

Report to Sustainable development panel
28 September 2016
Report of Director of regeneration and development
Subject Annual carbon footprint exercise

Item

6

Purpose

This report informs members of the outcomes of the annual carbon footprint exercise.

Recommendation

To note the report.

Corporate and service priorities

The report helps to meet the corporate priorities of as safe, clean and low carbon city

Financial implications

Within existing budgets.

Ward/s: All wards

Cabinet member: Councillor Bremner – Environment and sustainable development

Contact officers

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Background documents

None.

Report

1. All local authorities are required to annually report their emissions to central government. By using a carbon conversion factor, emissions from vehicle use (litres/km) and gas and electricity (kWh) use can be directly compared and the amount of emissions reported as kgCO₂e emitted. The council's annual carbon footprint report, as submitted to central government, can be found at Appendix A.
2. There have been requests in previous years that officers present the council's energy consumption (kWh, litres/km) alongside the carbon emissions figures (kgCO₂e). Therefore both sets of figures have been provided in this report with the understanding that although these figures are related, they are not directly comparable due to the use of carbon conversion factors which are influenced by factors at a national level.
3. Defra advise organisations reporting voluntarily to use kgCO₂e as this is the most comprehensive way to report an organisations impact. The 'e' in CO₂e signifies that CO₂ plus the other Kyoto gases in CO₂ equivalent (kgCO₂, kgCH₄ or kgN₂O) are incorporated into the conversion factor value.

The headlines:

4. Over the period 1 April 2015 to 31 March 2016 the council reduced its carbon dioxide emissions by 8.7%, or 673,992 kg of CO₂e, or nearly 674 tonnes. Or, in more tangible terms, the council reduced our carbon emissions this year by sufficient to fill over 4 thousand double-decker buses. This brings the total reduction, against a 2007 baseline, to 39.5% and brings us close to achieving the 40% carbon emissions reduction target set in the council's 2015-2018 environmental strategy.
5. Table 1 (below) gives an overview of the figures for the 2015-16 period. The data is split into Scopes as dictated by the DECC/DEFRA carbon footprint requirements. Further detail of what is included in each scope is given in paragraph 7.
6. The third column of Table 1 shows the amount of energy use either in kWh, litres of fuel used or km travelled. The fourth column shows this year's figures as a percentage increase or decrease against a 3 year average from 2012-15. This is in order to allow for one off anomalies in reporting. The fifth column shows the amount of carbon emissions produced by each factor of each scope in the 2015-16 period. Finally, the sixth column shows this year's figures as a percentage increase or decrease against a 3 year average from 2012-15.

7. Table 1 - Data by scope:

Scope	Detail	2015-16 energy use	Inc/ dec on 3 year average (2012-15)	2015-16 carbon emissions (kgCO ₂ e)	Inc/ dec on 3 year average (2012-15)
1	Gas council owned buildings	13,243,545 (kWh)	Decrease (18.9%)	2,442,772 (kgCO ₂ e)	Decrease (18.5%)
	Gas contractors	79,553 (kWh)	Decrease (30.7%)	14,674 (kgCO ₂ e)	Decrease (30.7%)
	Fuel council managed vehicles	15,637 (litres)	Decrease (45.6%)	42,278 (kgCO ₂ e)	Decrease (17.2%)
	Total Scope 1 emissions (kgCO ₂ e)			2,499,724	
2	Electricity council owned buildings	7,117,475 (kWh)	Decrease (5.1%)	3,303,732 (kgCO ₂ e)	Decrease (10.6%)
	Electricity contractors	279,653 (kWh)	Decrease (1.41%)	129,253 (kgCO ₂ e)	Decrease (10.5%)
	Total Scope 2 emissions (kgCO ₂ e)			3,432,985	
3	Grey fleet (km)	87,361 (km)	Decrease (7.3%)	16,722 (kgCO ₂ e)	Increase (13.2%)
	Public transport (km)	45,901 (km)	Decrease (40%)	3,759 (kgCO ₂ e)	Decrease (56.5%)
	Contractors data (km)	765,955 (km)	Increase (19.2%)	1,111,234 (kgCO ₂ e)	Decrease (19.1%)
	Total Scope 3 emissions (kgCO ₂ e)			1,131,715	
	Total emissions – All Scopes (kgCO ₂ e)			7,064,424	

8. Scope 1 emissions:

Process emissions (owned buildings)

- Data obtained from utility bills (kWh)

Process emissions (contractor-operated buildings)

- Data obtained from contractor's energy records (kWh)

Fuel use (owned vehicles)

- Data obtained from fuel invoices (litres)

Gas consumption – council owned buildings (kWh):

9. Overall there has been an 18.5% decrease in gas use across council owned assets when compared with the average of the previous 3 years. The trend is for a year on year reduction since 2007 as shown in Chart 1.
10. In particular, there is clear evidence that energy saving projects across our Sheltered Housing stock have resulted in a reduction in gas use over the past 12 months. In 2014, it was identified during the production of the Carbon Management Plan phase 2 that Sheltered Housing schemes are one of the council's highest gas users. This is due to the age and vulnerability of residents who often require the heating on for much of the year due to health-related issues. Officers and partners have worked sensitively to ensure that vulnerable residents continue to live in homes where they feel cosy and comfortable. Our projects in these schemes have included: boiler replacement, burner management trials, boiler valve insulation, loft pipework insulation and underground pipework insulation.
11. The council continues to work with our partners, NPS, to look for future opportunities, and this year we will be installing loft-space pipework insulation at Bradecroft, Seabrook and Harry Perry Sheltered Housing schemes, as well as Endothermic solution to heating systems. In addition we will be fitting Valve and Flange insulation in boiler houses.
12. One contributing factor to the reduction in gas consumption this year is the closure of 3 sheltered housing schemes over the period of time in question. This is considered in greater detail in paragraph's 34 and 35 later in this report.
13. Finally, this year's gas consumption figure will have been favourably affected by the mild winter experienced in 2015/16 as less energy will have been required to heat living spaces or hot water.

Gas consumption – contractors (kWh):

14. In the period 2015/16 there was an overall reduction in gas use by contractors of 30% against an average of the previous 3 years. We continue to work with contractors to monitor their energy use, but we do not monitor their data for them and rely upon contractors to provide accurate data. The data provided in the past has on occasion proven inaccurate and therefore this skews the figure resulting in a larger average reduction in kWh use over the past 3 years.

Fuel use in council managed vehicles:

15. There was an increase of 34% on petrol fuelled pool cars against the previous 3 year average figure. Conversely, there was a 49% decrease in diesel fuelled pool car use. The environmental strategy team is currently working closely with the transformation team to monitor use of the council's fleet and it is anticipated that the outcome of this work will be to reduce the size of the council's pool fleet. For local journeys, as an alternative to pool car and taxi use, the team introduced pool bikes in 2012 and most recently an electric bike has been added to the bike fleet.

16. Scope 2 emissions:

Electricity emissions (own buildings)

- Data obtained from utility bills (kWh)

Electricity emissions (contractor-operated buildings)

- Data obtained from contractor's energy records (kWh)

Electricity consumption – council owned buildings:

17. There was a decrease of electricity consumption in kWh of 5.6% across the council's portfolio of properties compared to the three year average figure. However, when we consider the carbon reduction figure (kgCO₂e) for the same period this shows a saving of 10.6% against a three year average. This is due to the carbon conversion factor which we are required by DECC/DEFRA to use when reporting the annual carbon footprint of the council. The 'carbon conversion factor' section below gives more details on this.
18. Officers continue to work with NPS to look for further opportunities to reduce this figure further. We have implemented a wide range of electricity saving projects across our portfolio since 2008 and it is becoming more challenging to find new opportunities. However, 3 variable speed drives have just been installed at Riverside leisure centre, and officers are investigating the replacement of lighting with LED lighting at car parks, churchyards and Riverside swimming pool. We are currently looking for a suitable low energy alternative for the events lighting at City Hall. In addition, we are looking to install VSD's in several sheltered housing schemes this year, as well as LED upgrades to some Landlord Lighting.
19. The council does purchase its electricity through a green tariff with Scottish and Southern Electricity (SSE). However, historically the tariff has not complied with strict Ofgem Green Supply Guidelines which would have enabled the council to claim the CO₂e reduction in the council's carbon footprint. We've spent some time investigating the merits of changing provider/tariff to a 'greener' provider. We've also been in contact with Ofgem, DECC and Carbon Smart to attempt to find a definitive answer as to whether there are any tariffs or mechanisms available that would enable the council to capture the carbon reduction gained. Sadly reports are currently very confusing. However, this is something we will

continue to pursue. It is important we avoid double-counting carbon emissions reductions by benefitting from them a national grid level and again at a local user level.

Contractor's electricity use (kWh):

20. This year has seen a significant decrease of a third in electricity use by contractors. In past years our figures have been impacted by a lack of consistent reporting and this may be the reason for significant decreases this year when using an average figure. Equally the contractors we work with are not always the same each year, and are only able to work on a best guess estimate of what percentage of their total contracts are due to working on behalf of Norwich City Council.

Carbon Conversion Factor:

21. The carbon conversion factor allows litres of fuel used, km travelled and kWh of energy burned to be compared to one another by measuring the carbon emissions produced during each activity. Carbon emissions are measured in kg of CO₂e.
22. In 2014 DECC/ DEFRA updated their kgCO₂e conversion factor. Instead of using a 5 year rolling average figure for electricity reporting they now use a 1 year average figure. The reason for the change was to make reporting easier for large FTSE 100 companies who report energy use on a frequent basis.
23. However, the 1 year factor is recognised as being more sensitive to national grid level energy mix changes. This sensitivity impacts the annual conversion factor and therefore the council's annual carbon reduction figure. In years where there is an increase in coal-powered electricity in the grid the conversion factor will be such that it will create an increase in electricity associated carbon emissions at a local level. Conversely, in years where more renewable technology produced electricity is put into the national grid, there will be a corresponding decrease in carbon emissions associated with electricity use at a local level.
24. This factor is outside of the council's control, but does affect our annual carbon emissions figure quite profoundly. The council's efforts to reduce the energy use through the introduction of energy efficient technologies and behaviour change will either, a) compound any changes in the national grid energy mix which assist with 'greening the grid', thereby further reducing emissions, or b) help to counterbalance changes in the national energy mix which may lead to an increase in carbon emissions at a grid level. We may be 'winners' some years and 'losers' in other years. In order to provide a more accurate picture for members it is intended continue to provide the energy use data e.g. kWh, litres fuel consumed, km travelled alongside the carbon emissions data.

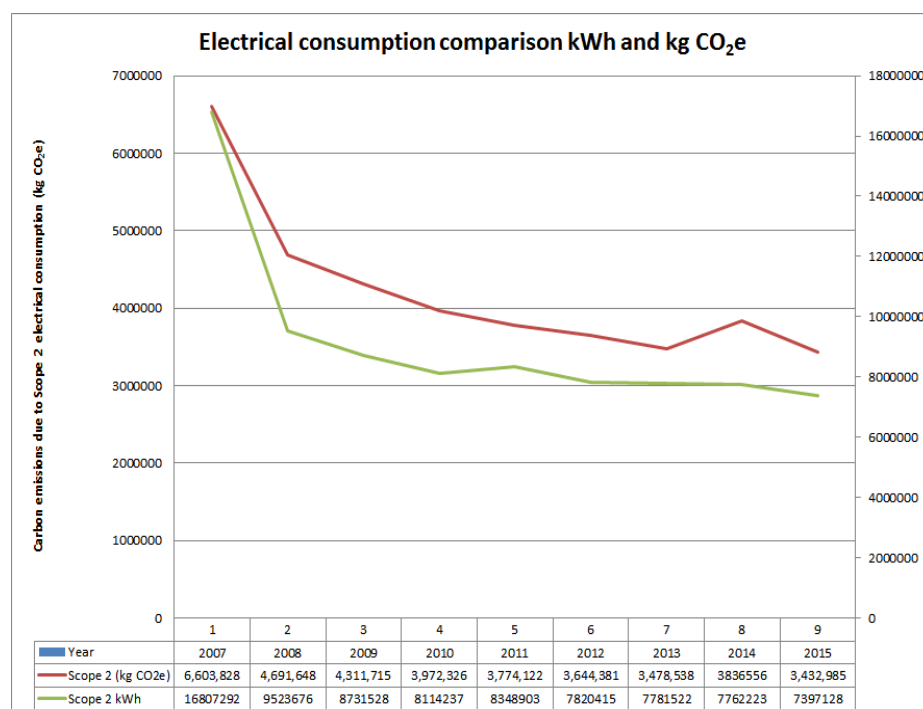
An illustration of the electricity carbon conversion effect:

25. In the 2014 conversion factor guidance DEFRA noted, "There was an 11% increase in the UK electricity factor from the previous year because there was a

significant increase in coal-powered electricity generation share in 2012 (the inventory year for which the 2014 GHG Conversion Factor was derived)."

26. Graph A (below) shows the nearly consistent drop in Scope 2 electricity use in kWh (bottom line) against the trend for electricity related carbon emissions (top line). Of interest is the peak in 2014 in carbon emissions. This is due, at least in part, to the increase in the amount of carbon intensive coal-powered electricity in 2012 affecting the 2014 conversion factor.

27. Graph A – Electricity use (kWh) vs Electricity use (kg CO₂e)



28. DECC have stated that in 2013 (the inventory year for which the 2015 GHG Conversion Factor was derived), "the electricity generated from renewable sources in the UK in 2013 increased by 30% on 2012, and accounted for 14.9% of total UK generation, up from 11.3% in 2012" (Digest of UK Energy Statistics 2014). This 'greening of the grid' has caused the conversion factor for carbon emissions relating to electrical use to drop by 7% against last year. This is reflected both in the council's Scope 2 emissions reduction and therefore the overall carbon footprint of the council this year.

29. Scope 3 emissions:

Business travel (grey fleet and contractor)

- Data taken from officer and member business mileage claim forms (km)
- Data taken from contractor business mileage records (km)

Public transport

- Data taken from officer and member business mileage claim forms (km)

- Data for train journeys taken from rail account invoices (km)

Fuel use in contractor vehicles

- Data obtained from contractor fuel records (litres)

Grey Fleet:

30. The grey fleet is where staff use their own cars for business miles. There has been a 7.3% decrease in grey fleet use this year, and this may correlate to the increase in the use of petrol fuelled pool cars, but this is likely to be an over-simplification and it requires further investigation.

Public transport:

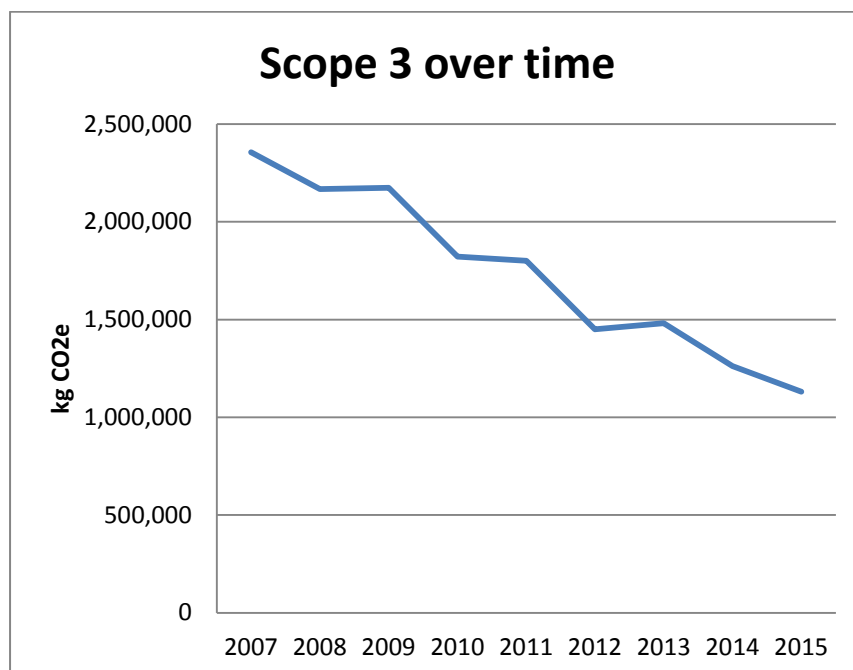
31. This year has seen a large decrease in the amount of taxi travel which we believe to be erroneous. We have disputed this with our provider but have been advised the data provided is correct. We are working to resolve the problem for next year's report. Rail travel remains largely the same as last year and air travel has decreased since last year with all flights taken during the period being domestic UK flights.

Contractor's fleet:

32. There has been a significant increase in contractor's diesel consumption this year, and a small increase in petrol use. This is in part due to contractor's working on additional projects, but also due to under-reporting from one major contractor which has skewed the comparison figures for last year and this year. This has highlighted the continuous need for ongoing monitoring and liaison between the council and our contractors.

33. Graph B (below) shows that whilst the overall trend over time is for a reduction in Scope 3 emissions, that these can be quite volatile as shown by the series of peaks on the graph. This is thought to be largely to many of the factors being outside of the council's direct control and the variability in staff travel requirements and the requirements of contracts year on year.

Graph B – Scope 3 emissions over time:



Further factors to consider:

Building rationalisation and change of responsibility:

34. In 2015/16 a number of assets this year were either vacated or responsibility for energy bills moved to a new tenant. Where this occurred, it resulted in an immediate and reduction in the council's carbon emissions for the asset.

35. This year this includes:

- Mile Cross depot – final staff moved out – the first full year's figures.
- Britannia Court sheltered housing scheme – closed
- Lakenfields sheltered housing scheme responsibility transferred to St Martins Housing trust
- St James sheltered housing scheme has been subject to refurbishment for much of the period in question. When it re-opens we anticipate it will be more energy efficient than previously due to energy efficiency measures implemented during refurbishment.
- The Guildhall responsibility transferred to HEART and has therefore been taken from our carbon footprint.
- West Norwich Area Housing Office – officers have moved into City Hall
- Mile Cross Area Housing Office – officers have moved into City Hall

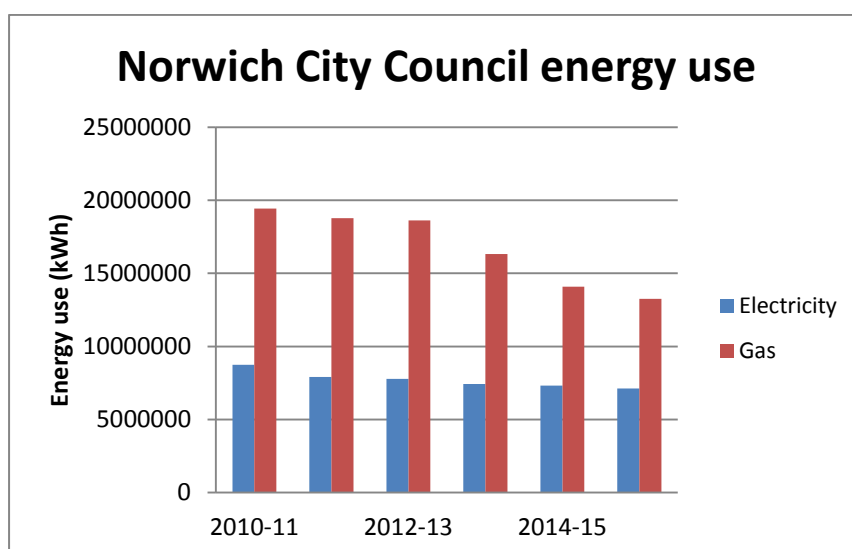
Variability:

36. By using the DECC/DEFRA 2015 carbon conversion factor the resulting drop in Norwich City Council's carbon emissions is reckoned to be 8.7% for the 2015/16 period.
37. By using the National Indicator (NI) 185 spreadsheet provided by DECC in 2008 and in which we have historically gathered our data, (but which does not use the carbon conversion factor), the carbon emissions this year over all 3 scopes are reckoned to have increased by 2%.
38. Historically we have applied a weather correction factor to the NI185 data. This factor allows for smoothing out extremes of temperature on the carbon emissions over all 3 scopes. If we apply the weather correction factor to the data for the period 2015/16 then council emissions have reduced by 5%. This might be the most reliable measurement since it takes into account extremes of temperature and yet is not influenced by mix of electricity at a national level and the corresponding carbon conversion factor. This would bring the current carbon reduction of the council to 35.8% based on a 2007 baseline.
39. In addition, other variables include: the reliability of third party data, the variation in contracts and contractors year on year.
40. Carbon emissions calculation is complex with many variables, and is at best an indication of the council's carbon journey. Whilst it is imperfect it nevertheless remains best practice. Monitoring our carbon emissions and our energy consumption allows the council to prioritise which areas of our operations would most benefit from energy reduction measures and allows us to allocate resources accordingly.

Gas and electricity consumption:

41. If we consider the gas and electricity consumption (kWh) data which is where we have the most control and influence and the most accurate data the long term trend is for a year on year drop in consumption levels as shown in Chart 1 below. This reflects the variety of energy saving projects that have been implemented since 2009.

Chart 1 – Norwich City Council energy use over time:

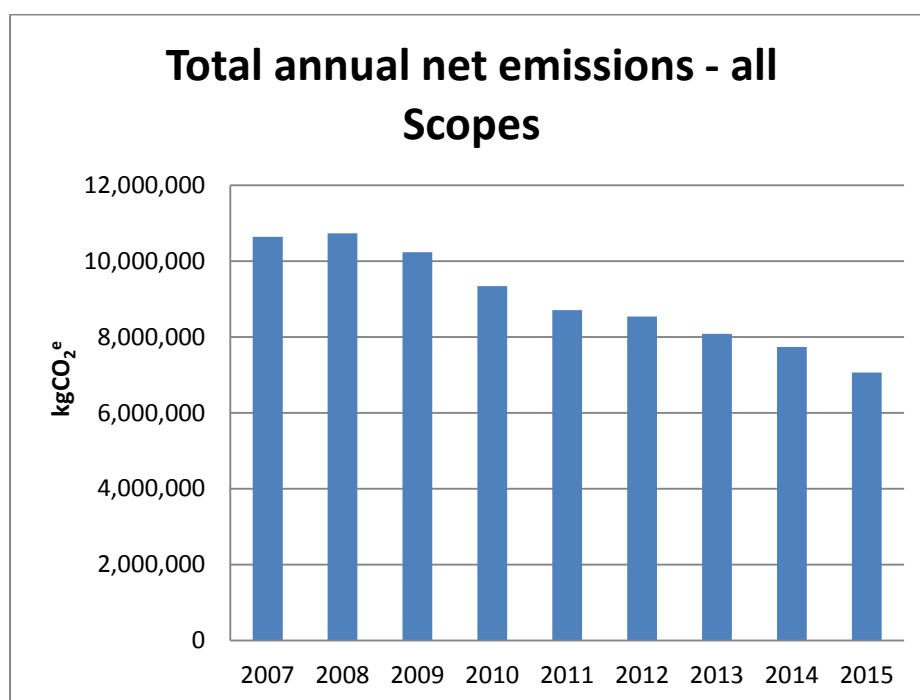


42. The team have worked with our Asset Management partners, NPS, over a number of years to implement a variety of energy saving technologies across our wide and varied assets. Often these have been at least part-funded by Salix funding, an interest free loan scheme for energy reduction projects. A list of these projects can be found in Appendix B of this report.

Conclusion:

43. Chart 2, below, shows a clear trend over time to lowering the council's carbon dioxide emissions, as we move closer to achieving the 40% target.

Chart 2 – Total net emissions – All Scopes:



44. Officers need to continue to work closely with contractors to monitor energy use throughout the year to encourage accurate and timely reporting, allowing discrepancies in data to be highlighted and addressed earlier.
45. Since the baselining exercise undertaken in 2007 the council and its contractors have saved 3,577 tonnes of CO₂e emissions from polluting the environment. This is the equivalent of 3,577 hot air balloons. The environmental strategy team are constantly seeking new opportunities for energy saving opportunities.