Citywide Progress 2020-21 Appendix 1

Staying within our carbon budgets: Where do our emissions come from?

There are three main sources of CO2 emissions that Manchester is responsible for or which we have influence over:

- Direct (energy-related) CO2 emissions: from homes, workplaces and ground transport activities inside the city.
- Aviation CO2 emissions: from flights taken by Manchester residents and organisations, from Manchester and other UK airports. Also recognising that we have a responsibility to work with UK Government, UK airports and others to ensure that emissions from all flights from Manchester Airport are in line with the Paris Agreement.
- Indirect / consumption-based CO2 emissions: from the things that we buy and ultimately dispose of, for example, food, clothes, phones, electrical equipment, furniture, construction materials, many of which are produced outside of the city."

Staying within our carbon budgets: Direct Emissions

Prepared by Dr Chris Jones (University of Manchester)[1]

Manchester's direct energy use carbon dioxide (CO_2) emissions fell by 3% between 2018 and 2019 [1]. A provisional estimate[2] for 2020 suggests that emissions may have fallen by a further 11% in the past year due to Covid-19 restrictions.

Figure 1 shows Manchester's historic energy related CO_2 emissions (emissions from direct fuel use in buildings, transport and industry, and electricity on a Scope 2 basis), with estimated emissions for 2019 and 2020 based on the national trend. The figure also shows the recommended emissions pathway related to the Manchester carbon budget. The estimated annual energy use emissions of CO_2 for Manchester in 2020 are 1.8MtCO_2.

[1] **NB**: All views contained with this report are attributable solely to the author and do not necessarily reflect those of researchers within the wider Tyndall Centre for Climate Change Research.

[2] The interim provisional estimate provided here is based on the latest provisional statistical release for UK territorial energy related CO_2 emissions (international aviation, shipping and land use CO_2 emissions removed for consistency with local data) at the time, which covers 2019 and 2020 [3]. This analysis applies the % year on year change for these emissions at the national level to the latest local authority emissions data for Manchester. This therefore assumes that in 2019 and 2020 Manchester followed the national trend in CO_2 emissions. For reference last year's update report set a provisional emissions change estimate of 4% based on the national trend while 3% was seen in the final data release.

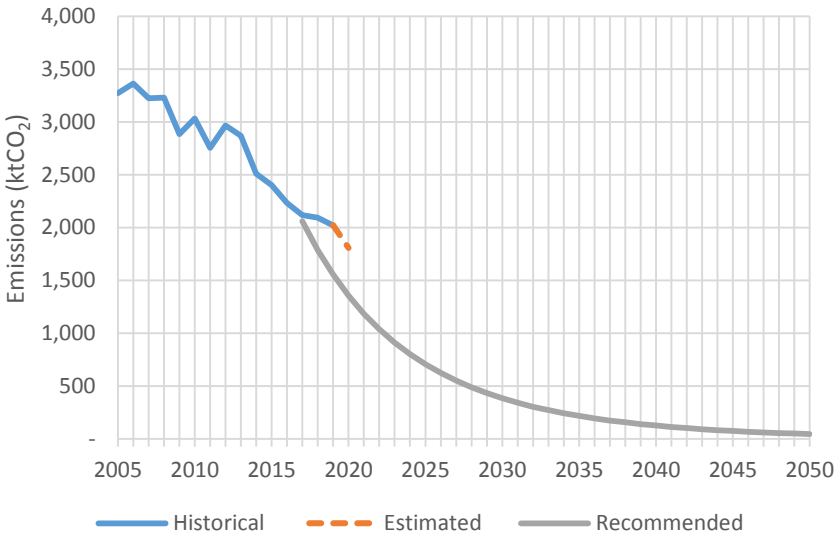

Figure 1: CO_2 Emissions for Manchester (Exc. LULUCF) and Recommended Emissions Pathway for the 2038 Carbon Budget

The latest data release on regional and local CO_2 emissions covers the period of 2005 to 2019. There have been some changes to the methodology for producing local CO_2 emissions sets (See [1]). These have primarily affected land-use based emissions but have also had implications for the energy CO_2 emissions attributed to the city. The variation is negligible for the 2009 to 2011 period but there is an upward revision of energy CO_2 emissions for 2011 to 2018 in the Manchester LA. Table 1 shows how emissions attributed to Manchester in BEIS Local and Regional Database have changed between the 2020 and 2021 releases. The 2021 data release is used in the rest of this report.

	Manchester LA CO_2 Emissions (exc. LULUCF) 2020 Data Release ($ktCO_2$)	*Manchester LA CO_2 Emissions (exc. LULUCF) 2021 Data Release ($ktCO_2$)*	*% Difference in Attributed Emissions*
2005	3,275	3,275	0.0%
2006	3,364	3,365	0.0%
2007	3,224	3,225	0.0%
2008	3,230	3,230	0.0%
2009	2,884	2,885	0.0%
2010	3,030	3,033	0.1%
2011	2,745	2,755	0.4%
2012	2,951	2,966	0.5%
2013	2,853	2,871	0.6%
2014	2,487	2,511	1.0%
2015	2,374	2,404	1.3%
2016	2,196	2,235	1.8%
2017	2,075	2,118	2.0%
2018	2,035	2,094	2.9%

Table 1: Comparison of Energy Related CO_2 Emissions Attributed to Manchester in 2021 and 2020 Local and Regional Carbon Dioxide Database Statistical Releases.

Manchester 2020 Carbon Target

Manchester has a long-standing carbon commitment to reduce scope 1 and 2 emissions by 41% against a 2005 baseline by 2020. This would equate to a carbon budget for 2005 to 2020 of 41.7 $MtCO_2$ with a linear (straight-line) reduction rate. Including the provisional figure 2020, emissions for 2005 to 2020 were 42.8 $MtCO_2$. With the influence of the pandemic Manchester has bettered its 2020 end point goal, with emissions in 2020 45% lower than in 2005, however the implied budget for the period was exceeded by 3%. Without the 11% reduction in emissions largely driven by lockdown restrictions in 2020 it is still likely that Manchester would have still achieved this end point target, having reached a 41% reduction in emissions against the 2005 baseline in 2019.

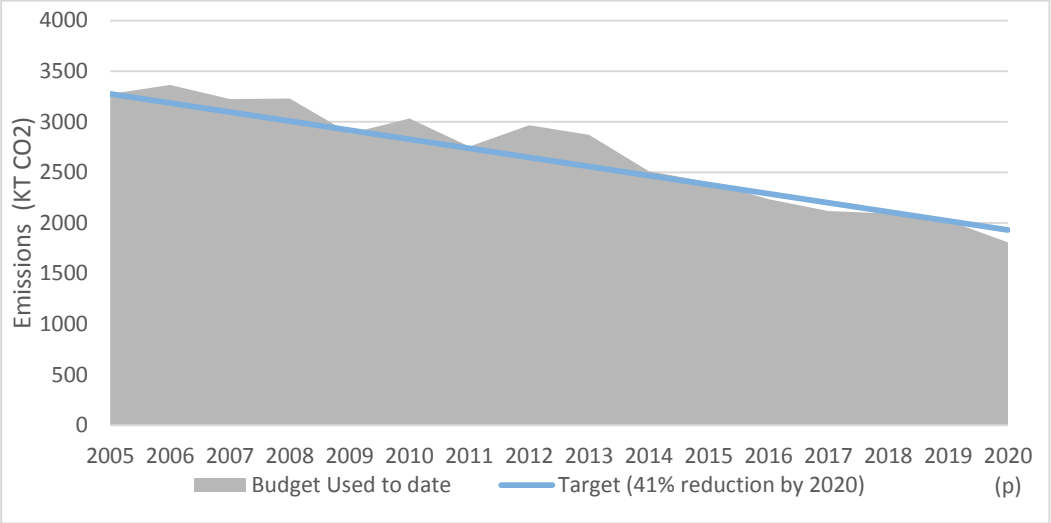

Figure 2: Progress Against Manchester's 2005 to 2020 Target. Data from [1] and Provisional Estimate Based on National Emissions Trend (p).

Progress Against the 15 $MtCO_2$ Carbon Budget for Making a Fair Contribution to Meeting the UNFCCC Paris Agreement

Manchester has committed to a carbon budget that positions it to make a fair contribution to meeting the goals of the United Nations Paris Agreement. This sets a commitment for the city to limit its carbon emissions from energy from 2018 onwards to 15 $MtCO_2$ [2]. The figure below shows Manchester's emissions [1] (provisional for 2020) compared to a pathway that evenly distributes the carbon budget over time. The emissions trend in the first three years of the carbon budget period (though 2020 is a provisional estimate) show Manchester is not yet following the recommended pathway, meaning that the carbon budget is being used at a faster rate. The distribution of the carbon budget can be varied in a number of ways, however slower reduction rates must be compensated for by faster reduction rates in the future to keep within the budget. Notably the estimated 11% drop in emissions due to Covid-19 restrictions do not match the rate of mitigation needed to get Manchester onto the emissions pathway to stay within the carbon budget. An average reduction rate of 16% per year would now be required to stay within the budget based on an even distribution of the budget.

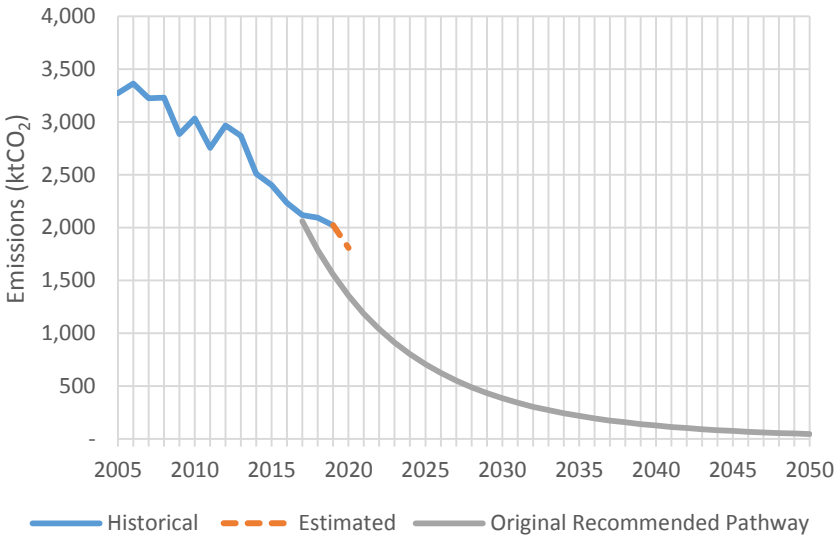

Figure 3: Progress in Reducing Energy Related CO_2 Emissions Against UN Paris Aligned Carbon Budget

The figure below shows how much of Manchester's carbon budget, split into 5-year periods have been used so far. In the first three years 86% of the 2018 to 2022 interim carbon budget has been used. This means that Manchester will almost certainly exceed the first interim budget. The extent to which it does will depend on whether emissions resume, exceed or reverse pre-pandemic trends.

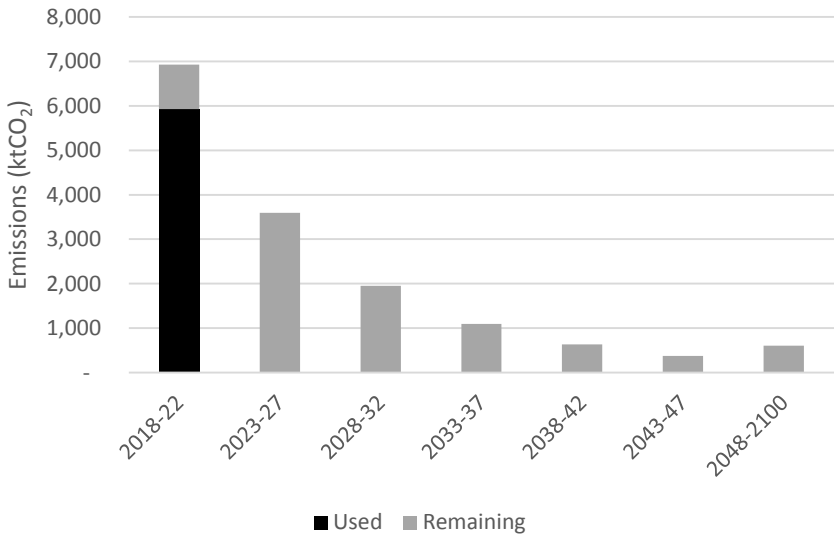

Figure 4: Manchester's Adopted Paris Agreement Aligned Carbon Budgets by Interim Period.

Pre-Covid Emissions Direct Emissions Trend

Due to the Covid-19 pandemic 2020 is a highly irregular year for emissions data. According to the provisional emissions data from BEIS, emissions fell by 11% in 2020 [3]. The biggest contributor to this reduction appears to be transport which had the largest proportional (20%) and absolute (24MtCO_2) decline over the year for the UK as a whole [3]. This sector has strong potential for a rebound if transport demand

is not shifted to active travel and public transport modes on the relieving of Covid-19 restrictions.

Overall, there are considerable risks to Manchester staying within its carbon budget. Previous decreases in UK and Manchester emissions can largely be attributed to the decarbonisation of the UK national grid since 2012. Future emissions reductions will necessarily involve demand and technology changes for transport and the heating of buildings within Manchester itself. Manchester, as with the UK as a whole [4] is not yet on track to meet a Paris Agreement aligned carbon emissions pathway for well below 2˚C of global warming.

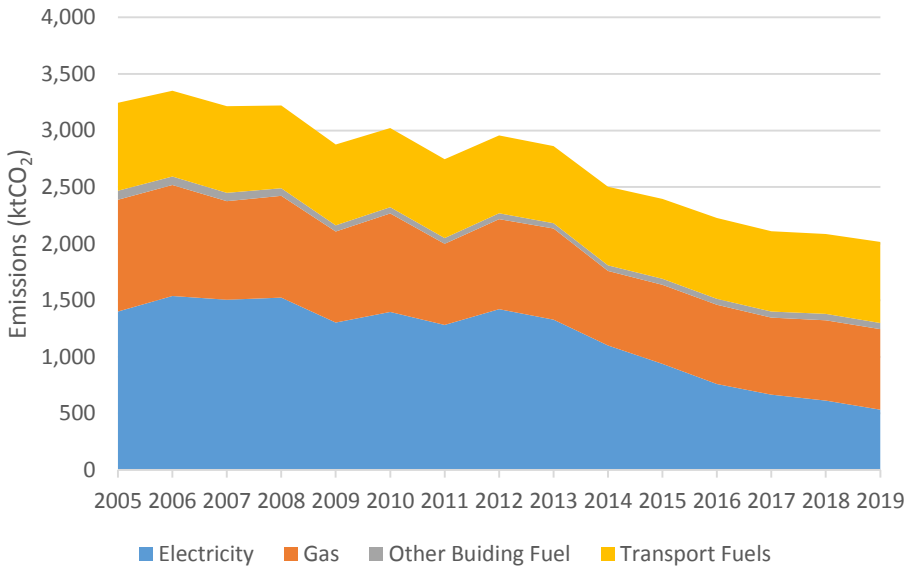

Figure 5: Manchester Direct Energy CO2 Emissions by Fuel Type 2005 to 2019 [1]

Figure 6 shows how Manchester's direct energy use emissions have changed between 2005 to 2019, as reported in BEIS Local and Regional CO_2 Database. It shows how the significant reduction in electricity use emissions from around 2012 is the main contributor to emissions savings to date. Figure 7 shows that this has happened while Manchester's population has grown, with electricity use emissions falling 64% between 2005 and 2019, while the population grew by 18% over the same period – highlighting the potential for emissions to reduce while population grows. The Figure also shows however that per capita transport and building heating emissions have not fallen significantly and have been largely static since 2013.

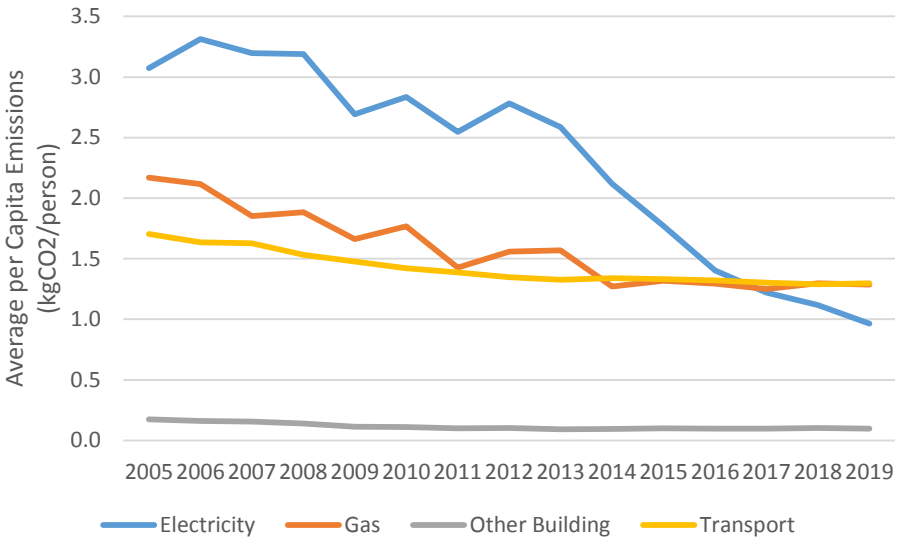

Figure 6:Manchester Direct Energy Use Emissions Averaged per Capita [1]

According to the BEIS data, vehicle emissions on minor roads are an important contributor to the lack of reductions in transport. Across road transport, emissions have reduced very little over the past decade, with an increase in the 2018 to 2019 period. This is likely primarily due to growing vehicle use on minor roads, offsetting some reduced emissions on A-Roads. This also has implications for local air quality and vehicle emissions related ill-health and deaths. There is a wider national trend on transport emissions starting to increase pre-Covid-19 [3] which may reflect changes in the vehicle stock towards heavier petrol and diesel vehicles.[3]

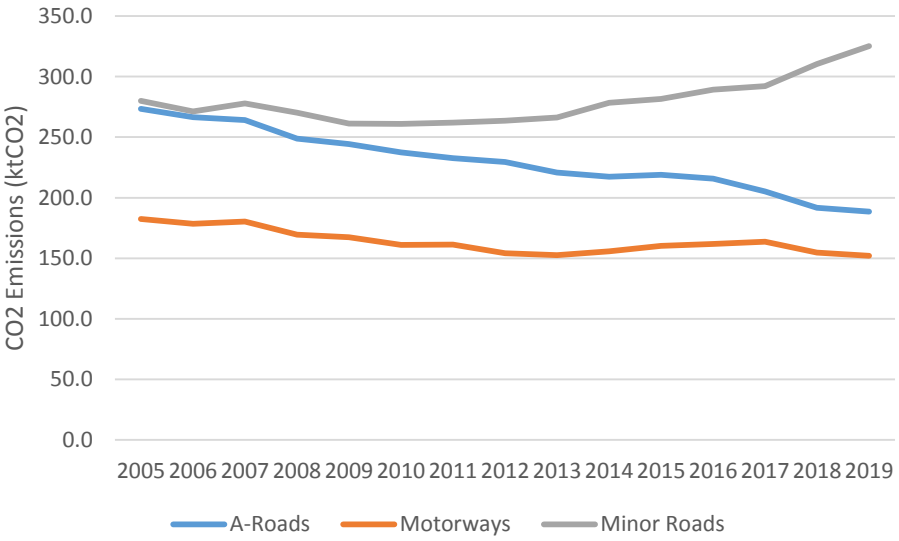

Figure 7: CO2 Emissions from Transport in Manchester LA area [1].

A return to pre-pandemic trends will see Manchester continue to drift off-track from the rates of carbon reduction needed to stay within its Paris Agreement aligned carbon budget. While decarbonisation of the National Grid and improved energy efficiency in electrical appliances will continue to produce some further emissions

[3] See https://www.iea.org/commentaries/growing-preference-for-suvs-challenges-emissions-reductions-in-passenger-car-market

savings, this alone will not put Manchester on track to meet its climate change goals. City-wide initiatives to tackle natural gas use in homes and fossil fuel transport in Manchester are needed so that these sectors pull their weight. This is a situation replicated at the UK national level where there is a widening gap between stated ambition and policy to achieve this [4]. This risk is amplified if changes post-Covid restrictions, particularly in transport, lead to a rebound in emissions to greater than 2019 levels. It is therefore a critical time for determining whether Manchester can meet its goal on direct energy use CO_2 emissions.

References

[1] Department for Business, Energy and industrial strategy, “UK local authority and regional carbon dioxide emissions national statistics: 2005-2019,” 2021. [Online]. Available: https://www.gov.uk/government/collections/uk-local-authority-and-regional-carbon-dioxide-emissions-national-statistics%0A.

[2] J. Kuriakose, K. Anderson, J. Broderick, and C. Mclachlan, “Quantifying the implications of the Paris Agreement for the City of Manchester,” 2018. [Online]. Available: http://www.manchesterclimate.com/sites/default/files/Manchester Carbon Budget.pdf.

[3] Department for Business, Energy & Industrial Strategy, “Provisional UK Greenhouse Gas Emissions National Statistics 1990-2020,” 2021. [Online]. Available: https://www.gov.uk/government/statistics/provisional-uk-greenhouse-gas-emissions-national-statistics-2020.

[4] Climate Change Committee, “Progress in reducing emissions 2021 Report to Parliament,” 2021. [Online]. Available: https://www.theccc.org.uk/publication/2021-progress-report-to-parliament/.

Staying within our carbon budgets: Aviation Emissions

The COVID-19 pandemic had an unprecedented impact on many sectors of the economy, and the aviation industry had a particularly significant impact.

Restrictions on non-essential travel saw passenger numbers at Manchester Airport fall by 94% from 29.3 million in 2019 to 1.6 million in 2020.

Reduced demand and social distancing also led to a marked drop in load factors from 82% in 2019 to 64.5% in 2020. With planes flying with fewer passengers, this in turn led to a 63% increase in emissions per passenger.

As a result, we estimate that the fall in emissions from flights from Manchester Airport was slightly less steep than that in passenger numbers - a 91% reduction from 3.7 million tonnes CO_2 in 2019 to 0.34 million tonnes CO_2 in 2020.

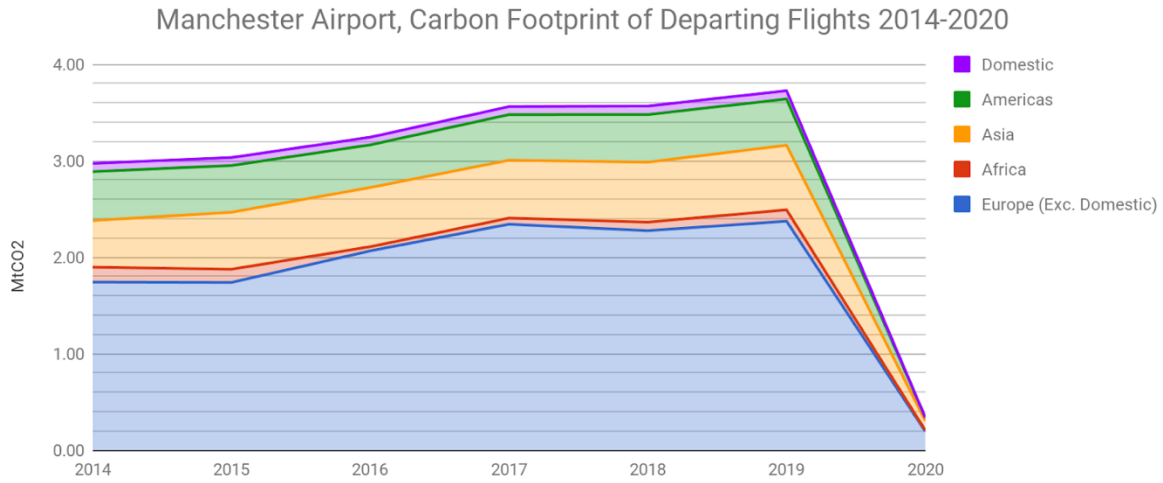

Figure 8: Manchester Airport, Carbon Footprint of Departing Flights 2014-2020

In comparison, UK aviation emissions are projected to have fallen by 75% from 37 million tonnes CO_2 in 2019 to 9.4 million tonnes CO_2 in 2020.

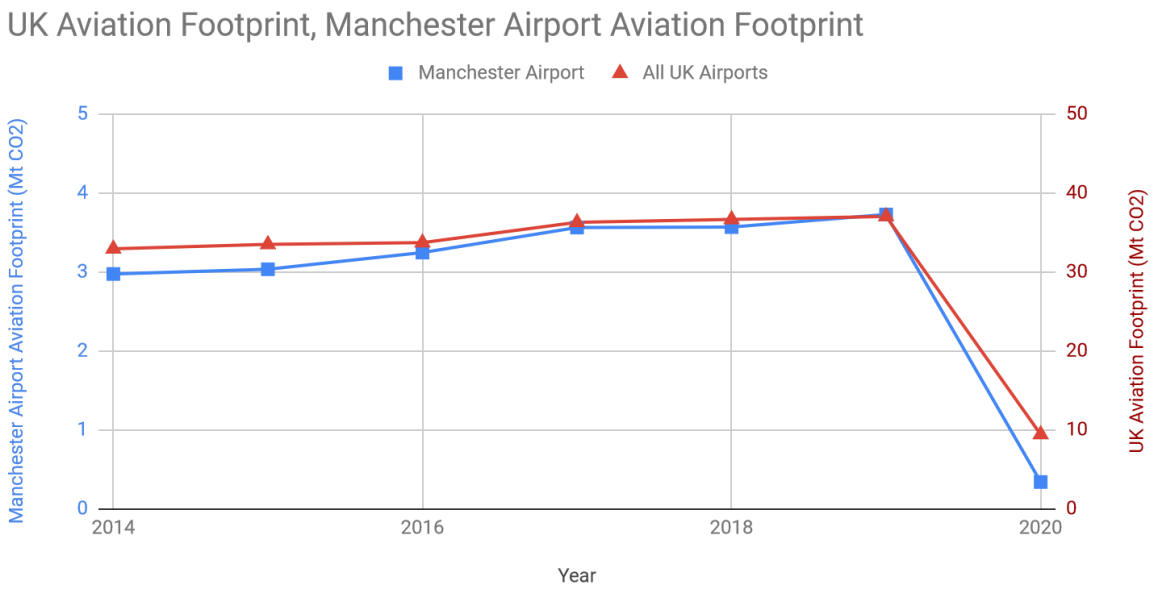

Figure 9: UK Aviation Footprint, Manchester Airport Aviation Footprint

Emissions from flights taken by Manchester residents from all UK airports followed a similar trend, falling by 91% from 0.19 Mt CO_2 in 2019 to 0.018 Mt CO_2 in 2020.

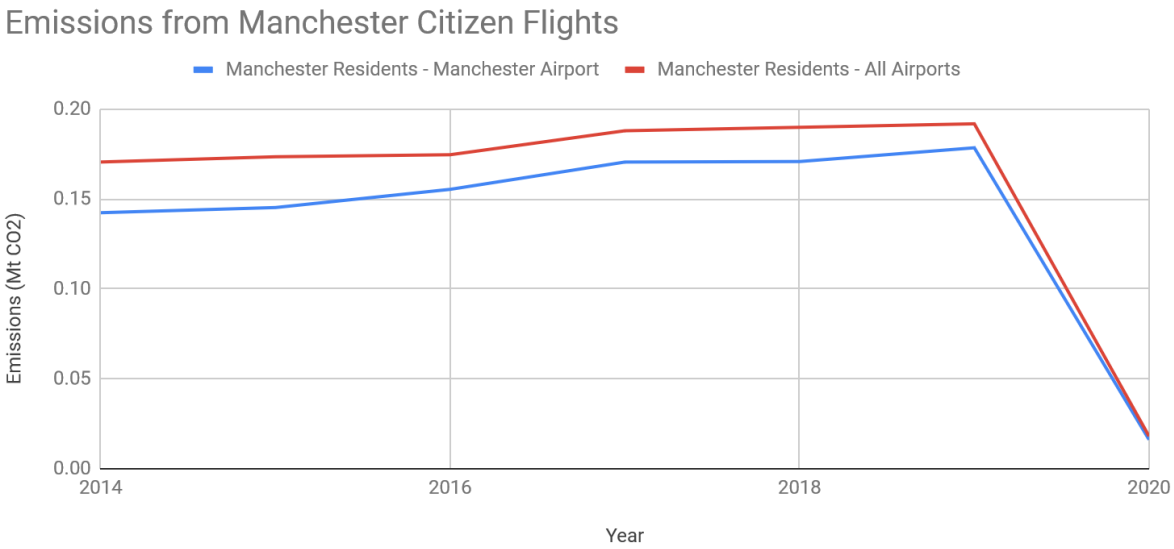

Figure 10: Emissions from Manchester Citizen Flights

In the last year, we've also seen the publication of two notable reports on future UK aviation pathways:

- In 2020, Sustainable Aviation - a coalition of UK airlines, airports, and manufacturers - issued its roadmap to net zero to 2050 through technological improvements, sustainable aviation fields and carbon offsetting and removal, followed in June 2021 by an update with interim targets.

- The Climate Change Committee published its Sixth Carbon Budget, which recommended that aviation emissions in 2030 should be 20% below 2019 levels, without carbon offsetting or removal.

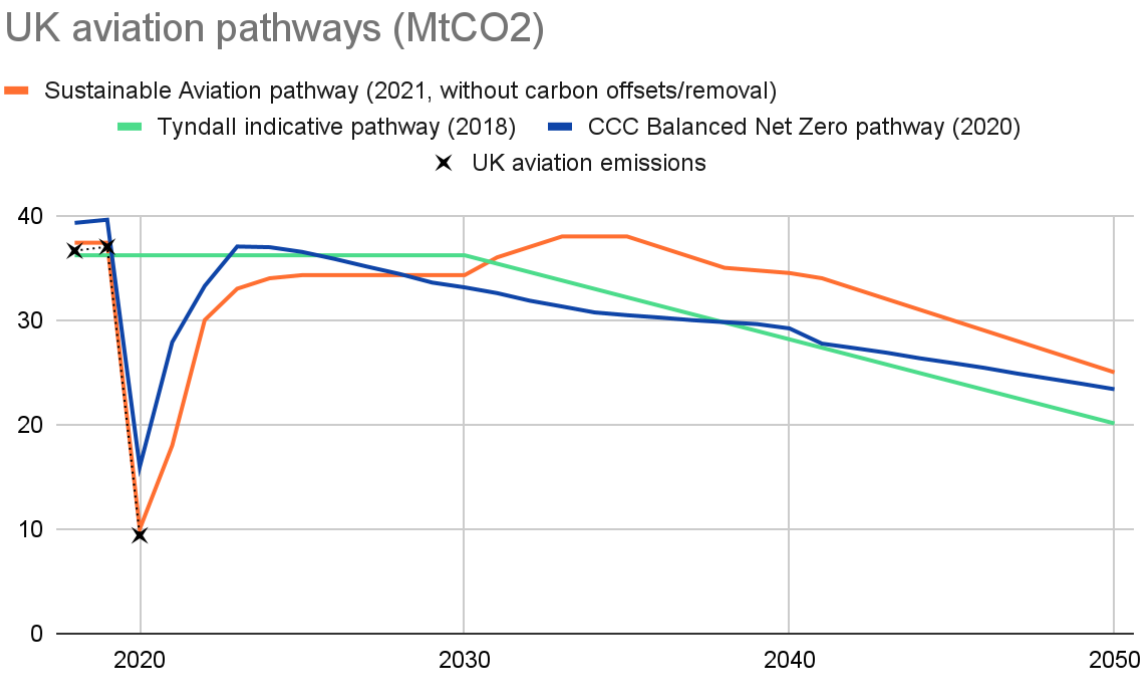

Figure 11: Figure 11 UK Aviation Pathways (MtCO2)

There is still a great deal of uncertainty about the speed and nature of the aviation industry's recovery. The industry is expecting a relatively quick rebound in leisure flights, but the future trajectory of business flights is less clear with virtual meetings having become embedded during the pandemic.

The aviation sub-group will continue to monitor aviation emissions, and work with the Partnership to help members play their part in keeping to a pathway aligned with the Tyndall carbon budget and the recommendations of the Climate Change Committee.

Staying within our carbon budgets: Consumption-based Emissions

A consumption-based approach measures all of the carbon emissions consequent of goods and services consumed within the city, regardless of where they are produced. This contrasts the 'direct' or 'production-based' approach that underpins Manchester's zero-carbon budget, which instead relates to emission directly occurring within the city and those underpinning the electricity it consumes.

A consumption-based approach is therefore an alternative way to understand the impact of Manchester's actions on planetary carbon emissions. Consider, for instance: a punnet of strawberries grown in Cheshire; a mobile phone manufactured in Zhengzhou, China; or cement produced in the Peak District, each of these are used by Manchester Residents, but their production creates emissions counted in other places.

According to a study led by C40 Cities Group, the consumption-based emissions of large cities like Manchester need to be reduced by two-thirds[4] within the next decade to ensure that we play our full part in meeting the Paris Agreement. These would be overlooked if we only focused on direct emissions - which is why tackling our consumption-based footprint in parallel is vital for a more holistic picture.

The Manchester Climate Change Framework 2020-25 committed to better understanding the broader climate change impact of the city's consumption of goods and services and to take action to develop more sustainable consumption practices for the city's residents and organisations.

Understanding Manchester's Consumption-Based Footprint

In November 2019 the Tyndall Centre was commissioned by the Manchester Climate Change Agency to review the city's climate change targets. As part of this review Dr Christopher Jones made a series of recommendations on how Manchester might measure and manage its consumption-based emissions[5].

This review noted that obtaining accurate and up-to-date data for city-level consumption-based footprints is a major challenge. Centrally, city-level consumption-based footprints rely heavily on assumptions, downsampling and estimations, painting a fuzzy picture. The lack of local data also means it is very hard to account for change that is specific to Manchester. We cannot, therefore, currently effectively track our progress year-on-year or set consumption-based emissions targets.

Based on a study by the C40 Cities Group[6] and the results of the Tyndall centre study we had previously made a very rough estimate that Manchester's consumption-based footprint was around 60% greater than its production-based footprint - around 3.3 MtCO2e for 2017. More recently, the Centre for Research into Energy Demand Solutions (CREDS) has developed a place-based consumption-

[4] https://www.c40.org/consumption
[5] https://www.manchesterclimate.com/sites/default/files/Consumption Based Carbon Target Setting.pdf
[6] https://www.c40.org/researches/consumption-based-emissions

based carbon calculator[7]. Though they also paint a somewhat fuzzy picture due to the data issues described above, their work has offered a greater resolution of understanding as they draw upon UK-specific data and break down the footprint into numerous sectors.

CREDS estimate that Manchester residents are responsible for 5,645.3 kgCO2e - 29% lower than the England average (Figure 13). Based on the population of the city in 2019 we can estimate a total consumption-based footprint of 3.12 MtCO2e for Manchester in the year 2019.

The largest proportion of our consumption-based footprint is estimated to be from flying (17%), followed by food and drink (16%) and gas usage (15%).

It is too early to say what effect the UK COVID-19 lockdowns and their economic consequences might have had on our consumption-based footprint. One study in Italy predicted that consumption-based emissions had fallen by 20%[8], whilst planetary emissions fell by around 7%[9].

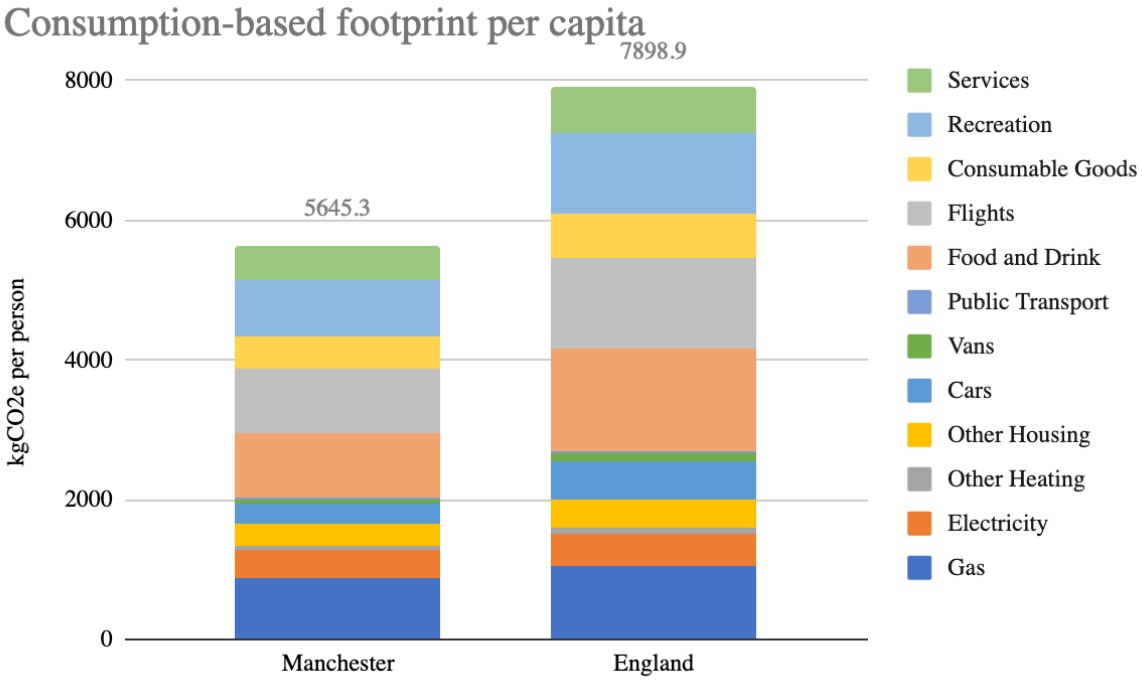

Figure 12: Estimated consumption-based footprint per capita for the City of Manchester compared to England. Adapted from CREDS[10].

Decarbonising Consumption Hotspots in the COVID-19 Recovery

Jones (2019) advised that action should focus on the following consumption-based emissions hotspots: food and drink, transport, construction, clean and waste water, and other manufactured goods. In February 2021 Dr Jane Wendler and Dr Joe

[7] https://www.carbon.place/la/
[8] https://doi.org/10.1016/j.scitotenv.2020.139806
[9] https://www.globalcarbonproject.org/carbonbudget/
[10] https://www.carbon.place/la/

Blakey extended this review to look at how these consumption-based emissions hotspots can be decarbonised in the economic recovery[11] from novel coronavirus (COVID-19). It brought together academic and grey literature alongside insights generated from two workshops with academics, organisations and citizens held in October 2020 to explore the 'low hanging fruit' alongside the more radical actions necessary to keep us within safer levels of warming. Meanwhile, Dr Josephine Mylan undertook a 'deep dive' study on the role of food in particular. Both studies made inroads for strategizing on mitigating consumption-based emissions in the pandemic recovery and will form an appendix to the refresh of the Manchester Climate Change Framework.

The first report highlighted the need for a climate-first recovery from the COVID-19 lockdown. Economic recovery interventions from policy-makers have tended to encourage consumption and thus risk increasing consumption-based carbon emissions. Cities have a key role to play in ensuring this does not happen.

It also highlighted the key role of tackling inequalities in consumption. Consumption-based emissions of the poorest half of citizens fell by nearly a quarter in the years between 1990 and 2015 and grew by 3% for the richest 10%[12]. At the same time, the richest 10% of the world's population are responsible for more than half of the world's emissions. It is estimated that the richest 10% had a net worth (financial assets, plus real assets, minus debts) of around £67,500 in 2018[13].

The reports also made a series of more specific recommendations for actions on each hotspot:

> **Food and drink** - included supporting a low carbon food culture, low carbon school meals, creating a better work life balance to allow people to engage more in sustainable food practices, and promoting low carbon food in workplaces. Dr Mylan's forthcoming 'deep dive' report will similarly advocate a systemic approach, leveraging Manchester's role in generating demand for food, by engaging with activities such as:
>
> - food processing by businesses, food retail, and the hospitality sector;
> - the provision of meals in public contexts (e.g. schools and hospitals);
> - shaping the infrastructure provided to households (e.g. proximity of food retail to housing; waste collection; transport); and
> - direct engagement with consumers (e.g. through education and information campaigns).
>
> It also highlights the multiple economic, social and environmental co-benefits of addressing key problem areas identified in the city's food provision, including reducing food waste, meat consumption, single use plastics and food insecurity.
>
> **Construction** - included enforcing carbon indicators in planning and procurement, encouraging experimentation in low carbon construction,

[11] https://www.manchesterclimate.com/green-recovery/decarbonising-consumption
[12] https://www.oxfam.org/en/research/confronting-carbon-inequality-european-union
[13] https://www.cnbc.com/2018/11/07/how-much-money-you-need-to-be-in-the-richest-10-percent-worldwide.html

creating a local base of low-carbon skills, and building only when absolutely necessary.

Other manufactured goods - included removing advertisements for high-carbon goods from public spaces, decarbonising final mile delivery through bicycles, buying less and buying better, and working to move away from our high-consumption and often throwaway culture.

Waste and wastewater - included tackling food waste by supporting businesses that redistribute it, reducing water demand (and hence the need for treatment), moving towards low-consumption and circular economies, and creating better waste management infrastructure to avoid landfill and incineration.

Transport beyond the city - included accelerating active travel schemes, enabling cycles on trams, encouraging working from home, discouraging international business travel, and addressing travel inequalities (aviation, for instance, accounts for around half of the emissions of the super rich[14]).

Moving Forwards

The Consumption-Based Emissions Sub-Group of The Manchester Zero Carbon Advisory Group, led by Dr Joe Blakey (The University of Manchester), will work to expand our understanding of Manchester's consumption-based emissions, enabling the city to better monitor and manage them.

We will continue to work towards tackling these hotspots, whilst also improving our understanding of Manchester's overall consumption-based footprint and working to track changes year-on-year.

Dr Joe Blakey
Dr Josephine Mylan
Dr Jana Wendler
(The University of Manchester)

[14] https://www.nature.com/articles/s41558-019-0402-3

Adaptation and Resilience to the changing climate

Our objective for 2020-25: To adapt the city's buildings, infrastructure and natural environment to the changing climate and to increase the climate resilience of our residents and organisations.

The Partnership and Agency acknowledge the adaptation and resilience dimension of work to address climate change requires further development if our commitments and actions are to reach parity with – and complement – mitigation efforts.

Manchester is exposed to a range of weather hazards. These will be exacerbated by climate change, potentially creating significant future challenges for the health, well-being and prosperity of the city. There is a projected shift towards higher temperatures and seasonal changes in precipitation patterns with drier, hotter summers, wetter winters and an increased incidence of extreme weather events.

Flooding is Manchester's most prominent extreme weather and climate change threat. Floods in February 2020 and 'near-misses' in January 2021 are just the latest indicators of the damage and disruption that these events can cause. Although currently relatively uncommon, droughts, heatwaves and wildfires represent future risks. Of particular concern is the impact that hotter summers will have on the health and well-being of the city's residents, workers, and visitors.

Understanding climate change hazards is just one dimension of our climate risk. We must consider our exposure and vulnerability to climate hazards, as well as our capacity to respond to them if we are to fully appreciate the full extent of our climate risk.

Many aspects of the city are exposed to the direct and indirect impacts of weather hazards. Earlier this year, the Agency published *Manchester's climate risk: a framework for understanding hazards & vulnerability*[15]. This document establishes an evidence base and structure for more detailed climate risk assessments for the city and its stakeholders. It identifies weather related hazards in the city and considers how climate change might affect them. It also establishes a framework to support a comprehensive assessment of the city's vulnerabilities and exposure to climate change and to evaluate our capacity – or lack thereof – to respond to these threats.

More effort is required to fully appreciate the extent of the risk of climate change for Manchester, both in terms of exposure and vulnerability. This is a complex but vital task that will support coordinated action to collectively create a more climate resilient Manchester.

Although the risk associated with climate change cannot be eliminated altogether, it is possible to build capacity and take action to adapt and to enhance climate resilience. On-going work at the Agency will develop an overarching strategic vision for a more climate resilient Manchester. Making progress is further supported by the bolstering of strong stakeholder networks in Manchester, and more widely in Greater Manchester and beyond.

[15] https://www.manchesterclimate.com/sites/default/files/Climate%20vulnerability%20framework.pdf

This includes work to co-produce a vision for a climate resilient Manchester which will explicitly link adaptation and resilience responses to other priorities in the city, including inclusive economic growth, in realising social justice and in identifying and maximising synergies between climate adaptation and mitigation. This will be accompanied by a series of principles that will frame action on the part of strategic stakeholders, businesses, communities and citizens to collectively realise greater climate resilience and adaptation.

Work throughout the remainder of 2021 and into early 2022 will identify good practice for the realisation of climate adaptation and resilience across the city. Indicators for monitoring progress against our adaptation and resilience objectives will be developed, building on learning from the IGNITION project review of GI target setting. We will also work with stakeholders to identify and report progress that has already being made and is on-going to enhance climate resilience.

The current Climate Change Framework 2020-25[16]. places particular emphasis on enhancing green infrastructure (GI) and nature-based solutions (NBS) as a key response to the changing climate. GI and NBS can help t[17]o reduce risks linked to flooding and high temperatures and can also reap a range of co-benefits for the city, its inhabitants, workers and visitors.

In practical terms, the following examples are some of the activities taking place to enhance Manchester's climate resilience.

IGNITION: the headline objective of this project is to establish innovative funding and delivery mechanisms to increase Greater Manchester's urban green infrastructure over the next two decades. To date the project has produced a green infrastructure baseline that will be used to better understand and plan the enhancement of existing and new green spaces in Manchester. Ignition is also developing a planning support system that can inform decisions on locations where GI investments could be targeted to maximise positive outcomes.

GrowGreen[18]: an €11.2m project running from 2017-22, coordinated by Manchester City Council, to support cities to develop and implement plans to become greener and better adapted to climate change. Manchester's new community park in West Gorton has now opened and demonstrates how nature-based solutions such as swales, bio-retention tree pits, rain gardens and permeable paving can be used to reduce surface water flooding in urban areas. Work on Manchester's Green and Blue strategy refresh has commenced and a piece of work has been commissioned to develop a river valley strategy for Manchester demonstrating how they can be better utilised to mitigate the impact of climate change and maximise other benefits such as improved biodiversity and health and wellbeing.

[16] https://www.manchesterclimate.com/sites/default/files/Climate%20vulnerability%20framework.pdf
[17] https://www.greatermanchesterca.gov.uk/what-we-do/ environment/ignition/
[18] www.growgreenproject.eu

Northern Gateway development[19]: this development, on the River Irk is planning to invest over £16m into flood mitigation and river works alongside major enhancements to the existing green spaces.

Mayfield development[20]: Mayfield will include a new multifunctional city park to provide recreation space for Manchester residents and visitors, manage flood water, and increase biodiversity. It will be the biggest creation of public open space in the city since the Victorian parks were created.

During 2021 and 2022 we plan to:

1. Refine our emerging vision for realising greater climate resilience and adaptation. This will include the development of a series of objectives and indicators for resilience, and associated actions for strategic stakeholders, business, and communities.
2. Support research and planning that assesses climate risk and develops associated adaptation and resilience responses.
3. Include adaptation and resilience in the engagement, education and support activities delivered by Manchester Climate Change Agency, and across the wider partnership. This will include giving specific attention to climate resilience and adaptation in the Framework refresh and associated consultations.
4. Continue to deliver the 'Green Infrastructure and Nature-based Solutions' action in the Climate Change Framework. Support will also be given to the refresh of the city-wide green infrastructure strategy currently underway.
5. Provide constructive support and input to refresh of the Manchester Local Plan which will provide an opportunity to update the statutory planning framework for the city to ensure it is supportive of efforts to increase the pace of adaptation and aspiration to build a more resilient city. Issues for consideration will include, the approach to flood risk, dealing with heat stress in new buildings and delivering sustainable drainage systems.

Together, these efforts will co-ordinate our collective effort to enhance the city's resilience to climate change.

[19] http://northerngatewaymanchester.co.uk/
[20] https://mayfieldmanchester.co.uk/