

Manchester's Climate Change Strategy: All CO₂ and mirrors?

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Steady State Manchester.

The City of Manchester has one of the most ambitious Climate Change Plans anywhere. But does it really add up? In this article we explain where we are now and what's been achieved since Manchester started Climate Change planning back in 2009¹, what's planned, and most important, we offer some ideas on what needs to happen now.

Because this is going to be a critical analysis, it is necessary to say that Manchester is to be commended for trying to take climate change seriously. It was one of the very first local councils to put together a plan and that plan was the result of a collaboration with a variety of experts, activists and stakeholder organisations. However, the effort has never had the resources it really needs. The, now free-standing, Manchester Climate Change Agency ("the agency", from here on) has just three staff. It is supported by a board and also has a number of volunteers. In 2017, it had income of around £32,000 per year but also received unspecified services in kind of some £112,000 from the city council². Given the scale of the task – reducing the city's carbon emissions to near zero ("mitigation" in the jargon) and readying the city for the climate change impacts to come (usually called "adaptation"), this is pretty insignificant. It is therefore impressive that the agency has done what it has. But as we will see, the challenge is very great, and its work is, effectively, in contradiction with what most of the city and its commerce are otherwise trying to achieve.

The agency's new report, whose recommendations have been accepted by the city council, begins to set out a plan for these tasks over the next 20 years.

Quite rightly, the agency emphasises that effective action on climate change will require action from all organisations, and indeed citizens, in the city.

Hence the title of its forward plan report: *Playing Our Full Part How Manchester's Residents and Businesses Can Benefit from Ambitious Action on Climate Change*³. But we do question whether it has the capacity to make this happen to any serious degree.

1 Manchester City Council (2009). *Manchester: A Certain Future. Our collective action on climate change*. Manchester: Manchester City Council. Retrieved from

<http://www.manchesterclimate.com/sites/default/files/MACF%202010-20.pdf>

2 Manchester Climate Change Agency CIC (2017) *Report and unaudited accounts, 30 September, 2017*.

<https://beta.companieshouse.gov.uk/company/09761661/filing-history/MzlwODc2NDQ1OWFkaXF6a2N4/document?format=pdf&download=0>

3 Manchester Climate Change Agency. (2018). *Playing Our Full Part How Manchester's Residents and Businesses Can Benefit from Ambitious Action on Climate Change*. Manchester. Retrieved from

http://manchesterclimate.com/sites/default/files/POFP%20Proposal%20to%20MCC%2016.10.2018_0.pdf

But hasn't a lot been achieved already?

Since the development of the city's first climate change strategy in 2009, Manchester: A Certain Future, climate action has been a collective, citywide effort. This approach has resulted in an estimated 34% reduction in CO₂ during 2005-17. It has come about from the actions of local residents, private sector businesses, local charities and not-for-profit organisations, universities, schools and colleges, Manchester City Council, Greater Manchester Combined Authority, other local public sector organisations and decarbonisation of the National Grid through Government policy.⁴

Effective action on climate change means reducing the emission of greenhouse gases, primarily carbon dioxide, the largest part of which is produced by the burning of fossil fuels. We'll come back to this question to look at some of the difficulties involved.

As noted, the city has been working on this agenda for more than 10 years (if we count the lead up to the *A Certain Future* report of 2009). So it is reasonable to assess its track record.

In its annual report for 2018, the agency says,

"Our analysis of the latest Government figures shows that over the last year the city's carbon emissions have fallen from 2.2 million tonnes in 2016 to 2.1 million tonnes in 2017 – a 2.7% reduction. To date the city has achieved a 34% reduction against the 41% target and is projected to achieve a 38% reduction in carbon emissions by 2020."⁵

Yet the government has not yet produced figures for 2017. The latest are for 2016. The reduction appears to be an estimate, based on recent trends. The figure of 34% is accurate though, on the basis of the government's figures. However, what are these figures? It is important to understand that carbon emissions for Manchester are not measured directly, but are instead estimated. The data are taken from tables supplied by the Office of National Statistics. They summarise the methodology like this:

"The dataset provides a spatial disaggregation of CO₂ emissions from the UK Greenhouse Gas Inventory (GHGI), part of the National Atmospheric Emissions Inventory (NAEI), on an end user basis. This means that emissions from the production and processing of fuels, including the production of electricity, are reallocated to users of these fuels to reflect total emissions for each type of fuel consumed. The disaggregation methodology is complex, and different approaches are used to make best use of the quantity and quality of suitable data that are available for each sector.

The activity data used to produce these estimates come from four main sources:

- *BEIS sub-national gas and electricity consumption statistics;*
- *Point source emissions from large industrial installations;*
- *High resolution emissions distribution maps developed under the NAEI programme; and,*
- *Land use, land use change and forestry (LULUCF) regional data supplied by the Centre of Ecology and Hydrology (CEH), under the NAEI programme.*

4 See note 3 (page 11).

5 Manchester Climate Change Agency (2018). Annual Report, 2018.

http://www.manchesterclimate.com/sites/default/files/MCCA_Annual%20Report%202018.pdf

National end user emissions data are used to calculate emission factors for each activity. Local authority activity data are then multiplied by the relevant emission factor to generate an estimate of emissions in each LA.”⁶

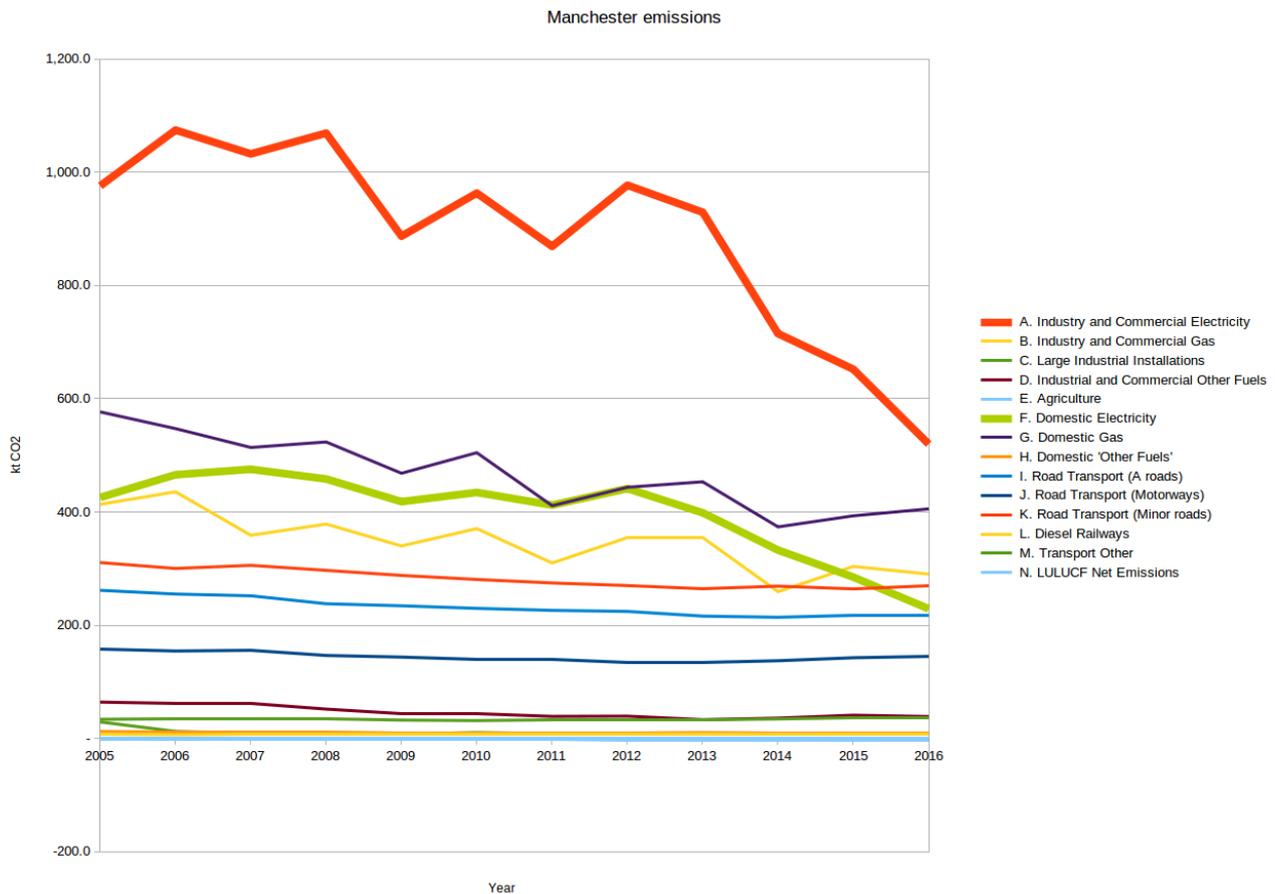
To take an example: suppose Greater Manchester's Clean Switch was highly successful in getting people to change from standard tariffs to renewable ones. That is to say (simplifying somewhat), the electricity the household purchased would be matched by renewable energy supplied to the grid and purchased, in turn, by the household's supplier. Suppose also that in Manchester, we thereby ended up using twice as much renewable energy as elsewhere. It would make no difference to the emissions attributed to city, except insofar as it reduced the hydrocarbon mix in the national supply. The same goes for other aspects. So the first problem is that the data used are, at best, an imperfect proxy for what's going on with the city's emissions. It turns out that reductions in emissions from electricity generation account for 60% of the reduction in the city's emissions, reported above, in the period 2005-17. On looking at Manchester's data we find that emissions from electricity generation fell by 46.56% (using 2005-2016)⁷: nationally they fell by 45% between 2005 and 2016⁸ (the mix of domestic versus industrial electricity in Manchester vs. nationally probably accounts for the difference). Conversely, increases in coal use for electricity generation in 2010 and again in 2012 led to Manchester's estimated overall emissions increasing temporarily.

So the changes claimed for Manchester are to a large extent outside its control and even where changes in emissions are under its control they are not necessarily reflected in the figures. This makes it difficult to assess Manchester's ability to make the changes required, at least on the basis of performance so far.

6 Pearson, B., Joe, R., & Tsagatakis, I. (2018). *Local and Regional Carbon Dioxide Emissions Estimates for 2005–2016 for the UK* (Technical Report No. GA0216) (p. 57). London: BEIS. Retrieved from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/719073/Local_CO2_-_Technical_Report_2016.pdf

7 2005 to 2016 UK local and regional CO2 emissions – data tables. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/720677/2005-16_UK_local_and_regional_CO2_emissions.xlsx

8 See note 6 (page 6).



Sources of Manchester's estimated greenhouse gas emissions over time. The two thicklines are for domestic and industrial electricity consumption which account for the largest share of reductions. See note 6 for source: graph by the author.

We've a carbon budget, so SCATTER!

The agency understands these problems. So they, along with Greater Manchester (via Mayor Burnham's Green Summit initiative) are using an approach called SCATTER ((Setting City Area Targets and Trajectories for Emissions Reduction), provided by a company called Anthesis⁹, with input from the University of Manchester's Tyndall Centre on Climate Change. The Tyndall Centre has proposed a carbon budget for the city, in effect our share of the national carbon budget, which is, in turn, the country's share of the global carbon budget that is required for a good chance of keeping average temperature rises within 2 degrees C. This sets a limited carbon budget of 15 megatonnes of CO₂ for 2018-2100; 13% annual reductions in CO₂ from 2018; leading to zero carbon net emissions by 2038. We will return to this budget and its implications shortly, but note here that the city council Executive adopted it at its meeting on 14 November, 2018¹⁰.

9 <https://www.anthesisgroup.com/scatter-carbon-footprint-reduction-tool>

SCATTER aims to improve the approach to emissions accounting by means of a greenhouse gas inventory for the city, aligned with “a globally recognised and credible reporting standard”¹¹. While it draws on the national dataset discussed above, over time it is designed to become more reflective of the actual emissions from Manchester.

SCATTER also provides a methodology for exploring scenarios for carbon reduction, making various assumptions about the rate with which different sectors reduce their emissions and the role of land (trees, soils, wetlands, grasslands, etc.) to capture and lock up carbon (or conversely to release it).

Manchester's new carbon budget: what it means.

A carbon budget is a statement of how much CO₂ can be emitted for a defined chance of keeping warming within a specific limit. For Manchester, Tyndall say,

Based on our analysis, for Manchester to make its ‘fair’ contribution towards the 2°C commitment enshrined in the Paris Agreement, Manchester would need to:

1) Hold cumulative carbon dioxide emissions at under 15 million tonnes (range of 8 to 24 MtCO₂) from 2018 onwards. To give a sense of the scale of the challenge, at current (2015) CO₂ emission levels, **Manchester would use its entire budget within 4 to 10 years.**

2) Initiate an immediate programme of mitigation delivering an annual average of 13% (range of 8% to 20%) cuts in emissions in order to remain within its fair 2°C carbon budget. The 13% [it's actually 13.2% - SSM] annual average reduction in emissions combines both national and local action and would be part of wider collaboration with Greater Manchester Combined Authority (GMCA) on meeting its emissions reductions goals. The recommended pathway, 13% per annum reductions, is similar to the annual rates of reduction achieved by Manchester in 2014 (18.8%) which was primarily driven by a change in the fuel mix for electricity; it is important to note that this reduction occurred over a single year only.¹²

They also say that “Manchester needs to begin a rapid programme of reducing emissions from Land Use, Land Use Change and Forestry (LULUCF)”. Since that is a relatively small part of the city's emissions (see above graph), that will not be explored further in this article although it is relevant both to the city's continual in-filling of green spaces and to the Greater Manchester Spatial Framework and the wider question of land use in the city region.

A carbon budget is actually a rationing tool: it aims to keep our carbon emissions within a fair share of what is permissible for minimally safe climate safety – minimally, since with just over 1 degree of warming we are already

10 Report to council (agreed by Executive on 14 November, 2018).

<https://democracy.manchester.gov.uk/documents/s2324/Climate%20Change.pdf>

Video of the discussion at Council Executive: https://manchester.public-tv/core/portal/webcast_interactive/383587/start_time/2297000

11 The World Resources Institute. (2014). *Global Protocol for Community-Scale Greenhouse Gas Emission Inventories*.

12 Tyndall Centre (2018). Quantifying the implications of the Paris Agreement for the city of Manchester http://www.manchesterclimate.com/sites/default/files/Appendix%20%20-%20Quantifying%20the%20Implications%20of%20the%20Paris%20Agreement%20to%20Manc..._0.pdf

witnessing severe impacts on the climate, impacts that have reached us too as we have seen with recent floods and fires.

It is worth exploring the scale of the challenge of this carbon budget in some more detail.

First the basic figures for Manchester's 2 degree carbon budget and its current emissions.

	ktCO2
Manchester 2 deg budget	15,000
Manchester annual emissions 2015	2,302
Manchester annual emissions 2016	2,176

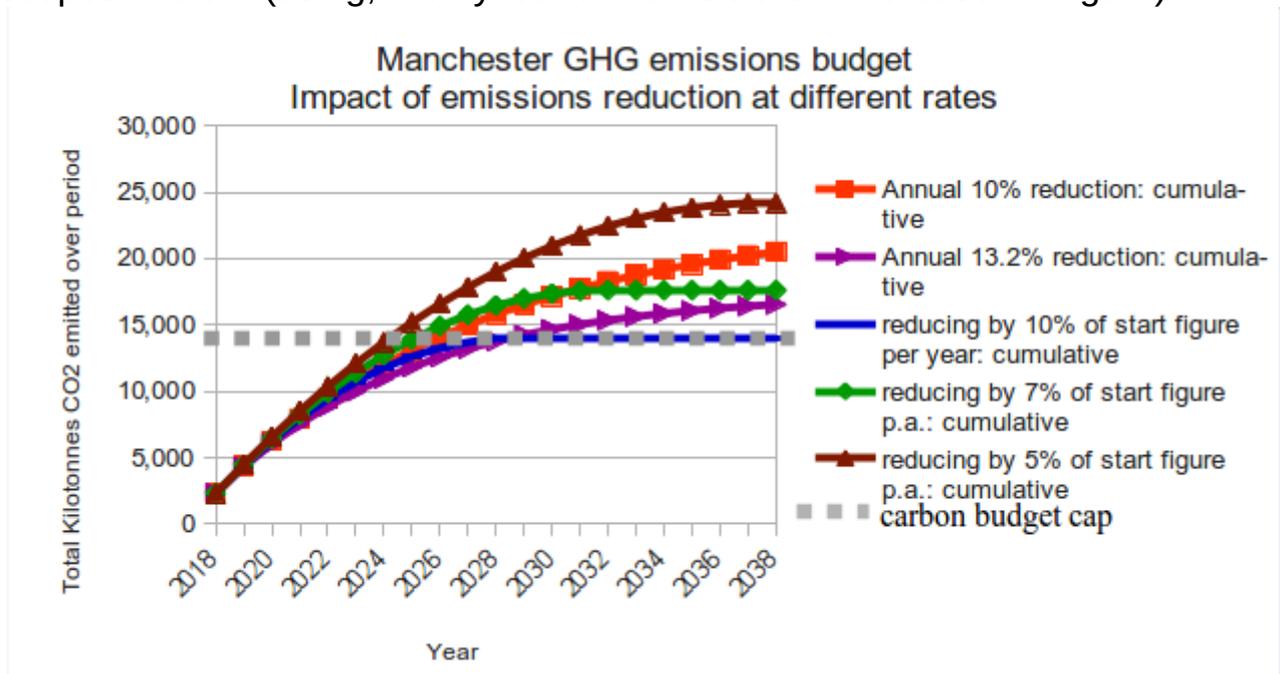
The current rate of emissions gets us into trouble very quickly.

years left at 2015 rate of emissions	2015 annual emissions as per cent of budget
6.52	15.35%

It is important to note that all this is only considering the emissions that take place in Manchester (scope 1) and as a result of Manchester's electricity use (scope 2). Emissions from the production of all the things brought into the city, flights from the airport, shipping to bring things here, land use change as a result of our food consumption, emissions as a consequence of all our investments (including the Greater Manchester Pension Fund's huge holdings in the fossil fuel industry), emissions caused by driving using petrol purchased outside the city, emissions from the waste we export for "recycling" all these things are excluded (scope 3). The reports and appendices are clear about this noting that these issues (including that elephant in the room, Manchester Airport) do need addressing – but when and how?

Scope	Definition
Scope 1	GHG emissions from sources located within the city boundary
Scope 2	GHG emissions occurring as a consequence of the use of grid-supplied electricity, heat, steam and/or cooling within the city boundary
Scope 3	All other GHG emissions that occur outside the city boundary as a result of activities taking place within the city boundary

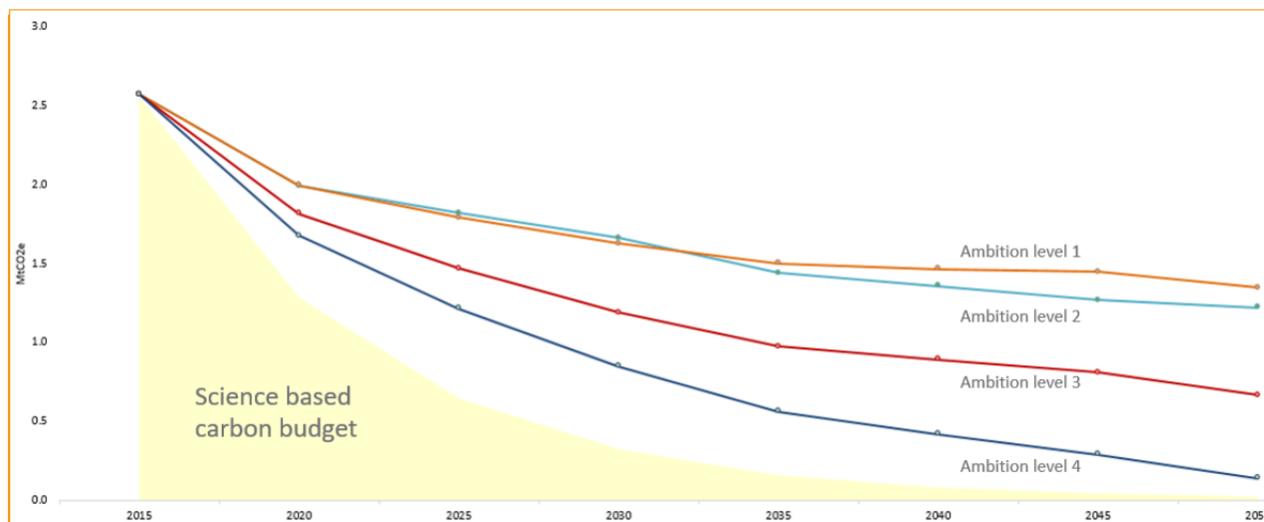
Let's look at the impact of various rates of emissions reduction for those scopes 1 and 2 (using, like Tyndall / Anthesis the 2015 baseline figure).



The grey dotted line represents the 2 degrees carbon budget for Manchester. The other lines represent a variety of theoretical emissions reduction trajectories. Note that they are theoretical in the sense that they do not fluctuate from year to year: in reality emissions will reduce in irregular amounts from year to year. The curves, however so illustrate the scale of the problem. Only one of those curves keeps the city within the budget. In this case, emissions are reduced in the first year by 10% and then in each following year by the same number of kilotonnes, 230. The Tyndall 13.2% annual reduction gets close but it overshoots, that is, it exceeds the carbon budget by 2030. However, by front-loading higher percentage reductions in

the earlier years it would come in under budget (the average annual figures is perhaps not very helpful since it is applied to a diminishing annual level of emissions).

This modelling demonstrates how difficult it is going to be to stay within our fair share of the global carbon budget. When SCATTER modelled some emissions reduction scenarios, all of them overshoot the budget of 15 megatonnes. Here is the graph from the relevant appendix¹³:



This leads us onto the question: what concrete actions will be required to stay within budget?

What must Manchester do to to play its full part?

Reducing emissions.

The Playing our Part report made the following proposals which have also been accepted by the council:

- *Manchester accelerates its efforts to mobilise all residents, businesses and other stakeholders to take action on climate change, starting in 2018.*
- *Manchester puts in place an action plan and the resources needed to stay within the proposed carbon budget, starting in 2018.*¹⁴

*With the new target endorsed by the council's Executive, the Manchester Climate Change Board will now develop a draft action plan by March 2019, ahead of producing a final plan by 2020, detailing how the city can stay within its carbon budget.*¹⁵

13 Playing Our Full Part: How Manchester's Residents and Businesses can benefit from ambitious action on climate change. Technical Appendix by Anthesis (UK) Ltd.

http://manchesterclimate.com/sites/default/files/Appendix%201%20Manchester_2038_Technical%20Report%2011.11.18_0.pdf

14 See note 11.

15 Statement on council website:

https://secure.manchester.gov.uk/news/article/8076/ambitious_climate_change_target_proposed_for_manchester

So far, so good, but what should be in this plan?. The technical report from Anthesis gives some clues but is actually rather sketchy. It breaks down the emissions into a number of key areas¹⁶:

Sector	Actions required	Current Context	Key SCATTER model assumptions (Level 4 scenario)
Energy supply	<ul style="list-style-type: none"> Significant increases in local renewable energy generation 	Only 2% of Greater Manchester's energy demand is provided via renewables sources, primarily landfill and sewerage gas. ³²	<ul style="list-style-type: none"> 100% of Greater Manchester's electricity supply comes from renewable sources by 2050 (with a view to maximise the proportion of renewables in-boundary or owned & controlled by the City) Solar PV on 50% of domestic properties plus over 100 football pitches' on commercial roof space and ground mounted sites 10x more biomass generation capacity 10x more onshore wind generation capacity
Domestic buildings	<ul style="list-style-type: none"> Large scale domestic retrofit and significantly more energy efficient new builds Energy demand reduction for heating lighting and appliances A shift away from natural gas as primary home heating source Smart temperature controls 	Approximately 95% of homes in Greater Manchester are heated via natural gas, over 25% of homes in are social housing stock. ³³	<ul style="list-style-type: none"> 75% reduction in thermal leakiness of 60% of all homes 80-100% of homes using electric (or zero carbon) heat source Average temperature (across the whole home) reducing to 16°C from 18°C via smart thermostats
Commercial buildings	<ul style="list-style-type: none"> Large scale commercial retrofit and more energy efficient new builds Significant energy demand reduction for heating, cooling and hot water, lighting and appliances A shift away from natural gas as primary heating source Smart temperature controls 	The 0-4 and 5-9 employment size bands accounts for 89,000 (89%) of enterprises within Greater Manchester. ³⁴	<ul style="list-style-type: none"> Space heating demand drops by 40% Hot water demand by 30% Cooling demand by 60%
Transport	<ul style="list-style-type: none"> 100% shift to zero emission passenger vehicles Significant reduction in distance travelled per passenger Passenger modal shifts from car to walking & cycling and increased public transport Freight modal shift from road to rail & water 	UK Electric Vehicle (EV) stock <5% of all vehicles. ³⁵	<ul style="list-style-type: none"> 100% zero emissions cars and buses by 2025 Complete railway electrification by 2035 25% reduction in passenger Km by 2035 Significant modal shifts in walking and cycling (+4%), bus and train (+15%) and reducing car travel (-19%)
Natural capital	<ul style="list-style-type: none"> Tree planting and peatland restoration 	City of Trees have planted c.330,000 trees to date. ³⁶	<ul style="list-style-type: none"> 3m trees planted by 2030, 5m by 2050 75% peatland restoration (across various bog and land types)
Waste & Industry	<ul style="list-style-type: none"> Electrification, energy efficiency improvements and Carbon Capture Usage and Storage Reductions in waste volumes and increases in recycling rates 	The UK's first CCUS demonstration plant opened in March 2018. ³⁷	<ul style="list-style-type: none"> Not included in the 'Scenario 4' pathway due to uncertainty of CCUS, however growth factors still applied Waste decreases by 20% and recycling hits 65% by 2035
Storage	<ul style="list-style-type: none"> Significant increases in storage capacities, specific technologies not specified 	Highview liquid air facility in Pilsforth, Bury, opened June 2018. ³⁸	<ul style="list-style-type: none"> 84MW of storage capacity within Manchester (equivalent of a 4kW battery in 10% of homes in Manchester)

This is not a bad start but, as we've noted:

1) Even the “ambitious” Level 4 scenario (the last column) fails to keep the city within its scope 1 and 2 carbon budget.

2) These actions apply to the city's territorial emissions. If we are to really play our full part then we need to also programme actions that cover the totality of the emissions we are causing (scope 3 as well). Moreover,

3) The climate change agency and council have limited powers to make these changes happen. They are clear about this but will need a real strategy for bringing the other sectors on board.

In what follows we'll look at each of these issues in turn.

What else needs to be considered to bring the actions in line with the city's share of the global carbon budget?

We'll take each of the sectors and proposals (from scenario 4), in turn, as listed by Anthesis (see above table) and comment. We do acknowledge that at this point the plan has yet to be prepared. So what we are doing here is, building from the information that has so far been provided, to suggest critical areas for attention.

¹⁶ Table from the Anthesis technical appendix, p. 20, http://www.manchesterclimate.com/sites/default/files/Appendix%201%20Manchester_2038_Technical%20Report%2011.11.18_0.pdf

1) **Energy supply:** *Significant increases in local renewable energy generation.*

This is fair enough but Anthesis then say, “100% of Greater Manchester's electricity supply comes from renewable sources by 2050”. Why 2050 when the aim is to be carbon neutral by 2038? They add, “(with a view to maximise the proportion of renewables in-boundary or owned & controlled by the City); Solar PV on 50% of domestic properties plus over 100 football pitches[on commercial roof space and ground mounted sites; 10x more biomass generation capacity; 10x more onshore wind generation capacity.” Increasing the supply of energy from locally owned and controlled renewable sources is to be welcomed of course, but where do the figures come from? Why only 50% of domestic properties? Where does the 100 football pitches” figure come from? What kind of biomass, sourced from where and burnt where? Where is the tenfold increase in onshore wind generation to go? But above all, what is the quantitative target in terms of units of electricity generation? Does this include increased demand for transportation and space heating? Does it include reductions or increases in consumption for other uses? The Greater Manchester Combined Authority, Spatial Energy Plan, 2017 (GMSEP)¹⁷ stated that, “...up to 9 % of GM's electricity could, technically, be generated locally using renewable sources. It is likely, however, that only a small proportion of this will be economically viable.” However, the parameters that determine what is “economically viable” are not fixed and likely to shift in further favour of clean energy (not that clean generation for Manchester needs to be locally based).

The GMSEP report points out that,

“Any wind farms built within Greater Manchester can be expected to feed energy into the National Grid. This means that, whilst they will contribute to reducing the carbon content of the electricity that is imported into Greater Manchester, their total output is unlikely to be allocated to GM in terms of carbon accounting.”

The same goes for any local energy generation that is fed into the grid.

With regard to biomass, the report noted that,

“Growing biomass in the UK could increase energy security and complement imports. However, UK land available for biomass production is finite so any large scale deployment of biomass will be dependent on imports. These are likely to have emissions associated with their production and transportation such that they may not be ‘low carbon’ over their entire life cycle. These factors combined with the versatility of biomass mean that future supplies are likely to be highly valued and so may not be economically viable to deploy at a large scale for domestic heating where cheaper options are likely to be available.”

Clearly, the Manchester plan will need to utilise the kind of detailed work that has been carried out regionally, building on it in detail and ambition. The recently released “Local Area Energy Planning” approach from the same

¹⁷ The Energy Technologies Institute / Catapult Energy Systems. (2017). GM Spatial Energy Plan (evidence base study). http://www.greatermanchester-ca.gov.uk/download/downloads/id/240/gm_spatial_energy_plan_evidence_base_study.pdf

consulting organisation that provided the GMSEP appears to offer a comprehensive framework for doing this¹⁸.

2) **Domestic buildings:** *Large scale domestic retrofit and significantly more energy efficient new builds; Energy demand reduction for heating lighting and appliances; A shift away from natural gas as primary home heating source; Smart temperature controls.* And the scenario 4 proposals are, 75% reduction in thermal leakiness of 60% of all homes; 80-100% of homes using electric (or zero carbon); heat source; Average temperature (across the whole home) reducing to 16°C from 18°C via smart thermostats. Again these proposals are sound, so far as they go, but why only 60% of homes? Perhaps this comes from the slightly under 60% of Manchester homes that have EPC ratings of D or worse? But how then is the target of 75% improvement for these decided? Moreover, an increased level of ambition would be needed, given that in Manchester, home heating is a major contributor to the domestic 30% share of carbon emissions. We have also noted above the interdependence between decarbonisation of heating and increased electricity demand.

Improved levels of domestic insulation are a critical element in enabling a lower overall energy input (of clean energy) to keep houses warm enough. How are radically improved levels to be achieved? How are they to be financed? We suggest that one model would be to establish a revolving retrofit fund, replenished by a share of the achieved reductions in energy costs and in the case of the private sector, from a share of any house price rises (improved EPC ratings increase both the saleability and value of homes).

As in other areas, it is essential that policies join up: proposals for a regional community bank, or for a regional green investment fund, are relevant, together with divesting local anchor institutions' holdings in fossil fuel companies and re-investing in local energy reform. Beyond finance, there is a need to develop cost-effective ways of conducting retrofit: for example, where possible, by working on neighbouring homes and combining retrofit with other home improvements¹⁹. Incentivising home sharing is also relevant, especially for older people living in larger houses but with spare rooms. Projected increases in housing are materially relevant to domestic energy demand for both heating and other uses (previous section). At the time of writing, the Office of National Statistics projections are at odds with central government targets and those of the discredited 2016 draft of the Greater Manchester Spatial Framework²⁰: it is difficult to plan with this uncertainty but

18 Catapult Energy Systems. (2018). Local Area Energy Planning: Supporting clean growth and low carbon transition. <https://es.catapult.org.uk/publications/local-area-energy-planning-supporting-clean-growth-and-low-carbon-transition/>

19 See Carbon Co-op's evidence to BEIS for helpful pointers: <http://carbon.coop/blog/jonathan/beis-call-evidence-building-market-energy-efficiency-0>

20 <https://steadystatemanchester.net/2018/10/10/why-is-the-gm-spatial-framework-delayed/>

it is likely that the city will see a greater density of housing units, if only due to the rising cost and inconvenience of commuting into the area.

3) **Commercial buildings:** *Large scale commercial retrofit and more energy efficient new builds; Significant energy demand reduction for heating, cooling and hot water; lighting and appliances; A shift away from natural gas as primary heating source; Smart temperature controls.* Scenario 4 assumes that *Space heating demand drops by 40%, Hot water demand by 30% and Cooling demand by 60%.*

This is fine in outline, but again, detailed proposals are required. Moreover, as we will discuss later on, the critical question is “how are the relevant organisations going to be encouraged, enabled, and let's face it, *made to* make these changes?”

4) **Transport:** *100% shift to zero emission passenger vehicles; Significant reduction in distance travelled per passenger; Passenger modal shifts from car to walking & cycling and increased public transport; Freight modal shift from road to rail & water.* And scenario 4 suggests *100% zero emissions cars and buses by 2025; Complete railway electrification by 2035; 25% reduction in passenger Km by 2035; Significant modal shifts in walking and cycling (+4%), bus and train (+15%) and reducing car travel (-19%).*

Transport accounts for 29% of Manchester's direct emissions. A significant reduction in distance travelled per passenger is a great aim but contradicts the city's emphasis, in its economic strategy, of getting people to travel to the places where the jobs are supposedly going to be created, in the “growth hubs” of places like the airport city, and the warehouse sheds around the conurbation, as well as the expanding city centre. As we continue to argue, you can't reduce carbon emissions while promoting economic growth²¹.

Some of the other proposals, from this, still budget busting, scenario sound implausible given current policies and trajectories: for all cars and buses driving round the city to be emission-free in just 7 years is, however desirable, just not likely. And while rail electrification by 2035 is achievable, the present government has cancelled plans for electrification of routes, though an alternative government could put this right²².

The target for car travel reduction is woefully insufficient. Our city is **infested** by the private motor car: we need to make it the exceptional way to travel, not the dominant form. That will be difficult because so much of the population uses cars, but it must be done. Moreover targets need expressing more clearly – is the 19% about a reduction in passenger miles, number of cars on

21 For a recent analysis, see Kuhnhenh, K. (2018). *Economic Growth in mitigation scenarios: A blind spot in climate science* (p. 25). Berlin: Heinrich-Böll-Stiftung. Retrieved from https://www.boell.de/sites/default/files/endf2_kuhnhenh_growth_in_mitigation_scenarios.pdf?dimension1=division_oen

22 Labour's current policy framework proposes ramping up rail electrification. Labour Party. (2018). *The-Green-Transformation: Labour's Environment Policy*. London. Retrieved from <https://www.labour.org.uk/wp-content/uploads/2018/09/The-Green-Transformation-.pdf>

the road, or number of journeys. There needs to be an assertive policy framework, with punitive charges for high emission vehicles²³ and for road use in the urban area²⁴, in concert with the provision of adequate alternatives, both active travel and public transport. Buses in particular are the most relevant area for investment but without re-regulation we will not achieve a rationally planned network²⁵. Finally the question of freight needs further analysis: reductions in the volume of goods being transported are going to be required but will also occur with the impacts of climate change, energy descent and geopolitical shocks. Shifting the remaining freight from roads will require significant investment in the alternatives, rail and water and this will look quite different from the inter-city mobility and high value passenger focus of the current rail investment plans and proposals (HS2 and HS3).

5) **Natural capital:** *Tree planting and peatland restoration.* And the scenario suggests: *3m trees planted by 2030, 5m by 2050 75% peatland restoration (across various bog and land types).* This is very welcome but vague. Again it would be helpful if these figures were explained, in terms of what they mean for our green spaces (including those whose natural ecosystem is not woodland), who will plant the trees, how they are to be sourced and what the carbon metrics are likely to be. Otherwise it is hard to evaluate them. However, while valuable, it is outside the city where most of the battle over land-based carbon sinks is to take place.

6) **Waste & Industry:** this part of the table is particularly vague, only mentioning carbon capture in relation to power generation, and waste disposal (and only setting woefully inadequate indicative assumptions that “Waste decreases by 20% and recycling hits 65% by 2035”). Industry, even in our post-industrial city still accounts for 41% of greenhouse gas emissions. It is therefore concerning that the report and its main “technical appendix” remain almost silent on what must be done. Data on industry for the city is hard to find. For Greater Manchester as a whole, the breakdown of the larger sectors is as follows. They are listed in order of their share of the total city regional Gross Value Added (GVA) which gives an idea of the price of their products but not of their carbon intensity:

23 Madrid, for example has banned all petrol vehicles registered before 2000 and all diesels before 2006 from its central districts. https://www.eldiario.es/madrid/Manana-circularan-Madrid-vehiculos-ambiental_0_845165619.html (in Spanish).

24 There are a number of examples in European cities, including Milan, Stockholm and Oslo https://en.wikipedia.org/wiki/Road_pricing#Europe

25 <https://steadystatemanchester.net/2018/11/29/better-buses-in-greater-manchester/>

Industry (by SIC07 code)	% of Greater Manchester total GVA in 2014.
Wholesale and retail trade; repair of motor vehicles	11.60%
Manufacturing	9.43%
Real estate activities	9.30%
Human health and social work activities	7.23%
Professional, scientific and technical activities	7.19%
Financial and insurance activities	6.34%
Education	6.34%
Construction	5.54%
Administrative and support service activities	5.12%
Information and communication	4.62%
Transportation and storage	4.59%
Public administration and defence; compulsory social security	4.01%
Accommodation and food service activities	2.64%
Other service activities	2.14%
Food products, beverages and tobacco	1.68%
Arts, entertainment and recreation	1.64%
Electricity, gas, steam and air-conditioning supply	1.39%
Basic metals and metal products	1.11%
Rubber and plastic products	1.07%
Water supply; sewerage and waste management	1.01%

This would give some clues as to the key areas for action but needs supplementing with at least an estimate of the carbon intensity factor for each sector prior to identifying priority actions. We know that carbon intensity is high for areas such as construction and the motor trade, for instance, yet both will present challenges should serious action be taken on emissions.

7) Storage. The final row of the Anthesis table is about energy storage. There is a lot of interest in electricity storage at present to smooth the peaks and troughs of renewable energy supply and demand and also to convert flows of energy into more portable stores. At present this relies on a) pumped hydroelectric storage schemes, b) electrical batteries (including vehicle batteries as a buffer store), c) conversion of surplus energy to hydrogen gas. All involve losses of energy. Battery storage relies on mineral extraction (for example Bolivian lithium) so has an embedded hydrocarbon cost, and social and environmental consequences where extraction takes place. However, there is not a direct relevance to Manchester's carbon reduction plans. The table lists as its scenario 4 assumption, the figure of *84MW of storage capacity within Manchester (equivalent of a 4kW battery in 10% of homes)*. It

is unclear why this figure should have been chosen and just what is being proposed.

Playing our part means reducing our total carbon footprint

*The Board also recognises there are areas of the city's activities that generate CO₂ indirectly and, whilst currently difficult to measure, the city still needs to address these emissions. We expect it will be possible to include them in future definitions of zero carbon when data and monitoring processes improve.*²⁶

The above quotation is welcome insofar as it recognises that non-territorial emissions are relevant. But the statement is misleading for two reasons. Firstly, it is misleading to label them as indirect. They are the direct result of our activity. Every time we buy something made outside the city, every time we watch a video on the internet, every time we go on holiday, and for every mouthful of food or drink, we are pulling the lever of demand that uses materials and energy and causes carbon emissions at every step of the way from resource extraction via manufacture, processing, transportation, storage and consumption, to the finality of waste. That is pretty direct. These emissions, though they might happen in Brazil, in the mid Atlantic, in China, or in a field in Cheshire, are all our responsibility. The test of that is that we can reduce them by changing what we do here. To say they are indirect and thereby to leave them for another day – that's not playing our full part. Secondly, it is a bit of an evasion to imply that the (real) difficulty in measuring these scope 3 or consumption emissions justifies leaving them until another day. That's not playing our full part.

It so happens that we know quite a lot about our total carbon footprint. The government issues statistical tables for the UK. We can apply these to our territorial emissions to arrive at a rough estimate. For the UK, in 2015, the total carbon footprint was 1.72 times larger than that for the territorial emissions, or put another way, the scope 1 and 2 emissions accounted for 58.16% of the total²⁷. A study conducted in Greater Manchester in 2011 made detailed estimates of the total carbon footprints for each of the local authorities in Greater Manchester²⁸. It estimated Manchester's total carbon footprint as 7,134,675 tonnes of CO₂ equivalent. At the same time, the direct emissions were estimated at 3,200,000 tonnes. So the total footprint was approximately 2.23 times higher than of the scope 1 and 2 figure. Nationally at that time, the ratio was approximately 1.81. The methodologies differed somewhat between the national figure and the local study. If we apply the

²⁶ *Playing Our Full Part*. See note 3 p. 9.

²⁷ For the direct emissions: Final UK greenhouse gas emissions national statistics: 1990-2016. (n.d.). Retrieved 8 December 2018, from <https://www.gov.uk/government/statistics/final-uk-greenhouse-gas-emissions-national-statistics-1990-2016> For the consumption emissions: <https://www.gov.uk/government/statistics/uks-carbon-footprint>

²⁸ Berners-Lee, M., Hatter, W., & Hoolohan, C. (2011). *The Total Carbon Footprint of Greater Manchester: Estimates of the Greenhouse Gas Emissions from Consumption by Greater Manchester Residents and Industries*. Small World Consulting / Lancaster University. Retrieved from http://media.ontheplatform.org.uk/sites/default/files/gm_footprint_final_110817.pdf

national reduction 2011-2015 in the share of consumption emissions to the 2011 Manchester figure, we arrive at a ratio of 2.12. Erring on the generous (to Manchester) side, we could say that the scale of our total carbon emissions is likely to be around twice that of our territorial emissions. The conclusion is clear. To play our full part, we do need to consider all our emissions. That means identifying actions that also bring down those extra-territorial emissions, the ones that we essentially outsource to other economies and populations.

The study on Greater Manchester's total carbon footprint also made a number of suggestions about reducing consumption-based emissions. It makes interesting reading, firstly for the areas covered (e.g. reducing food waste and more careful driving – both of which have had policy initiatives addressed to them, but also the reduction of leisure flights, which has not). Secondly, though, the proposals were for a modest 1% emissions reduction per year. Having collectively delayed doing anything serious about our emissions, over the intervening 7 years, that looks small indeed. We now need to consider reductions in the order of 13 per cent per year in our consumption emissions, collectively, if we are to seriously “play our full part”. Given the following breakdown (from 2011, but based on data a couple of years older) of our total carbon footprint in Manchester, the areas for action should be clear enough. Note that this is the total footprint, which includes the direct emissions already discussed. But obvious candidates include sectors such as personal flights (and yet the city council is still paying for officers to fly to other UK cities), “other non-food consumption” and “construction” (let's end the construction frenzy in the urban core). When considering consumption footprints, though, we must not forget that many people in Manchester do not have high carbon footprints (while many others do).

Estimated Total Carbon Footprint of Manchester and Greater Manchester, 2009-2010²⁹

	Manchester		Greater Manchester	
	tonnes	per cent	tonnes	per cent
Food and drink from retail	974,097	13.65%	5,243,164	12.74%
Household fuel	746,289	10.46%	4,989,076	12.12%
Personal flights	1,082,870	15.18%	4,603,801	11.19%
Other non-food shopping	726,235	10.18%	4,025,839	9.78%
Domestic vehicle fuel	414,332	5.81%	3,467,025	8.43%
Public admin. And other public services	518,160	7.26%	2,985,495	7.25%
Household electricity	495,168	6.94%	2,723,970	6.62%
Eating, drinking and staying away	467,800	6.56%	2,702,071	6.57%
Car manufacture and maintenance	217,303	3.05%	1,997,475	4.85%
Other bought services (inc. financial)	359,844	5.04%	1,995,796	4.85%
Healthcare	279,531	3.92%	1,541,187	3.75%
Construction	241,129	3.38%	1,349,483	3.28%
Water, waste and sewage	203,293	2.85%	1,064,560	2.59%
Travel by train, bus and other	180,796	2.53%	1,039,805	2.53%
Education	108,471	1.52%	758,464	1.84%
Electrical goods	119,354	1.67%	663,994	1.61%
Total	7,134,675	100.00%	41,151,205	100.00%
	food and related	20.21%	19.31%	
	personal transportation	24.03%	24.47%	
	public services	12.70%	12.84%	
	utilities	20.25%	21.33%	
	Subtotal for food, transport, public services and utilities	77.19%	77.95%	
	Other sectors	22.81%	22.05%	
	All sectors	100.00%	100.00%	

Towards a strategy for collective action

A little frustration, even cynicism, is understandable here since we have now had nearly ten years of hearing that all organisations in the city need to be encouraged to get on board with these climate mitigation plans. In 2009, the City's first Climate Change Action Plan, *Manchester a Certain Future*, stated as the second of its two overall aims,

“To engage all individuals, neighbourhoods and organisations in Manchester in a process of cultural change that embeds ‘low-carbon thinking’ into the lifestyles and operations of the city.”³⁰

But where are the detailed plans and proposals, even from some of the bigger players that routinely work in partnership with the city council? And

²⁹ Table from Steady State Manchester (2012). In Place of Growth. Data from Berners Lee et al. (2011) see note 28. Data used in compiling the estimates is largely from 2009 and 2010 (see methodology section of their report).

³⁰ Manchester a Certain Future. (2009) page 5, see note 1.

what is the strategy for actually making this happen this time? The table in the Anthesis report that we have reviewed is followed by a rather scattergun tour of possibilities (and promotion) for some key organisations in the city but as the report acknowledges, these only account for approximately 20% of the city's carbon footprint (based on building-based emissions). The other 80% will be critical but much harder.

So, if a collective, shared response is necessary if Manchester is to “play our full part”, but relatively little has been achieved yet in building this alliance of actors, then “what is to be done”?

The *Playing Our Full Part* report states that “Manchester Climate Change Board wants all organisations in the city to help realise this vision.” It's third proposal, adopted by the council's Executive is,

“Manchester accelerates its efforts to mobilise all residents, businesses and other stakeholders to take action on climate change, starting in 2018.”

However, there is not any clear suggestion, yet, as to what an adequate strategy might be. There is a form for organisations to fill in and express their support, but that is all. It will be argued that the approach will be integrated within the Our Manchester Strategy, the overall strategy that the council leads with other key organisations. But other than asking organisations to pledge and make plans, there is little here that is recognisable as a political strategy for building the kind of change coalition that is going to be needed.

Indeed it is not easy to produce such a strategy but let's take the risk of suggesting a few pointers.

1. **Tell it like it is.** The *Playing Our Full Part* report makes the strong suggestion that everyone will benefit from climate change mitigation actions. Certainly, as the report suggests, it will be better to live in a warm house that is cheaper to heat, a neighbourhood that is not enveloped in traffic fumes, and to eat a healthy diet. These co-benefits are well established but there is a danger that by spinning such a positive tale, the public, and organisations are not confronted with the absolute necessity of taking action, not so much to create a better life – that is highly uncertain as we face collapsing economic, social and environmental systems – but to prevent things getting much worse. Manchester could make a declaration, like Bristol council³¹ and the London Assembly³², and others worldwide, that there is a CLIMATE EMERGENCY. This would underline the urgency of the situation, signalling to all stakeholders in the city how it is. An emergency requires emergency action. There will be hard choices to be made: our council (and the other Greater Manchester ones) receives income from the Manchester Airport Group, for example: with council finances squeezed between government austerity and rising population needs there will need to be serious

31 Bristol has also set 2030 as a deadline to go carbon neutral. This is 8 years earlier than Manchester but so far it is only an intention: the Mayor has been mandated to produce a detailed plan.

32 <https://www.london.gov.uk/press-releases/assembly/call-on-mayor-to-declare-climate-emergency>

consideration as to how it can be weaned away from what we have called “aviation dependency”³³.

2. Bring the public in. In addition to seeking pledges from organisations (which the climate change agency has tried before with limited success), the city could far more proactively use its convening power to create climate emergency summits in each ward and for each business sector. These would combine crash briefings on carbon literacy, explaining the crisis, and participative planning to establish local action plans for individuals, households, neighbourhoods. Key ideas and proposals could then be scaled up for city and region-wide action. The British like to refer to the spirit of collective action, of being in the same boat, that characterised the last great war. The stakes here are, if anything higher: a climate emergency could galvanise public participation, rebuilding community across the many divides, on a shared civic project of survival and regeneration. There is plenty in the report on actions individuals can take and this can be built on, very much with a view to supporting both collective action and institutional supports for individual behavioural change. Just leaving things to individual conscience is insufficient, as we are sure the authors of the reports understand. Moreover, widespread public action not happen without resources. One idea would be that each ward has a climate animator – someone to lead, galvanise, inform, facilitate, organise, plan, monitor, etc. at local levels, involving not just citizens but traders and businesses. At the city level, a team of climate animators could work with business sectors. But it's going to require more than the modest funding the agency currently has to work with. Why not use some of the considerable revenue from the airport to fund such a scheme in the short term (pending the city weaning itself off aviation dependency)³⁴?

3 Establish a media strategy. In hand with bringing the public in, there will need to be an effective media strategy for explaining the problem that we share and motivating people to get involved. A balance between frightening people (some anxiety will be necessary to the process – too much will freeze people) and encouraging them to take positive, collective action, will be needed.

4. Recognise climate action and shame climate destruction. This needs to be relentless. The city is good at spinning the positives, promoting a culture of celebration, not always justified by the facts on the ground. We know, however, that some key players and sectors will drag their feet. They

33 e.g. <https://steadystatemanchester.net/2014/07/16/can-we-end-aviation-dependency-and-meanwhile-how-to-spend-the-profits/> Also see the discussion in our Policies for the City Region, <https://steadystatemanchester.files.wordpress.com/2017/03/policies-for-the-city-region-the-longer-version-v3-final.pdf>

34 Manchester recently received a profits windfall of £39.3M, just part of the total income for this financial year. <https://www.manchestereveningnews.co.uk/business/business-news/manchester-airport-dividend-profit-council-14868721>

should be exposed, particularly where their inaction (or worse, damaging activity) contributes to a worsening of climate damage.

5. **Produce regular, accessible updates.** People and organisations will need to know where we are. A publicly accessible dashboard could be constructed. It would have top level data on emissions (courtesy of the SCATTER tool for making visible the greenhouse gas inventory) and, through a set of traffic light indicators, on the status of the multiple actions that will be designed to cut emissions. This will make it clear where we are on target, where we are not, and who is accountable. It could be boosted by having competitions and awards for the neighbourhoods, businesses and other organisations making the greatest contribution to emissions reductions (think Britain in Bloom, or the Spirit of Manchester awards).

6. **Lobby for change at the superior levels.** As we have made clear, radical reductions in emissions will require regional, national and international level actions. Having a coherent strategy for emissions reduction will enable the blocks and barriers to be identified. Where these lie at other levels (for example, the UK government is committed to the expansion of fossil fuel extraction) then Manchester needs to use its existing and future networks to lobby, and lobby hard, for change.

7. **Shock-proof the city.** It is going to get ugly, however well we perform on emissions reductions. There will be extreme weather and supply shocks that will affect our population. The city will need a very public and assertive programme for building community resilience – shock proofing our people, our neighbourhoods and their supply systems, particularly give nthat many companies are laggards in their assessment and management of climate change impacts and risks³⁵. This will not start from a zero base: the city is already experienced in disaster planning and response, but rather than responding to single events, it will be necessary to develop capacity for responding to threats of longer duration and greater impact. Climate change jargon calls this adaptation: we call it shock-proofing.

Conclusion

Manchester has good intentions on climate but these need a step change if they are to become a reality. This article has analysed the nature of the problem and, without prescribing what, after all, has to be a plan by and for the people and institutions of the city, we have outlined some of the key dimensions of an adequate approach. The city has to get serious about this agenda and built an effective alliance to realise deep cuts in our total greenhouse gas emissions: that's what "Playing Our Full Part" means.

35 Goldstein, A., Turner, W. R., Gladstone, J., & Hole, D. G. (2018). The private sector's climate change risk and adaptation blind spots. *Nature Climate Change*. <https://doi.org/10.1038/s41558-018-0340-5>

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