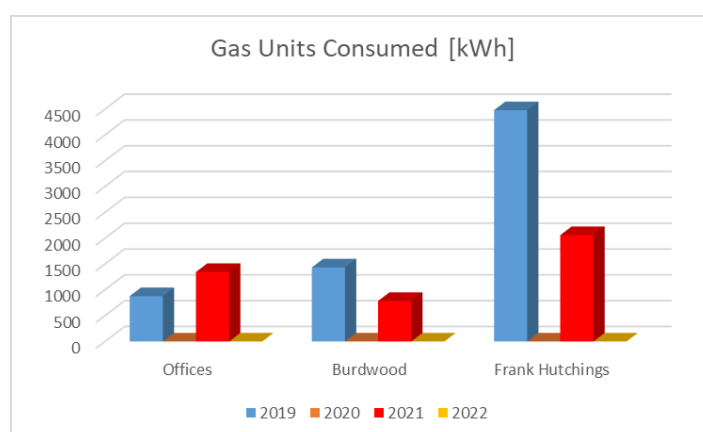
Observations:

- The public toilets are the largest single contributor to electricity demand. The energy consumed by this premise is required for hot-water, heating, and lighting. It is recommended that the Council checks that these energy draws are all switched-off after lock-up during out-of-hours periods. Potential energy savings could be obtained by considering the following – are hot water taps and valves fully sealed and switching off after use, and can lighting transition to LED's at a future refurbishment.
- Electricity consumed at the Market, Burdwood, Frank Hutchings, and the Moors Pavillion have all been reduced by around 40% relative to reference year of 2019. Whilst this energy

reduction may reflect less usage of the facilities following Covid it is encouraging to see as it indicates that the facilities are being managed appropriately and energy is not being wasted when the facilities are unused.

- The Town Council Office only reduced consumption by 3% during the same period, and the toilets had an increase to 7%. This broadly flat consumption is expected as these facilities would have remained in use and available through 2021 and would be little impacted by reduced activity associated with Covid.
- Unlike other community facilities, the Moors Workshop only reduced its consumption by 6%. This is slightly surprising as it may be expected to have a similar reduction in activity to the community halls. This suggests there may be an energy draw (such as lighting or hot-water heating) that is being left on during periods when the facilities are closed.

Year on Year Comparison of Gas Consumption



Observations:

- Both the community halls have reduced their gas consumption significantly relative to the reference year 2019. Burdwood has reduced by 45% and Frank Hutchings has reduced by 49%. This most probably reflects a change in usage following the Covid pandemic.
- The Council Offices, starting from a smaller consumption level, has increased by a significant and unexpected 53%. The following reasons have been considered:
 - Different weather patterns with different demand in heating: a comparison of the heating days² in 2019 and 2021 suggests very similar weather. 2019 had 1,983 heating days and 2021 had 2,021 heating days. Therefore, this is excluded as an explanation to the increased heating load.
 - Errors in meter reading. With a relatively small consumption any carry-over from one year to another will have a significant impact in comparisons. The meter readings should therefore be checked, and no further action would be required if this explains the change.

² Heating days is the number of half-hour periods above 15.5°C over a year which is used as a guide to the different weather patterns and heating demand year-on-year. National records are available at <https://www.gov.uk/government/statistics/weather-digest-of-united-kingdom-energy-statistics-dukes>

- Alternatively, the increased usage points to either an increase in hot-water or room heating. This could occur if either thermostat or timers have been changed. It is recommended that timers are checked to ensure that heating is not taking place outside of office hours.
- The final consideration is a change in usage behaviour. For example, are windows being left open during heating periods resulting in an increased heating load, or have thermostat settings been changed to run at higher temperatures?

Solar Generation

The Town Council has two photo-voltaic (PV) roof mounted solar systems. There is an 8kW peak installation at the Council Offices and 4kW peak at the Frank Hutchings Hall. A generation meter reading is available that provides information on the total amount of energy (in kWh) that is generated over a year.

The power generated from these systems will be used on site, and if there is an excess of power then it will be exported to the utility company. Without information from an export meter reading, it will be assumed that all power generated is consumed on site³.

	Offices - solar resource [kWpeak]	Offices (Solar generation) [kWh]	Offices (Total demand) [kWh]	% of demand from solar	Ratio of generation to peak [kWh/kWp]	Frank H. - solar resource [kWpeak]	Frank H. (Solar generation) [kWh]	Frank H. (Total demand) [kWh]	% of demand from solar	Ratio of generation to peak [kWh/kWp]	Carbon saved [kg]
2019	8	7725	13183	59%	966	4	4415	11548	38%	1104	3366
2020	8		0			4					
2021	8	7725	13045	59%	966	4	4415	8716	51%	1104	2806
2022											

Table 6: Solar generation meter readings, % of demand served by solar, performance of panels, and carbon savings *note in the absence of an updated reading for 2021 an estimate based on 2019 generation readings are used *

Observations:

- The solar panels provide up to 3.4 tonnes of CO2 saving in 2019 which was the last year of generation meter readings.
- At both locations the total demand exceeds the solar power generated, so it is likely that most of the solar power generated is being used on site.
- For the total CO2 footprint (8.9 tonnes), assuming that all solar energy is used on site then this is equivalent to a total saving of the Council's footprint of approximately 19%.
- Both systems are delivering approximately 1000kWh for each kWpeak installed. This is a measure of overall performance and indicates that both systems are working well.

³ In practice a proportion of power will be exported and this will be more significant when radiance is high (the sun is shining) as up to 8kW/4kW can be generated at each premises. The consequence of this assumption is that the carbon savings in Table 6 will be an upper estimate.

Summary

The Council is making good progress in reducing its GHG (carbon equivalent) footprint relative to the reference year in 2019.

- Thatcham Town Council GHG footprint is 8.9 tonnes
- Site Utilities (Gas and Electricity) account for 95% with electricity consumption dominating GHG at 86% of total.
- 'Grey' fleet car usage accounts for the remaining 6%

Management guidance:

- In comparison to year 2019 the GHG footprint has reduced by 6.0 tonnes (40%)
- Whilst 2021 has been impacted by Covid resulting in reduced usage of community halls the reduction in GHG footprint indicates good discipline is being maintained in using energy only when facilities are in use.
- The transition to using 'grey' fleet cars (private vehicles used for business travel) has reduced the GHG emissions by 1.1 tonnes of CO₂
- The largest single electricity demand is associated with the public toilets. Checks should be put in place to ensure water heating and lighting is switched off during out-of-hours periods.
- An anomaly is observed for the Town Council Offices. Whilst the electricity consumption is flat relative to 2019, the relatively small gas usage has increased very significantly (53%). Further investigation is recommended, and regular readings should be conducted.
- The two installations of solar panel systems save 3.4 tonnes of CO₂, or approximately 19% of the Council's total GHG (carbon equivalent) footprint.