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CARBON BASELINE AUDIT REPORT

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1 INTRODUCTION

During the months of October and November 2019 Buckinghamshire County Council (BCC) and Local Partnerships engaged in conversations about BCC's wishes to establish an emissions reduction action plan for the new Buckinghamshire Council, including establishing the current carbon emissions baseline, targets and activity against targets for each of the five councils that will form the new Buckinghamshire Council. This stems from a motion regarding climate change passed by BCC on 26th September 2019 and HM Government's new commitment, announced on 11th of June 2019, to reach 'net zero' carbon emissions by 2050. Amongst other statements, the motion committed BCC to undertake a carbon audit / gap analysis which would be used to establish the proposals the authority could implement to support the climate change agenda.

Whilst BCC is leading this activity, the work needed to reflect forthcoming changes regarding the structure, specifically the movement from a two-tier structure to single unitary status (the new Buckinghamshire Council) in April 2020. Consequently, the carbon audit needed to encompass emissions from all 5 authorities that are to become the new Buckinghamshire Council, namely Buckinghamshire County Council, Aylesbury Vale District Council, Chiltern District Council, South Buckinghamshire District Council and Wycombe District Council. In this way the carbon audit can be used to assist and inform the policy decisions of the new Buckinghamshire Council once it is established, for example the efficiency of the services provided in terms of associated Greenhouse Gas (GHG) emissions, the metric that any 'net zero' target would be measured against.

In order to reflect the political commitments made on the 26th September, BCC developed a specification setting out the requirements of the carbon audit. This includes an important component of 'gap analysis' of carbon emissions that are not currently reported for which reporting would be expected in the future under recognised guidance.

This report includes recommendations for the new Buckinghamshire Council related to recognised carbon accounting / reporting guidance and standards in sections 2.4 and 2.5, for those areas within the applicable emissions reporting scope. Advice has not been provided related to areas not included within the emissions reporting scope. In those few cases where emissions were not currently reported, help has been provided to identify where such data may be gathered from and explained the methods for calculating emissions as well as any assumptions made when the data lacked the granularity needed. The result is a comprehensive review of where each Council lies in terms of their GHG emissions reporting standards as well as an overview of the guidance available and some recommendations for a robust carbon accountancy framework going forward.

BCC's specification also required 'Carbon Budgets' (which will reflect the GHG emissions allowance the new Buckinghamshire Council will have for every milestone period of 5 years), and 'Measures', (actions that the new authority can undertake in order to pave the way to becoming 'net zero' carbon by 2050). The necessary year on year reductions have been plotted using the new combined baseline in a graph and it has been concluded that an annual reduction of 300 tonnes (equivalent to a 3.33% annual reduction of the combined baseline from 2019-20) is all that is needed to achieve the 'net zero' carbon target by 2050. However, this does not include any allowances for growth, diversification or changes in the definition of emissions reporting scopes by central government policy, though such will be included in the modelling exercise that Local Partnerships will undertake during the course of 2020-21.

2 CARBON BASELINE AUDIT

2.1 Methodology

The purpose of this Carbon Audit is twofold: first to provide reassurance that the emissions reporting that is currently being undertaken by the five councils involved in the audit is in line with appropriate standards and guidance, and secondly to identify areas where there is room for improvement.

After careful consideration of the available GHG reporting standards (see section 2.4) it has been concluded that the most appropriate standard to compare the five councils against is the GHG Protocol as it is the most used and represents best practice. Following a comprehensive review of available data, it can be confirmed that all five councils that are currently reporting are compliant with the BEIS and DEFRA guidance (see section 2.4). The GHG Protocol on the other hand is a global set of standards that adds detail where this is not available elsewhere possibly because GHG reporting by local authorities is currently voluntary in the UK. Outlined below is a simplified version of the GHG Protocol's main 6 steps that draws from both the Corporate and Cities Standards and sets out its implications for the 5 councils audited.

2.1.1 Step 1 – Setting Organisational Boundaries

Each Council operates differently, with some of the services (as well as in some cases the maintenance) being undertaken by external contractors. It is therefore necessary to firmly establish the reporting boundaries of the councils and give due consideration to the inclusion / exclusion of given 'direct' and 'indirect' emission sources. This is simplified by the fact that Local Partnerships has been informed that the audit is to focus on direct operations within the control of the 5 councils, including staff business travel. Enquiries were made of the different councils to clarify boundary and interface issues, for example with respect to fleet emissions reported under Scope 1, or responsibilities for the cost of utilities in certain Council buildings that are occupied by third parties.

With regard to setting the organisational boundaries for reporting, with consideration of where the responsibility for particular emissions might lie, the GHG Protocol specifies the following two approaches:

- under the *equity share approach*, an organisation accounts for GHG emissions from operations according to its share of equity in (business) operations; whereas
- under the *control approach*, an organisation accounts for 100% of the GHG emissions from operations over which it has control. Organisations do not account for GHG emissions from operations in which it owns an interest but has no control of. 'Control' can be defined in either financial or operational terms.

The second approach outlined above is the equivalent to the 'financial control' principle used by all 5 councils when establishing their boundary. As indicated above, control is defined or equated to financial or contractual commitments for which the councils are ultimately responsible (which in theory could include contractors and supply chain emissions, although this may lead to double counting).

2.1.2 Step 2 – Setting Operational Boundaries

The agreed scope for the combined baseline is as follows:

Scope 1 - GHG emissions from sources that are owned or controlled by the Council for example, emissions from combustion in owned or controlled boilers, furnaces, vehicles. As per DEFRA's guidance[1] fugitive emissions from air conditioning systems have also been included.

Scope 2 - GHG emissions as a consequence of the activities of the Council, occurring from sources generating purchased energy neither owned nor controlled by the Council, for example electricity purchased for the operation of Council buildings and streetlighting.

Scope 3 - GHG emissions as a consequence of the activities of the Council, occurring from sources (not included in Scope 2) neither owned nor controlled by the Council – for this audit, staff business travel has been included in the combined baseline.

The GHG Protocol advises that "...*setting operational boundaries that are comprehensive… will help an organisation to better manage the full spectrum of GHG risks and opportunities that exist along its value chain*"[2]. This is to say that, in establishing the scope of the operational boundaries in a narrow way, the new Council could potentially be missing certain opportunities, such as providing climate adaptation services to the community.

2.1.3 Step 3 – Identifying emission sources

A range of GHG's are commonly included within GHG emissions reports. GHGs have a differing capacity to cause global warming – dependent upon radiative properties, molecular weights, and atmospheric residence times. The index of Global Warming Potentials (GWP), as published by the Intergovernmental Panel on Climate Change (IPCC), can be used to assess the relative global warming effect of the emissions of different gases over a defined time period. This period is usually taken to be one hundred years and is calculated relative to the emission of an equal mass of CO_2. The GWP of each GHG may therefore be expressed in CO_2 equivalents (CO_2e) and indicates that for those gases with a high GWP, a relatively small emission can still have a considerable relative impact.

Once the organisational and operational boundaries above are established, the likely emissions associated with the Council's operation and maintenance activities as a whole must be identified. Initial key emission sources that would be relevant are:

- Stationary energy;
- Transportation;
- Waste;
- Forestry and other land use[3].

However, given that Scope 3 emissions are excluded and that most of the councils have contracted out waste removal management and grounds maintenance, the last two categories do not feature in the combined baseline unless we have been able to verify that the services are provided by the Council. This is the case in South Buckinghamshire, where the Council directly maintains the grounds, and in Aylesbury Vale where the refuse collection vehicles are operated by the Council directly.

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1 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/43491/4793-faq-greenhouse-gas-emissions-las.pdf

2 https://ghgprotocol.org/sites/default/files/standards/ghg-protocol-revised.pdf

3 http://ghgprotocol.org/sites/default/files/standards/GHGP_GPC_0.pdf

Additional features within carbon accounting often include the calculation of emission savings or avoidance due to certain supply-based or 'behavioural' actions. These could include the following:

- Installed Onsite Renewables Generation
- Renewable Energy Tariffs

In principle, the supply of renewable energy can be assumed to displace the relative proportion of emissions that would have otherwise been released as a result of conventional generation. Thus, within the GHG report the use of a renewable energy supply would be reflected by a decrease in the overall level of kWh supply and therefore the associated emissions. In order to determine this, a provision to calculate any 'displaced' emissions could be included within the GHG report.

2.1.4 Step 4 – Selecting emissions calculation approach

GHG emissions can be calculated through a variety of methods. The direct measurement of emissions, through monitoring or flow rates, is not common and more often emissions are calculated based upon a mass balance basis specific to facilities or processes. Such methods are also of greater relevance to industrial operations. Alternatively, the most common approach for calculating emissions is through the application of documented emission factors, and this is the approach which has been adopted here, as it is standard practice. Documented emission factors are represented using a calculated ratio that converts a measure of activity from an emissions source into a volume of GHG emissions, for example, a vehicle's CO_2e emissions per litre of fuel consumed.

2.1.5 Step 5 – Selecting emission factors

In order to calculate the emissions produced by the various processes and activities accounted for within the GHG report, it is essential that reliable emission/ conversion factors are sourced. Such factors underpin the workings of GHG reporting, and as such it is essential that they are sufficiently reliable, robust and transparent. The key published data source which provides the majority of emission factors in the UK is the BEIS 'Greenhouse Reporting; Conversion Factors'[4] which is updated annually.

An important distinction in this area that the GHG Protocol introduces (and it is unfortunately not observed in the UK) is between the term 'emission factor' and 'conversion factor', as the two are not considered to be synonymous:

- Emission Factor = a numerical value to enable a conversion from an input measure of energy consumption to a volume of associated CO_2 / CO_2e emissions.
- Conversion Factor = a numerical value to enable a conversion from a unit of activity / consumption (e.g. consumption of aggregate in cubic metres) into an appropriate unit so that an emission factor can be applied (e.g. conversion from cubic metres into tonnes).

Since the official document referenced above uses the term 'conversion factors' to describe the GHG Protocol 'emissions factors' the adoption this terminology at this stage is not recommended, however the distinction should be noted so that the new Buckinghamshire Council can introduce it in future at its discretion.

It is acknowledged that emission factors inherently contain certain assumptions within the applied values. For example, the emission values for vehicle emissions produced per kilometre driven do

[4] https://www.gov.uk/government/collections/government-conversion-factors-for-company-reporting

not account for the impact of different UK average driving speeds, and to an extent the impacts of vehicle age. They also take no account of further 'real-world' effects, such use of accessories (air conditioning, lights, heaters etc), vehicle payload (only the driver +25kg is considered and vehicles assume no passengers or further luggage), poor maintenance (e.g. tyre under inflation), gradients, weather conditions, aggressive driving style, and other such variables. A further difference is that car and motorcycle transport emission factors are based upon vehicle-kilometres emissions, whereas public transport and air transport are based upon factors for passenger-kilometres. Such issues can to a degree be overcome so that more accurate emission estimates are generated.

The GHG Protocol recommends that an organisation should use the most accurate calculation and appropriate approach available to the reporting context. Consequently, changes in emission factors between reporting periods will essentially comprise a change in assumptions and will presumably be reflective of improvements in data accuracy with time. Through reporting year on year, such changes will require consideration in terms of changing baselines and the comparison of 'like-for-like'. For example, standard electricity generation values are anticipated to change in time given the development of the UK's energy generation mix. As such, the corresponding emission factors are anticipated to evolve and be reflective of such market changes and could help new Buckinghamshire Council along their way to 'net zero' carbon by 2050.

2.1.6 Emissions baseline

Part of the carbon accounting process involves tracking the changes in emissions over time. In order to allow meaningful and consistent comparisons of emissions, a common approach is to set a performance datum with which to compare current emissions. This performance datum is referred to as the 'Base Year', for which verifiable emissions data should be available. In setting and tracking progress towards a GHG target, it is referred to as a 'Target Base Year' in the GHG Protocol.

Organisations typically select a single year to represent the base year (or baseline, as it most commonly known in the UK), although there is a potential risk that this year's data is unrepresentative of the organisation's typical annual emissions profile. To overcome this issue, it is recommended that an average of emissions over several consecutive years is adopted, so that any unusual fluctuations in emissions occurring within individual years are removed.

For consistent tracking, the baseline emissions may need to be recalculated should an organisation undergo significant structural change, due to changes in calculation methodology or improvements in the accuracy of emission factors / activity data, or should significant errors be identified. Should recalculations be required, baseline emissions are essentially retrospectively recalculated to reflect the changes that would otherwise compromise the consistency and relevance of the reported GHG emissions. Given the annual updates of emission factors detailed previously, re-baselining upon this basis each year would be required.

Within the local authority context, significant changes may occur, for example, due to changes in the number, scale and type of services offered within a reporting period, particularly during the process of combining several organisations and their respective services. The combined baseline presented later in this report is therefore anticipated to significantly change in the next couple of years, due to operational differences between reporting periods. It is therefore considered that to enable emissions comparisons which allow for such operational changes, an appropriate 'like for like' approach will be required. For example, this may include carbon reduction projects' emissions being calculated upon a financial basis (e.g. tonnes of CO_2e per £-spend), or internally on an employee basis (e.g. tonnes of CO_2e per employee). Such an approach would allow a standardised methodology of comparison to reporting and facilitate target setting. This aspect would therefore require discussion with the new authority to establish the most suitable approach.

2.2 Audit findings and gap analysis

When BCC engaged in conversations with Local Partnerships regarding a Carbon Audit for the 5 authorities that will combine into a Unitary Authority in 2020, the parties agreed the timely submission of data (in the right format) was a prerequisite for the success of the audit, especially given the short timescales.

The data packs for the 5 authorities were received a few days prior to Local Partnerships being formally commissioned to undertake the Audit. The data from different authorities presented varying degrees of depth and granularity. With this we would like to acknowledge the efforts by the BCC's officers in collating, amalgamating and even converting into GHG not just BCC's data but that of the 4 district Councils in a matter of weeks. The gaps in the data available and the limitations that this creates for auditing purposes are explored in detail in the individual sections below. This includes coverage of the assumptions and additional calculations that Local Partnerships undertook to be able to finalise what we will call the 'Combined Baseline', the Scope 1 and 2 emissions plus Scope 3 Business Staff Travel from all 5 authorities.

2.2.1 Buckinghamshire County Council

Buckinghamshire County Council (BCC) data was received on the 25th of November, in an amalgamated format within GHG reports that combined data from all the authorities. Although the scoping, 'conversion factors' and structure appeared to be sound, Local Partnerships informed BCC that further granularity and background data was needed for the audit to be effective. Two further submissions followed on the 2nd and 4th of December making up a total of 9 key documents including raw energy data and mileage, as well as the 2018-19 written GHG emissions report. This data was reviewed by Local Partnerships and generated 41 queries, mostly in relation to boundaries (to establish what services have been outsourced) and the breakdown of fleet data, including a discussion on assumptions around an inconsistent data set.

BCC data sets were the most complete in comparison with the data sets from the other councils, with few gaps from the outset. The Carbon Audit focused mostly on ensuring BCC's processes were both compliant and reflective of best practice in the sector. Through detailed questioning of the data it became apparent that BCC had previously been reporting GHG emissions beyond the specified scopes, which prompted a further submission of the GHG emissions figures by BCC on the 5th of December. Further review of the new data identified a number of areas that needed to be excluded from the combined baseline as out of scope under the guidelines issued by the Project Sponsor. These included 'Outsourced school transport' and 'Waste Transport to EFW'.

This is stated here to provide clarity on the difference between the emissions submitted on the 5th of the December and BCC's overall contribution to the combined baseline. In fact, the reporting within BCC is exemplary with many of the recommendations in this report already present in their reporting, such as recalculating the baseline emissions annually in accordance with the Appendix E to the GHG Protocol[5]. Furthermore, BCC is one of the few authorities that is fully committed not just to reporting but to exceeding the 2020 Pledge that derived from the Clean Growth Strategy[6].

The "gaps" identified in BCC's data were minimal: one formula not working due to zero values in some cells, one of the references in the written report being a year out of date and one link that no longer worked. The only two substantial recommendations for BCC to improve their GHG reporting are to install AMRs (Automatic Meter Reading) for generation only[7] in their PV

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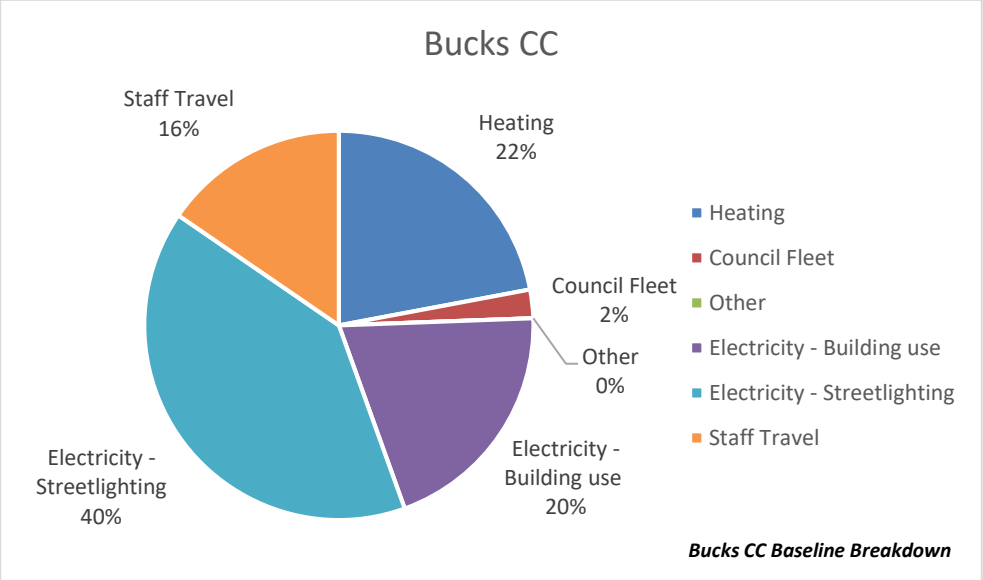
[5] https://ghgprotocol.org/sites/default/files/standards/ghg-protocol-revised.pdf

[6] https://www.gov.uk/government/publications/emissions-reduction-pledge-2020-emissions-reporting-in-public-and-higher-education-sectors

[7] Without an export meter the installation will be paid for 50% of its overall generation as export so by installing a generation only meter we will be able to calculate the carbon being displaced by the panels without leaving the Council financially worse off if site happens to use more than half of the energy generated by the panels.

installation and to reinstate the reporting of fugitive emissions from air conditioning systems, which might account for more than 1% of the total emissions for the unitary authority.

All of the additional tabs on the GHG report providing detailed information on data sources, changes and projects underway are representative of best practice, the most impressive and innovative being weekly updates from Asset Registers as well as everything being linked to SystemsLink (an energy software that links to the AMR meters) and SAP accountancy software.



Bucks CC Baseline Breakdown

The pie chart above shows the distribution of CO_2e emissions in the baseline year (2018-19) for Buckinghamshire Council. In total, Buckinghamshire County Council emitted a total of 4914 tonnes of CO_2e under Scope 1 and 2 emissions in 2018-19, and the staff business travel as recorded for 2018-19 equates to 897 tonnes. This makes BCC the major contributor to the combined baseline with a total 5,812 tonnes, which is to be expected due to the geographical area covered and the number of services.

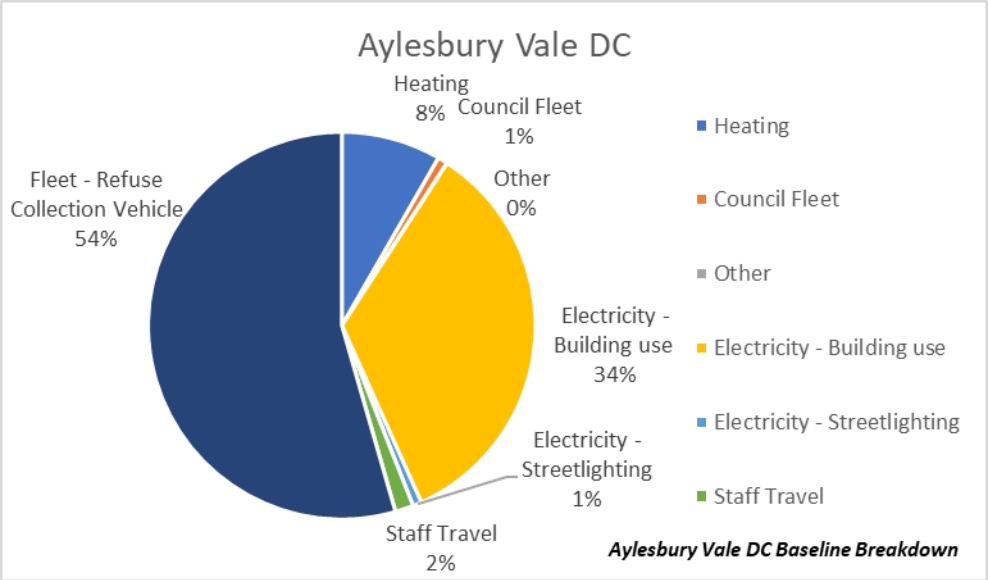
2.2.2 Aylesbury Vale District Council

Aylesbury Vale District Council (AVDC) data was supplied on the 25th of November, immediately prior to BCC officially commissioning the report. The data set contained 4 different versions of the same '2018-19 BEIS report', each contributing part of the Scope 1 and 2 emissions, and some aggregated data on Scope 3 emissions for business mileage. A fifth version seemed to aggregate the previous 4. In addition, Local Partnerships was supplied with two old GHG written reports dating from 2013-14 and 2014-15 and was notified that, at that time, no stationary fuel combustion data was available for AVDC. This data set was reviewed and generated 10 main queries relating to baseline, the lack of historical data or recent written reports. In addition, Local Partnerships enquired about the 'green tariffs' which apparently halved AVDC's carbon footprint in 2015-16.

On the 3rd of December and after discussions with BCC, AVDC supplied gas kWh data. On the 6th of December and after most of the data had been reviewed, Local Partnerships received contact details of the relevant officers in the district councils. Unfortunately, some of the queries were not fully resolved. In their original instruction BCC's had advised that GHG reporting may be under-resourced in some of the district Councils and so those responding may not have direct experience of these activities.

Local Partnerships calculated the footprint of AVDC heating with the kWh data supplied by BCC, thus closing the main gap in the data for the combined baseline. BCC also helped with details on the type of vehicles that form the fleet owned and operated by AVDC, as part of Scope 1 emissions. However Local Partnerships has been unable to get further information relating the staff mileage data in terms of source or types of cars, and has agreed with BCC's suggestion to convert the mileage on the basis of an 'average size car' powered by an 'unknown fuel', a

category present in the HM Government's conversion factors used throughout the baselining exercise.



The pie chart above shows the distribution of CO_2e emissions in the baseline year (2018-19) for Aylesbury Vale District Council. In total Aylesbury Vale District Council emitted a total of 1,881 tonnes of CO_2e under Scope 1 and 2 emissions in 2018-19, and the staff business travel as recorded for 2018-19 equates to 29.25 tonnes. This makes AVDC total contribution to the combined baseline 1,910 tonnes, second to BCC's and above is the breakdown of their emissions by type.

2.2.3 Chiltern District Council

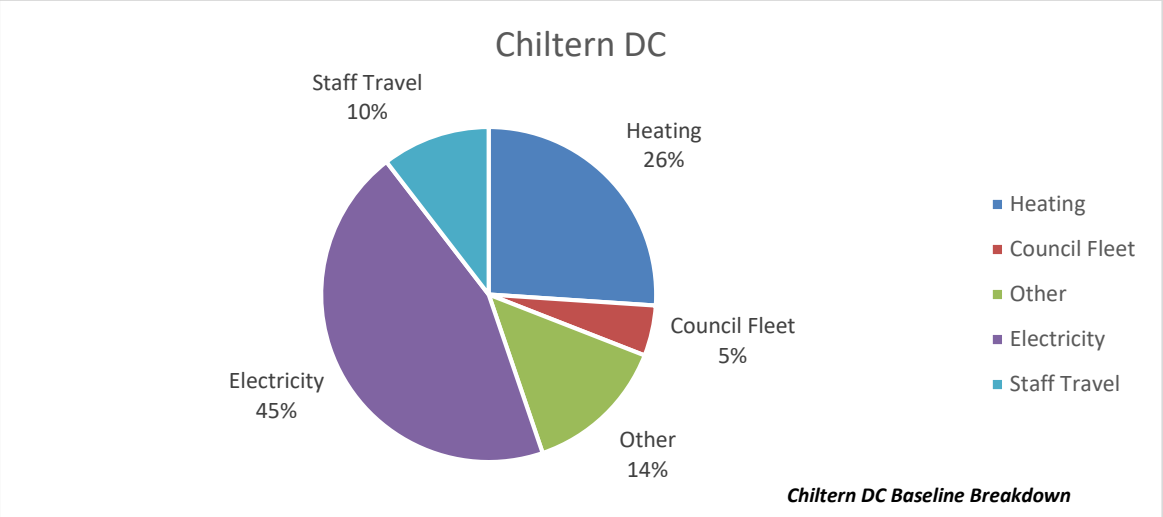
Chiltern District Council (CDC) data was originally supplied on the 25th of November 2019. The data set comprised only 4 different files, two of which were different versions of the 2018-19 'BEIS report' where the emissions did not reconcile. In addition, Local Partnerships was given two GHG reports, one dating from 2013-14 and the other from 2017-18. This data set was reviewed and generated 20 queries, the most significant of them being the discrepancies between the 2018-19 data sets. Once this was clarified as a version control issue, Local Partnerships proceeded to interrogate the data in the original GHG report with the help of one of the CDC Council officers with responsibility for reporting. In CDC's reports Local Partnerships found some examples of best practice. For example, CDC officers do capture 'fugitive emissions' in their reporting (emissions from air conditioning leaks in Council offices) which have been included in the combined baseline as per HM Government Guidance[8]. Other examples of best practice include stating the reduction in emissions achieved by solar PV, even if this is not discounted from the baseline, and including a graphic representation of Scope 1, 2 and 3 emissions. Finally, CDC have imposed emission reduction targets on certain contractors that they outsource services to, such as waste and green spaces, and confirmed that these targets continue being built into the contractors' framework terms and are monitored. Local Partnerships would like to highlight this as an example of best

8 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/303310/sharing_information_greenhouse_gas_emissions_from_Council_own_estate_operations_faqs.pdf

practice that could further mitigate the environmental impact of Scope 3 emissions even if the Council is not formally reporting indirect emissions at this stage.

During Local Partnerships' interrogation of the CDC data it emerged that some of the emissions reported under 'Scope 2 – Purchased electricity' have now been fully outsourced and have thus been excluded (i.e. leisure centres and Papersort). It also emerged that the mileage currently reported is not all for services financially controlled by the Council. Apart from the obvious categories for outsourced services such as 'Serco' it was confirmed that both 'Dog Waste' and leisure centres (under GLL, the leisure centres operator) have been fully outsourced, so they have both been excluded from the CDC emissions and combined baseline. The only CDC emissions source reporting under Scope 3 is staff business mileage.

For Scope 1 emissions from fleet we did not have any data granularity but simply an amount of emissions for vehicles powered by 'petrol/diesel/LPG'. We did check these are all used by Council employees to deliver a Council service (parking attendants) and subsequently included them. As the combined baseline (see page 14 below) mirrors the structure of BCC emissions reports, which are a lot more detailed and most likely to be used going forward, the net figure supplied by CDC under 'Average medium car (unknown fuel)' has been introduced. Similarly, under Scope 3 Staff Business Travel, the CDC categories did not coincide with those that BCC uses, which are aligned with accountancy software SAP. We have assumed that the 'hybrid', 'petrol' and 'diesel' categories provided by CDC correspond to medium size engines hybrid, petrol and diesel cars. As the miles had already been converted to CO_2e, where to put them in the table does not make a material difference to the combined baseline - we are highlighting this so that further granularity can be sought next year and emissions can be placed under the right car category in terms of the size of the engine.



Chiltern DC Baseline Breakdown

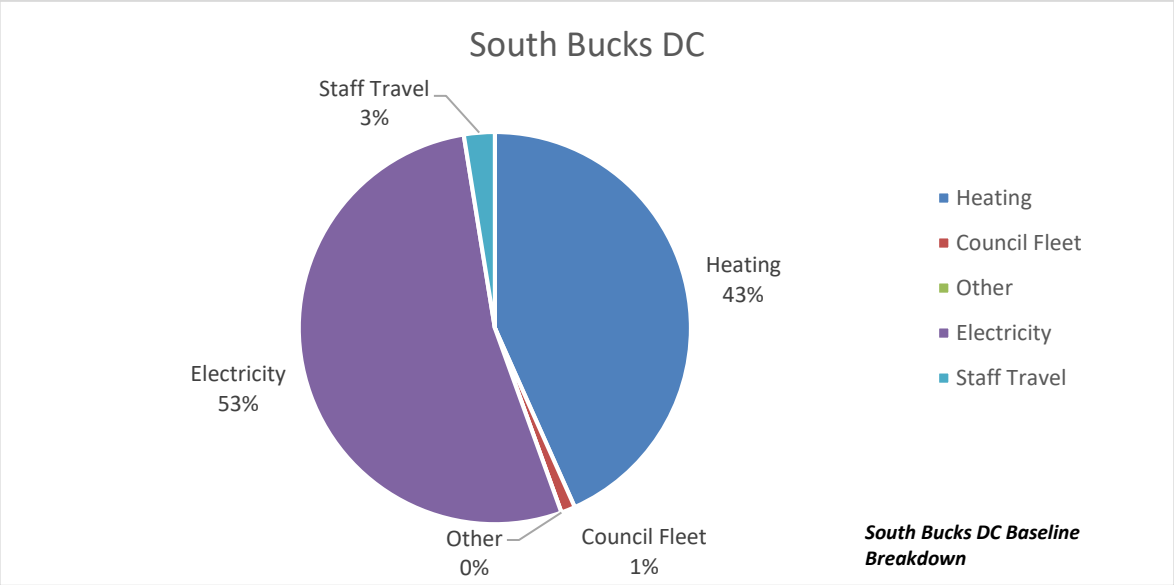
The pie chart above shows the distribution of CO_2e emissions in the baseline year (2018-19) for Chiltern District Council. In total Chiltern District Council emitted a total of 263.82 tonnes of CO_2e under Scope 1 and 2 emissions in 2018-19, and the staff business travel as recorded for 2018-19 equates to 30.78 tonnes. This makes CDC total contribution to the combined baseline 294.60 tonnes. In CDC's case the footprint against street lighting is set to zero reflective of the data received, indicating that the responsibility for street lighting sits with the district council.

2.2.4 South Buckinghamshire District Council

The data pack received for South Buckinghamshire District Council (SBDC) was one of the most extensive. It was comprised mostly of nine written GHG emissions reports covering the period between 2010-11 and 2018-19, plus the 2018-19 GHG figures. As GHG reporting is now a shared service between CDC and SBDC it was also possible to interrogate this data with the help of the same Council officer in charge of compiling data on emissions at CDC. This data was reviewed and 8 main queries emerged, mainly concerning the reporting boundary and calculation methodology. Fugitive emissions were being reported by SBDC in line with good practice, and on investigation it was confirmed that they were zero for the 2018-19 period because there were no

leaks. In addition, neither CDC nor SBDC were weather-correcting their fuel consumption, a practice that it seems has been discouraged since the new emissions factors were launched in 2013-14.

Neither CDC nor SBDC seem to be adjusting their baseline year to reflect changes in their building's portfolio. The SBDC 2011-12 GHG report stated: '*Except for electricity emissions relating to 2010/11, no changes have been made to previously reported emissions (the base year and 2010/11), as calculation changes generated less than a 10% change in emissions.'* Local Partnerships was pleased to confirm with the Council officer responsible for collating the data that this rule of thumb was no longer applied. Finally, it was noticeable how the level of detail on the GHG reports went down once this became a shared service. The old reports (covering the period 2010 to 2017), even if repetitive, were a lot more comprehensive, including a risk matrix that even mentioned 'adaptation risks', another example of best practice that Local Partnerships would recommend for the new authority.



South Bucks DC Baseline Breakdown

As with CDC, Scope 1 fleet emissions have been verified as emissions pertaining to the Council (in this case ground maintenance of some golf courses is undertaken by a Council employee) but the level of disaggregation needed to fit the BCC template was not there, so we have put them under 'average size car (unknown fuel)' with the intention that the new authority will be able to get a better level of granularity. In regard to staff business travel, as there were no details of the type of car, we have followed the BCC template and assumed the mileage recorded under petrol and diesel is for medium size engine cars. As previously explained, this does not affect the baseline calculations as figures were already converted to CO_2e, however, we were unable to check if the correct emission factors have been used.

The pie chart above shows the distribution of CO_2e emissions in the baseline year (2018-19) for South Buckinghamshire District Council. In total South Buckinghamshire District Council emitted a total of 278.65 tonnes of CO_2e under Scope 1 and 2 emissions in 2018-19, and the staff business travel as recorded for 2018-19 equates to 7.28 tonnes. This makes SBDC total contribution to the combined baseline 285.93 tonnes. In this case there was no breakdown of electricity consumption so we could not separately calculate the footprint of street lighting within this figure.

2.2.5 Wycombe District Council

The data pack for Wycombe District Council (WDC) was also supplied on 25th November and comprised 5 files, two with raw data on mileage and energy, two emissions reports with the previous data amalgamated and converted, and also a written report from 2013-14 that helped us understand former targets. During a conversation with the Council representative, it was confirmed the Council has not been reporting on their emissions since 2013-14, with the 2018-19 emissions report prepared for the purposes of isupplying Local Partnerships with carbon data. It

was also confirmed that the Council has not been actively pursuing their targets, which were a 2% reduction year on year against the 2008/9 baseline.

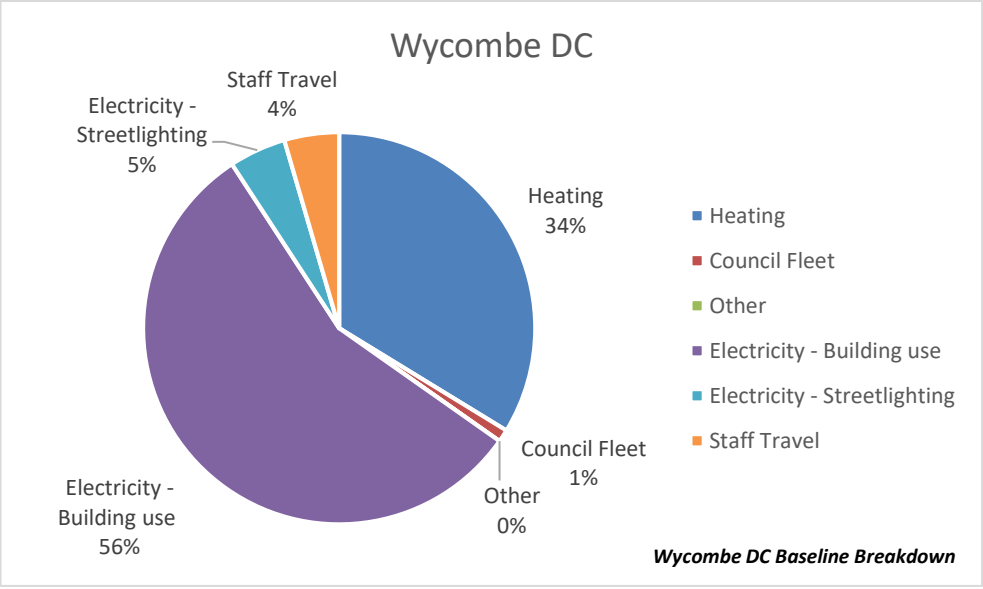
This data set generated 25 queries, mostly related to organisational boundary, scopes and targets. Local Partnerships reviewed the energy and mileage data with the relevant Council officers (both from WDC and BCC) and can advise:

- In terms of Scope 1 Fleet data, the file 'New Lease vehicles' pertains to parking wardens, a service the Council has full financial control of, so these emissions have been included under Scope 1.

- In terms of Scope 2 emissions, the Energy File included 'Market Traders' energy consumption, which is recharged to traders by the Council and should therefore be excluded.

- Regarding Scope 3 – Staff Business Travel, the only data available was mileage (not the type of car) so the 'average car – unknown fuel' was assumed again. However, BCC suggested that the vehicles used for WDC could be bigger. Whilst that would not make a difference for diesel cars, the emission factors for larger petrol cars would be considerably larger. We have noted his as one area of weakness for the current baseline due to lack of data granularity, which we propose can be addressed when the new unitary authority is formed.

In order to make the aforementioned adjustments to the baseline as calculated by BCC, Local Partnerships deducted the total consumption attributed to Market Traders in the raw data provided by WDC from the 2018-19 GHG emissions data compiled by BCC, apportioning the same consumption per month as applied by BCC. In respect of the Scope 1 emissions from the car park wardens fleet, the methodology applied recently by BCC was followed i.e. using the number plate to find the type of fuel on the MOT government website and then researching the size of the engine. With regard to the diesel vans in the fleet (diesel vans are classified in accordance with tonnage rather than engine size) the tonnage range of these model's fell between Class I and Class II so Class I has been assumed because only the top-end of the range would qualify as Class II.



The pie chart above shows the distribution of CO_2e emissions in the baseline year (2018-19) for Wycombe District Council. In total, Wycombe District Council emitted a total of 651 tonnes of CO_2e under Scope 1 and 2 emissions in 2018-19, and the staff business travel as recorded for

2018-19 equates to 30.80 tonnes. This makes WDC total contribution to the combined baseline 681.80 tonnes.

2.3 Updated Combined Baseline

This Carbon Audit and the review of the individual datasets from the different councils resulted in a number of changes to the baseline calculations put together by BCC. Local Partnerships has calculated the updated combined baseline to be 7,943 tonnes.

Having checked the calculations and 'conversion factors' of the original baseline document supplied by BCC and being satisfied they were correct, we have taken the carbon totals for the individual councils as calculated by BCC, only adjusting those where the aforementioned changes of scope had affected what was being reported. This means that there are some decimal points difference in the total emissions since the Local Partnerships spreadsheet does not feed off raw data and 'conversion factors', but of carbon tonnage as calculated in the BCC spreadsheets.

A summary of the updated combined baseline is below, with the full spreadsheet available as a separate document.

Combined Baseline

Combined Baseline - Scope 1, 2 plus Staff Business Travel (Scope 3) GHG emissions from Buckinghamshire County Council, Aylesbury Vale DC, Chiltern DC, South Bucks DC and Wycombe DC

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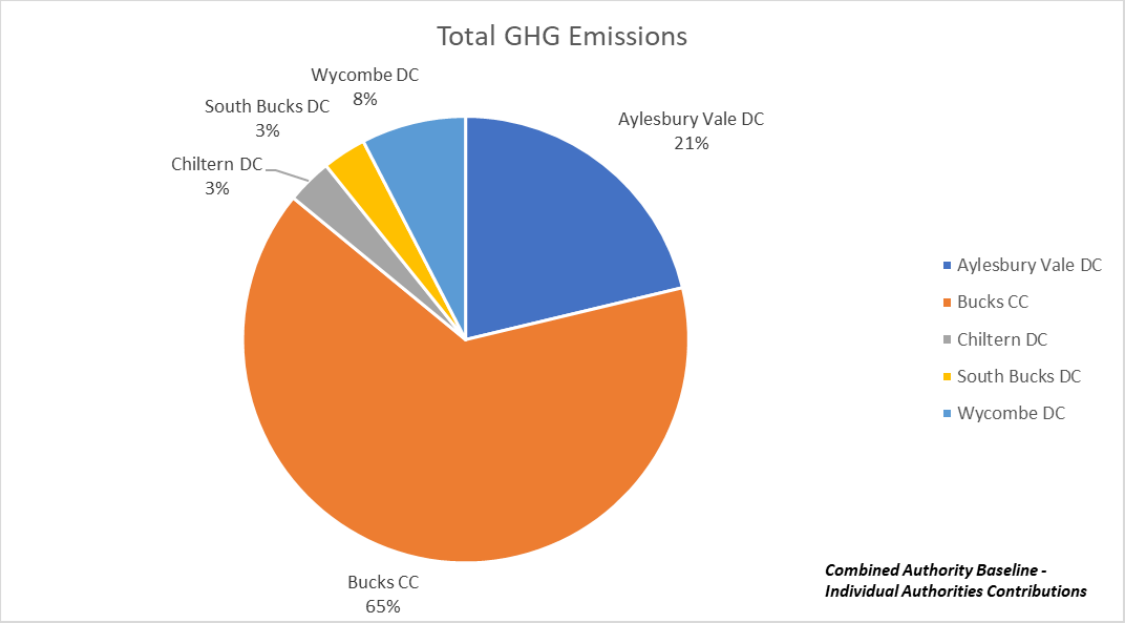
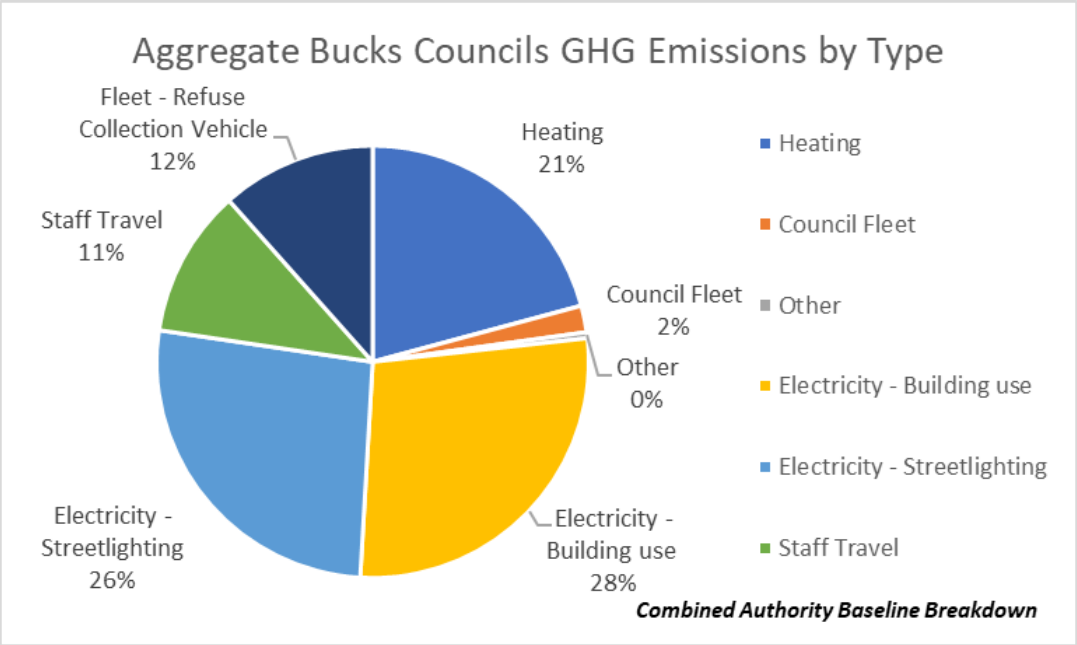
Scope	Units	Aylesbury Vale DC	Bucks CC	Chiltern DC	South Bucks DC	Wycombe DC	Unitary 2018-19
Scope 1 & 2	tCO_2e	1,880.96	4,915.92	263.82	278.65	651.00	7,990.35
Scope 3 (Staff business travel)	tCO_2e	29.25	896.84	30.78	7.28	30.80	994.95
Total GHG emissions	tCO2e	1,910.21	5,812.76	294.60	285.93	681.80	8,985.30



The pie chart above is a graphic representation of the contribution of the different councils to this combined baseline of CO_2e emissions.

Furthermore, the breakdown per emitting category of the Combined Authority Baseline is reflected in the chart below. It can be seen that at the aggregate level, electricity continues to be the largest cause of emissions and therefore the greatest challenge.



2.4 Existing reporting guidance

As the local authority GHG emissions reporting (as well as any reduction targets) are currently voluntary, there is not one specific set of guidance that must be adhered to. Whilst the UK Government has produced (and continues to update) guidance on reporting for the public sector, including local authorities, there are also global standards, such as the GHG Protocol, that would be suitable to follow, especially if the Council were to begin reporting Scope 3 emissions more extensively. Also, carbon accounting is a discipline under development with examples most commonly found in the private sector, which we will continue to investigate during the course of 2020-21 with a view to adopting a specific methodology for the Council. In this section we review some of the guidance and standards currently available so that the Council can evaluate their merits and propose a different mix of reporting criteria to that currently used at its discretion.

2.4.1 Green House Gas Protocol

Originally published in 2001 and with numerous revisions to this date, the Greenhouse Gas Protocol (GHG Protocol) and associated 'Standards' are prepared jointly by the World Business Council for Sustainable Development (WBCSD) and the World Resources Institute (WRI), and is reportedly the most widely used international carbon accounting tool. The guidance documents are complemented by a number of cross-sector and sector-specific calculation tools that are consistent with those proposed by the Intergovernmental Panel on Climate Change (IPCC).

The Standards currently consist of the following products:

- Corporate Standard
- GHG Protocol for Cities
- Mitigation Goal Standard
- Corporate Value Chain (Scope 3) Standard

- Policy and Action Standard
- Policy and Action Standard
- Project Protocol

The most relevant standard to this project is the GHG Protocol for Cities, which supersedes the International Local Government Greenhouse Gas Emissions Analysis Protocol (community section) published by ICLEI – Local Governments for Sustainability in 2009 (and the International Standard for Determining Greenhouse Gas Emissions for Cities published by the World Bank, United Nations Environment Programme (UNEP), and UN-Habitat, United Nations Human Settlements Programme, in 2010).

However, the Standards are globally recognised tools and are based upon step-by-step approaches to carbon accounting at the corporate, organisational and project level. As these tools are taken to represent current best practice they have been considered as the basis of the Carbon Audit methodology as stated above.

2.4.2 BEIS Emissions Pledge Guidance

Within the Clean Growth Strategy, the government introduced a voluntary target for GHG emissions reduction that is now known as the 'Emissions Reduction Pledge 2020'. This was set as a 30% reduction by 2020 compared to a 2009/10 baseline and invited the 'wider public sector' to participate, including all local authorities. Attached to the Pledge are two documents[9], one of which provides guidance for emissions reporting specifically for the public sector and higher education. Although relatively short-lived (in theory this guidance is for reporting between 2018 and 2020) this document contains the BEIS reporting principles which, on the whole, BCC and district councils have been following, including quoting the 'grey fleet' (use of employees' own cars for which fuel costs are claimed back via expenses) as an example of Scope 3 emissions.

Generally this guidance comprises very similar steps to the GHG Protocol when it comes to gathering and reporting emissions data, with slightly different names that might be more reflective of local authorities language, i.e. 'defining the state', 'emissions data' (deciding what to include under each scope), 'setting the baseline year' (recommends 2009/10), and finally 'emissions reporting' using any relevant template the local authority had already been using, e.g. former National Indicator 185's. Further guidance is then offered in terms performance against the 2020 target and, how to sign up etc. A second document provides an overview of the potential effect on emissions of the introduction different payback measures and what will happen beyond energy efficiency.

Whist this guidance is current and specific to the public sector, in our opinion it does not have the depth to form part of a long-term carbon accounting framework. As the guidance itself recognises the government is still to set a robust reporting framework, which should include carbon accountancy principles and guidance on how to use them.

2.4.3 DEFRA Guidance

The accounting standards adopted for the BC baseline are the UK Government Environment Reporting Guidelines: Including streamlined energy and carbon reporting guidance' (2019 update)[10] regarding how organisations with voluntary reporting on a range of environmental

[9] https://www.gov.uk/government/publications/emissions-reduction-pledge-2020-emissions-reporting-in-public-and-higher-education-sectors

[10] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/850130/Env-reporting-guidance_inc_SECR_31March.pdf

matters, including voluntary energy and GHG emissions, can approach their reporting. The DEFRA Guidance refers specifically to local authorities and proposes a number of accounting and reporting principles: Relevant, Quantitative, Accuracy, Completeness, Consistent, Comparable, and Transparent. We elaborate further on the meaning and implications of the DEFRA Guidance in section 2.5 as we recommend that the Council follows these as part of our recommendations on accounting methodology.

The DEFRA guidance also establishes a step by step approach to reporting, as follows:

- Step 1 Determine the boundaries of your organisation
- Step 2 Determine the period for which you should collect data
- Step 3 Determine the key environmental impacts for your organisation
- Step 4 Measure
- Step 5 Report

In addition, this document provides detail on how to undertake each of those steps, defining for example the different types of 'boundary' (financial control, operational control, etc), which local authorities have now been using for a number of years. Furthermore, this document provides detailed guidance on the use of 'intensity factors' which, as mentioned earlier in this report, might be of use once the new unitary authority is created. Guidance is also provided on 'upstream' and 'downstream' emissions, which will be necessary to consider if the new authority decides in due course to report on a wider range of Scope 3 emissions.

Whilst this guidance is not as detailed or internationally recognised as the GHG Protocol, we believe it should be the Council's first reference point for guidance until BEIS publishes the 'robust reporting framework' detailed in the Emissions Reduction Pledge 2020 High Level Assessment[11].

2.4.4 Carbon Trust

The Carbon Trust approach to carbon reporting has long been building on existing international standards for the measurement of GHG emissions. The Carbon Trust Standard was launched in June 2008 and makes direct reference to the GHG Protocol and ISO14064 – Greenhouse Gases. The Carbon Trust approach is based upon the following five main steps:

- define the methodology;
- (ii) specify the boundary and scope of coverage;
- (iii) collect emissions data and calculate the footprint;
- (iv); verify results (optional); and
- (v) disclose the footprint (optional).

This is very similar to both the DEFRA Guidance and the GHG Protocol methodology.

2.4.5 BS ISO 14064-1:2019

This part of the ISO14064 series, named 'Specification with Guidance at the Organization Level for Quantification and Reporting of Greenhouse Gas Emissions and Removals'[12], details principles and requirements for designing, developing, managing, and reporting for organisation level GHG inventories. This standard incorporates many key concepts and requirements of the

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11 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/721974/High_Level_Potential_Assessment-final_July2018.pdf

12 https://shop.bsigroup.com/ProductDetail/?pid=000000000030327038

GHG Protocol above and is therefore consistent with our proposed approach for the Council, as set out below.

2.5 Proposed Accounting Principles & Recommendations

2.5.1 Accounting Principles

The GHG Protocol takes its accounting principles from the Corporate Standard, adapted to fit public sector clients and now more specifically cities. The principles and their implications are very similar to those proposed by DEFRA which, according to the aforementioned DEFRA guidance, are based on the GHG Protocol. The table below provides a comparison between the two.

GHG Protocol	DEFRA Guidance
Relevance: The reported GHG emissions shall appropriately reflect emissions occurring as a result of activities and consumption patterns of the city. The inventory will also serve the decision-making needs of the city, taking into consideration relevant local, subnational, and national regulations. The principle of relevance applies when selecting data sources and determining and prioritising data collection improvements.	Relevant: Ensure the data collected and reported appropriately reflects the environmental impacts of your organisation and serves the decision-making needs of users — both internal and external to your organisation.
	Quantitative: KPIs need to be measurable. Targets can be set to reduce a particular impact. In this way the effectiveness of environmental policies and management systems can be evaluated and validated. Each chapter provides the details for that subject area. Quantitative information should be accompanied by a narrative, explaining its purpose, impacts, and giving comparators where appropriate.
Accuracy: The calculation of GHG emissions shall not systematically overstate or understate actual GHG emissions. Accuracy should be sufficient enough to give decision makers and the public reasonable assurance of the integrity of the reported information. Uncertainties in the quantification process shall be reduced to the extent that it is possible and practical.	Accuracy: Seek to reduce uncertainties in your reported figures where practical. Achieve sufficient accuracy to enable users to make decisions with reasonable confidence as to the integrity of the reported information.
Completeness: Cities shall account for all required emissions sources within the inventory boundary. Any exclusion of emission sources shall be justified and clearly explained. Notation keys shall be used when an emission source is excluded, and/or not occurring.	Completeness: Quantify and report on all sources of environmental impact within the reporting boundary that you have defined. Disclose and justify any specific exclusions.
Consistency: Emissions calculations shall be consistent in approach, boundary, and methodology. Using consistent methodologies for calculating GHG emissions enables meaningful documentation of emission changes over time, trend analysis, and comparisons between cities. Calculating emissions should follow the methodological approaches provided by the GPC. Any	Consistent: Use consistent methodologies to allow for meaningful comparisons of environmental impact data over time. Document any changes to the data, changes in your organisational boundary, methods, or any other relevant factors.

GHG Protocol	DEFRA Guidance
deviation from the preferred methodologies shall be disclosed and justified.	
	Comparable: Organisations should report data using accepted KPIs rather than inventing their own versions of potentially standard indicators. The narrative part of a report provides the opportunity for an organisation to discuss any tensions which exist between providing comparable data and reporting organisation-specific KPIs. Use of accepted KPIs will aid you in benchmarking your organization and will aid users of your report to judge your performance against that of your peers.
Transparency: Activity data, emission sources, emission factors, and accounting methodologies require adequate documentation and disclosure to enable verification. The information should be sufficient to allow individuals outside of the inventory process to use the same source data and derive the same results. All exclusions shall be clearly identified, disclosed and justified.	Transparent: This is essential to producing a credible report. Address all relevant issues in a factual and coherent manner, keeping a record of all assumptions, calculations, and methodologies used. Internal processes, systems and procedures are important, and the quantitative data will be greatly enhanced if accompanied by a description of how and why the data are collected. Report on any relevant assumptions and make appropriate references to methodologies and data sources used. There is more on transparency in Step 5 on reporting.

In Local Partnerships' opinion, the DEFRA principles, although indeed very similar to the GHG Protocol ones, better reflect the voluntary nature of GHG reporting for local authorities at present. The language used is also made to fit a number of organisations and naturally tie in with other UK Government guidance. As a result, we recommend that the Council use DEFRA's accountancy principles as stated above, combined with the GHG Protocol reporting methodology stated in Carbon Audit section.

In addition, we recommend that the Council takes into consideration additional guidance contained within the GHG Protocol, which we believe will become very relevant as we advance on our path to become a net zero carbon nation by 2050, namely that within the requirements of any accountancy framework, an organisation will need to make important decisions in terms of setting the inventory boundary, choosing calculation methods, deciding whether to include additional scope 3 sources, etc. Trade-offs between the principles above may be required based on the objectives or needs of the organisation. For example, achieving a complete inventory may at times require using less accurate data. Having said that, over time, as both the accuracy and completeness of GHG data increase, the need for trade-offs between these accounting principles will likely diminish.

2.5.2 Recommendations

Throughout the Carbon Audit of the five councils we identified a number of existing practices that would help create a robust reporting framework for the new Buckinghamshire Council, and which we recommend are implemented:

1. In order to contribute to the 'Transparency' accountancy principle, which will become more and more important as members of the public scrutinise local government plans to address the 'climate emergency', it is good practice to insert a web link to any external documents, assumptions or calculations, for example, the source of emissions factors, and also to make sure these are updated as new versions of the emissions' reports are issued.

2. The Data Collection Tracker currently used by BCC at the back of the GHG report is an excellent addition, and should be adopted across the whole of the new unitary authority
3. Most of the councils currently collect data from Solar PV systems manually. Unfortunately, this data is thus not segregated between what is being used onsite (which is displaced automatically from the baseline) vs. what is being exported (which could help offset emissions from the new Council in the future). We would recommend fitting export AMRs to any solar PV that is installed (as is standard under schemes such as Re:fit) and consider retrofitting them to the larger existing solar PV systems.
4. Although the solar PV data cannot currently be segregated between consumption and exports, is it good to state the CO_2e [reduction?] achieved with PV in the emissions reports
5. The 'Projects and Savings' Tab in the BCC GHG report is another extremely useful addition to the emissions' report and should be adopted across the whole of the new unitary authority. Whilst BCC confirmed that at present these are only estimated savings, using energy performance contracts as the standard approach will mean that the authority can record actual (guaranteed) savings.
6. There is a 'comparison tab' at the end of the GHG report from BCC, which includes potential explanations to changes in the data. This is also a very good initiative that should be mirrored in the rest of the portfolio.
7. Two of the district councils include graphic representations of their Scope 1 & 2 emissions vs. Scope 3 in the cover page of the GHG report. This helps to communicate the levels of emissions from the various sources and should be adopted in the new unitary authority's future reporting.
8. Some of the district councils report on 'fugitive emissions' of gases used in air conditioning systems, which in some cases represent sizeable contributions well beyond 1%. We recommend that the new unitary authority reports on fugitive emissions as per the HM Government Guidance on Sharing GHG emissions information from Council own estate operations FAQ[13].
9. The largest reduction on Scope 1 emissions in South Bucks during reporting years 2011-12 and 2012-13 was the elimination of air conditioning leaks. It is, therefore, recommended that, in addition to investigating and reporting on this 'fugitive emissions' as per the above, planned maintenance for air conditioning (as opposed to reactive maintenance) is introduced across the portfolio.
10. South Bucks reports between 2010 and 2016 outline 'Climate Adaptation Risks identified to 2080 for South Bucks'. Although we could not find any further references to this, it constitutes best practice to start looking into adaptation, both in the context of the Council operations but also the wider community, which can be helped through the planning system.
11. The level of detail on emissions reports in some of the district councils reduced considerably where reporting became a 'shared service'. We recommend that the greater level of detail, combined with the inclusion of climate risk assessments, should be applied as the standard going forward.
12. In relation to the expected boiler efficiency of biomass plants, the source of the assumptions used should link to the BEIS publication on 'Measurement of the in-situ performance of solid biomass boilers' from 2018 (link below), and the specific assumption updated accordingly .
    https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/831083/Full_technical_report.pdf

13 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/303310/sharing_information_greenhouse_gas_emissions_from_Council_own_estate_operations_faqs.pdf

2.5.3 Conclusion

Although the standard of GHG reporting varies between the different councils, Local Partnerships is able to confirm that generally there is a good understanding of the GHG reporting guidance and carbon accountancy principles and practice is aligned with these principles. The area where all councils could improve their practice is in regard to transparency within GHG reports to ensure the reader is fully informed of assumptions and other pertinent information, for example:

- How has the Council calculated its emissions?
- What are the assumptions, methodologies, and reference data used?
- To which parts of the organisation does the data relate?

In addition, we would like to encourage the new unitary authority to identify the risks and opportunities that arise from its impact on the environment and from the environment's impact on the Council and its services (for example from climate change).

3 A PATHWAY TO THE 2050 'NET ZERO' TARGET

3.1 The scale of the challenge

As part of our proposal we have offered to help the new unitary authority map out a way of achieving the 'net zero' target by 2050. This will be very dependent on the structure of the new organisation as, for example, property rationalisation or amalgamation of services might reduce the current footprint. In addition, there is an element of growth expected both in population and the level of services required as a result which will increase emissions. However technological developments, efficiencies and new ways of working as well as the decarbonisation of the grid might help keep emissions down. Projecting the pathway of emissions to 'net zero' by 2050 is therefore difficult and will require modelling of such variables as well as periodic review of the 'carbon budget', representing the new authority's permitted amount of GHG emissions over a given period of time.

At present the combined baseline of the 5 councils, namely Buckinghamshire County Council, Aylesbury District Council, Chiltern District Council, South Buckinghamshire District Council and Wycombe District Council as calculated by Local Partnerships after auditing all of their GHG emissions data is 8,985 tonnes of CO_2e. This figure is based on a boundary that only includes Scope 1 and 2, which will always be the responsibility of the authority, plus a limited amount of Scope 3 emissions, which at present the new unitary authority may choose to include or exclude.

However, as the UK Government addresses its 2050 commitments, the scope for which local authorities are responsible might change, and local government may be required to take responsibility for managing emissions reductions on other services such as waste management and education, especially in relation to their associated transport needs. The actual scale of the reduction required may therefore be higher.

3.2 A linear Pathway

A year-on-year linear reduction from 2018-19 to 2050 of 300 tonnes CO_2e per annum would be required for the new unitary authority to achieve net zero by 2050, an annual reduction of 3.33%.

Two of the current district councils already have targets beyond this rate of reduction, and with baselines that include more than just staff business travel. Specifically, CDC targets a 4% annual reduction and South Bucks targets a 5% year on year reduction.

3.3 Next steps

Now that BCC has an idea of the 'scale of the challenge' in terms of year on year reductions, conversations should continue in terms of using the recommended guidance to expand on the scope of the GHG emissions reporting and targets, as these might become more stringent or mandatory as the 2050 deadline gets closer.

This report will be followed by a "Modelled Pathway to 2050", which will include 5 yearly milestones and the first Carbon Budget, and an Action Plan with high level costings so that the new unitary authority can start to plan how it will meet the 2050 target. This will also include guidance on green tariffs and carbon offsets which, as it seems the case in Aylesbury, can help drive down emissions and further the renewable energy efforts of energy suppliers, big and small.

We look forward to continuing to support new Buckinghamshire Council in the journey towards a net zero carbon 2050 which, as the BEIS Emissions Reduction Pledge 2020 high level assessment suggests, will include decarbonising heat through a variety of means including low carbon heating measures, such as creating and extending district heat networks. We also hope the new Buckinghamshire Council will seize the opportunity and play an active role in climate adaptation as well as the decentralisation on the energy supply, striving towards self-sufficiency

within the county rather than relying on green tariffs so that others can profit from what is quickly becoming a key commodity on the 21st century: low carbon energy.

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