

The Impacts of and Solutions to Scope 3 Emissions

The Routemap to Carbon Negative notes that there is currently no baseline for York and North Yorkshire's Scope 3 emissions, but that they are expected to be substantial. Although many of the actions in the Routemap are likely to tackle scope 3 emissions, more research into the areas where these emissions occur in York and North Yorkshire would help us to target scope 3 emissions more specifically.

Introduction

Greenhouse gas (GHG) emissions can be split into three groups or scopes:

Scope 1 emissions – These are 'direct emissions from owned or controlled sources' (Carbon Trust).

Scope 2 emissions – These are 'indirect emissions from the generation of purchased electricity, steam, heating and cooling' (Carbon Trust).

Scope 3 emissions – These are 'all other indirect emissions that occur' anywhere else in a value chain (Carbon Trust).

Most approaches to achieving net zero focus on scope 1 and 2 emissions, as these tend to be easier to measure and easier to change because they are usually within our control. Examples of this might include changing company vehicles to electric vehicles (scope 1), or swapping to green electricity in our buildings (scope 2). Scope 3 emissions might include things like purchased goods and services and the emissions from these in their transport and disposal. Currently, York and North Yorkshire's Routemap to Carbon Negative focuses on scope 1 and 2 emissions, with the aim to reduce scope 3 emissions through the actions in the Routemap.

Importance

Only accounting for scope 1 and 2 emissions can mean that scope 3 emissions are left to grow, especially as the UK decarbonises and utilises more products and materials from abroad. Decarbonising in the UK and relying more on products and services from overseas can lead to offshoring, where 'the performance of any part of the services or a solution under a contract may occur outside the UK for domestic (UK) consumption' (DWP, 2016). These emissions may then not be counted towards the UK's carbon footprint, or not as accurately as they were before. The danger of not accounting for scope 3 emissions is that we do not have a full picture of emissions, and that as scope 1 and 2 emissions are reduced, scope 3 emissions rise or become a larger part of our overall emissions.

Scope 3 emissions will represent different things for different types and levels of organisations, but can account for a large percentage of their emissions. For example, scope 3 emissions for companies often account for 70% or more of their total carbon footprint (Global Compact Network UK). For Local Authorities, scope 3 emissions usually represent between 70% and 80% of their total emissions (LGA, 2021a). There is very little information about regional scope 3 emissions or country scope 3 emissions, however this does represent an opportunity for York and North Yorkshire to be at the forefront of emissions reporting.

Reporting

Scope 3 emissions are more difficult to look at than scope 1 or 2, mostly because other organisations or individuals often have the data, which leads to estimates rather than concrete figures. The process for reporting on scope 3 emissions may involve:

- Emissions mapping – finding out what the emissions sources are, whether there is any existing data for this and what the accuracy of this data is.
- Gathering data – finding any data to fill the gaps and utilising any other data to build a baseline.
- Prioritise – look at which emissions may have the most meaningful impact including cost, benefits, speed etc.

Approaches

The UK’s sixth Carbon Budget now better reflects the UK’s contribution to global emissions, as it incorporates ‘international aviation and shipping emissions’ (HM Government, 2021), but scope 3 emissions are still not examined as much as scope 1 and scope 2. Some approaches to scope 3 emissions reporting are detailed below. If the links in the below table do not work, please try copying and pasting them into your browser.

Group	Approach	Link
Local Government Association (LGA)	Utilising the Greenhouse Gas Accounting Tool, the LGA gives some guidance for looking at the GHG emissions used in social care for local authorities, including scope 3 emissions.	Scope 3 greenhouse gas accounting guidance for social care Local Government Association Greenhouse Gas Accounting Tool - Local Partnerships
Ashfield District Council	Ashfield District Council used a mixture of methodologies which can be viewed in appendix 4. They then categorised the data by SIC code and covered 37 of these. They examine purchased goods and services, capital goods, fuel and energy, upstream transport and distribution, waste, business travel, commuting, downstream leased assets and investments. Accounting for their scope 3 emissions in 2019/2020 led to a 64% increase compared to their 2015/16 emissions, showing how much of difference scope 3 emissions can make.	Scope 3 Emissions - Ashfield District Council
Enfield Council	Enfield council detail their scope 3, including their baseline from 2018-2019. They include capital goods, fuel and energy related activities, business travel, downstream leased assets and outsourced services etc. Most of their scope 3 emissions relate to council housing, especially the emissions from construction. The council’s scope 1 and 2 emissions in 2020/2021 are 17,480 tCO ₂ e, and their scope 3 for the same period are 55,093 tCO ₂ e. They used the internationally accepted GHG protocol for corporate accounting.	Enfield-Carbon-Emissions-Review-20-21-Environment.pdf
Westminster City Council	Westminster City Council account for scope 3 emissions including fuel usage of external contractors. Scope 3 emissions account for	Carbon emissions reporting Westminster City Council

	7621 tCO ₂ e of the total 39553 tCO ₂ e in 2020-2021. However, employee commuting, council leased vehicles and other areas are excluded because there is a lack of data. They calculate their emissions using the UK Government GHG Conversion Factors for Company Reporting.	
Leicestershire County Council	Leicestershire County Council do not account for all their scope 3 emissions due to cost and availability, but they do look at business mileage, electricity consumption, water supply and treatment and waste. These emissions accounted for 11% of their total emissions in 2020-2021. They used the Government's Environmental Reporting Guidelines and the Greenhouse Gas Protocol.	Greenhouse Gas Emissions Report 2020/21 (leicestershire.gov.uk) Guidance Greenhouse Gas Protocol (ghgprotocol.org) Environmental Reporting Guidelines (publishing.service.gov.uk) Leicestershire County Council Net Zero Pathways and Scope 3 Emissions Study - Buro Happold
Hull City Council	Hull city council currently only collects staff data for scope 3 that looks at vehicle and water use.	Carbon Emissions Council and City of Hull Hull City Council Environment and climate change strategy 2010-2020 (hull.gov.uk)
Durham City Council	Durham City Council do account for some scope 3 emissions, but most of these are those that have moved from scope 1 and 2 because they are no longer under their control such as schools. Their scope 3 emissions for 2020-2021 are 19,922 CO ₂ e compared to 16,700 CO ₂ e for scope 1 and 12,275 CO ₂ e for scope 2, again a significant proportion of the total.	The council's carbon footprint - Durham County Council
London Borough of Redbridge	The council do account for scope 3 emissions, but they note that these emissions are estimates because of the complexity of the data. They include emissions from dwellings leased to tenants and from goods and services, as well as investments. They estimate scope 3 emissions because consumption data is unavailable, but are working to develop a more accurate framework.	Redbridge - Overview of Emissions Cabinet Tuesday, 8th June, 2021 7.15 p.m. (redbridge.gov.uk)
Cambridgeshire County Council and University College London	This council utilised a quantitative Carbon Calculator and a qualitative Code of Practice to measure emissions and as best practice. They found that most scope 3 emissions for Local Authorities come from their procurements.	Cambridgeshire County Council and University College London: Procurement tools to measure and reduce carbon emissions Local Government Association

WRAP	WRAP are in the process of creating a shared framework for measuring scope 3 emissions and getting better access to data specifically for the food and drink industry, which typically sees 90% of its emissions coming from scope 3 sources.	A CONSISTENT MEASURE FOR SCOPE 3 EMISSIONS FOR THE FOOD AND DRINK INDUSTRY IS COMING WRAP
LGA	The LGA has a guidance document for local authorities with details of how to examine their scope 3 emissions. They estimate that about 54% of local authorities currently report on scope 3 emissions for their own operations. Only 33% are reporting on scope 3 emissions for the local area. This guide may help Y&NY LEP to design research into regional scope 3 emissions, and help local authorities to examine their own scope 3 emissions.	Climate Change: reporting guidance for local authorities Local Government Association
Journal of Cleaner Production	This study employed the IPCC emissions accounting method for electricity. The study found that the scope 2 and 3 emissions of electricity-related carbon were much higher than scope 1 emissions in Shanghai. The study concluded that an increase in scope 3 emissions came from an increase in population and increased per capita electricity consumption.	Multi-scope electricity-related carbon emissions accounting: A case study of Shanghai - ScienceDirect
Higher Education Funding Council for England (HEFCE)	This series of studies have looked at measuring scope 3 emissions for the higher education sector. They include business travel, commuting, waste, water and procurement. For each study, there are different models which might be applicable to getting data for our region.	HEFCE - Measuring scope 3 carbon emissions EAUC

Scope 3 Emissions and Net Zero

As discussed in the whole life carbon cost of dwellings, the tools we are using to reach net zero including solar panels, electric cars, heat pumps etc., all generate greenhouse gas emissions when they are made. Emissions from the manufacture, transport and some installation are counted as scope 3, and therefore have little bearing on GHG emissions reductions targets on UK soil, despite being very important. More research needs to be done into what these emissions may represent.

Net Zero Item	Impacts
Solar panels	Solar panels require resources to make, many of which are sourced overseas, such as silicon, glass and metal. There are over 350 companies worldwide that manufacture PV cells in countries like Canada, China, Germany, Japan and the USA (The Renewable Energy Hub, 2022b). More than 50% of the embodied carbon impact comes from the panels themselves, but aspects such as mounting systems, ballast, inverters and optimisers also contribute to the impact (ELEMENTA, 2022). However, this impact is gradually decreasing, and the thought process is that 'we need to 'invest' embodied carbon into installing renewable energy

	infrastructure’ (ELEMENTA, 2022) to decarbonise and to drive renewable energy production into the UK, which will in turn reduce those embodied emissions further as more production is done in the UK.
Heat Pumps	Heat pumps have complex parts. Most of their emissions in the manufacturing stage come from metals and refrigerant gas that are used, but if these elements are recycled then this should mitigate the environmental cost (The Renewable Energy Hub, 2022a). However, there is not currently that much research available.
Insulation	Insulation can be made from lots of different materials, all of which have slightly different carbon emissions and sources. For example, cork has less embodied carbon than expanded polyurethane, and cork can sequester more carbon during its use (Bull). Foams in particular are often made with hydrofluorocarbon (HFC) agents or blowing agents that end up in the atmosphere (Emerson, 2020). More eco-friendly insulation materials such as cellulose insulation, wood wool, cork, hemp and sheep’s wool are generally recommended because they are recyclable or compostable, not because of the distance they’ve travelled or because the production process is more sustainable.
Biomass Boilers	Biomass boilers are generally made from a lot of different materials. In one example, steel, copper, cast iron, glass wool, nylon, glass fibre, refractory material and wood packaging were all key materials (Longo et al.). These materials are likely to have come from countries overseas. For example, the biggest steel producer is China, closely followed by India and Japan (World Population Review). One analysis of the manufacture of one type of heat pump found that high electricity and raw materials consumption as well as high scraps production contribute to the Global Energy Requirement of this product. However, more research needs to be done/located to fully understand biomass boiler emissions.
Airtightness	There is very little research on the embodied carbon of activities and materials that make things airtight. Methods to address draughts include using caulking, weather stripping, having double or triple glazing, replacing exterior doors and reinsulating homes. All of these will have carbon impacts, especially as many of these methods require materials like plastic, metal and foam. However, there is again very little specific research.

With all the above examples, there is very little research about the scope 3 emissions in net zero technologies including how the materials travel to the UK. This illustrates the main problem when looking at scope 3 emissions – there is not enough information available to truly understand our scope 3 emissions. However, with net zero technologies specifically, the general consensus is that their involvement is key to reducing our overall emissions, and so any carbon cost associated with them is outweighed by their benefits.

Actions so far

As of the 24th of August, there has been a short meeting between Lucy Allis (Local Authorities Climate Action Coordinator) and Alex Massie from Eunomia, who previously worked with the LEP on our Local Authorities Procurement Toolkit. In this meeting, Alex outlined the possibilities for finding out more about York and North Yorkshire’s scope 3 emissions, and discussed some previous approaches. He emphasised how difficult it can be to get accurate data for scope 3 emissions, and

that as a result, any conclusions drawn would be more useful to inform general direction for action rather than as a concrete set of data to inform action. However, he did agree that scope 3 emissions are important to consider, and that they are often a large contributor to the overall emissions of a company, city or region.

Conclusions

Although scope 3 emissions are difficult to measure and change, it is crucial that we consider them in our journey to net zero, because otherwise the measures put in place may not have as large an impact on global emissions. The first step for this is to establish a baseline for scope 3 emissions and to examine where they overlap with scope 1 and 2. However, following the conversation with Eunomia, it seems that establishing a detailed baseline at this time may not be possible, or particularly helpful, especially if the data cannot be used to inform action.

Therefore, the proposed action is to undertake some research internally using data we already have from local authorities, and literature from other regions, countries etc., to establish what areas are most likely to have the biggest scope 3 impact. This should be completed by the end of 2022, and may form a basis for more extensive scope 3 research in the future.

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