Carbon Emission update 2022/23

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1 Executive Summary

Flintshire County Council's target is to become net zero carbon by 2030.

In order to gauge progress towards this target, carbon emissions are tracked and reported on an annual basis. By understanding what the sources of carbon emissions are, the Council can formulate strategic priorities to mitigate climate change.

The progress detailed within the report allows us to pinpoint areas where data collection methods need to be improved, focus investment and decision making on areas that are not performing as expected, and review projected forecasts to take us to our 2030 goal.

The methodology used to determine the Council's carbon footprint is based on Welsh Government guidance 'Welsh Public Sector Net Zero Reporting Guide Version 3, 2023'.

Some of the methodology used within this process has already changed year on year since the baseline calculation was made in 2018/19. Introduction of new measures into the calculation can confuse and undermine the progress that the Council is making in its carbon reduction activities. Due to this, this progress report follows the sources of carbon emission as detailed in our in-scope baseline footprint calculations.

The total carbon emissions for 2022/23 before removing carbon offsets from our land was 32,328tCO$_2$e. This is a 30.5% decrease on carbon emissions reported in 2021/22, and 30.4% decrease based on our 2018/19 baseline. These reductions are mostly due to a decrease in emissions from Procurement, 41.5% from the 2021/22 period and 34.5% based on our 2018/19 baseline. The methodology adopted for emissions from procurement remains based on value of spend, therefore an increase in Council spend will reflect an increase in carbon emissions. However, for the 2022/23 period, updated emission factors for each spend category (originally set in 2011 and now using 2019 data) were provided by Welsh Government resulting in an average emission factor decrease of 32% for the goods and services the council purchased.

Carbon emissions from Buildings reduced by 8.4% compared with 2021/22 figures, however, carbon emissions from Mobility and Transport increased by 0.2% due to greater staff commute and business travel. For buildings, this is close to annual reduction targets as detailed in the climate change strategy. Overall, there have been reductions of 27.2% and 17.9% for Buildings and Mobility and Transport respectively based on our 2018/19 baseline.

There remains a need to improve data collection methodologies for some emissions sources so to improve accuracy and detail. With relation to Procurement emissions, progress has been made with the employment of a new Joint Procurement Business Partner – Decarbonisation who is funded by both Flintshire and Denbighshire County Councils and will work to move away from the inaccurate spend-based methodology, allowing the council to have greater influence and control on emission reductions from this source.

Considerations have also been noted to review the baseline emissions and interim targets for Supply Chain following methodology updates, and the interim targets for Mobility and Transport following identification of barriers delaying progress against these targets. These will be addressed within the full Climate Change Strategy review in 2024/25, as described within the strategy.

2 Our Baseline

Everything we do has an effect on the environment we live in; from burning fossil fuels for heating to collecting kerbside waste and recycling. Flintshire County Council reports its carbon footprint to Welsh Government as tonnes of carbon dioxide equivalent (tCO_2e) within its organisational and operational boundaries. This plan relates to the Council's internal operations which are:

- Buildings owned and operated by the Council including offices, depots, schools, community centres, care homes, public conveniences and street lighting. This includes heating, electricity and water use within these facilities.
- Fleet vehicles owned by the Council,
- Business travel for work,
- Employee commuting,
- Procurement of goods and services.

The scope excludes:
- Domestic properties,
- Buildings owned by us that are leased out and operated by third parties,

In order to establish where we are and where we need to be, we first need to look at our baseline figures. In 2018/19 we were able to capture the data set out below. Figure 1 below shows a breakdown of GHG emissions by emission source for 2018/19.[1]
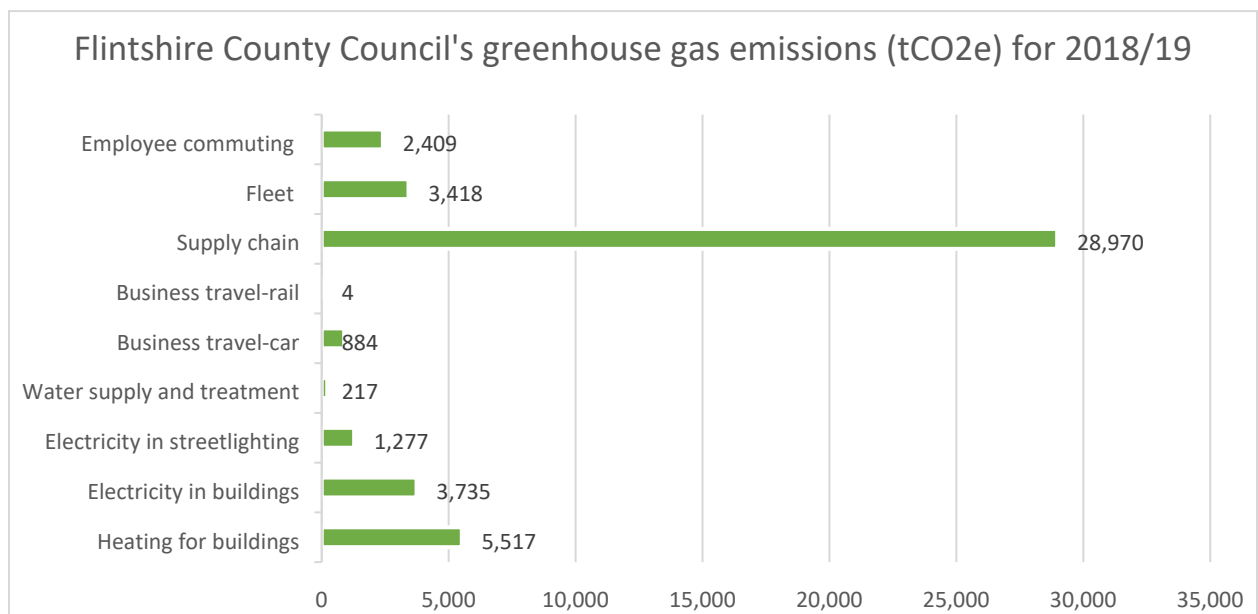

Figure 1: Flintshire County Council's GHG emissions for 2018/19 baseline

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[1] *It should be noted that the data has been collected using the best available methods at that time, and therefore the expectancy is that data accuracy will improve with emerging methodologies.*

As these figures suggest, the biggest contributors to the Council's carbon footprint in 2018/19 were:
- Supply chain; procurement of goods and services: 62%
- Heating for buildings: 12%
- Electricity in buildings: 8%
- Fleet: 7%
- Employee commuting: 5%[2]

The Council produced 1,664 tonnes of waste in 2018/19 from its operations, however all waste collected by the Council, including operational waste, was either recycled or sent to energy from waste plants for incineration when it cannot be recycled. All green waste is composted. Therefore the only carbon emissions related to waste are included in the 'Fleet' data through waste collection vehicles.

Supply chain; procurement of goods and services equates to 62% of our baseline carbon emissions total. The Council understands that there are actions that can be taken to reduce these emissions through decision making processes and supplier engagement, of which the new Procurement Business Partner – Decarbonisation will work towards. However, this figure will only see significant reductions if the appropriate investment, policy and infrastructure is provided and developed by the Government.

From this data we understand that our baseline carbon emissions for 2018/19 were 46,434 tCO2e.

In 2018/19, the Council reported an estimated 1,500 tCO_2e absorbed from its land assets. However, this figure has been estimated based on two specific land types – grassland and woodland/forest – with a common value factor used to determine the absorption of carbon. As yet, no formal baseline figures have been calculated for our land assets to determine more accurate absorption figures and therefore this action is a priority in realizing the true benefits of our land to both carbon sequestration and wider habitat richness.

The 2018/19 carbon absorption total can be removed from our emissions total as a 'carbon offset'. Therefore to meet our net zero carbon goal, the total carbon emitted by the Council, minus the total carbon absorbed from Council owned and operated land, must equal zero by 2030.

In 2018/19 the balance of carbon emissions was 44,934 tCO_2e.

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[2] *Note this data has a high level of inaccuracy due to the calculation methodology used*

3 Carbon Emissions for 2022/23

The Council now has carbon emission data for five financial years as shown in Figure 2 below. The total carbon emissions for 2019/20 saw a 1% reduction on the 2018/19 baseline. The total carbon emissions for 2020/21 saw a 17% reduction on the 2018/19 baseline. The total carbon emissions for 2021/22 saw a 1% increase on the 2018/19 baseline. The total carbon emissions for 2022/23 are 32,328 tCO_2e giving a 30.4% decrease on the 2018/19 baseline with emissions reductions achieved across all sources.

The methodology adopted for calculating our carbon emissions is mandated by Welsh Government. The methodology for calculating carbon emissions from supply chain remains based on the value of spend, meaning if the Council spends more money one year than a previous year (including high inflation), then the consequential emissions may be higher.

However, for the 2022/23 period, updated emission factors for each spend category (originally set in 2011 and now using 2019 data) were provided by Welsh Government resulting in an average emission factor decrease of 32% for the goods and services the council purchased. This is expected to be due to decarbonisation across other sectors and improved accuracy in emission factors.

The result of this demonstrates a reduction in carbon emissions from supply chain beyond our 2024/25 target - however, this is not due to any positive actions the Council has made to decarbonise supply chain, and therefore does not preclude us from prioritising action in this area.

The column titled '22-23 Spend w. 2011 EF' in Figure 2 demonstrates how the council's 2022/23 carbon footprint would look if the 2011 supply chain emission factors had been utilised. Supply chain emissions in 2022/23 using the new emission factors are 18,894 tCO_2e. However, if supply chain emission factors from 2011 had remained, then emissions would have been 30,838 tCO_2e. This would have resulted in a total 2022/23 carbon footprint of 44,183 tCO_2e, which is still a reduction on the 2018/19 baseline by 4.8% due to reductions achieved elsewhere, but much less than the 30.4% seen.

Following 5 years of carbon data, we now have a clearer understanding of our emission sources and the impact we can have in reducing these. The targets within each key theme will be reviewed and considered within the strategy's full review in 2024/25 to ensure we are aiming for ambitious but achievable targets towards net zero carbon.

Over the coming years we will move away from the calculation methodology of emissions associated with spend value by working with our suppliers to better understand the emissions associated with the individual contracts we procure. This work will now be accelerated following the recruitment of a Joint Procurement Business Partner for Decarbonisation in Sept 2023 – part funded by Flintshire Council and part funded by Denbighshire Council.
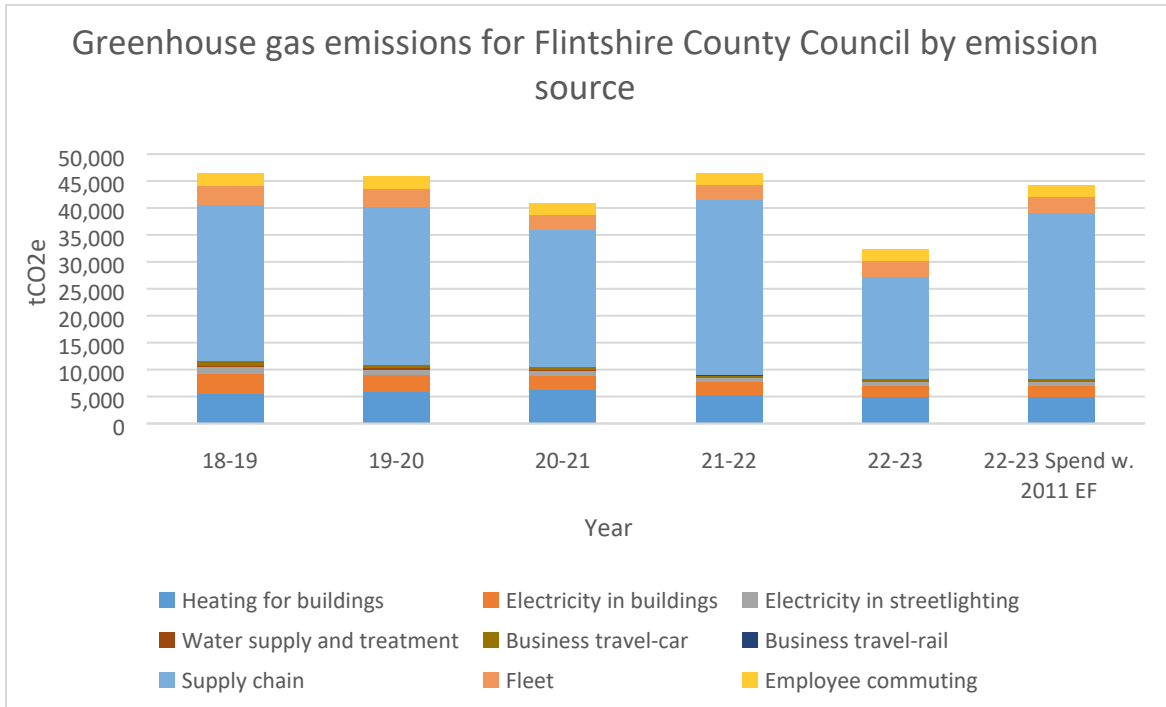
Figure 2: Flintshire County Council GHG emissions over past 5 financial years by emission source, including 2022/23 supply chain comparison using previous years' supply chain emission factors.

Aside from supply chain, compared to 2018/19 baseline emissions, we saw a 9.9% reduction in heating from buildings, 44.4% reduction in electricity in buildings, 49.3% reduction in electricity from street lighting, 46% reduction in business travel and 17% reduction from fleet. This is reflective of the projects carried out in the 2022/23 reporting year by further reducing emissions from buildings through greater efficiency measures such as LED lighting, building management systems and generation of solar electricity. Additionally, the need to ventilate buildings for Covid-19 was also removed helping to retain heat.

The methodology used to determine emissions from business mileage has improved with 67% of miles claimed now stating car size and is expected to improve further as more staff have access to online recording. Methodology for employee commuting continues to have a high level of deviation due to gaps in data records. An employee survey to determine distance, travel methods and frequency to the workplace is due in October 2023 allowing for improved, council-relevant estimates.

The methodology to determine emissions from water has also been improved for the 2022/23 period, where meter read data has been used for 76% of the water used. The remaining data remains calculated using invoice cost values and is considered lower accuracy. Being able to capture all water usage from meter reads would improve the accuracy of emissions from water usage across our buildings.

Figure 3 below shows our actual emissions and the milestones we hope to reach between now and 2030. We are currently aiming for a 60% emission reduction in Buildings, 80% emission reduction in Mobility & Transport and 60% reduction in Procurement by 2030.

Theme	Baseline tCO$_2$e	Actual Emissions tCO$_2$e (reduction %)	Targeted Reduction	
	2018/19	2022/23	2024/25	2029/30
Buildings	10,747	7,827.6 (27.2%)	35%	60%
Mobility & Transport	6,716	5,517 (17.9%)	50%	80%
Procurement	28,970	18984 (34.5%)	30%	60%

Figure 3: Flintshire County Council Carbon Emission Milestones to 2030

To achieve these milestones, we set annual targets in each theme as detailed below in Figure 4. The target percentage reduction is compared to the previous year (2021/22). The reduction target for Buildings was almost achieved, however Mobility & Transport saw a slight increase in emissions from the previous year. The reduction target for Procurement was achieved many times over compared with 2021/22 and is mostly explained by the revision of emission factors.

Theme	2021/22 tCO$_2$e	2022/23 reduction target (%)	2022/23 tCO2e	2022/23 actual reduction (%)
Buildings	8,543	9%	7,827	8.4% reduction
Mobility & Transport	5,504	9%	5,517	0.2% increase
Procurement	32,446	8%	18984	41.5% reduction

Figure 4: Flintshire County Council Carbon Emission Targets for 2022/23

4 Land Use emissions

Land use emissions are determined using the Welsh Government's methodology, emission factors for each land type, and our internal knowledge of land types under our ownership and control. Depending on usage, land can have positive or negative net carbon emissions. Settlements and croplands are net emitters while forests and grassland absorb and store carbon. Wetlands and peatlands also have the potential to absorb and store carbon depending on their condition, however the Welsh Government methodology does not currently include emission factors for these land types.

The emission breakdown from our land types in 2022/23 can be seen in Figure 5 and remains unchanged from 2021/22.

Land Type	Area (Ha)	Emission Factor	Total kgCO2e
Forest	151.68	-5.42	822,135
Grassland	479.91	-1.44	691,402
Settlements	1.23	2.1	2,589
Wetlands	78.91	/	/

Figure 5: Breakdown of Flintshire County Council Land Types and Carbon impact 2022/23

Figure 6 shows the 2022/23 emissions and removals of kgCO2e based on the above methodology. By increasing the quantity of forest land and grassland we can increase the amount of carbon that we absorb and store.

Welsh Government are developing an improved methodology to better account for our land assets so that we can ensure this data is accurate and better reflect the assets that we have within Flintshire.

Land-based emissions	Units of kgCO$_2$e	
	Emissions	Removals
Total land-based emissions	2,589	1,513,538

Figure 6: Summary of Flintshire County Council land-based emissions/removals 2022/23

5 Renewable Energy generation

The Council continues to invest in renewable energy generation both within its building assets and large scale solar farms. Investing in renewable energy that is consumed onsite allows a reduction in energy used from the grid. This saving is demonstrated in the emissions from electricity use. Investing in renewable energy that is exported into the grid assists in the local and national decarbonisation of energy provision moving us away from reliance on energy generated by burning of fossil fuels.

Figure 7 below shows the energy generated from renewables in 2022/23 compared to 2021/22, generation comparison against 2021/22, and exported. The commissioning of both Flint solar farm and Crumps Yard in Connahs Quay has elevated our energy generation from ground mounted solar PV. Weather variations, down-time of both wind turbines and biogas generators, and the natural decline of methane production from former landfill sites explains the decrease in both wind and biogas energy generation.

Renewables	Units of kWh		
Categories	**Total Generated**	**Generation Change from 2021/22 (%)**	**Total Exported**
Solar PV (roof mounted)	700,097	10% increase	175,025
Solar PV (ground mounted)	1,801,633	150% increase	1,801,633
Wind	9,918	9% decrease	2,480
Biogas CHP (landfill gas turbines)	915,184	43% decrease	915,184
Renewables	3,522,138	18% increase	2,894,322

Figure 7: Flintshire County Council Renewable Energy Generation 2022/23

The Welsh Government required all public sector buildings be supplied with renewable electricity by 2020, or as soon as contractually able. In 2022/23, the council purchased all electricity from renewable sources through the use of REGOs (Renewable Energy Guarantees of Origin certificates). However, this is not reflected within our electricity emissions as per Welsh Government reporting methodology.

Green Energy Tariff	Units of kWh
Purchased Renewable Electricity	10,648,030

Figure 8: Flintshire County Council Renewable Electricity Purchased 2022/23

6 Next steps and recommendations

It is the role of the Climate Change Committee to oversee and review the progress made against the Council's ambition to become net zero carbon by 2030. The Committee will continue to develop the Climate Change strategy and action plan and oversee implementation of its delivery.

Data collection for certain emission sources still requires improvement for future calculations, whether to improve methodology used to increase accuracy, provide greater detail or reduce the burden on staff. Work is already underway to improve data for business travel, employee commuting and homeworking, as well as a new officer to address emissions from procurement.

The use of Microsoft Power BI will also be investigated to discover how data requests and manual collection can be minimised to reduce demand on staff resource.

With the review of the council's Climate Change Strategy due in 2024/25, a number of items in need of particular consideration have been identified and are listed below.

- Review of the Baseline and interim emissions target for Supply Chain as knowledge to decarbonise improves and methodology is updated.
- Update of the full 2018/19 baseline emissions figure following updates to supply chain baseline.
- Review of the interim emissions target for Mobility & Transport following greater understanding of barriers at Alltami Depot to decarbonise fleet, and improvements to staff commute methodology.

Appendix 1 - Glossary

Biodiversity: The variety of plant and animal life that make up our natural world or a particular habitat.

Building Management System (BMS): Computer controlled system that can be used to monitor and manage building functions such as heating.

Carbon Dioxide Equivalent (CO$_2$e): the equivalent amount of carbon dioxide that would produce the same amount of global warming over a 100 year timescale.

Carbon Store: the amount of carbon stored in the natural environment such as soil, woodland, peatland etc. These may also be described as carbon sinks.

Council assets: buildings and land owned by Flintshire County Council.

Decarbonisation: reducing the carbon intensity and greenhouse gas emissions of an activity or service or wider organization.

Emission Factor: The quantity of greenhouse gas emissions per unit of an activity (e.g. kWh, Mile, £)

Landfill Biogas: The gases created by the action of microorganisms within a landfill as they decompose organic waste, including for example, food waste and paper waste.

Net Zero Carbon: Emissions of greenhouse gases are balanced by the removal of greenhouse gases from the atmosphere such as by trees, peatland and carbon capture and storage technologies.

Offsetting: A reduction in GHG emissions (e.g. wind turbines replacing coal) or an increase in carbon storage/GHG removal enhancement (tree planting, peatland restoration) outside of the GHG emissions boundary of an organisation that is used to compensate GHG emissions occurring within the organisation's boundary

REGO: Renewable Energy Generation of Origin certificates demonstrate electricity has been generated from renewable sources.

Sequestration: Removing carbon dioxide from the atmosphere and then storing it, usually through environmental processes such as photosynthesis, absorption by soil, oceans etc.