The Economic Benefits of Local Climate Action

Researched and produced by Centre for Sustainability, Equality and Climate Action, Queens University Belfast and the Place-Based Climate Action Network for UK100

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Executive Summary

This report by the Centre for Sustainability, Equality and Climate Action, Queens University Belfast and the Place-Based Climate Action Network for UK100 presents a synthesis of existing work relating to the economic benefits of local climate action. It offers cross-sector insight into how investment in local climate action can lead to tangible emission reduction, but can also create good quality green jobs, economic opportunities, important social co-benefits and level up areas across the UK as we seek to recover from the COVID-19 pandemic. It presents a clear evidence base that highlights not only is Net Zero transformation possible, but also that the costs of inaction are immense.

Key Insights

- Investment in climate action at the local level would see over 800,000 green jobs across the UK by 2030, rising to 1.38 million total jobs by 2050[1]
- For every £1 invested in climate mitigation and protecting communities from the impacts of extreme weather events a further £9 is saved[2]
- If UK businesses reduce carbon emissions to Net Zero by 2030 instead of 2050, then society (including the private sector) would escape costs equivalent to £1.1 trillion[3]
- One in five workers, and 6.3 million jobs in total, will be affected by the transition to a Net Zero carbon economy across the UK, with around three million workers requiring upskilling and around three million in high demand.[4]

1 https://www.ecuity.com/wp-content/uploads/2020/06/Local-green-jobs-accelerating-a-sustainable-economic-recovery_final.pdf
2 https://www.gov.uk/government/speeches/a-different-philosophy-why-our-thinking-on-flooding-needs-to-change-faster-than-the-climate
3 https://www.bitc.org.uk/blog/challenge-2030-lets-make-the-climate-crisis-history-as-we-build-back-better-from-covid-19/
4 https://pcancities.org.uk/tracking-local-employment-green-economy-pcan-just-transition-jobs-tracker

Other additional benefits

- The savings from climate action and the costs of climate inaction need to be included in making decisions. For example, for every £1 invested in energy efficiency measures, the NHS can save £0.42 (amounting to annual savings of £1.4 billion in England alone).[5]

Transport

- At present, congestion in towns and cities across the UK costs the economy around £11 billion every year[6]
- Every £1 million of investment in sustainable transport infrastructure can create 12.7 full time equivalent (FTE) jobs in the UK economy. For every kilometre of greenways and cycle paths constructed 1.6 FTE jobs can be created directly, indirectly and induced[7]
- Commuters who opt to cycle using dedicated cycle lanes (where they exist) instead of cycling on the road in often congested urban centres take half as many days off as others, resulting in a £13.7 billion boost to the UK economy, equivalent to about £36 million per UK local authority.[8]

5 https://volans.com/wp-content/uploads/2021/03/RetrofitRevolution.pdf
6 https://www.sustrans.org.uk/media/4472/4472.pdf
7 https://www.sustrans.org.uk/media/4472/4472.pdf
8 https://www.sustrans.org.uk/media/4472/4472.pdf

Nature-based Solutions (NbS)

- At the scale of afforestation recommended by the Climate Change Committee (CCC), 30,000 hectares of woodland afforested through capital investment would generate £366 million in value added, totalling just under £1 million in gross value added (GVA) per UK local authority[9]
- Depending on how and where trees are planted in urban areas, a conservative estimate of the economic benefit per tree over 50 years ranges from £1,200 to £8,000.[10]
- Property values benefit from an increase in green spaces in towns and cities – studies show increases between 5% and 18% in property values in greener and more afforested streets.[11]

Buildings, Energy and Poverty

- If sufficient investment across the UK was committed to retrofitting UK homes up to at least EPC C level of energy efficiency performance by 2030, then some 150,000 jobs could be created across the UK, bringing proportionally bigger benefits to regions where underemployment is highest[12]
- Investment in building energy efficiency measures across local authorities totalling £8.5 billion could deliver additional economic benefits equivalent to £92.7 billion[13]
- It is estimated that UK households could save £7.5 billion in energy expenditure, through energy efficiency measures[14]
- Retrofitting can free up additional consumer spending capacity, acting as a demand boost for local economies.

9 https://data.gov.uk/dataset/24d87ad2-0fa9-4b35-816a-89f9d92b0042/local-authority-districts-april-2020-names-and-codes-in-the-united-kingdom
10 https://www.treeconomics.co.uk/wp-content/uploads/2018/08/GBU_Street-Tree-Cost-Benefit-Analysis-2018.pdf
11 https://www.theeeig.co.uk/media/1096/eeig_report_rebuilding_for_resilience_pages_01.pdf
12 https://www.treeconomics.co.uk/wp-content/uploads/2018/08/GBU_Street-Tree-Cost-Benefit-Analysis-2018.pdf
13 https://volans.com/wp-content/uploads/2021/03/RetrofitRevolution.pdf
14 https://www.theeeig.co.uk/media/1096/eeig_report_rebuilding_for_resilience_pages_01.pdf

Challenges

- A key challenge and constraint on local authorities realising the multiple benefits from decarbonisation and climate adaptation measures, especially in housing and transportation and NbS, is a lack of capacity and resources. The findings of this research support those from UK100 Power Shift report[15] and back up National Audit Office (NAO) reports from December 2020 and July 2021, which call for greater powers and transfer of resources from national Government to local authorities, along with greater clarity of roles and responsibilities, a view also echoed by the UK Cities Climate Investment Commission.[16]

15 https://www.uk100.org/sites/default/files/publications/Power_Shift.pdf
16 https://cp.catapult.org.uk/event/uk-cities-climate-investment-commission-uk-ccic-launch/, https://www.nao.org.uk/report/local-government-and-net-zero-in-england/

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Part I

Introduction

> **A mix of adaptation and mitigation options to limit global warming to 1.5°C, implemented in a participatory and integrated manner, can enable rapid, systemic transitions in urban and rural areas [...(high confidence)]. These are most effective when aligned with economic and sustainable development, and when local and regional governments and decision makers are supported by national governments.**
> **Intergovernmental Panel on Climate Change (IPCC)**[17]

The climate and biodiversity crises pose unprecedented ecological challenges and threats to the world, the UK, and local authorities across the country. It will require equally unprecedented economic transformation to rapidly decarbonise our societies, involving changes to how efficiently we use and conserve energy, how we heat and insulate our homes, how we travel, and in the nature and focus of our industrial and commercial activity.

Fortunately, this economic shift can unlock correspondingly significant social and economic benefits for our society. If done correctly, and in the time frame suggested by climate science (here 2030 should be the year around which policy should be focused), we can not only avoid the worst consequences of climate change but capitalise on the huge economic and other co-benefits of urgent transformative climate action at scale.

This synthesis report explores and highlights the arguments concerning, and compiles the research relating to, the economic benefits of confronting the climate crisis in local authorities across the UK.[18] Importantly, it considers these benefits in the context of rebuilding after the COVID-19 pandemic and the impacts the public health emergency has had on local authorities, their finances, and local economies across the UK. Whilst local authorities are directly responsible for 4-10% percent of local emissions in the UK,[19] through their policies and partnerships they have strong influence over a significant proportion of UK emissions. The UK Government's analysis in the Net Zero Strategy states that 82% of UK emissions are influenced by local authorities.[20] Other PCAN research has revealed that while approximately 75% of local authorities across the UK have declared climate and ecological emergencies since 2019, the focus of local climate action is predominantly on mitigation: less than 12% of climate emergency declarations mention adaptation.[21] As this report suggests there are multiple economic (and non-economic) benefits of climate adaptation such as NBS.

Part I briefly explores the emissions profile in the domestic, transport, industrial and commercial (I&C), and land use sectors in local authorities and regions across the UK, while outlining the priorities for decarbonisation based on these emissions data. It then proceeds to explore the economic opportunities and benefits for local authorities of rapid decarbonisation in the context of COVID-19, focusing on job creation, gross value added (GVA), productivity boosts and efficiency, among other benefits. It also highlights the social and health benefits of ambitious decarbonisation through tackling fuel poverty and air pollution, for example, while considering the positive economic impacts of targeting these social issues. Finally, it applies and explores some of these benefits to a number of case studies across the UK.

Part II of the report proposes changes in relation to Government guidance in the HMT Green Book to better align with and realise climate action by local authorities. It also outlines how taking a 'functional finance' approach to understanding state finances can contribute to the policy discussion and innovation needed around public finance and state action on the climate crisis. It suggests the need for flexibility and 'common but differentiated responsibilities' as part of an equitable approach to local authorities meeting (potentially) statutory decarbonisation and nature restoration/ NBS targets. It gives an overview of emerging local economic models such as community wealth building (CWB) that hold promise in terms of local delivery of Net Zero.

17 IPCC (2018), Special Report on 1.5°, Summary for Policymakers, https://www.ipcc.ch/sr15/chapter/spm/
18 This report is based on a comprehensive review of existing published academic, policy/government and advocacy-based research, mostly drawn from the UK. It therefore should be read with these caveats and qualifications in mind.
19 UK100 (2021), 'Local Authority Contributions to Net Zero, uk100.org/publications/local-authority-contributions-net-zero
20 UK Government (2021) Net Zero Strategy, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1026655/net-zero-strategy.pdf
21 Howarth, C et al (2021), Trends in Local Climate Action in the UK, https://pcancities.org.uk/sites/default/files/TRENDS%20IN%20LOCAL%20CLIMATE%20ACTION%20IN%20THE%20UK%20_FINAL_0.pdf

Emissions Profiles and Trends in UK Local Authorities

Introduction

This section explores the data and trends relating to carbon emissions at regional and local authority level. By taking this approach, we can identify the sources of emissions as indicators of economic characteristics within local authority areas throughout the UK, in order to accurately determine the most significant benefits of climate action for local economies (and in some cases, conversely, the costs of climate inaction).

National and regional emissions trends

Carbon emissions

In 2019,[22] the UK economy emitted 345 $MtCO_2$. When breaking down this total,[23] the domestic sector is responsible for 27% of carbon emissions, with transport accounting for 36% and I&C sector responsible for 37%. At the national level, this breakdown provides for little insight into regional context and challenges and the economic benefits presented by tackling them. It should also be noted that emissions data at the local authority level concerns only CO_2 emissions, and not greenhouse gases (GHG) generally – carbon emissions account for 81% of all UK GHG emissions.[24] Table 1 below breaks down both carbon emissions data and total final energy consumption data by UK region, allowing for a nuanced analysis of regional and local authority emissions trends.

22 The latest year for which emissions data at local authority level is the time of writing (ONS)
23 Includes netting effects of Land Use, Land Use Change and Forestry (LULUCF)
24 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/894785/2005-18-local-authority-co2-emissions-statistical-release.pdf

Table 1: Net UK GHG emissions by gas, base year, 2018, 2019[25]

Table 1: Net Uk								
Year	Emissions	Carbon dioxide (CO_2)	Methane (CH4)	Nitrous oxide (N2o)	Hydro-fluoro-carbons (HFC)	Perfluoro-carbons (PFC)	Sulphur hexafluo-ride (SF6)	Total
Base Year	Net Emissions (including net LULUCF emissions)	608,288,719	133,899,840	49,564,616	18,559,478	596,760	1,313,790	812,223,204
2018	Emissions (excluding net LULUCF emissions)	379,090,958	49,423,967	19,983,810	13,128,403	256,839	615,423	462,499,399
	Net LULUCF emissions	-1,383,288	4,864,060	2,074,892				5,555,664
	Net emissions (inclusing net LULUCF emissions)	377,707,670	54,288,027	22,058,703	13,128,403	256,839	615,423	468,055,063
2019	Emissions (excluding net LULUCF emissions)	366,079,724	49,118,323	20,161,741	12,500,027	344,686	589,389	448,819,279
	Net LULUCF emissions	-1,025,390	4,897,276	2,074,266				5,946,152
	Net emissions (including net LULUCF emissions)	365,079,724	54,015,599	22,236,006	12,500,027	344,686	589,389	454,765,431
2018 to 2019 change	Emissions (excluding net LULUCF emissions)	-12,985,845	-305,644	177,931	-628,375	87,847	-26,034	-13,680,120
	Net LULUCF emissions	357,899	33,216	-627				390,487
	Net emissions (including net LULUCF emissions)	-12,627,946	-272,428	177,304	-628,375	87,847	-26,034	-13,289,633

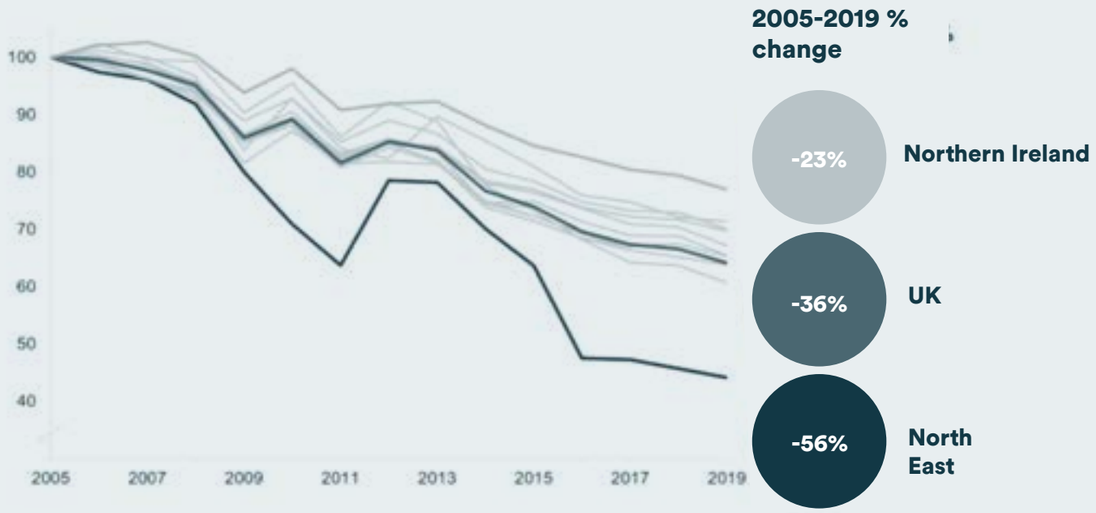
Using the Department for Business, Energy and Industrial Strategy's (BEIS) estimates of CO_2 emissions reductions (base year 2005), we can see that the region with the largest decrease is the North East and Northern Ireland as the region with the least (Table 2 and Figures 1 and 2).

25 BEIS (2021), Annual Statement of Emissions for 2019, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/978537/annual-statement-emissions-2019.pdf

Table 2: End user CO_2 emissions and CO_2 per km2 by region 2005 and 2019[26]

Region / country	2005		2019		Difference between 2005 and 2019 per km² (tCO_2)
	Total emissions ($MtCO_2$)	Per km² (tCO_2)	Total emissions ($MtCO_2$)	Per km² (tCO_2)	
UK	537	2.2	345	1.4	-0.8
Wales	33	1.6	24	1.1	-0.4
Scotland	48	0.6	31	0.4	-0.2
Northern Ireland	18	1.3	14	1.0	-0.3
England	435	3.3	276	2.1	-1.2
North East	33	3.9	15	1.7	-2.2
North West	60	4.0	39	2.6	-1.5
Yorkshire and the Humber	53	3.4	35	2.2	-1.2
East Midlands	42	2.6	29	1.8	-0.8
West Midlands	45	3.4	30	2.3	-1.1
East of England	48	2.5	34	1.7	-0.7
London	47	29.5	29	17.9	-11.6
South East	65	3.4	41	2.1	-1.3
South West	40	1.7	26	1.1	-0.6

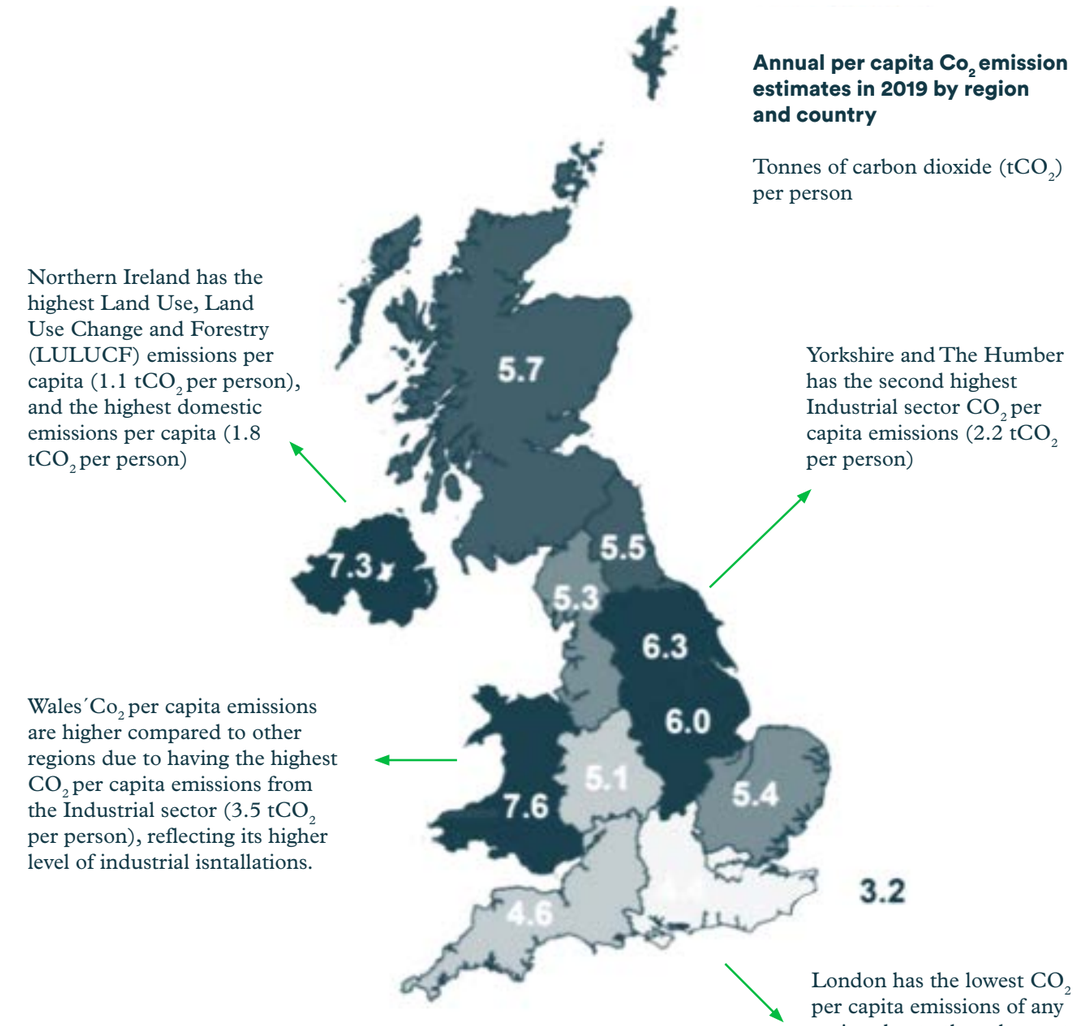
Figure 1: End user CO_2 emissions by region[27]



26 BEIS (2021), UK local authority carbon dioxide emissions estimates 2019, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/996056/2005-19-local-authority-co2-emissions-statistical-release.pdf

27 BEIS (2021), UK local authority carbon dioxide emissions estimates 2019, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/996056/2005-19-local-authority-co2-emissions-statistical-release.pdf

Figure 2: Annual per capita CO_2 emission estimates by region and country[28]



It is also useful to summarise the breakdown of GHG emissions by sector (Figure 3), and by both sector and region (Figure 4).

28 BEIS (2021), 2019 Local Authority Carbon Dioxide Emissions: Statistical Summary, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/996055/2019-local-authority-co2-emissions-stats-1-page-summary.pdf

Figure 3: Territorial UK GHG emissions by sector (2019)[29]

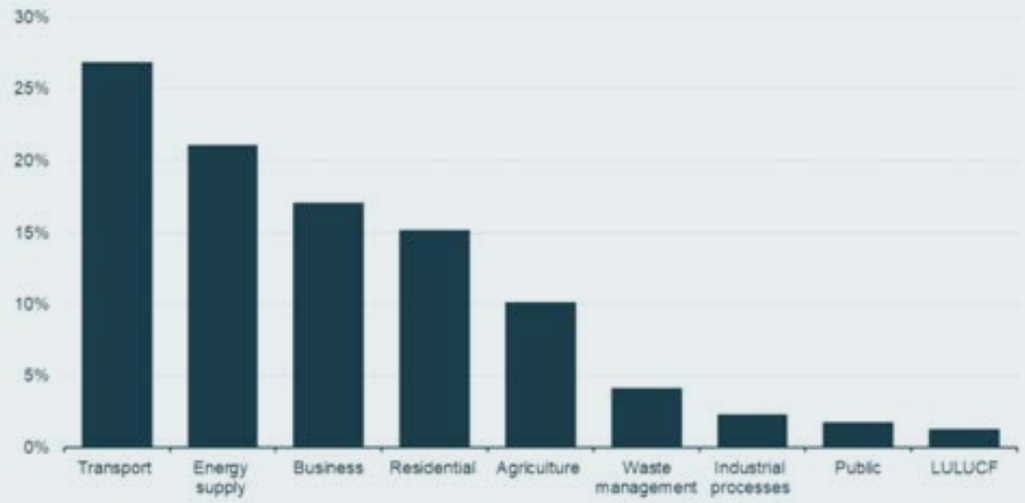


Figure 4: End-user CO_2 emissions by region and sector, 2019[30]

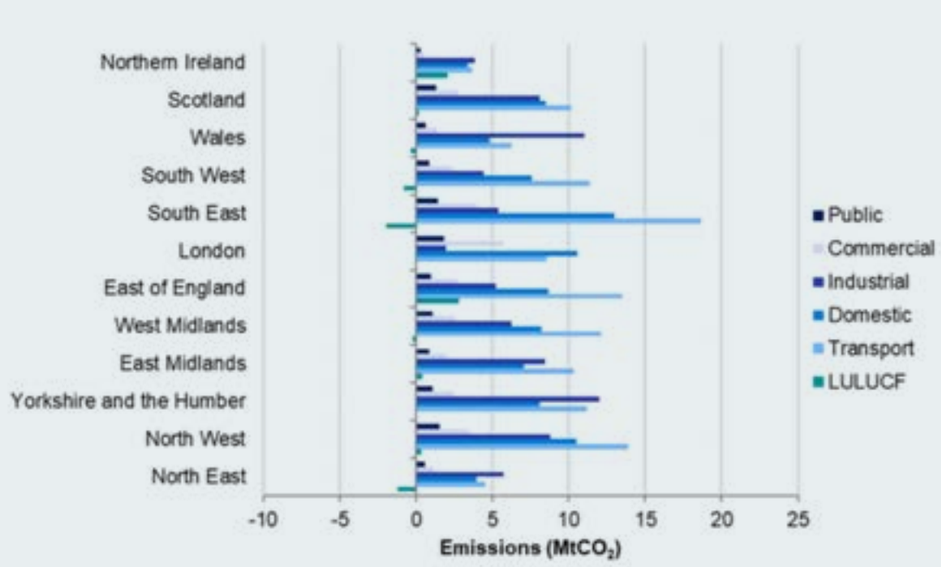
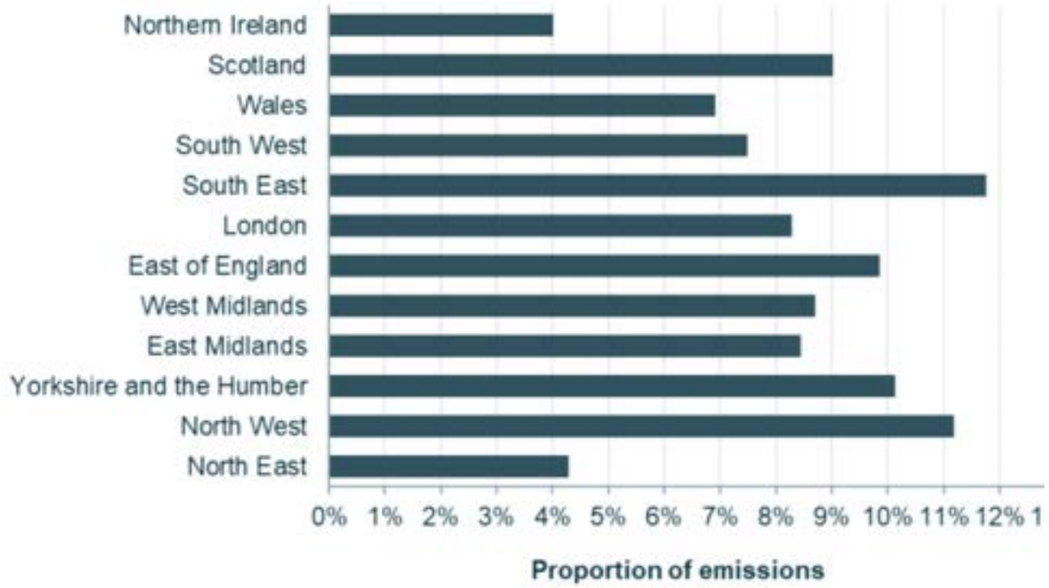


Figure 5 details regional emissions as a proportion of total carbon emissions in the UK, and Figure 6 provides an emission breakdown on a per capita basis.

29 BEIS (2021), 2019 UK Greenhouse Gas Emissions, Final Figures https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/957887/2019_Final_greenhouse_gas_emissions_statistical_release.pdf

30 BEIS (2021), UK local authority carbon dioxide emissions estimates 2019, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/996056/2005-19-local-authority-co2-emissions-statistical-release.pdf

Figure 5 – Proportion of UK emissions by region, 2019[31]



The three regions with the largest shares of emissions (South East, North West, and Yorkshire and the Humber) point to the nuanced nature of emissions and energy consumption in the UK, across domestic, transport, and I&C emissions.

The South East region, for example, is the highest emitting region in the UK by a significant margin, responsible for some 40,507.9 $MtCO_2$ in 2019. Of this, transport is by far the most significant source of emissions, accounting for almost half of its emissions at 18,650.1$MtCO_2$.[32] At local authority level, often transport emissions can be deceivingly high, owing to the inclusion of motorway emissions in a local area, and not on account of any particular local authority policy decision. However, South East transport emissions are dominated by main and minor roads. For the purposes of this report, we have chosen case studies that are representative of this trend in emissions, and where local authorities can have a direct effect on transport emissions through policy levers at their disposal. We also assess the knock-on effects of these emissions, such as the adverse health effects of air pollution and traffic congestion, and highlight the costs to the economy of unsustainable transport practices, and the economic benefits of investing in Net Zero alternatives.

31 BEIS (2021), UK local authority carbon dioxide emissions estimates 2019, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/996056/2005-19-local-authority-co2-emissions-statistical-release.pdf

32 BEIS (2021), UK local authority and regional carbon dioxide emissions national statistics: 2005 to 2019, https://www.gov.uk/government/statistics/uk-local-authority-and-regional-carbon-dioxide-emissions-national-statistics-2005-to-2019

In Yorkshire and Humber, almost half of all emissions are from I&C sources, with transport and domestic emissions much lower than in the South East. The economic implications of this relatively large emissions share are clear. This directly concerns economic activity, and there are therefore clear implications in terms of employment and regional development to consider as the area moves towards Net Zero. To this point, the Grantham Institute states that the "zero carbon transition will not take place evenly across the UK and the different spatial and sectoral impacts need to be understood by policy".[33] Therefore, in choosing case studies we have opted to represent regions of the UK undergoing transitions away from carbon intensive forms of employment, and the economic benefits that can be unlocked by supporting this Just Transition.[34]

By contrast, the North West region closely mirrors national averages of emissions by source. Transport in the North West accounts for 35% of emissions, domestic emissions for 28%, and the remaining 37% come from I&C. The North West of England's place as the UK's second highest emitting region relates to its population, which at 7.3m[35] ranks third among UK regions (including London) and devolved administrations. When measured per capita, at 5.3 tonnes of CO_2 per person, the North West's emissions closely mirror the UK average (5.2 tonnes CO_2 per capita). It is for this reason that it is an interesting case study. Further research into urban areas with an evenly distributed emissions profile, which are similar to the UK average, allows us to highlight economic opportunities to tackle the climate crisis which intersect across domestic, transport, I&C and land use sectors.

33 https://pcancities.org.uk/sites/default/files/Financing-inclusive-climate-action-for-a-just-transition-in-the-UK_POLICY-BRIEF_8PP.pdf
34 Fearon and Barry, (2021), Mapping a Just Energy Transition in Northern Ireland, https://www.qub.ac.uk/research-centres/SECA/News/MappingaJustEnergyTransitioninNorthernIreland.html, and International Labour Organisation Guidelines on Just Transition Principles - https://www.ilo.org/wcmsp5/groups/public/---ed_emp/---emp_ent/documents/publication/wcms_432859.pdf
35 ONS, (2021), Census Output Area population estimates – North West, England https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/datasets/censusoutputareaestimatesinthenorthwestregionofengland

Local authority emissions analysis

BEIS provides a breakdown of emissions data for local authorities.[36] This dataset was developed by examining the broad source sector breakdowns at the national and regional due to data constraints at the local level. This data constraint issue is addressed in more detail in the UK100 report Local Authority Contributions to Net Zero,[37] which pulls together publicly reported emissions from local authorities across the UK.

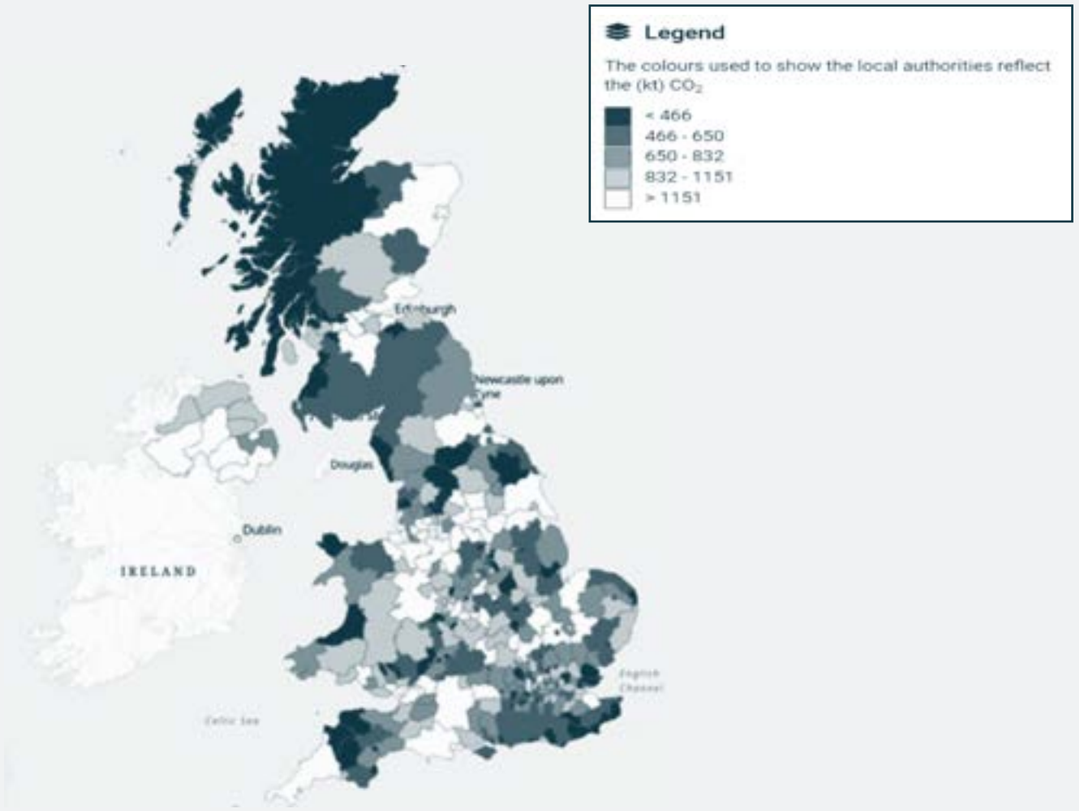
Between 2017 and 2018, 321 out of the 382 local authority areas in the UK saw a decrease in net emissions. This means, however, that almost one in seven local authorities have seen emission increases.[38] Figure 6 displays the concentration of the highest emitting local authorities on a per capita basis.

Between 2005 and 2018 local authorities in the North East have seen a combined 55% reduction in emissions, driven by the closure of industrial facilities and high-emitting installations in the region. This trend can be seen in local authorities across the UK, and the economic benefits of further decarbonisation and regeneration of these areas is an important theme for the case studies.

Of the primary sectors covered by BEIS's data, transport is highest emitting in some 54% of local authorities.[39] The I&C sector was the highest emitter in 25% of local authorities, while the domestic sector had the highest share in the remaining 21%. Often the margins between sectors, particularly in smaller regions and authorities, can be negligible, and this figure may be further compounded by the presence of transport emissions in authority areas which are largely beyond the control of local authorities themselves.

36 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/894785/2005-18-local-authority-co2-emissions-statistical-release.pdf - Estimates of carbon dioxide emissions have been produced for each Local Authority in the UK from the following broad source categories: Industry, commercial & public sector (including electricity-related emissions) • Domestic (including electricity-related emissions) • Transport • LULUCF (including removals of carbon dioxide from the atmosphere, so that net emissions from this sector can sometimes be negative). The level of sectoral detail is constrained by BEIS data available for local electricity and gas use.
37 uk100.org/publications/local-authority-contributions-net-zero. This report and Local Authority Contributions to Net Zero were being produced in parallel so the exact data contained in that report is not referenced here
38 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/894785/2005-18-local-authority-co2-emissions-statistical-release.pdf
39 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/894785/2005-18-local-authority-co2-emissions-statistical-release.pdf

Figure 6: CO_2 emissions per capita by local authority area[40]



However, while I&C (45.8%) and domestic (36.9%) emissions have fallen dramatically across the UK between 2005 and 2018, transport emissions have dropped by just 7.3%.[41] This points to the intractability of transport in particular in the national emissions profile, and confirms transport as the highest emitting sector in over half of UK local authorities. Despite population growth, demographic changes in suburban regions outside major urban hubs, the increasing number of private vehicles[42] and kilometres travelled by these vehicles,[43] local authorities can realise substantial economic and health benefits by reducing transport emissions through active travel and public transport schemes, explored in detail in the next section.

40 National Atmospheric Emissions Inventory (NAEI) (2021), CO_2 Interactive Map, https://naei.beis.gov.uk/laco2app/
41 Calculations include land use net effect and unallocated emissions, ONS, 2018
42 https://www.gov.uk/government/statistical-data-sets/tsgb09-vehicles
43 https://www.gov.uk/government/statistical-data-sets/tsgb01-modal-comparisons

On the domestic emissions front, the top local authority areas for gross domestic emissions closely correlate with those experiencing high levels of fuel poverty. Indeed, of the top 10 local authorities in England with the highest emissions in the domestic sector, eight are also in the top 10 local authorities for gross households experiencing fuel poverty (Table 3).

This trend presents both a challenge and an opportunity for local authorities. The widespread presence of fuel deprivation is a clear social justice issue in a society rich with sources of heat and energy. Fortunately, tackling fuel poverty is widely recognised as a cost-effective way of reducing emissions sharply in the short term, while also tackling lost worker productivity and resource burden on the state through health service and social protection payments.[44]

Table 3 – Gross domestic emissions and gross households in fuel poverty by local authority[45]

Local authority	Gross domestic emissions (KtCO2)	Ranking (English local authorities)	No. of households in fuel poverty	Ranking (English local authorities)
Birmingham	1,432.5	1	92,990	1
Leeds	1,118.2	2	57,592	2
County Durham	843.4	3	36,620	7
Cornwall	781.8	4	29,123	9
Sheffield	779.1	5	42,801	4
Bradford	766.7	6	38,925	6
Wiltshire	720.6	7	21,058	N/A
Cheshire East	667.0	8	18,336	N/A
Kirklees	657.7	9	31,027	8
Liverpool	614.3	10	39,527	5

44 https://recovery.smithschool.ox.ac.uk/wp-content/uploads/2020/11/COP-26-Background-Paper-05-2020.pdf
45 BEIS local authority emissions data, 2018; BEIS Sub-regional fuel poverty data 2021 (2019 reported), https://www.gov.uk/government/statistics/sub-regional-fuel-poverty-data-2021

The snapshot in Tables 4-7 of the top and bottom councils ranked by their carbon emissions provides us with a number of insights.

Table 4: Top three UK local authorities by emissions per capita, 2018

Name	Emissions per capita (tCO_2 per person)
City of London	82.3
Neath Port Talbot	45.5
North Lincolnshire	43.3

Table 5: Top three UK local authorities by gross emissions, 2018

Name	Total emissions ($KtCO_2$)
North Lincolnshire	7,445.2
Neath Port Talbot	6,505.8
Birmingham	4,129.4

Table 6: Bottom three UK local authorities by emission per capita, 2018

Name	Emissions per capita (tCO_2 per person)
Argyll and Bute	0.7
Highland	0.8
- Northumberland - Hackney	2.2 2.2

Table 7: Bottom three UK local authorities by gross emissions, 2018

Name	Total emissions ($KtCO_2$)
Isles of Scilly	9.4
Argyll and Bute	57.5
Oadby and Wigston	179.3

Firstly, the three highest emitting areas on the basis of per capita emissions[46] are driven directly by the presence of large industrial installations. Port Neath Talbot, North Lincolnshire, and High Peak's I&C emissions account for 91.9%, 89.6% and 89.7%, respectively. The high concentration of emissions in a small number of installations presents an opportunity to rapidly decarbonise by focusing on a Just Transition for industry and workers in those areas. Given that this profile of emissions is replicated throughout many UK regions, the case studies will explore authority areas of this kind in much greater detail.

Secondly, the disconnect between the local authorities with the highest per capita emissions and those where gross emissions are highest, points to the disparate nature of emissions profiles in more populated areas with myriad emissions sources – fuel poverty and poor energy efficiency, I&C emissions, car dependency and so on. These more complex and multifaceted emissions profiles will be represented in case studies. Finally, the lowest ranking local authority areas by per capita emissions are dominated by areas with two similar demographic, economic and emissions profiles. The areas that are sparsely populated and rich in natural capital - heavily forested areas and peatland areas for example, in Argyll and Bute, the Scottish Highlands and Northumberland. The second profile is one of densely populated, typically London-based, areas with low transport and I&C emissions. There are important lessons relating to the climate mitigation impact of land use through carbon sequestration. Argyll and Bute (-510.8), Highland (-1,550.1), and Northumberland (-1,114.3) enjoy a highly significant negative emissions effect as a result of the nature of physical geography in these areas and associated carbon sequestration land use strategies. However, it is obvious that not all local authorities can replicate the majestic wilderness of the Scottish Highlands or Northumberland National Park, for example, but attention should be drawn to the important mitigation effect of preserving and restoring the natural world through NBS to the climate crisis. Indeed, without these LULUCF mitigation factors, the emissions profile and population size of the above authority areas would place them in insignificance as part of this analysis. Therefore, the jobs-rich economic opportunities of NBS and climate mitigation through land use will be explored through case studies.

46 The City of London is somewhat of a misnomer, and it's extremely high value of emissions per capita is due to the extremely small population (approx. 8,700 people) in the area

Summary

This section has provided a brief snapshot of the extent and nature of emissions regionally and by sector across the UK. In doing so, it has highlighted the diverse and most important avenues for decarbonisation, as a means of framing the economic benefits of climate action in local authority areas. The next section will explore these economic benefits in much greater detail, before applying these insights to specific case studies.

Economic benefits of climate action for local authorities

This section outlines the multiple economic benefits of decarbonisation and climate action for local authorities across the UK. It highlights these benefits in different sectors, looking at the opportunities for output growth, employment, and reduced social and economic cost by tackling domestic, transport, and I&C emissions. It also indicates the many benefits of investing in NBS, and the positive economic impacts of climate resilience measures.

COVID-19, decarbonisation, and local economies

This research takes place in the midst of unprecedented economic disruption caused by the COVID-19 pandemic and the associated public health emergency. **In 2020, the UK economy (in GDP terms) contracted by 11%; the most severe shock to output in over 300 years.**[47] Despite a predicted rebound in 2021, with GDP expected to rise by 4%,[48] the economic damage across the UK is lasting and widespread, if unevenly distributed geographically.[49] Official unemployment across the UK is expected to peak at 6.5% by the end of 2021.[50] Through the Coronavirus Job Retention Scheme, which ran from March 2020 to September 2021, almost 12 million employee jobs had been furloughed in total, at a cost of £69.3 billion.[51]

47 http://cdn.obr.uk/CCS1020397650-001_OBR-November2020-EFO-v2-Web-accessible.pdf

48 Pre-pandemic levels of GDP are expected to be reached by Q2, 2022 - https://obr.uk/efo/economic-and-fiscal-outlook-march-2021/

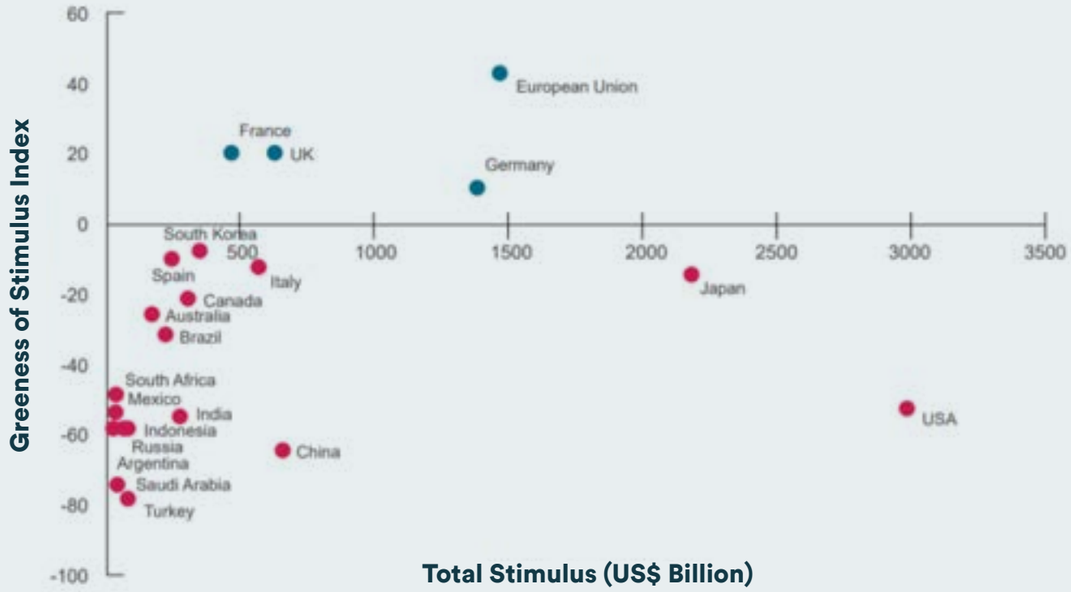
49 ttps://www.local.gov.uk/publications/local-economic-recovery-planning-playbook-action

50 Powell and Francis-Devine (2021), Coronavirus: Impact on the labour market, House of Commons Library, https://researchbriefings.files.parliament.uk/documents/CBP-8898/CBP-8898.pdf

51 Francis-Devine, Powell and Clark (2021), Coronavirus Job Retention Scheme: statistics, House of Commons Library, https://researchbriefings.files.parliament.uk/documents/CBP-9152/CBP-9152.pdf

At the national and international level, state supports for sectors not affected by lockdown and public health measures have been significant, with some seeking to use public investment committed during the pandemic as a lever to decarbonise the economy and drive a green and low carbon recovery[52] (Figure 7).

Figure 7 – Scale and 'greenness' of government COVID-19 support and stimulus[53]



52 While there is no agreed definition of 'green jobs' or 'green stimulus', this report defines green jobs/economic activity as relating to agriculture, energy, industry, waste, water, research and development, administration and transport organised around, on or towards low carbon energy transition, climate adaptation measures and protecting ecosystems and biodiversity. This would include, as the ONS defines it, "areas of the economy engaged in producing goods and services for environmental protection purposes, as well as those engaged in conserving and maintaining natural resources" (ONS, 2021, https://www.ons.gov.uk/economy/environmentaccounts/methodologies/thechallengesofdefiningagreenjob) which would include reusing, repairing or recycling, increasing sustainable manufacturing and consumption. ONS definitions and estimates are used later in the report

53 ILO and WWF (2020), Nature Hires: How Nature-based Solutions can Power a Green Jobs Recovery, https://wwfint.awsassets.panda.org/downloads/nature_hires_report_wwf_ilo.pdf

The dilemma for local authorities

The impact of this disruption on local authorities has been significant. The National Audit Office (NAO) predicts that, despite significant government funding for lost income and pandemic support throughout 2020, 75% of local authorities feel this support is inadequate to meet local funding pressures.[54] Some 25 English local authorities are in danger of public bankruptcy,[5556] (with some like Croydon already declared bankrupt, and others such as Kent, Leeds, Manchester, and Nottingham all warning that they will have to reduce staff numbers and cut service provision to avoid bankruptcy), 252 (74%) are underfunded, and 94% of finance officers in single tier local authorities are planning to make service spending cuts in 2021-22.[57]

Given the legal requirement of public authorities to 'balance the books' this is perhaps unavoidable in the absence of government support. Local authorities have been hard-pressed by £6.9bn in additional demand-led spending on services, social distancing measures, PPE and other pandemic-related expenditures, while enduring lost income streams in the region of £2.8bn. Government support has stopped at £9.1bn, leaving local authorities with a combined shortfall of about £600m.[58]

Reducing public spending and investment in local authorities however, will only intensify the economic damage and social inequalities caused and exposed by COVID-19. Within that context, green post-pandemic strategies (policies that achieve climate or ecological benefits but based on regressive policies of either cutting public services or increases taxes or costs which impact disproportionately on lower income groups) will as this report points out, fail to realise the positive economic potential of climate and decarbonisation proposals to 'build back better', and undermine public confidence and support for green recovery strategies and plans that are not seen to benefit local populations.

54 https://www.nao.org.uk/wp-content/uploads/2020/08/Local-government-finance-in-the-pandemic.pdf
55 25 Councils designated by NAO as either 'acute' or 'high' financial risk
56 https://www.theguardian.com/society/2021/mar/10/swingeing-cuts-on-cards-as-councils-in-england-face-funding-crisis-watchdog-warns
57 https://www.nao.org.uk/wp-content/uploads/2020/08/Local-government-finance-in-the-pandemic.pdf
58 https://www.nao.org.uk/wp-content/uploads/2020/08/Local-government-finance-in-the-pandemic.pdf

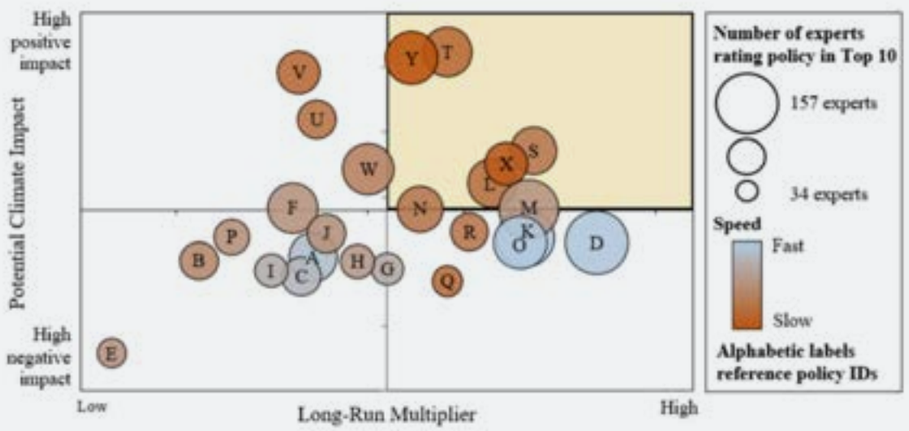
It is in this very difficult context that local authorities must consider the meaningful, lasting and interrelated benefits of decarbonising across all sectors, confronting the climate crisis, and harnessing the economic opportunities of local climate action. Research has pointed to the necessity of investment in green measures to secure a stable recovery with positive knock-on effects for the rest of the economy.[59]

A survey by the Oxford Smith School of Enterprise and the Environment of 231 influential economists and government and central bank officials indicates strong support for fiscal policies supporting green investments. This survey suggested that a green recovery was viewed as superior in terms of economic multipliers and impacts on long-term economic performance. It identified five policies with high potential on both economic multiplier and climate impact metrics:

1. clean physical infrastructure
2. building efficiency retrofits
3. investment in education and training
4. natural capital investment
5. clean energy research and development.

59 https://www.smithschool.ox.ac.uk/publications/wpapers/workingpaper20-02.pdf

Figure 8: A survey of economists by the Oxford School of Enterprise and the Environment



A Temporary waiver of interest payments
B Assisted bankruptcy (super Chapter 11)
C Liquidity support for large corporations
D Liquidity support for households, start-ups and SME's
E Airline bailouts
F Not for profits, education, research, health inst. bailouts
G Reduction in VAT and other goods and services taxes
H Income tax cuts
I Business tax deferrals
J Business tax relief for strategic and structural adj.
K Direct provision of basic needs
L Education investment
M Healthcare investment
N Worker retraining
O Targeted direct cash transfers or temporary wage increases
P Rural support policies
Q Traditional transport infrastructure investment
R Project-based local infrastructure grants
S Connectivity infrastructure investment
T Clean energy infrastructure investment
U Buildings upgrades (energy efficiency)
V Green spaces and natural infrastructure investment
W Disaster preparedness, capacity building
X General R&D spending
Y Clean R&D spending

At the same time, public investment in the delivery of Government's commitment to achieve Net Zero can secure additional employment, has a stronger multiplying effect than spending cuts or tax reductions, and can deliver greater output boosts with benefits for tax and rates revenue that can finance further green investment.[60]

Public support for local authority action

Local authorities across the UK are integrating climate action and green measures into locally-tailored plans for economic recovery.[61] Crucially, the public also trusts local authorities to deliver on services, five times more than private companies or central government.[62] Cuts, austerity and outsourcing will only engender distrust and dissatisfaction, which could make any measures to transition to a decarbonised and fairer economy more difficult and with less support from those affected.[63] ***Survey data also shows that 70% of the public acknowledge local communities must act in the face of the climate crisis, and believe climate breakdown is the joint-second highest spending priority for local authorities.***[64] It is clear, therefore, that high levels of, often under-acknowledged or publicly recognised, public support exists for local authorities to identify and realise the local economic benefits of climate action in response to COVID-19, as a way of also addressing existing local social and economic inequalities and challenges.

Economic Benefits of Climate Action and Decarbonisation

Harnessing the economic and social benefits of climate action requires local authorities to take a major role in planning and delivering on funding. It means investment in capital and infrastructural projects on a major scale, and in committing operating expenditure to climate action through targeted local employment initiatives.

60 https://www.smithschool.ox.ac.uk/publications/wpapers/workingpaper20-02.pdf
61 https://www.local.gov.uk/publications/local-economic-recovery-planning-playbook-action
62 https://www.apse.org.uk/apse/assets/File/APSE%20Survation%20Survey%20Dec%202020.pdf
63 http://files.nesc.ie/nesc_research_series/Research_Series_Paper_15_TTCaseStudies.pdf
64 After social care and tied with housing and road maintenance.
https://www.apse.org.uk/apse/assets/File/APSE%20Survation%20Survey%20Dec%202020.pdf

General benefits

Green economic interventions of this kind can have transformative impacts on local economies, and it is important that these benefits are widely shared in terms of employment, better health outcomes, a cleaner environment, and improved services, for example. These need to be made public through effective media and communications campaigns. In other words, climate action at the local level can and should be used to strengthen communities, making them more cohesive and resilient against economic and ecological threats. Such an approach can avoid negative impacts, such as those witnessed in ex-coal mining communities impacted by pit closures in the 1980s that still endure decades on; higher levels of deprivation, worse health outcomes, and higher levels of unemployment.[65]

Cost avoidance

Among the strongest economic cases for UK local authorities to invest in climate mitigation and adaptation is avoiding the rising costs of climate impacts.[66]

The estimated annual cost of floods in the UK has reached £340m, and is expected to rise to £428 million if global temperatures rise by 2°C, reaching £619 million if post-industrial warming reaches 4°C.[67] Extreme weather events due to the climate crisis have profound effects on local economies and business owners unable to withstand sudden shocks. During 2013 and 2014 during bouts of particularly damaging flood, the average cost of flood damage to UK businesses was £82,000.[68] A study carried out by Leeds University has found that the winter of 2019/2020 floods in Calderdale West Yorkshire cost local companies about £43 million in direct losses, plus £25 million in indirect losses.[69] Worse still, some 40% of businesses were unable to reopen after suffering from flood damage,[70] and many businesses (and some homeowners) have difficulty in securing adequate insurance cover.[71] ***Yet, it has been estimated that for every £1 invested in climate mitigation and protecting communities from the impacts of flooding, a further £9 is saved.***

65 https://www.coalfields-regen.org.uk/wp-content/uploads/2019/10/The-State-of-the-Coalfields-2019.pdf
66 Benjamin M. Sanderson & Brian C. O'Neill (2020), 'Assessing the costs of historical inaction on climate change', Sci Rep 10, 9173 https://www.nature.com/articles/s41598-020-66275-4
67 https://www.theccc.org.uk/2016/01/15/infographic-future-flood-risk-in-the-uk/
68 https://www.ukgbc.org/wp-content/uploads/2020/08/Nature-based-solutions-to-the-climate-emergency.pdf
69 https://icasp.org.uk/2021/06/11/helping-flood-hit-companies-build-for-the-future/
70 https://www.ukgbc.org/wp-content/uploads/2020/08/Nature-based-solutions-to-the-climate-emergency.pdf - p8
71 The government Flood Re scheme does not extend to businesses for example. https://www.bbc.co.uk/news/business-50391494

Leeds in 2018-19 spent £620,000 on the 'costs of climate change',[72] and a further £1.18m in 2019-20 – shrewd investment in climate resilience measures, such as land drainage, flood defence and waste management changes could save cash-strapped councils like Leeds in the years ahead. Phase 2 of the Leeds Flood Alleviation Scheme *"will reduce flood risk to a 0.5% probability of occurring in any given year (1 in 200 probability), including an allowance for climate change until 2069. This level of protection will guard against a similar event to the Boxing Day floods in 2015, which cost Leeds an estimated £36.8m and the city region more than £500m".*[73]

The Humber: Hull Frontage scheme is a £42 million flood defence scheme to upgrade the defences along the edge of the Humber Estuary to protect the city of Hull from tidal flooding. It is a particularly low-lying area, with over 90% of its area below high tide level.[74] Not only will the Humber: Hull Frontage scheme reduce the risk of flooding from the estuary for 113,000 properties, domestic as well as commercial/retail and public, but it will also provide marine ecosystems, and new opportunities for maximising the economic and social benefits of being surrounded by and working with, not against, water and nature, following the experience in the Netherlands for example.[75]

In 2016 Sheffield launched a project of 'grey-to-green' Sustainable Urban Drainage Systems (SUDS), improving flood resilience by planting urban trees and flower gardens to drain surface water. The project also intends to tackle air pollution, whilst also creating cycle lanes and art installations.[76] Early results show the heat island effect diminishing and: *"there are positive reductions to the ambient temperatures for the surrounding area compared to the almost one hundred percentage coverage of bitmac surface prior to the scheme starting; a series of new habitats have been created, with both soil and plant-based communities able to establish. The species diversity and length of flowering times of the bulbs and perennials mean that insect pollinators have a good source of nectar throughout the year".*[77]

72 "Running expenses - Climate change costs - From the Revenue Outturn - RO5 - Environmental and regulatory services: Regulatory services, Community Safety, Flood defence, land drainage and coast protection and Waste management. Part of Waste management." https://lginform.local.gov.uk/reports/lgastandard?mod-metric=6507&mod-area=E08000035&mod-group=LAsByTypeAndCountry&mod-type=comparisonGroupType
73 https://news.leeds.gov.uk/news/councillors-approve-plans-for-multi-million-pound-flood-defences-in-leeds
74 Some parts of the city are below sea level, and as much of the land on which Hull stands is reclaimed marshland, it has limited natural drainage, and combined with its low-lying position means it is particularly vulnerable to flooding. https://core.ac.uk/download/pdf/1882329.pdf
75 https://livingwithwater.co.uk/projects/the-art-of-the-possible
76 https://www.nigeldunnett.com/grey-to-green-2/; https://www.sheffield.gov.uk/content/dam/sheffield/docs/planning-and-development/planning-applications/Major%20Development%20Types.pdf; https://una.city/nbs/sheffield/grey-green-project
77 https://www.susdrain.org/case-studies/pdfs/suds_awards/006_18_03_28_susdrain_suds_awards_grey_to_green_phase_1_sheffield.pdf

Cost avoidance as an economic benefit of climate action is also time-sensitive, in the sense that the more rapid and ambitious climate action is, the greater the benefits will be in the long run. Indeed, **if UK businesses reduce carbon emissions to Net Zero by 2030 instead of 2050, then society (including the private sector) would escape costs equivalent to £1.1tn.**[78]

Households are affected as directly as businesses and local authorities by failing to tackle the climate crisis. For residents, however, these costs manifest themselves as essential costs of living. According to the Joseph Rowntree Foundation food, energy, water, home insurance, health-related impacts, and vulnerability of household incomes are all affected by the climate crisis, with obvious and particularly regressive and often irreversible effects for those on the lowest incomes.[79] There is a clear opportunity for local authorities to play a central role in decarbonising the housing stock both in relation to new build and retrofitting existing buildings.[80]

For example, research from the Belfast Climate Commission demonstrates that given the city's unique carbon profile with domestic housing accounting for the largest proportion of its emissions, a large-scale housing retrofit and insulation programme would not only reduce emissions, but provide hundreds of jobs, increase the disposal income of thousands of households, improve their quality of life and end energy poverty.[81]

Falling costs of decarbonisation

Typically, policymakers understand the opportunity-cost argument of tackling climate change now to avoid dramatic costs in the future, however budget constraints and lack of investment capital can hamper progress, despite the falling costs of decarbonisation.

78 https://www.bitc.org.uk/blog/challenge-2030-lets-make-the-climate-crisis-history-as-we-build-back-better-from-covid-19/
79 https://www.climatejust.org.uk/sites/default/files/FINAL%20Watkiss%20report%2030032016.pd
80 https://www.uk100.org/sites/default/files/publications/Power_Shift.pdf
81 https://pcancities.org.uk/sites/default/files/Belfast%20Net-Zero%20Carbon%20Roadmap_0.pdf

The CCC has revised downwards their prediction for the total cost to the UK economy of achieving a Net Zero carbon society by 2050. While **the annual spending requirement needed to completely decarbonise the UK economy was previously estimated to be between 1-2% of GDP, the CCC now forecast this at 1%, possibly less, due to lower future energy costs.**[82] Lower healthcare costs, reduced exposure to climate change-related extreme weather events, and new industrial opportunities in green technologies will also play a role in bringing this estimated annual cost down, which currently stands in the region of £50bn increase per year.[83] Indeed globally greater investment in the short-term to realise the economic benefits of climate action will have correspondingly larger cost reductions in years to come.[84]

Employment

This section explores the general benefits for employment associated with investment in decarbonisation.

Firstly, though there are many definitions of 'green' employment, research indicates that green employment, broadly defined, is both better than non-green equivalent work and offers greater benefits across the economy generally.[85] Jobs in the green energy, energy efficiency and environmental management sectors in the US are higher waged and higher skilled than those in comparable industries.[86] Studies show similarly positive results for a given quantity of investment. In the US a $1m (£724,575) investment in fossil fuel infrastructure and related industries would create 2.65 full-time equivalent (FTE) jobs, whereas the same level of investment in renewables or energy efficiency projects create between 7.49-7.72 FTE jobs – in other words, ***investing in green infrastructure over fossil fuels offers a net increase of about 5 jobs for every $1m invested.***[87] Along with the job creation potential of green energy investment, energy efficiency not only delivers in terms of job creation but also in cost savings. The Energy Efficiency Infrastructure Group (EEIG) has calculated significant savings can be made by ensuring homes are at least EPC C rating by 2030 (Table 8).[88]

82 https://www.theccc.org.uk/publication/net-zero-the-uks-contribution-to-stopping-global-warming/
83 https://eciu.net/analysis/briefings/climate-impacts/climate-economics-costs-and-benefits
84 https://www.carbonbrief.org/guest-post-why-the-low-carbon-transition-may-be-much-cheaper-than-models-predict
85 https://www.ilo.org/wcmsp5/groups/public/---ed_emp/---emp_ent/documents/publication/wcms_502730.pdf
86 https://www.brookings.edu/wp-content/uploads/2019/04/2019.04_metro_Clean-Energy-Jobs_Report_Muro-Tomer-Shivaran-Kane_updated.pdf
87 https://www.sciencedirect.com/science/article/abs/pii/S026499931630709X
88 EEIG, (2020), 'Energy efficiency's offer for a net zero compatible stimulus and recovery' https://www.theeeig.co.uk/media/1096/eeig_report_rebuilding_for_resilience_pages_01.pdf

Table 8: Annual energy cost savings by UK region and nation[89]

Region	Annual Energy Cost Savings
East	£ 690,000,000
East Midlands	£ 540,000,000
London	£ 910,000,000
North East	£ 320,000,000
North West	£ 850,000,000
South East	£ 1,020,000,000
South West	£ 660,000,000
West Midlands	£ 650,000,000
Yorkshire and the Humber	£ 620,000,000
Northern Ireland	£ 200,000,000
Scotland	£ 670,000,000
Wales	£ 370,000,000
UK	£ 7,500,000,000

Green jobs also offer significant (and often localised) multiplier effects for employment in other sectors. For every one jobs created in green sectors a further 4.2 jobs are created in non-green and non-tradable sectors across the economy (in recessionary periods this figure is closer to 2.2).[90] Hence attempting to 'cut costs' by investing in non-green infrastructure is both unsustainable and uneconomic in terms of being poor value for taxpayers' money.[91]

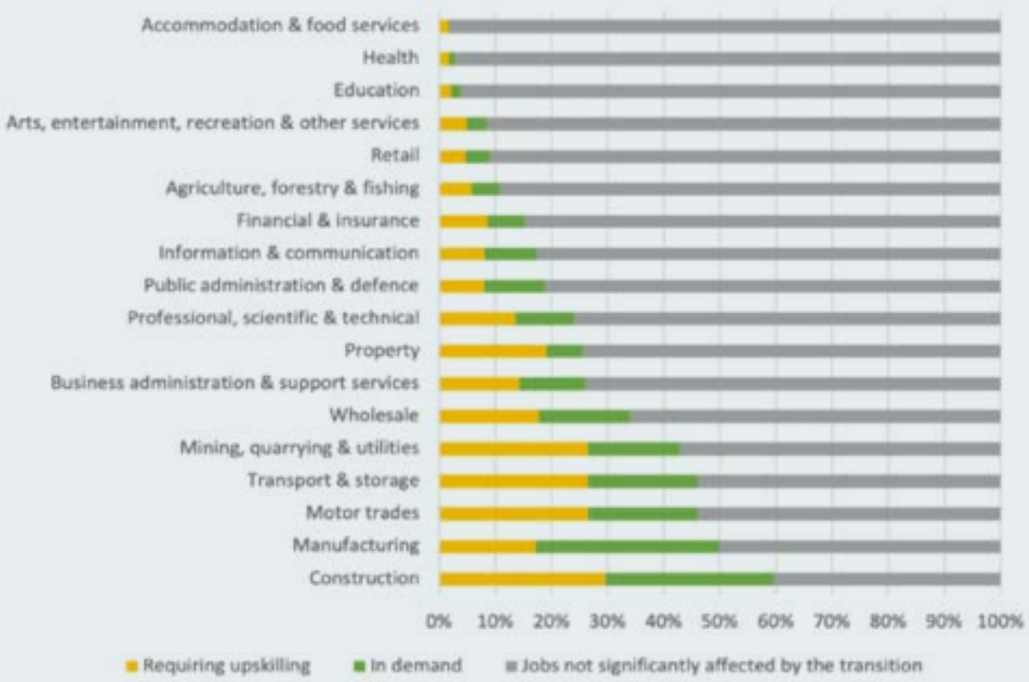
Recent PCAN research has estimated that ***one in five workers, and 6.3 million jobs in total, will be affected by the transition to a Net Zero economy across the UK, with around three million workers requiring upskilling and around three million in high demand.*** This research found that:

89 EEIG, (2020), 'Energy efficiency's offer for a net zero compatible stimulus and recovery' https://www.theeeig.co.uk/media/1096/eeig_report_rebuilding_for_resilience_pages_01.pdf
90 https://blogs.lse.ac.uk/businessreview/2018/10/17/what-are-green-jobs-and-where-are-they/
91 There is also risk and liability issues for local authorities by investing in non-green infrastructure, such as airports, given climate risk has to be reported within investment portfolios and pension schemes as per the recommendations of the Government's Task Force for Climate-related Financial Disclosures https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/933782/FINAL_TCFD_REPORT.pdf

> **Around 80% of existing jobs will not be significantly affected by the transition [...] However, few businesses are likely to be unaffected by it. Industries as diverse as manufacturing, agriculture, real estate, and scientific and technical services will all need to upskill workers in some parts of their business and hire new employees in others.[92]**

This research suggested that in terms of reskilling (and thus presenting economic opportunities), the sectors most affected are Construction; Motor Trades; Transport and Storage and Mining, Quarrying and Utilities, with Accommodation and Food Services; Health and Education services least affected.

Figure 9: Jobs requiring upskilling, jobs in demand, and jobs not significantly affected by the transition, by sector[93]



92 https://pcancities.org.uk/tracking-local-employment-green-economy-pcan-just-transition-jobs-tracker
93 https://pcancities.org.uk/tracking-local-employment-green-economy-pcan-just-transition-jobs-tracker

In the context of the UK, it also means that these are more secure than carbon-intensive jobs, and those vulnerable to automation and technological change. A structural shift to a decarbonised society, with a focus on jobs-rich climate action, can create a more fertile policy and decision-making context for local authority action for decent and stable work opportunities and growth areas. In the context of COVID-19 where unemployment is set to remain high for some time, and given that some 2.64m people are currently 'underemployed',[94] this is highly significant. The Trades Union Congress (TUC) states that the investment required to upgrade UK infrastructure and drive rapid decarbonisation could create some 1.24m jobs in high value added and structurally significant employment.[95]

Efficiency, productivity and output

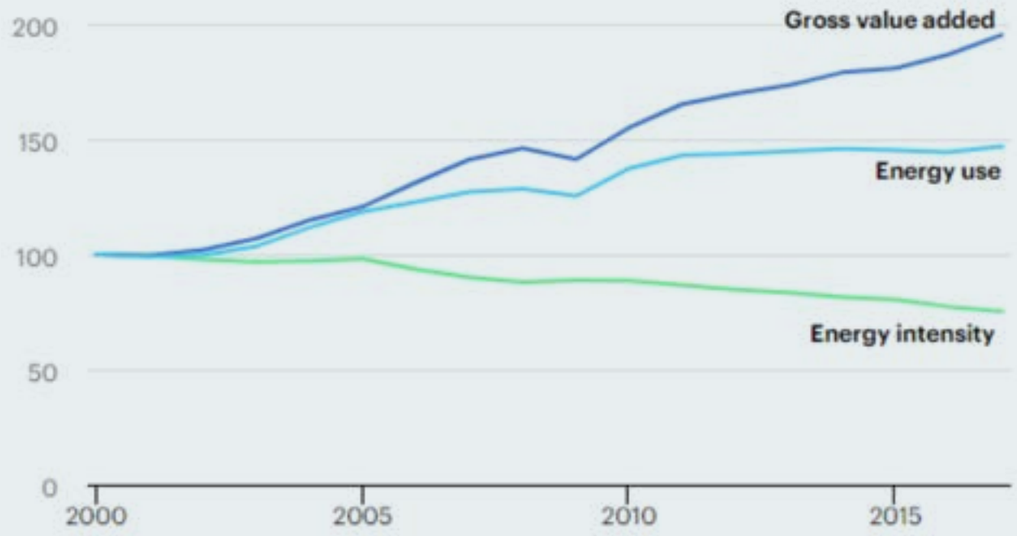
There are also productivity benefits of climate action and investment in green energy and climate resilience/adaptation initiatives at the local level. This is an area where the UK struggles.[96] Productivity, defined broadly and not as simply as 'GVA per hours worked', can benefit significantly from lower energy costs (by improving output-input ratio) and energy efficiency improvements.[97] On the international scale, including the UK, improvements in energy efficiency have decreased the intensity of energy use (and therefore emissions intensity) while GVA has continued to rise.[98] It is clear that local authorities can improve local GVA-to-energy consumption ratios, thereby improving energy based productivity, particularly in local authorities with major industrial installations where carbon energy consumption is extremely high. This is against the backdrop that between 2000-2017 energy consumption per unit of GVA declined in international industrial sectors by some 25% (Figure 10).[99]

Rapidly falling renewable power costs can also increase GVA margins by lowering input costs. The IEA states that energy generated by solar photovoltaic (PV) technology and onshore wind is now cheaper than any fossil fuel.[100] In fact, solar power is now the cheapest electricity in history on a global scale.[101] Not only can this lower input

94 https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/datasets/underemploymentandoveremployment emp16
95 https://www.tuc.org.uk/sites/default/files/2020-06/RebuildingAfterRecession.pdf
96 https://www.ons.gov.uk/economy/economicoutputandproductivity/productivitymeasures/datasets/internationalcomparisonsofproductivityfirstestimates
97 https://www.iea.org/reports/multiple-benefits-of-energy-efficiency/productivity
98 https://iea.blob.core.windows.net/assets/d0f81f5f-8f87-487e-a56b-8e0167d18c56/Market_Report_Series_Energy_Efficiency_2018.pdf
99 https://www.iea.org/reports/multiple-benefits-of-energy-efficiency/productivity
100 https://eciu.net/analysis/briefings/climate-impacts/climate-economics-costs-and-benefits & https://www.irena.org/publications/2020/Jun/Renewable-Power-Costs-in-2019
101 https://www.lowcarbonenergy.co/news/solar-is-now-the-cheapest-form-of-energy-in-history-says-iea/#:~:text=Notably%2C%20the%20IEA%20officially%20states,right%20here%20in%20the%20UK

costs significantly, it also frees up surpluses for reinvestment in further productivity improvements or additional employment for growth opportunities. ***Investment in onshore wind to deliver an additional 35GW of capacity by 2035 could reduce costs sufficiently to support an additional £290m of GVA every year.***[102]

Figure 10: Manufacturing energy intensity in International Energy Agency (IEA) member countries and major emerging economies, 2000-2017[103]



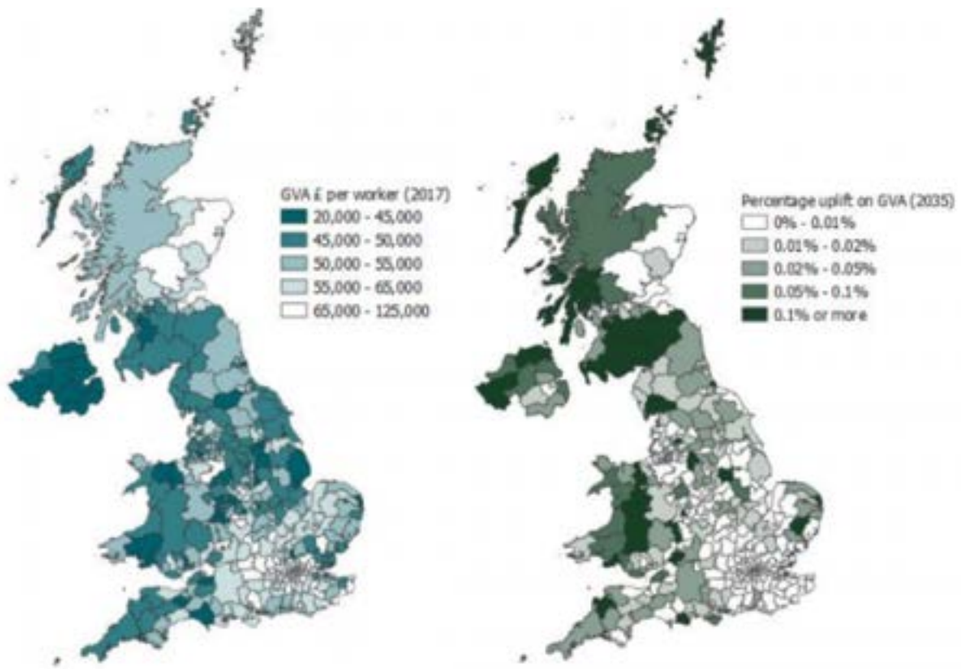
Crucially, these benefits could be spread out across regions and local authorities struggling to improve productivity against the UK average – i.e. local authorities with the most stagnant productivity levels (measured by GVA per worker) would, in the round, see the biggest percentage improvements in productivity rates by delivering onshore wind infrastructure (Figure 11).

102 https://www.vivideconomics.com/wp-content/uploads/2019/08/Quantifying_the_Benefits_of-report-.pdf
103 https://www.iea.org/reports/multiple-benefits-of-energy-efficiency/productivity

This is crucial in the context of Confederation of British Industry (CBI) research, which indicates that improving regional productivity in the UK, and closing regional productivity gaps, could add as much as £200bn to the UK economy, with resulting improvements for wages, consumption and demand across the economy, and additional employment opportunities.[104]

In circular economy terms, investment in resource efficiency improvements can have similarly important benefits for productivity. Reducing resource and material throughput can reduce input costs in business operations, while creating economic opportunities for sectors in the circular economy, such as water, waste management and treatment. Although the UK performs relatively well concerning resource consumption-to-output ratios,[105] the UK economy could benefit from cost savings of £55bn over time, while reducing emissions by as much as 90 million tonnes CO_2.[106]

Figure 11: Distribution of existing productivity levels and percentage uplift on GVA[107]



104 https://www.cbi.org.uk/our-campaigns/boost-regional-growth-and-add-200bn-to-the-economy/
105 https://www.eea.europa.eu/publications/more-from-less
106 http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&Completed=2&ProjectID=16943
107 https://www.vivideconomics.com/wp-content/uploads/2019/08/Quantifying_the_Benefits_of-report-.pdf

Economic Benefits of Climate Action – sector by sector

This section highlights the specific economic benefits that can be delivered by local authorities taking action to reduce transport, domestic and I&C emissions, as well as those derived from investing in NBS.

Transport

The dominance of private internal combustion cars, using petrol or diesel, is stifling significant economic opportunities. Transport is now the highest emitting sector of the UK economy,[108] the most difficult to decarbonise and is also creating profound social and health challenges, each with their own economic costs and knock-on effects.[109] According to the 'Transport and Environment Statistics 2021 Annual report': *"most transport modes have seen relatively little change in emissions from 1990 to 2019".*[110]

Congestion, cost avoidance, and productivity

At present, congestion in towns and cities across the UK costs the economy a staggering £11bn every year.[111] According to the British Chamber of Commerce, this congestion and its associated costs drain some £17,000 from each individual business in the UK each year.[112] This is made more concerning by the fact that traffic levels are predicted to rise by 55% by 2040, and congestion is set to rise by 85% by 2040 unless significant investment and policy change is committed to.[113] Congestion is set to cost the UK economy some £307bn between 2013 and 2030.[114]

The primary means by which unsustainable and inefficient transport systems harm the local economy is through lost worker hours, measured in worker absenteeism due to health impacts of congestion, and time wasted sitting in traffic. The UK is presently the 4th most congested developed nation globally, and the 3rd most congested in Europe.[115] UK drivers spend an average of 32 hours in a year in traffic congestion

108 Committee on Climate Change (2020), Sixth Carbon Budget Report – Methodology.
109 Argyriou, I. and Barry, J. (2021), 'The political economy of socio-technical transitions: a relational view of the state and the case of UK bus system decarbonisation', Energy Research and Social Sciences (forthcoming)
110 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/984685/transport-and-environment-statistics-2021.pdf
111 https://www.sustrans.org.uk/media/4472/4472.pdf
112 https://www.sustrans.org.uk/media/4472/4472.pdf
113 https://www.local.gov.uk/sites/default/files/documents/5.16%20Congestion_report_v03.pdf
114 https://www.local.gov.uk/sites/default/files/documents/5.16%20Congestion_report_v03.pdf
115 https://inrix.com/press-releases/traffic-congestion-cost-uk-motorists-more-than-30-billion-in-2016/

during peak hours of the day and delays on strategic roads equate to 4.9 days wasted per person every year.[116]

The economic impact of this is significant. T***he direct and indirect costs of the effects of congestion and lost time amount to an average of £968 per driver per year.***[117] For local authorities with particularly high transport emissions on minor roads, such as Birmingham, where some 408,000 private cars are registered,[118] the total direct and indirect economic costs could be as high as £395m. Furthermore, the productivity impact caused by vehicle pollution costs some £2.7bn.[119] Of this, £1.7bn would be counted as GDP reductions, which would amount to 0.08% of UK GDP in 2020.[120]

Hybrid and electric cars

A shift to electric and hybrid cars has already started within the UK, aided in part by government support. The CCC projects that around 18 million battery and plug-in hybrid electric vehicles (EV) will be on the road when the ban on the sale of new internal combustion vehicles is introduced in 2030. Ofgem predicts that one in four consumers plan to buy an electric car in the next five years.[121] While charge point grant programmes have been rolled out, there is an absence of an overarching strategy to coordinate and support local authorities to ensure that the required number of charge points, especially on street and rapid charging points, by region is available in time. As a recent report for the CCC pointed out, over 167 Local Authorities have 20 or fewer charging points.[122]

Active and sustainable travel, efficiency, and jobs creation

Active travel - walking and cycling - and public transport investment can have significant impacts on employment and generate productivity and efficiency improvements across the economy, while reducing stubbornly high transport emissions.
Every £1m of investment in sustainable transport infrastructure can create 12.7 FTE jobs in the UK economy.[123] Moreover, for every kilometre of greenways and cycle paths constructed 1.6 FTE jobs can be created directly, indirectly and induced.[124] For local authorities these benefits stand in contrast to the 'jobs per pound invested' secured by funding typical roads projects. A Sustrans jobs study argues that: "smaller scale projects and investment in sustainable transport create more jobs per pound invested" than carbon- and resource-intensive road infrastructure projects.[125]

There are broader economic benefits that would flow from investments in active travel transport networks to reduce emissions. For instance, greenways and more pedestrianisation offer accommodating, attractive and investable places and experiences for residents and visitors. Long distance cycle routes, such as rural greenways, can contribute as much as £30m to a local economy, enough to sustain 600 locally-rooted jobs.[126] Moreover, worker productivity can be increased through the provision of cycle lanes which reduce days lost to health concerns related to traffic congestion. Commuters who opt to use cycle lanes (where they exist) instead of congested roads in urban centres take half as many days off as others, resulting in a £13.7bn boost to the UK economy, equivalent to about £36m per UK local authority.[127] The benefit to cost ratio of investments in walking and cycling are estimated at 5.62:1 (or 'very high' value for money).[128]

Given these clear benefits, it is important to recognise public concern surrounding air pollution, and associated the economic, social and health costs. A majority of people in the UK believe that air pollution is a problem that should be addressed, and that road transport is the primary driver of air pollution.[129] Survey results also show that 70% of UK citizens support improved public transport services, with 67% supporting stricter laws and enforcements of regulations around air quality and 61% supporting repurposing and pedestrianisation of roads.[130]

116 https://www.local.gov.uk/sites/default/files/documents/5.16%20Congestion_report_v03.pdf
117 https://inrix.com/press-releases/traffic-congestion-cost-uk-motorists-more-than-30-billion-in-2016/
118 https://www.gov.uk/government/statistical-data-sets/all-vehicles-veh01
119 https://uk-air.defra.gov.uk/assets/documents/reports/cat19/1511251135_140610_Valuing_the_impacts_of_air_quality_on_productivity_Final_Report_3_0.pdf
120 https://uk-air.defra.gov.uk/assets/documents/reports/cat19/1511251135_140610_Valuing_the_impacts_of_air_quality_on_productivity_Final_Report_3_0.pdf, https://www.ons.gov.uk/economy/grossdomesticproductgdp/timeseries/ybha/ukea
121 https://www.ofgem.gov.uk/publications/one-four-consumers-plan-buy-electric-car-next-five-years-according-ofgem-research
122 https://www.theccc.org.uk/publication/the-uks-transition-to-electric-vehicles/

123 https://www.sustrans.org.uk/media/4472/4472.pdf
124 https://www.sustrans.org.uk/media/4472/4472.pdf
125 https://www.sustrans.org.uk/media/4472/4472.pdf
126 https://www.sustrans.org.uk/media/4472/4472.pdf
127 https://www.sustrans.org.uk/media/4472/4472.pdf
128 https://researchbriefings.files.parliament.uk/documents/CBP-8615/CBP-8615.pdf
129 https://www.cleanairfund.org/wp-content/uploads/2020/08/Clean-Air-Fund-YouGov-Survey-Data-June-2020.pdf
130 https://www.cleanairfund.org/wp-content/uploads/2020/08/Clean-Air-Fund-YouGov-Survey-Data-June-2020.pdf

Social and health benefits

There are very real and unacceptable human and health costs caused by air pollution from traffic congestion. Public Health England (PHE) suggests that between 28,000 and 36,000 people lose their lives in the UK each year due to air pollution exposure.[131] Other estimates put these annual preventable deaths as high at 40,000.[132] The Royal College of Physicians estimate that some 340,000 life years have been lost as a result of preventable air pollution,[133] and it is preventable – a 1μg/m^3 reduction in fine particulate matter could spare the English population from 50,900 cases of coronary heart disease, 16,500 strokes, 9,300 cases of asthma, and 4,200 cases of lung cancer over 18 years in the future.[134]

PHE put the total potential costs to the NHS and social care system due to the health impacts of PM2.5 and NO2 in England between 2017 and 2025 at £1.69 billion combined (£1.54 billion for PM2.5 and £60.81 million for NO2).[135]

Even for those citizens who avoid such dangerous health impacts, particulate air pollution reduces average life expectancy in the UK by 6 months.[136] Crucially, these are not heavily concentrated geographically. Though pollutants have a greater impact in highly congested urban environments; the UK regularly exceeds legal limits for outdoor air quality, and as a result two-thirds of the UK population are exposed to air which exceeds World Health Organisation (WHO) pollution guidelines.[137] Previously Defra estimated that the cost of these health effects on the UK economy and NHS was as high as £16bn per annum.[138]

131 https://www.gov.uk/government/publications/health-matters-air-pollution/health-matters-air-pollution
132 https://www.local.gov.uk/sites/default/files/documents/5.16%20Congestion_report_v03.pdf
133 https://www.local.gov.uk/sites/default/files/documents/5.16%20Congestion_report_v03.pdf
134 https://www.gov.uk/government/publications/health-matters-air-pollution/health-matters-air-pollution
135 https://www.gov.uk/government/publications/health-matters-air-pollution/health-matters-air-pollution
136 https://uk-air.defra.gov.uk/assets/documents/reports/cat19/1511251135_140610_Valuing_the_impacts_of_air_quality_on_productivity_Final_Report_3_0.pdf
137 https://www.ukgbc.org/wp-content/uploads/2020/08/Nature-based-solutions-to-the-climate-emergency.pdf . WHO September 2021 updated guidelines (the first in 15 years) states that the harmful health effects of air pollution are due to lower levels of exposure than previously thought, therefore this estimate of the affected UK population is likely higher
138 https://uk-air.defra.gov.uk/assets/documents/reports/cat19/1511251135_140610_Valuing_the_impacts_of_air_quality_on_productivity_Final_Report_3_0.pdf

Nature-based Solutions (NBS)

NBS are critical to tackling climate change. By definition, NBS are essentially *"actions to protect, sustainably manage, and restore natural or modified ecosystems, which address societal challenges effectively and adaptively, simultaneously providing human wellbeing and biodiversity benefits".*[139] NBS provide direct benefits for an environment under threat from unsustainable economic activity, while providing significant economic benefits and opportunities in the process.

Examples of NBS include:

- Restoring and protecting forests and wetlands in catchment areas
- Rewetting peat bogs
- Protecting or restoring coastal ecosystems
- Rewilding selected areas and ecological restoration
- Creating green roofs, green walls and planting trees in urban areas
- Parks and urban green and blue spaces and corridors.[140]

As the recent Dasgupta Review commissioned by the UK Government notes:

> **"Conserving and restoring our natural assets will sustain and enhance their supply. It is less costly to conserve nature than to restore it once damaged or degraded, all else being equal. In the face of significant risk and uncertainty about the consequences of degrading ecosystems, in many cases there is a strong economic rationale for quantity restrictions over pricing mechanisms. Expanding and improving the management of Protected Areas therefore has an essential role to play.[141]**

NBS also have the potential to contribute to achieving multiple UN Sustainable Development Goals, which are quickly becoming drivers of strategy and day-to-day operations of public, private and other organisations across the world (Figure 12).

139 https://www.ilo.org/wcmsp5/groups/public/---ed_emp/documents/publication/wcms_757823.pdf
140 These final two measures can moderate the impacts of the 'heat island effect', capture stormwater, SUDS, absorb carbon dioxide, create value habitats and improve soil health, provide a range of natural benefits such as intercepting dust, toxins and noise, sheltering and cooling property, act as carbon sinks and buffer flooding. They also provide spaces for recreation, fostering well-being, improving mental health, and a host of other social, economic and cultural benefits. https://www.ceh.ac.uk/our-science/projects/urban-blue-and-green-space; https://ascelibrary.org/doi/10.1061/JSWBAY.0000919
141 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/957629/Dasgupta_Review_-_Headline_Messages.pdf

NBS benefits for employment and GVA

NBS are jobs-rich climate interventions with significant benefits for employment, both within NBS sector and as a multiplier for broader economic activity. Of importance in the context of post-COVID-19 recovery strategies, social distancing is easier to structure than in other economic sectors. The Royal Society for Protection of Birds (RSPB) examined the economic benefits of habitat restoration in two ways: the labour intensive and high-value added process of restoring various types of habitats, and the less labour intensive activity of maintaining restored habitats in the future.[142] Using this method, the employment and value added benefits of investing in NBS were calculated for three of the most significant habitats in nature restoration – woodland, peatlands, and salt marsh (Table 9).

Figure 12: Societal challenges and Nature-based Solutions interventions reviewed[143]

142 https://www.cam.ac.uk/stories/economicsofprotectingnature
143 https://www.ilo.org/wcmsp5/groups/public/---ed_emp/documents/publication/wcms_757823.pdf

Table 9: NBS employment and GVA benefits[144]

Type of nature restoration	Return in economic and social benefits for every £1 invested	Temporary jobs per 100 hectares of restoration	GVA per 100 hectares restoration investment
Woodland (afforestation)	£2.79	25	£1.2m
Peatlands	£4.62	3	£0.156m
Salt marsh	£1.31	14-74	£0.88m-£4.8m

The significant nature of these benefits, particularly on the employment front, shows the jobs-rich nature of NBS as an investment opportunity, above even other green investment choices. In particular, the restoration of woodlands offers major employment benefits, alongside myriad economic advantages. Curating and restoring peatlands, however, are less employment intensive as an investment, but are valuable carbon sinks; the economic and social benefits of which as a return on investment are significant.

Similar results were produced in other studies. Garrett-Peltier and Pollin found that investments in restoring and sustainably managing woodland habitats created more jobs per unit of investment than more carbon-intensive sectors such as agriculture, gas, mass transit and freight rail construction. For every $1m invested in woodland restoration a total of 39.7 direct and indirect jobs are created, or almost 40 jobs directly and indirectly created per every £710,000 invested.[145] The government have announced a £640m Nature for Climate fund to plant 40m trees[146] – by employing Garrett Peltier's above calculation, **we can estimate this could create over 35,700 jobs in NBS[147] nationally, or equal to an average of over 90 jobs per local authority.[148]**

The boost to output across the economy is also a compelling case for supporting NBS. For example, the investment required to restore a hectare of woodland generates £12,219 in GVA (during the restoration phase). After that, the conservation and management of this woodland contributes £3,139 in GVA over a period of a century.[149] **At the scale of afforestation recommended by the CCC, 30,000 hectares of woodland afforested through capital investment would generate £366m,totalling just under £1m in GVA per UK local authority.[150]**

144 https://www.camecon.com/wp-content/uploads/2021/03/The-economic-costs-benefits-of-nature-based-solutions_final-report_FINAL_V3.pdf
145 https://www.ilo.org/wcmsp5/groups/public/---ed_emp/documents/publication/wcms_757823.pdf
146 https://www.gov.uk/government/news/budget-2020-what-you-need-to-know
147 640m/710k = 901. 901x39.7 = 35,785
148 343 Local Authorities
149 https://www.ukgbc.org/wp-content/uploads/2020/08/Nature-based-solutions-to-the-climate-emergency.pdf
150 https://data.gov.uk/dataset/24d87ad2-0fa9-4b35-816a-89f9d92b0042/local-authority-districts-april-2020-names-and-codes-in-the-united-kingdom

Another important consideration is that NBS jobs are especially well-placed to absorb workers from large at-risk sectors like retail, accommodation and food, and entertainment. Similar in some ways to housing retrofit programmes, as the workforce in these at-risk sectors is disproportionately composed of younger people with low specialisation levels; transitioning these workers to NBS activities is possible at a low cost.[151]

Ecosystem services and broader economic benefits

For local authorities, the benefits of NBS investments extend beyond employment and value added. The reality is that land use investments, such as NBS, are fundamental to achieving low cost ecosystem and climate commitments and targets. In both rural and urban areas, the broader benefits manifest themselves in different ways. In rural environments, local authorities have a greater opportunity to restore and preserve wide open spaces to become forest estates and public amenities, functioning as significant eco-tourist destinations as well as natural carbon sinks. In 2016, some 226 million visits were made to public forests.[152] More than 95 million people visit National Parks and their hinterlands each year, spending more than £4bn and supporting some 68,000 jobs.[153] For rural local authorities with an option to utilise these large natural spaces, and to create and restore new ones through NBS, the benefits are clear.

In more urban environments, NBS offer different, though nonetheless significant, economic opportunities. Figure 13 details these benefits in numerical terms.

Between 2013 and 2018 1-in-12 high street shops have disappeared in English and Welsh city centres – this equates in gross terms to the closure of at least 40 shops per town centre.[154] By making town and city centres greener, we make them more attractive and more hospitable environments in which residents and consumers like to spend time. Firstly, property values benefit from an increase in green spaces in towns and cities – studies show increases between 5% and 18% in property values in greener and more afforested streets.[155]

151 Vivid Economics, (2020), Green Employment and Growth, https://www.vivideconomics.com/wp-content/uploads/2020/07/200720-green-labour-note.pdf
152 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf
153 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf
154 https://www.theguardian.com/cities/ng-interactive/2019/jan/30/high-street-crisis-town-centres-lose-8-of-shops-in-five-years
155 https://www.treeconomics.co.uk/wp-content/uploads/2018/08/GBU_Street-Tree-Cost-Benefit-Analysis-2018.pdf - p23

As a result, urban afforestation drives increased footfall and demand in towns where high streets increasingly struggle to compete against online retail. Beyond property prices and boosting high street consumption, afforestation — and related urban NBS initiatives — can provide economic benefits driven by the reduction of energy use through insulation, reducing surrounding air temperature, mitigating against flooding, and carbon sequestration.[156]

Figure 13: Economic benefits of NBS in urban local authorities[157]

Some insights taken from the evidence of NBS generating local economic growth:

£ 10-50% Increased willingness to spend on products whilst in the presence of street trees in central business districts

£ 30-50% Increase in restaurante patronage due to street trees

£ 40% Increase in commercial trading rates after investment in well planned green space

£ 10% Increase in willingness to pay for products associated with high green cover

£ 50% 50% of park visitors visit a local business before or after their visit

156 https://www.ukgbc.org/wp-content/uploads/2020/08/Nature-based-solutions-to-the-climate-emergency.pdf
157 http://uknea.unep-wcmc.org/EcosystemAssessmentConcepts/EcosystemServices/tabid/103/Default.aspx

Afforestation

Indeed, the economic benefits of afforestation in particular warrant their own discussion as a policy choice. The function and placement of trees in urban areas is often to capture and absorb excess stormwater, a role quickly gaining in importance as climate impacts become more extreme. Depending on how and where trees are planted in urban areas, a conservative estimate of the economic benefit per tree over 50 years ranges from £1,200 to £8,000.[158] Using this approach, ***planting 6,000 trees strategically located across a large English town with flooding issues, for example, could deliver benefits of up to £48m over 50 years, or equivalent to almost £1m per year.***

However, only a small fraction of forested land in the UK is owned outright by local authorities,[159] which restricts the pursuit of these benefits somewhat. Therefore, land agreements are typically used by local authorities where funding and afforestation is managed and coordinated with local landowners who agree to environmental improvements on their land. The Greater Manchester City region has 7,000 such hectares operating under this kind of agreement[160] – about 5.6% of the total city region land area – and is also involved in a pilot project called IGNITION to realise green infrastructure and climate resilience projects across the city region through NBS.[161] Increasing this coverage to 13% for example[162] – the national average for forested land – 2,300 jobs in the Manchester city region alone would be created.[163] Toronto has preserved an 'urban forest' whose economic contribution to the city region has been valued at $7bn CAD (£5.3bn).[164]

158 https://www.treeconomics.co.uk/wp-content/uploads/2018/08/GBU_Street-Tree-Cost-Benefit-Analysis-2018.pdf - £1,223 cumulative benefit per open grown tree over 50 years, £8,000 cumulative benefit over 50 years for Root Space System planted trees absorbing large volumes of urban storm water. According to authors, this valuation does not account for obvious economic benefits which were difficult to quantify – "Increased economic growth and prosperity (Rolls and Sunderland, 2014), including increased consumer spending and greater ground rents in leafier areas, increased productivity (Kaplan, 1993; Wolf, 1998), house prices and a reduction in crime."
159 https://www.forestresearch.gov.uk/documents/3107/nigreatbritain.pdf - 3.1% in 2003
160 https://www.greatermanchester-ca.gov.uk/media/1986/5-year-plan-branded_3.pdf
161 https://www.ukgbc.org/wp-content/uploads/2020/08/Nature-based-solutions-to-the-climate-emergency.pdf
162 https://www.forestresearch.gov.uk/tools-and-resources/statistics/statistics-by-topic/woodland-statistics/#:~:text=The%20area%20of%20woodland%20in,and%209%25%20in%20Northern%20Ireland
163 7,000/5.6(%) = 1% - 1,250Ha. 1,250x13(%) = 16,250. 16,250-7000 = 9,250 additional Ha. 9,250/100Ha = 92.5 x 25 jobs per 100 Ha = 2,312 jobs created in Manchester.
164 https://www.toronto.ca/city-government/data-research-maps/toronto-at-a-glance/ The population of Toronto's urban centre, for reference, is similar to that of the Greater Manchester Metropolitan area - https://www.manchestereveningnews.co.uk/news/greater-manchester-news/manchester-new-population-figures-statistics-18481319

Social and health benefits

There are important social and health benefits advanced by NBS too. For instance, reduction in petty crime, violent crime and damage against property is achieved in areas where 'greenness' and natural life proliferates – crime levels fall 1.2% for every 1% increase in 'greenness', and violent crime falls by 56%.[165] The economic benefits of safer residential and economic areas are obvious, though difficult to quantify. Furthermore, not only are people more likely to spend time in tree-lined streets of internal shopping districts, but they are likely to be made healthier while doing so. ***Particulate matter can fall by as much by 60% in well-forested urban centres, with significant benefits for costs avoided in the health service and in worker productivity through days lost to illness.***[166] Afforestation in urban areas also assists with noise reduction, and Defra conservatively estimates the benefits to the economy of this noise reduction amount to some £41m (2017 prices).[167] Hedgerow planting and restoration, can reduce roadside pollution by half, according to research by the University of Surrey's Global Centre for Clean Air Research (GCARE).[168] The value of such research is not only in demonstrating the clear health and air quality benefits of NBS, but also indicates that: *"coniferous hedges are preferable to deciduous hedges since the former will show large air pollution mitigation effects irrespective of the stages of the vegetation cycle"*; evidence crucial to inform local authority place making and planning efforts.

Domestic emissions

Domestic emissions comprise 27% of all UK emissions, and some 19 million homes across the UK have an EPC rating of D or worse.[169] Reducing domestic emissions through energy efficiency retrofits is not only an economic opportunity for local authorities by way of job creation, it has profound social and economic benefits through conserving heat and energy consumption and preventing financial waste. Local authorities can realise significant economic benefits through energy retrofit investment, a policy choice in line with public wishes to see them take a bigger role in local housing provision.[170]

165 https://www.treeconomics.co.uk/wp-content/uploads/2018/08/GBU_Street-Tree-Cost-Benefit-Analysis-2018.pdf
166 https://www.treeconomics.co.uk/wp-content/uploads/2018/08/GBU_Street-Tree-Cost-Benefit-Analysis-2018.pdf
167 https://www.camecon.com/wp-content/uploads/2021/03/The-economic-costs-benefits-of-nature-based-solutions_final-report_FINAL_V3.pdf
168 Ottosen, T-B and Kumar, P. (2020), 'The influence of the vegetation cycle on the mitigation of air pollution by a deciduous roadside hedge', Sustainable Cities and Society, Vol. 53, https://www.sciencedirect.com/science/article/pii/S2210670719329567?via%3Dihub
169 https://publications.parliament.uk/pa/cm5801/cmselect/cmenvaud/346/34605.htm.
This might be an underestimate given not all houses have an EPC
170 https://www.lloydsbankinggroup.com/assets/pdfs/who-we-are/our-purpose/the-big-conversation/the-big-conversation-report-2020.pdf

Indeed, 61% of the public believe making our homes more energy efficient is the biggest priority for climate action.[171] Figure 14 summarises the benefits of reducing domestic emissions.

Figure 15: Summary of economic and social benefits of reducing domestic emissions[172]

Economic	Environmental	Social
Cost savings: investment in home renovation for net zero will reduce household energy expenditure by £7.5 billion per year **Enhanced property valuations:** retrofits increase both the sale and rental value of homes and buildings. Properties with an EPC rating A sell for 14% more than equivalent properties with an EPC rating G **Higher growth:** lower energy bills for households and businesses means higher consumer demand and higher productive investment. An investment of £8.5 billion in energy efficiency measures would deliver benefits totalling £92.7 billion.	**Lower GHG emissions:** around 40% of the UK´s carbon emissions derives from the built environment **Energy savings:** through cost-effective investments in energy efficiency, total energy use can be reduced by an estimated 25% by 2035 **Catalysing behaviour change:** people who experience their home or place of work being retrofitted are more likely to make sustainable lifestyle choices.	**Jobs:** over 150,000 skilled and semi-skilled jobs canbe created by 2030 **Less fuel poverty:** reducing total energy use by 25% by 2030 would lead to average energy savings of roughly £270 per household per year **Health and wellbeing:** retrofits can save the NHS £0.42 for every £1 spent on energy efficiency measures, reducing yearly costs of around £1.4 billion in England alone

The CCC's Independent Assessment of UK Climate Risk report highlights that cooling must also be considered in response to improving building efficiency. It flags: *"Risks to human health, wellbeing and productivity from increased exposure to heat in homes and other buildings."*[173]

Benefits for employment and GVA

Home retrofits are a high value and high priority green construction activity to respond to both the climate crisis, but also to the economic disruption and uncertainty caused by COVID-19.[174] Indeed, it has strong multiplier effects on broader value-added and employment measures, and for this reason investing in construction initiatives in the midst of economic crisis is often a 'first response' action

171 https://www.apse.org.uk/apse/assets/File/APSE%20Survation%20Survey%20Dec%202020.pdf
172 https://volans.com/wp-content/uploads/2021/03/RetrofitRevolution.pdf
173 https://www.theccc.org.uk/publication/independent-assessment-of-uk-climate-risk/
174 https://www.smithschool.ox.ac.uk/publications/wpapers/workingpaper20-02.pdf

sparbroader economic revival.[175] It is important therefore to look at the employment benefits of green retrofit investment in UK homes.

If sufficient investment across the UK was committed to retrofitting homes up to at least EPC C level by 2030, then some 150,000 jobs could be created across the UK, bringing proportionally bigger benefits to regions where underemployment is highest.[176] Figure 15 breaks down where these jobs would be realised on a regional basis, along with the scale of investment required to create them.

Figure 15: FTE equivalent jobs created by improving all homes to EPC C rating, by UK region[177]

175 https://www.theeeig.co.uk/media/1096/eeig_report_rebuilding_for_resilience_pages_01.pdf
176 https://www.theeeig.co.uk/media/1096/eeig_report_rebuilding_for_resilience_pages_01.pdf
177 E.ON Written submission https://committees.parliament.uk/writtenevidence/21390/pdf/

The broader impact of this employment creation on the rest of the economy is also crucial. The ONS employment multiplier tables show that for every job created by investment in the construction industry, a further 1.95 FTE jobs are created; and for every £1m invested in the construction sector, almost 15 FTE jobs can be created.[178] The same is true for increasing output across the rest of the economy - £1m invested in the construction sector can create a further £0.847m in GVA across the economy, and £2.029m in additional output. In the context of economic recovery, this green construction investment is crucial. On the whole, investment in energy efficiency measures across local authorities totalling £8.5bn could deliver additional economic benefits equivalent to £92.7bn.[179]

This investment, of course, would not simply produce these economic effects in a vacuum, where all other economic impacts are static; it would also drive innovation and create broader economic opportunities across the sector. The scale of investment outlined above can not only create vast employment and economic multiplier effects in local authorities, but can also spark significant industrial opportunities for UK manufacturers, according to the CCC, helping to grow the existing £8bn construction sector services, contracting, manufacturers and professional services to be exported overseas.[180]

More broadly, this investment can be structured in a way that acts as an incentive for private sector investment. Using this funding as leverage for private sector activity can attract £5 in private investment for every £1 committed in public spending.[181] A similar strategy was deployed through Germany's federal energy efficiency initiative, which successfully leveraged €6 Euros (£5.10) for every €1 (£0.85) of public funds invested.[182]

178 https://www.ons.gov.uk/economy/nationalaccounts/supplyandusetables/adhocs/009747ftemultipliersandeffectsreferenceyear2015bespokeindustrygroups
179 https://volans.com/wp-content/uploads/2021/03/RetrofitRevolution.pdf
180 https://www.theccc.org.uk/wp-content/uploads/2019/02/UK-housing-Fit-for-the-future-CCC-2019.pdf
181 https://www.theeeig.co.uk/media/1096/eeig_report_rebuilding_for_resilience_pages_01.pdf
182 https://www.theeeig.co.uk/media/1096/eeig_report_rebuilding_for_resilience_pages_01.pdf

Avoided leakage

Retrofitting can also free up additional consumer spending capacity, acting as a demand boost for local economies where income is not unnecessarily wasted on heat energy leaking out of windows and uninsulated roofs. It is estimated that UK households could save £7.5bn in energy expenditure, which could be redirected towards local consumption.[183] This would increase the resilience of local economies, especially in relation to low income households who tend to spend their money (rather than save it) and spend it locally (rather than in consumption or investment outside the local area). If these kinds of efficiency improvements can reduce energy consumption by 25%, the average UK home could save £270 per year at current prices when all social and economic benefits are considered.[184]

Health and social benefits

At present the UK has the least efficient housing stock in Europe.[185] Aside from the economic opportunities the improvement of this presents to local authorities, it also creates an impetus to tackle energy poverty and disadvantage which is exacerbated by poor quality housing. Tragically, 3,000 people die preventable deaths in the UK annually as a result of being unable to heat their homes.[186] For these reasons, investing in warmer homes and eradicating energy poverty not only dramatically improves social conditions, but also saves the Government the additional costs of addressing the health impacts of fuel poverty. For every £1 invested in energy efficiency measures, the NHS can save £0.42 (amounting to annual savings of £1.4bn in England alone).[187]

183 https://volans.com/wp-content/uploads/2021/03/RetrofitRevolution.pdf . An issue to be considered here however is whether that extra disposal income is spent on climate and environmentally damaging goods, services and activities, thus wiping out or undermining the climate benefits. This is an example of a common policy failure known as the 'rebound effect' or 'Jevons' paradox'. Thus an integrated suite of behavioural and educational measures are needed to maximise the positive outcomes of climate policies which lead to income savings for businesses and households.
184 https://www.sciencedirect.com/science/article/abs/pii/S030142151830421X
185 https://green-alliance.org.uk/resources/reinventing_retrofit.pdf
186 https://green-alliance.org.uk/resources/reinventing_retrofit.pdf
187 https://volans.com/wp-content/uploads/2021/03/RetrofitRevolution.pdf

I&C

Of all major sectors the most prominent decarbonisation successes in recent years have come from the I&C sector in the UK, which has reduced 67.8m tonnes of CO_2 emissions since 2005.[188] This is due to a combination of deindustrialisation and closure of major production installations, and also the decarbonisation of British electricity (the mass consumption of which has been the primary driver of emissions at major industrial sites over time).[189]

Though emissions are dominated by major industrial installations across the UK, the I&C sector accounts for emissions flowing from the private sector at large, across all sectors. Decarbonising these sectors and realising economic benefits therewith involves many benefits – retrofitting to reduce waste, improving productivity through lower energy costs, reducing private sector impediments such as congestion and poor spatial planning, boosting tourism and hospitality potential, freeing up investment capacity, and creating more welcoming consumer environments in town centres and high street. 'Green jobs' could be more widely defined beyond official definitions as given by the ONS for example.

There are conflicting definitions of what constitutes green employment. The International Labour Organisation (ILO) states that: *"Green jobs are decent jobs that contribute to preserve or restore the environment, be they in traditional sectors such as manufacturing and construction, or in new, emerging green sectors such as renewable energy and energy efficiency"*.[190] Central to the ILO definition of green jobs is that they are 'decent', in that they are well-paid, ideally unionised, and secure (Figure 16) – on the whole green jobs are better skilled and better paid, but also offer greater experience, training and development on the job than less sustainable counterparts.[191]

188 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/894785/2005-18-local-authority-co2-emissions-statistical-release.pdf
189 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/894785/2005-18-local-authority-co2-emissions-statistical-release.pdf
190 https://www.ilo.org/global/topics/green-jobs/news/WCMS_220248/lang--en/index.htm
191 https://www.researchgate.net/publication/277307271_Do_Green_Jobs_Differ_from_Non-Green_Jobs_in_Terms_of_Skills_and_Human_Capital

Figure 16: Graphic representation of ILO 'Green Jobs'[192]

The ONS employs two distinct definitions – the Environmental Goods and Services Sector (EGSS), and the Low Carbon and Renewable Energy Economy (LCREE). ONS definitions indicate that LCREE activity captures a much greater degree of green economic activity across a broader range of industries. The ONS defines EGSS as:

> **made up of areas of the economy engaged in producing goods and services for environmental protection purposes, as well as those engaged in conserving and maintaining natural resources. Excluded from the scope of EGSS are goods and services produced for purposes that, while beneficial to the environment, primarily satisfy technical, human and economic needs or that are requirements for health and safety. Goods and services related to minimising the impact of natural hazards and those related to the extraction, mobilisation and exploitation of natural resources are also excluded.[193]**

192 https://www.ilo.org/global/topics/green-jobs/news/WCMS_220248/lang--en/index.htm
193 https://www.ons.gov.uk/economy/environmentalaccounts/bulletins/ukenvironmentalaccounts/2010to2015#:~:text=The%20environmental%20goods%20and%20services%20sector%20is%20made%20up%20of,conserving%20and%20maintaining%20natural%20resources

The ONS defines the LCREE across 17 low carbon sectors (Table 10).[194]

Table 10: LCREE[195]

Offshore wind	Renewable combined heat and power
Onshore wind	Energy efficient lighting
Solar PV	Other energy efficient products
Hydropower	Energy monitoring, saving or control systems
Other renewable electricity	Low carbon financial and advisory services
Bioenergy	Low emission vehicles and infrastructure
Alternative fuels	Carbon capture and storage
Renewable heat	Nuclear
Fuel cells and energy storage	

Green jobs and LCREE

In recent years, there has been a clear and recognisable decline in the green economy, as defined by the ONS, at the UK level. The gross number of businesses involved in the LCREE green economy have declined by 28.9% (93,500 down to 66,500) between 2014 and 2019, and total employment in the sector has fallen by 14.3% (235,900 down to 202,100).[196] Moreover, when measured by EGSS activity, the UK is behind European competitors in the eco-industry sector – 1.3% of UK workers were engaged in EGSS employment in 2018, compared to the EU average of 2.1%.[197]

194 https://www.ons.gov.uk/economy/environmentalaccounts/bulletins/finalestimates/2018#measuring-the-data
195 https://www.ons.gov.uk/economy/environmentalaccounts/bulletins/finalestimates/2018#measuring-the-data
196 https://www.ons.gov.uk/economy/environmentalaccounts/datasets/lowcarbonandrenewableenergyeconomy-firstestimatesdataset
197 https://media.nesta.org.uk/documents/Going_Green-_Preparing_the_UK_workforce_to_the_transition_to_a_net_zero_economy.June.2020.pdf

It is also dominated by employment which is heavily concentrated in the retrofitting and energy efficiency sector. Some 71% of employees in LCREE sectors are employed in energy efficiency, while a further 12% work in the low carbon electricity sector. While this concentration may be concerning, it is also a sign of unrealised potential and opportunities for local authority investment in the green economy. The same is true again for EGSS where the electricity, gas and water supply industry supplies 221,946 jobs, equivalent to 55% of employment in the sector.[198] In any case, there is a huge potential for growth in the green industry in the UK.

The Local Government Association (LGA) forecast that investment in climate action at the local level would see over 800,000 green jobs across the UK by 2030, rising to 1.38 million total jobs by 2050.[199] This has been broken down by English region and county (Figure 17).[200]

Figure 17: Low carbon job creation across English regions by 2050[201]

Region	Number of low-carbon jobs in 2050	% share of low-carbon jobs
North East	84,205	7.1%
North West	170,601	14.4%
Yorkshire and the Humber	167,697	14.2%
East Midlands	96,842	8.2%
West Midlands	97,015	8.2%
East of England	119,294	10.1%
London	143,764	12.2%
South East	163,014	13.8%
South West	139,765	11.8%
Total England	**1,182,197**	**100%**

198 https://media.nesta.org.uk/documents/Going_Green-_Preparing_the_UK_workforce_to_the_transition_to_a_net_zero_economy.June.2020.pdf; https://www.ons.gov.uk/economy/environmentalaccounts/datasets/ukenvironmentalgoodsandservicessectoregssestimates
199 https://www.ecuity.com/wp-content/uploads/2020/06/Local-green-jobs-accelerating-a-sustainable-economic-recovery_final.pdf
200 A broader breakdown for Scotland, Wales and Northern Ireland is not included in the report
201 https://www.ecuity.com/wp-content/uploads/2020/06/Local-green-jobs-accelerating-a-sustainable-economic-recovery_final.pdf

Crucially, these new jobs will not compound overconcentration in one sector or UK region or another; in fact, they will be both sectorally and regionally balanced. The predominance of jobs will be created in labour intensive industries such as 601,000 (44%) in construction, a further 478,000 (35%) in operation and maintenance, and 298,000 (22%) in manufacturing.[202]

This is important for the UK economy generally as it seeks to gain a competitive edge on green products and services, but the regional balance can allow areas heavily dependent on a small number of high-emitting industrial installations to transition to green industrial production that match the specialisms of that region built up over time. The largest share of new jobs by 2050 in England are projected to be created in Yorkshire and Humber, a major UK manufacturing hub. As an example of the regionally-specific green economy and industrial opportunities available, the Midlands' historic place in the automotive industry puts it at the forefront of the EV revolution.

If investment and local economic policy is mismanaged, however, it will be difficult for some areas with a heavy dependence on unsustainable industry to coordinate a 'Just Transition'. The approach of investing in line with regional specialisms offers opportunity, and precedents already exist. The Teesside steelworks, which is an extremely carbon and energy intensive industry, has undergone a transformation into an industrial site for the production of offshore wind turbine parts.[203] In Scotland, government and local authority intervention following the closure of the Longannet coal plant facilitated the transition of the industrial site and installation of a train manufacturer, creating 1,000 jobs and supporting 5,000 more.[204]

Not only is this planned and Just Transition necessary to prevent lasting economic and social damage, it also reinvigorates local economies whose dependence on obsolete and unsustainable industries bodes poorly for their local future. Carbon intensive industries that are highly exposed to international trade and competition, such as steel for example, have been effectively rendered uncompetitive on global markets and are therefore extremely vulnerable.[205] More needs to be done by the Government over the next decade to actively manage and coordinate the structural transitions within the UK economy. Transforming the energy system from high to low or no carbon to address climate breakdown effectively means long term systemic change to the UK economy.

202 https://www.ecuity.com/wp-content/uploads/2020/06/Local-green-jobs-accelerating-a-sustainable-economic-recovery_final.pdf
203 https://www.thetimes.co.uk/article/ex-steelworks-to-make-wind-farm-parts-in-plan-for-6-000-green-jobs-h32g9v6mf; https://www.ge.com/news/press-releases/ge-renewable-energy-plans-open-new-offshore-wind-blade-manufacturing-plant-teesside-uk
204 https://www.bbc.co.uk/news/uk-scotland-scotland-business-50829294
205 Bassi and Duffy (2016), UK climate change policy: how does it affect competitiveness?, https://www.lse.ac.uk/granthaminstitute/wp-content/uploads/2016/05/Bassi-and-Duffy-policy-brief-May-2016.pdf

Case Studies

Introduction

These case studies have been chosen due to their distinct emissions profile, each representing broader groups of local authorities with similar profiles, in order to explore the economic benefits of committed climate action in housing and domestic emissions, areas dependent on singularly carbon intensive industrial installations, more broadly distributed high-emitting local economies, NBS, and carbon intensive and congested transport systems.

They are intended to better illustrate the economic and other co-benefits of locally-specific, place-based climate action, as well as giving an overview of the diverse climate and emissions profiles and contexts across different localities, highlighting relevant actions that are being taken or might be considered appropriate in given areas.

General

Leeds City Council
Population (2018): 789,200
Total CO_2 emissions (2018): 3.9MtCO_2
CO_2 emissions per capita (2018): 4.9tCO_2
Gross emissions ranking UK local authorities (2018): 4th

Leeds City Council is an interesting local authority case study given its very high gross emissions relative to other authority areas. There is also a noteworthy balance of emissions sources across domestic, transport, and I&C sectors, which broadly reflects the UK national average. It represents a complex climate challenge which requires solutions that cut across all sectors, but which also present significant economic opportunities.

The establishment of the Leeds Climate Commission in 2017, and the presence of a PCAN in the city region, has resulted in the production of detailed research into the area's decarbonisation challenges. Between 2020 and 2050, the Leeds Commissionestimate that some 63MtCO_2 will be emitted in the region during that period.[206]

206 https://leedsclimate.org.uk/sites/default/files/Net-Zero%20Carbon%20Roadmap%20for%20Leeds.pdf

Crucially, however, tackling CO_2 in the domestic and transport sectors can reduce as much as 77% of these potential emissions.[207]

Concerning the domestic sector, a 'mini-Stern' review forecasts that 'highly effective' measures to reduce emissions, which are also deemed cost-effective such as home insulation and boiler retrofits, are among policies that could reduce the city's energy bill by as much as £277m by 2030, equivalent to 17% of the city's £1.6bn income which is projected to be spent on energy bills in that year,[208] equivalent to £327 per person. More ambitious investments in energy efficiency retrofits, among a much wider suite of decarbonisation policies, could save up to £392m by 2030, totalling around £462 per person, creating significant cost savings and opening up demand opportunities for wider economic growth.[209] Local investment in this more ambitious approach can also create up to 26,000 additional employment years, equivalent to 650 jobs over 40 years from 2030.

In the transport sector specifically, the Commission highly recommends cost-effective measures such as investing in more hybrid cars, public transport and HGVs. Implementing the most ambitious investment scenarios by 2030, could create almost 7,500 additional job years.[210]

All of this is incredibly important in the context of COVID-19 and the threat to employment the public health emergency has created. Further data compiled by Green New Deal UK estimates that Leeds could see 13,000 permanent job losses as a result of the pandemic – targeted climate action in green infrastructure, post-pandemic care work, and efficiency measures, for example, will generate 11,600 jobs in just two years, going a long way to replacing lost employment, rising to 27,300 jobs within 10 years.[211]

City of Edinburgh Council
Population (2018): 518,500
Total CO_2 emissions (2018): 2.3MtCO_2
CO_2 emissions per capita (2018): 4.4tCO_2
Gross emissions ranking Scottish local authorities: 4th

207 https://leedsclimate.org.uk/sites/default/files/Net-Zero%20Carbon%20Roadmap%20for%20Leeds.pdf
208 https://leedsclimate.org.uk/sites/default/files/6660%20Leeds%20mini-stern%20exec%20summary_v3.pdf
209 https://leedsclimate.org.uk/sites/default/files/6660%20Leeds%20mini-stern%20exec%20summary_v3.pdf
210 https://leedsclimate.org.uk/sites/default/files/6660%20Leeds%20mini-stern%20exec%20summary_v3.pdf
211 https://www.yorkshiretimes.co.uk/article/Across-Leeds-Over-11600-Green-Jobs-Could-Replace-Jobs-Lost-To-COVID-In-The-Next--

Edinburgh is home to a local Climate Commission, similar to Leeds in England and Belfast in Northern Ireland, which has produced localised research pertaining to the economic benefits that can be unlocked by following a number of pathways to Net Zero by 2050.

As with Leeds, the 'cost-effective' decarbonisation policy options (those which reduce emissions most effectively for the amount of investment committed, and which generate net savings over the medium- and long-term), provide significant economic dividends for Edinburgh as a city and a local authority. Investment in rapid decarbonisation in the domestic, transport, and I&C sectors, through energy efficiency, green infrastructure, and active travel policies for example, could reduce energy costs across Edinburgh by some £553m annually by as early as 2030.[212] Crucially, this saving would more than cover the value of investment required to realise them over time. Moreover, these policy interventions would also generate almost 600 additional jobs across a period of 20 years from 2030-2050.[213]

As is often the case, more ambitious decarbonisation efforts in the same timeframe will generate greater economic returns, though investment required will obviously be correspondingly higher. Exploiting all policies which the Edinburgh Climate Commission deem technically feasible in the given timeframe would increase energy cost savings and job creation significantly - £597m could be saved annually in energy expenditure by 2030, rising to a savings peak of £777m by 2040, while creating over 1,200 jobs.[214]

Once again, COVID-19 has presented a clear opportunity to change trajectory while simultaneously dealing with longer-term economic impacts caused by the pandemic. Studies show that every £1 invested in recovery can realise multipliers equal to 3-8 times the initial investment, with social benefits which are greater again in impact.[215]

Belfast City Council
Population (2018): 341,900
Total CO_2 emissions (2018): 1.4MtCO_2
CO_2 emissions per capita (2018): 4.1tCO_2

212 https://www.edinburghclimate.org.uk/sites/default/files/Edinburgh%20Carbon%20Roadmap_0.pdf
213 https://www.edinburghclimate.org.uk/sites/default/files/Edinburgh%20Carbon%20Roadmap_0.pdf
214 https://www.edinburghclimate.org.uk/sites/default/files/Edinburgh%20Carbon%20Roadmap_0.pdf
215 https://www.edinburghclimate.org.uk/sites/default/files/ECC_Report_ForwardFasterTogether_0.pdf

Belfast is the largest city in Northern Ireland, and like most regional cities in the UK has a roughly balanced emissions profile across the transport, domestic and I&C sectors, with domestic emissions representing the largest share. Moreover, much like Edinburgh and Leeds, Belfast is also home to a city-wide Climate Commission. The presence of a PCAN has resulted in the production of a comprehensive Net Zero Carbon Roadmap measuring the emissions, energy, and economic profile of Belfast.[216]

Through the advocacy of cost-effective and energy efficient decarbonisation measures, this Roadmap sets out an ambition to reduce emissions in Belfast by 80% by 2030, reaching Net Zero by 2050. Housing stock in Northern Ireland is of a poor quality in relation to energy efficiency, and Belfast is no exception. In 2018, Belfast's domestic sector was responsible for 543ktCO_2, and PCAN research points to insulation of domestic buildings as by far the most effective carbon reduction policy option available to local policymakers.[217] Targeting the domestic sector for decarbonisation in this way can deliver sharp emissions reductions in the short term, eliminating 43% all of Belfast's projected and potential emissions out to 2050.

The economic benefits correspond with these carbon reduction targets. Implementing the most ambitious suite of policy measures across the built environment, I&C, transport, and the domestic sector could create over 700 jobs and save the city £283m a year in 2030 by way of energy expenditure. More cost-effective measures, representing a lower overall investment that pays for itself through generated savings and avoided costs, could create some 239 jobs and save £263m in 2030 and up to £349m at a peak of annual savings in 2040.[218]

Domestic Emissions

Birmingham City Council
Population (2018): 1.14m[219]
Total CO_2 emissions (2018): 4.13MtCO_2
CO_2 emissions per capita (2018): 3.6tCO_2
Gross domestic emissions local authority rank (highest): 1st

216 https://pcancities.org.uk/sites/default/files/Belfast%20Net-Zero%20Carbon%20Roadmap_0.pdf
217 https://pcancities.org.uk/sites/default/files/Belfast%20Net-Zero%20Carbon%20Roadmap_0.pdf
218 https://pcancities.org.uk/sites/default/files/Belfast%20Net-Zero%20Carbon%20Roadmap_0.pdf
219 https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/datasets/populationestimatesforukenglandandwalesscotlandandnorthernireland

Birmingham City Council ranks top among all UK local authorities in gross CO_2 emissions in the domestic sector with 1.43m tonnes emitted in 2018, with the predominance of these emissions coming from use of domestic gas. This is largely due to the inefficiency of Birmingham's housing stock, with an average EPC rating of 62 (D category) which sits below the UK average.[220] Rates of fuel poverty in Birmingham are also well in excess of the English average (13.8% of homes in 2019) and have been rising consistently in recent years. In 2014, 14.1% of households were in fuel poverty; by 2019 the share of homes in fuel poverty had risen to 21.2%,[221] the third highest among all UK local authorities that year. In gross terms, this means 92,990 households live in fuel poverty as a result of low incomes, energy costs, and energy inefficiency.

Given that 80% of homes we will use in 2050 have already been constructed, a major part of both the climate and social challenge here involves the retrofitting of inefficient properties. The ambition of the UK government is to upgrade all UK homes to at least EPC C efficiency rating by 2035, an ambition supported by the CCC.[222] As of 2019, 71.4% of homes in Birmingham had an EPC rating of D or lower according to ONS data, totalling 314,129 homes in gross terms.[223] Though cost estimates vary, retrofitting homes to a 'high C' or 'low B' standard costs £17,700 per home,[224] and research from Nottingham Trent University points to an average retrofit cost of £17,000.[225] Trade bodies, however, place costs much lower at an average of £3,800 per home, assuming costs fall as investment increases.[226]

There are also important social and human benefits to be generated from tackling fuel poverty and poor quality housing. In 2019-20, there were 28,300 excess winter deaths in England and Wales and the West Midlands at 17.5% currently sits above the England average of 16.8%, suffering higher winter fatalities.[227]

220 https://www.ons.gov.uk/peoplepopulationandcommunity/housing/articles/energyefficiencyofhousinginenglandandwales/2020-09-23
221 https://lginform.local.gov.uk/reports/lgastandard?mod-area=E08000025&mod-group=AllRegions_England&mod-metric=2131&mod-type=namedComparisonGrou
222 https://publications.parliament.uk/pa/cm5801/cmselect/cmenvaud/346/34605.htm
223 https://birminghampropertynews.co.uk/2019/07/31/only-28-6-of-birmingham-households-are-eco-friendly/
224 https://publications.parliament.uk/pa/cm5801/cmselect/cmenvaud/346/34605.htm
225 https://www.theguardian.com/environment/2018/oct/11/uks-housing-stock-needs-massive-retrofit-to-meet-climate-targets
226 https://publications.parliament.uk/pa/cm5801/cmselect/cmenvaud/346/34605.htm
227 https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/bulletins/excesswintermortalityinenglandandwales/2019to2020provisionaland2018to2019final

In this context it is clear significant investment will be required to upgrade homes. EEIG research forecasts that investment in retrofits to bring all homes up to an EPC C standard by 2030 would generate 150,000 jobs, and 14,200 jobs in the West Midlands in particular. Just shy of one in five homes in the West Midlands area reside in the Birmingham City Council local authority.[228] Therefore, we can estimate some 2,840 jobs can be created in the Birmingham City Council area through an ambitious retrofit programme for 2030.

Transport

Bristol City Council
Population (2018): 463,400
Total CO_2 emissions (2018): 1.54MtCO_2
CO_2 emissions per capita (2018): 3.3tCO_2
UK city ranking for traffic congestion: 3rd (3rd in 2019, 5th in 2018)[229]

Bristol is one of the most congested cities in the UK. Though congestion statistics have been dramatically affected by the COVID-19 public health emergency, Bristol's position in UK congestion rankings has remained relatively consistent.

In 2018, the average motorist in Bristol spent 149 hours in traffic, with an average congestion cost per driver of £1,099.[230] In 2019, the picture was similar, though improved – 103 hours were lost by the average driver at a cost of £803 each, and a total cost to the city of some £207m.[231]

In 2018 and 2019 it was faster to cycle around the city than to drive, and in 2018 it was faster to travel by bus.[232] Bristol City Council strategy documents cite highways as the Council's biggest asset, valued at some £5bn. However, they also state the annual £7m cost of maintaining these highways will only increase with the 'frequency of extreme weather events' emanating from a changing climate.[233]

228 https://www.gov.uk/government/collections/fuel-poverty-sub-regional-statistics
229 Inrix, Global Traffic Scorecard 2020
230 https://inrix.com/press-releases/scorecard-2018-uk/
231 https://inrix.com/press-releases/2019-traffic-scorecard-uk/
232 https://www.itv.com/news/westcountry/2019-02-12/bristol-is-one-of-britains-worst-cities-for-traffic-costing-drivers-149-hours-and-more-than-1-000
233 https://www.bristol.gov.uk/documents/20182/3641895/Bristol+Transport+Strategy+-+adopted+2019.pdf/383a996e-2219-dbbb-dc75-3a270bfce26c

Beyond economic benefits, the health benefits of this improvement are also crucial. Though the legal limit for NO2 is 40µgm^3, some locations across Bristol present an annual mean concentration that is at least 50% higher, exceeding 60µgm^3.[234] As a result of this pollution, 300 citizens die each year in Bristol, about 8.5% of all deaths in the area.[235] Moreover, higher air pollution days alone are responsible for 68 people being admitted to hospital in Bristol.[236]

In the context of the city's ambition to build over 100,000 new homes and create additional employment by 2036 as it grows, transformation in public transport is required, particularly, in the context of climate breakdown, for cycling as the greenest transport option.

As of 2017, there were 112 miles of cycle lanes in Bristol City (up by just six miles from 2015). And although 26 million bike journeys were made in Bristol in that year, 56% of residents never ride a bike. Similarly, just 10% of employees commute by bicycle.[237] Despite being low, present levels of cycling, already save the NHS some £1.4m annually, the equivalent salary of 61 nurses who have been pivotal in saving lives throughout the COVID-19 pandemic.[238]

An initiative to double the total length of cycle lanes, to a total length of 224 miles, would create an additional 288 FTE jobs, directly, directly and induced.[239] It would also double the total benefit created for Bristol by cycling for leisure and essential transport from £62m to £124m.[240]

Improvements to active travel networks will be important in combating the tragic social and health costs to Bristol residents. Some policy improvements are already in place. After contemplating the benefits of a congestion charge on private cars, representatives in Bristol have instead opted for the more robust measure of a ban on all diesel vehicles from the city centre from 2021 onwards.[241]

234 https://www.cleanairforbristol.org/air-pollution/air-quality-in-bristol/
235 https://www.bristol.gov.uk/documents/20182/3641895/Bristol+Transport+Strategy+-+adopted+2019.pdf/383a996e-2219-dbbb-dc75-3a270bfce26c
236 https://www.centreforcities.org/reader/cities-outlook-2020/air-quality-cities/
237 https://www.sustrans.org.uk/media/2954/bike-life-bristol-2017.pdf
238 https://www.sustrans.org.uk/media/2954/bike-life-bristol-2017.pdf
239 https://www.sustrans.org.uk/media/4472/4472.pdf
240 https://www.sustrans.org.uk/media/2954/bike-life-bristol-2017.pdf
241 https://www.centreforcities.org/reader/cities-outlook-2020/air-quality-cities/

Land use and NBS

Staffordshire Moorlands

Population (2018): 98,400
Total CO_2 emissions (2018): 1.16MtCO_2
CO_2 emissions per capita (2018): 11.8tCO_2

Staffordshire Moorlands District Council (SMDC) is a predominantly rural area in the West Midlands. Around one third of district land falls within the Peak District, and is adjacent to the Great North Bog, described as the 'UK's rainforest'.[242] Though a sparsely populated area where emissions are released evenly across domestic, transport and commercial sources, the per capita emissions picture of the district is distorted by the presence of industrial installations responsible for 73.4% of I&C emissions and 52.6% of all local authority emissions.In 2019 the authority declared a climate emergency and has set an ambitious Net Zero carbon target for 2030.[243] A prominent piece of the Net Zero puzzle in SMDC has been the recent embrace of NBS as a cost-effective and ecologically restorative means of decarbonising and unlocking economic benefits.

The area's Green Infrastructure Delivery Plan seeks to identify options for NBS in the local economy. In collaboration with the Staffordshire Wildlife Trust, the district's 222 square miles of green spaces have undergone an analysis of seven different kinds of habitats and aligning these with tailored NBS. Some 60 NBS projects have been identified across the area, overseen by a Green Infrastructure Projects Board with two sub-committees, one examining NBS projects, and the other active travel options, with economic benefits of any project being a prime consideration in both.

Two projects in particular stand out. SMDC plans to create 100 'community orchards', of which 30 are to be delivered in FY2021. Each orchard comprises 15-40 fruit and nut trees of native and local origin, procured from local enterprises to limit carbon impact of the projects, with an average of about 25 trees per orchard. At a low cost of just £300-500 per orchard, many have been co-produced with local community groups, such as schools and parish halls for example, under the condition that they are jointly financed with the groups and open to the public for their amenity.

The second project involves the repurposing of a stretch of disused rail line connecting the local towns of Tean and Cheadle. The ambition is to develop it into a walkway and cycle lane, connecting the surrounding villages. This project will be used to increase awareness of these natural amenities to direct consumer demand towards town and village centres, creating jobs and promoting tourism and recreation services.[244]

242 https://www.moorsforthefuture.org.uk/__data/assets/pdf_file/0022/345451/The-GNB-summary-vision.pdf
243 https://www.conservativehome.com/localgovernment/2020/10/joe-porter-in-staffordshire-moorlands-we-are-taking-practical-action-to-help-tackle-climate-change.html
244 https://www.staffsmoorlands.gov.uk/media/3355/Green-Infrastructure-Strategy/pdf/22.10_SMDC_Green_Infrastructure_Strategy_May_2018.pdf?m=1531894585753

South Yorkshire Mayoral Combined Authority

Population: 1.8m
Approximate CO_2 emissions: 6.8MtCO_2[245]
CO_2 emissions per capita: 3.8tCO_2

> **In the new landscape after COVID, we will not pursue growth at any cost: we will prioritise growth that helps create a better society...More supportive of enterprise, more sustainable, more equitable: that is our path to a Stronger, Greener, Fairer economy.[246]**

The South Yorkshire Mayoral Combined Authority (SYMCA - formerly Sheffield City Region) includes Sheffield alongside Doncaster, Barnsley, and Rotherham.[247] The region has set an ambitious Net Zero target for 2040, a recognition of the social, economic, and ecological benefits that can be unlocked by such a rapid green transition.[248]

Sheffield's automotive sector puts SYMCA in a good place to take advantage of the hydrogen and EV revolution, particularly with the local presence of stalwart companies such as ITM Power.[249] Similarly, a history of rail manufacturing presents opportunities for the ongoing expansions and electrification of the network. Partnerships between local authorities, the Local Enterprise Partnership, and the University of Sheffield's Advanced Manufacturing Research Centre (AMRC) and Energy Institute, have enabled specialisms in battery and storage technology and digitalisation.[250]

245 https://southyorkshire-ca.gov.uk/getmedia/423b1606-ad2b-4261-93b0-f712b7fef6e8/SCR-Energy-Strategy.pdf
246 https://southyorkshire-ca.gov.uk/getmedia/f958934e-2218-461d-9642-c011d1979644/SCR_SEP_Full_Draft_Jan_21.pdf
247 https://southyorkshire-ca.gov.uk/
248 https://southyorkshire-ca.gov.uk/getmedia/423b1606-ad2b-4261-93b0-f712b7fef6e8/SCR-Energy-Strategy.pdf
249 A government-partnered manufacturer of PEM electrolysers which enables the extraction of hydrogen from water https://www.gov.uk/government/publications/the-ten-point-plan-for-a-green-industrial-revolution/title
250 https://www.sheffield.ac.uk/energy/news/one-largest-battery-storage-systems-uk-will-help-balance-all-our-electricity-needs; https://democracy.sheffield.gov.uk/documents/s30197/10-%20Green%20City%20Strategy%20Appendix%201.pdf

Despite these lofty ambitions and longstanding industrial capabilities, SYMCA and South Yorkshire in general is underperforming in low carbon economic sectors relative to other regions in the North of England.[251] Greening industry in SYMCA can tackle this ongoing productivity stagnation and create decent green employment. The UK's low carbon economy is expected to grow by 11% annually out to 2030, a growth rate many times greater than the aggregate growth rate of the UK economy as a whole, and indeed economic growth in Yorkshire and Humber. These growth opportunities are especially important in the context of COVID-19, where economic disruption will cause the loss of some 6,000 jobs in Sheffield local authority alone.[252] Indeed, with the right investment in green commerce and industry, alongside wider climate action, some 23,000 green jobs over 10 years could be created in Sheffield.[253]

SYMCA authorities have cited an ambition to go beyond economic growth and instead to prioritise 'stronger, greener, [and] fairer' economic development through, among other things, the networking of local industry to develop strong internal supply chains and the generation of inclusive growth.[254] This inclusive approach can maximise the economic benefits of climate action at the local level, as recognised by the TUC who state that a rapid green transition in Yorkshire and Humber can generate thousands of additional jobs through the strategic utilisation of supply chains.[255] Indeed, the high-tech green industrial potential in SYMCA, namely around hydrogen capabilities, digitalisation, and battery storage, have been cited by the Scottish TUC as major opportunities for employment growth by effectively enhancing internal local supply chains in Scotland.[256] This case study is instructive for many former industrial heartlands across the North of England, Scotland and Wales, where many local authority regions are heavily reliant on a very small number of extremely carbon-intensive industrial installations.

251 https://southyorkshire-ca.gov.uk/getmedia/423b1606-ad2b-4261-93b0-f712b7fef6e8/SCR-Energy-Strategy.pdf
252 https://www.greennewdealuk.org/local-data-methodology/
253 https://www.greennewdealuk.org/local-data-methodology/
254 https://southyorkshire-ca.gov.uk/getmedia/f958934e-2218-461d-9642-c011d1979644/SCR_SEP_Full_Draft_Jan_21.pdf
255 https://www.tuc.org.uk/news/we-can-create-60000-green-jobs-yorkshire-less-two-years-says-tuc
256 https://www.stuc.org.uk/files/Policy/STUC_Green_Jobs.pdf

Part II

Introduction

Part I of this report summarised and synthesised some of the existing evidence and research on the economic benefits of local climate action. Part II moves on to offer suggestions as to how local authorities and other local stakeholders, business and communities can deliver and achieve those economic and other benefits drawing on available resources and insights from the case studies. The role of local authorities in managing and coordinating local action to achieve climate resilient, Net Zero places will be vital to deliver Government climate commitments. As the CCC noted, *"Decarbonising buildings, transport, waste and industry, cutting emissions from agriculture and storing more carbon through land-use and forestry are dependent on delivery at a local scale".*[257]

Part II examines what can be done under the current 'decision-making as usual' processes, governance arrangements (especially between national Government and local authorities), and dominant economic thinking and models. It also outlines moving beyond this existing policymaking and delivery context by considering a range of innovative thinking and action, economic models and financing.

As BEIS has pointed out in relation to the Sixth Carbon Budget, without further ambitious and coordinated government action at all scales, the UK will exceed its Fourth and Fifth Carbon Budgets. The Sixth Carbon Budget can only be achieved if the Government, regional agencies and local authorities work together. However, different configurations of these relationships, such as devolving new powers, resources and obligations to local levels, will deliver different outcomes. The vital role of local authorities is related to their capacity for leadership, decision-making and public service delivery that is close to citizens and communities, and their unique ability to coordinate and collaborate with other significant climate actors to deliver GHG emissions reductions and climate adaptation. An example of this leadership and ambition is that around 75% of all councils across the UK have declared a 'climate and ecological emergency'.[258] What now follows is the process of taking these commitments from vision to strategy to delivery. A framework through which this local and national collaboration can be realised is required. This is why UK100 advocates the establishment of a Local and National Net Zero Delivery Board, which was a key recommendation from the Power Shift[259] report, and more recent UK100 work on Research into a National-Local Net Zero Delivery Framework – both of which offer a comprehensive examination of and make the case for greater local powers to deliver Net Zero. The inclusion of a Local Net Zero Forum in the Net Zero Strategy[260] was a welcome development here, and in order for this to be successful, it needs to have a focus on delivery, be adequately resourced and include input from locally elected leaders and Parliamentarians.

Perhaps the declarations, and growing awareness of the potential for economic opportunities linked to climate action, will mark a step change. With the scope for job creation, and indeed a new industrial strategy and economic model, local authorities have a unique opportunity to deliver local tangible benefits of climate action with democratic legitimacy and support. For any 'Just Transition', while of course there is a heavy onus on national Government and state agencies, the role of local authorities will be vital. Local climate action can empower and invigorate communities, strengthen local economies and create not just more sustainable but also more inclusive and equal economies. The latter can also include transformations to the structure of the local economy not simply in relation to positive outcomes such as jobs or inward investment or innovation, but also in terms of ownership and control of important parts of the local economy.

Local climate action can achieve demands for 'building back better' as we come out of the COVID-19 pandemic, a new development path that is supported by citizens,[261] most business and policy think tanks, Government and almost all political parties. The pandemic has meant that local communities have been reoriented to the local sphere, and local authorities themselves have been more appreciative of local assets and how they can be best used for the benefit of local people.[262] As well as helping to achieve this post-pandemic recovery, climate action and the Net Zero objective in particular could also achieve other Government objectives, as the NAO suggests: *"There are links between achieving net zero and government's wider objectives, such as to 'level up' the prosperity of different regions of the UK and government's ambition for a 'green recoery' from the COVID-19 pandemic".*[263]

257 https://www.theCommittee on Climate Change.org.uk/publication/local-authorities-and-the-sixth-carbon-budget
258 Howarth, C et al (2021), Trends in Local Climate Action (PCAN),: https://pcancities.org.uk/sites/default/files/TRENDS%20IN%20LOCAL%20CLIMATE%20ACTION%20IN%20THE%20UK%20_FINAL_0.pdf

259 https://www.uk100.org/publications/power-shift; http://uk100.org/publications/research-national-local-net-zero-delivery-framework
260 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1026655/net-zero-strategy.pdf
261 A 2020 Ipsos Mori global poll found that 86% of adults "want the world to change significantly and become more sustainable and equitable rather than returning to how it was before COVID-19" https://www.ipsos.com/en/global-survey-unveils-profound-desire-change-rather-return-how-life-and-world-were-covid-19
262 Report on Workshop on 'Community Wealth Building, Doughnut Economics & Place-based Climate Action', Tuesday 18th May 2021, p.5.
263 National Audit Office, (2021), Local government and net zero in England, (London: HM Government) https://www.nao.org.uk/wp-content/uploads/2021/07/Local-government-and-net-zero-in-England.pdf (note, this report only refers to councils in England), http://uk100.org/publications/research-national-local-net-zero-delivery-framework

Community Wealth Building (CWB) and Place-based Climate Action

CWB is a form of local economic development that involves a much greater role for innovative government economic action to secure jobs, economic resilience and benefit for local communities by keeping as much of the wealth created in an area from flowing out of it.

CWB has emerged in the UK as a new and interesting local economic development model. First pioneered in the UK by Preston City Council in Lancashire, CWB has now been adopted to greater or lesser extent in other local authorities such as Oldham, the Wirral, Glasgow, North Ayrshire, North of Tyne, Birmingham, Manchester, Bristol, Stevenage and the London Boroughs of Newham, Islington and Hackney.[264] It is supported by the Scottish and Welsh Governments, and is being piloted in Northern Ireland by the Department for Communities.[265]

Overview of CWB

CWB seeks a key role for local authorities to use their procurement and market shaping power alongside coordinating significant local economic actors and organisations (usually public sector 'anchor' institutions), to *"reconfigure the core institutional relationships of the economy in order to produce better, more egalitarian outcomes as part of its routine functioning".*[266] While initially focused on economic regeneration for deindustrialised and struggling cities and regions in the USA and UK, over time it has expanded to include non-economic concerns, including climate action:

> **The intent is to mobilise under-utilised local assets and capacity, in the form of human (i.e. skills and knowledge), social (i.e. personal networks, culture and community solidarity), environmental (i.e. the built environment and natural assets), institutional (i.e. local authorities and educational institutions) and physical capital (i.e. local firms and local savings), to drive economic development.[267]**

264 Manley, J., and Whyman, P. (eds) (2021), The Preston Model and Community Wealth Building: Creating a Socio-Economic Democracy for the Future, (London: Routledge). An interesting feature of the Preston model is its basis in institutional and personal links between the Council and the University of Central Lancashire, i.e. a 'public-public' partnership. While not coextensive with universities, the editors in their conclusion do stress the importance of education across the local authorities, communities and anchor institutions: "The Preston Model can be seen, therefore, as a long term social and economic transformation of work, life and place which can only be made sustainable and resilient through education" (p.237)
265 Scottish Government, 'Community Wealth Building', https://www.gov.scot/policies/cities-regions/community-wealth-building/; 'Welsh Government, Progress towards the development of a new procurement landscape in Wales' https://gov.wales/sites/default/files/pdf-versions/2021/1/3/1610564636/progress-towards-the-development-of-a-new-procurement-landscape-in-wales.pdf
266 Guinan, J, O'Neill, M (2020), The Case for Community Wealth Building (Cambridge: Polity Press)
267 Whyman, P. (2021), 'The Economics of the Preston Model', in Manley and Whyman

CWB is about creating a resilient and inclusive economy for local people. In keeping more wealth locally, the local multiplier effect is increased, which keeps the money circulating in the local economy.

This is particularly true for those on low incomes who tend to spend almost all of their income locally on goods and services. This increases local economic resilience and business/job retention and expansion.

While accused by critics as a regressive form of protectionism, in seeking both the relocalisation of the economy and relocation of economic activities from overheated parts of the economy (from say the South East to the North West of England for example), this could be viewed positively as delivering 'levelling up' and more geographical and regional balanced in the UK economy.[268]

CWB could be viewed as an example of how local authorities can coordinate and enable community initiatives, investing in low carbon, climate resilient and more democratic, pluralistic local economies. Even when local authorities have declining budgets, as now, there are things they can do, including encouraging other public bodies, anchor institutions such as the NHS, police, firefighting and rescue services and universities, to take action. Indeed the Government's Net Zero Strategy highlights that local authorities have influence over some 82% of emissions.[269] In short, CWB could be a 'paradigm shift' in local economic development which has many advantages as a frame and strategic direction within which local climate action can be placed.[270]

CWB is explicitly based on identifying and creating partnerships between local 'anchor institutions'. Anchor institutions are public bodies including local authorities themselves, publicly-funded universities, schools, health trusts, and police, rescue and fire services. They are called 'anchors' because unlike private sector businesses, especially multi-national ones, they are firmly rooted in a particular locality and highly unlikely to relocate. The identification of such anchor institutions and coordination and collaboration between them is another indication of the indispensable role of partnership working in local authorities' climate action planning.

268 Whyman, op cit., p.137.
269 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1026655/net-zero-strategy.pdf
270 Hartnell, C. (2019), 'Community Wealth Building: What's it all About?' https://www.rethinkingpoverty.org.uk/events/event-reports/community-wealth-building/

CWB and local climate action

While initially not directly focused on climate action and decarbonisation, the CWB approach has now explicitly integrated climate and ecological outcomes into its aims. This represents an extension in some ways of its core aims of redirecting local capital to meeting local infrastructural requirements, and thus mobilising local investment to meet local needs and using public procurement for social, environmental as well aseconomic benefit.[271] As noted in Community Wealth Building 2.0, launched in early 2021, Preston City Council notes the importance of realising social value as part of its procurement strategies stating that:

> **Social value' is the wider benefit gained by a local community from the delivery of public contracts or services. These benefits include employment, training, a strengthened civil society, improvements to the local environment and mitigation of the climate risk.[272]**

This link between CWB and climate action is also echoed in North Ayrshire in its explicit recognition of the positive climate impacts of re-localising the economy and shortening supply chains in procurement policies.

Box 1: North Ayrshire, Community Wealth Building: FAQs[273]

What is the role of Community wealth Building role in the climate change agenda?

Community Wealth Building aims to create a fairer and more sustainable local ecnomy. The Council declared a Climate Emergency in 2019 and Community environmental challenges and opportunities. It also helps us to be more aware of where goods and services come from. Community Wealth Building makes everyone think more about keeping it local and it has the potential to shorten supply chains. We will also use our land and assets in different ways to support the Council to meet its net zero carbon targets and ensure a sustainable local envoronment. We´ll encourage our business base to think about their environmental impact too.

271 Preston City Council (2021), Community Wealth Building 2.0: Leading Resilience and Recovery in Preston https://www.preston.gov.uk/media/5367/Community-Wealth-Building-2-0-Leading-Resilience-and-Recovery-in-Preston-Strategy/pdf/CommWealth-ShowcaseDoc_web.pdf?m=637498454035670000&ccp=true#cookie-consent-prompt
272 Ibid.
273 https://www.north-ayrshire.gov.uk/Documents/community-wealth-building-faq.pdf

CWB seeks to localise supply chains or require suppliers to have achieved specific decarbonisation or nature restoration targets though the public procurement process for example.[274] This can increase local economic resilience and job creation and offers a way to address perhaps the most intractable and difficult climate mitigation challenge, namely Scope 3 emissions. Most local and national climate mitigation policy relates to GHG emissions directly emitted at source (Scopes 1 and 2), but does not address consumption-based emissions (Scope 3). This includes the pioneering Net-Zero Carbon Roadmaps for Leeds, Belfast and Edinburgh produced by PCAN. There are plans to redress this in the next iteration of the Leeds roadmap, recognising that as climate action evolves at the national and local level there will need to address consumption-based emissions. This will not be without significant problems as explored by the UK100 report 'Local Authority Contributions to Net Zero'.[275]

Within the last year, CWB has evolved to integrate local responses to the climate crisis into its analysis and practice. This has been identified by the CCC:

> **Local authorities are identifying opportunities for innovation in procurement and commissioning, and an increasing number of local authorities are integrating climate action with community wealth-building approaches, for example through local food networks, community renewable energy schemes on public buildings and social housing and through creating smaller procurement lots for energy efficiency works to enable local suppliers to bid for contracts.[276]**

New forms of local and more democratic ownership

In seeking to build a new, Net Zero economy, we are starting to see local authorities and citizens taking more direct control and oversight of key carbon emitting economic activity. For example, local authorities are beginning to work towards municipally-owned energy systems as ways of ensuring green economic alternatives can be developed and tailored to local needs and contexts. This includes the identification of renewable energy projects and providing funding for community energy schemes, and forming their own energy companies. Not only does inclusive community ownership and oversight of local economic resources provide citizens with the policy levers to decarbonise, the evidence points to the fact that they are also more inclined

274 Edinburgh PCAN (2021), 'Local Authority Contributions to Net Zero'
275 uk100.org/publications/local-authority-contributions-net-zero
276 Committee on Climate Change, (2020), op cit., p.31.

to do so.[277] This is because the purpose of ownership looks beyond the sole function of profit-seeking, and towards more broad-based goals focused on enhancing community wellbeing and social inclusion. There is huge potential to scale up these interventions. Examples of this include schemes such as Bristol Energy, and, recently, Hackney Light and Power. It is also significant that the Mayor of London launched London Power, a collaboration between City Hall and Octopus Energy to encourage residents to switch to renewable energy sources.

The UK Infrastructure Bank's (UKIB) commitment to provide finance and advice to local authorities for low carbon and climate adaptation projects is to be welcomed, not least when it moves from focusing solely on private finance. Local financing is a key delivery mechanism for Net Zero as suggested by the CCC, the Financing a Just Transition Alliance, and work by UK100 and PCAN.[278] While there is a growing appetite and demand within local authorities, citizens and businesses for ambitious place-based climate action, there is a gap between local leaders' ambitions and what they are able to develop. Lack of resourcing and expertise has meant this demand for climate action, as represented by the identification and compiling schedules of investable local projects, has failed to be realised at scale (with notable exceptions such as Bristol's LEAP Prospectus and Greater Manchester's Environment Fund). At present *"local government lacks the capacity, tools and development capital to build this essential net zero infrastructure pipeline"*, and here the UKIB has a vital role to play.[279]

Financing a local just transition/green new deal

There are considerable funding constraints already facing local authorities, with restrictions of capacity, borrowing and so on. As highlighted by UK100's Power Shift report, adequate funding and financing is required to deliver the government's Net Zero ambitions.[280] Financing any local Just Transition presents a dilemma: on the one hand how to create bottom-up financing strategies to deliver inclusive, job-rich climate action that offers tangible benefits to local people, and also on the other hand to connect these with the large pools of capital looking for investable projects. The problem here is not the lack of investable capital, or even local capital, but rather capital not being invested locally. As Robins et al. point out: *"there is no shortage of capital at a local level to invest in climate action. By one estimate, there is around £4bn of investable wealth per 100,000 people in the UK. Currently, however, the bulk of this asset base flows into funds and markets outside of the communities in which the investor or saver lives".*[281]

Local responses to a new green industrial strategy

The Centre for Alternative Technology estimates that providing 100% of UK primary energy from renewables by 2030 would generate 1.33 million net jobs.[282] With this in mind, local industrial strategies must focus on producing the green workforce of the future. Sectors such as marine, wind and solar, transport and construction, and new employment opportunities provided by carbon capture processes, provide great potential to create jobs and revitalise rural and ex-industrial local economies, as outlined in the Government's '10 Point Green Industrial Plan'.[283] While some of this plan can only be funded and delivered at national level ('New and Advanced Nuclear Power' or 'Jet Zero' for example), all 10 elements will require national Government to work with local authorities and communities. As the LGA noted in response to the 10 Point Plan, a devolved approach to the development of green, climate and low carbon energy skills is needed. The LGA's 'Work Local' proposal for localising skills and employment services and training is a good example of the type of coordinated strategy needed for the realisation of local benefits of the green transition and the national achievement of Net Zero.[284] The roll out of the plan will also need to be rural proofed, and address the specific challenges in rural areas, such as the appropriate technology mix for 'hard to decarbonise' buildings in rural areas, as the Rural Services Network has pointed out.[285]

277 Raworth, 2018, Doughnut Economics; Trebeck & Williams, 2019, The Economics of Arrival,
278 Robins, N. (2020), The Road to Net-Zero Finance: A report prepared by the Advisory Group on Finance for the UK's Climate Change Committee https://www.theccc.org.uk/wp-content/uploads/2020/12/Finance-Advisory-Group-Report-The-Road-to-Net-Zero-Finance.pdf ; 'Financing a Just Transition Alliance'; https://www.lse.ac.uk/granthaminstitute/financing-a-just-transition/; Lethier, S. (2021), Parliamentary update - March 2021: Budget edition https://uk100.gn.apc.org/blog/2021/03/parliamentary-update-march-2021-budget-edition; PCAN Finance Platform https://pcancities.org.uk/finance-platform
279 Lethier, op cit. It is telling that local authorities often outsource the development of their climate action strategies to outside consultants, "demonstrating that Local Authorities potentially lack internal skills or capacity or both to respond to the fast changing climate policy environment";
https://uk100.org/publications/local-authority-contributions-net-zero
280 https://www.uk100.org/publications/power-shift

281 Robins, N. et al (2021), Just Zero: Report of the UK Financing a Just Transition Alliance
282 Centre for Alternative Technology (2019), Zero Carbon Britain: Rising to the Climate Emergency, https://cat.org.uk/info-resources/zero-carbon-britain/research-reports/zero-carbon-britain-rising-to-the-climate-emergency
283 HM Government (2020), The Ten Point Plan for a Green Industrial Revolution https://www.gov.uk/government/publications/the-ten-point-plan-for-a-green-industrial-revolution
284 Local Government Association, 'Work Local', https://www.local.gov.uk/topics/employment-and-skills/work-local#:~:text=Work%20Local%20is%20the%20LGA's,support%20for%20individuals%20and%20employers
285 Rural Services Network (2020), 'Rural Lens Review' https://rsnonline.org.uk/images/rural-lens/ten-point-plan-rural-lens-review.pdf

Procurement of goods and services

An important element of a CWB approach to local climate action is that local citizens can see local authorities making tangible changes to their procurement, operations, and workforce management. The CWB approach, pioneered by Preston has been recognised as an important example of innovative place-based economic decision-making that has great potential for enabling local authorities to deliver on climate action.[286] Public procurement is an important local authority capacity that can ensure alignment with net zero as well as wider social value for workers and communities, which is precisely what the CWB approach seeks to achieve.[287]

The Social Value Act (2012) can be effectively used to decarbonise supply chains through climate/carbon literate procurement policies. A good use of procurement policy for climate purposes is for authorities to consider 'zero waste' policies, to eliminate the use of single-use plastics and excess packaging, specify recycled content and favour appliances and goods that are repairable and recyclable.[288] The original Public Services (Social Value) Act, legislated that public bodies 'consider' social value in the services they commission and procure. This language of 'consider' is too weak and the recent (January 2021) policy changes requiring all government contracts to explicitly incorporate social value within the procurement ranking process, stipulates a 10% minimum weighting, which like the language of 'consider' is arguably too weak. At the same time, there should be similar stipulations and legislation on local authority procurement, even though as Preston's CWB approach shows, Government directives are not required to use procurement to drive social and environmental benefits. Such procurement shifts, especially if done together with other authorities or public sector organisations such as health trusts or universities for example, could significantly reshape and decarbonise supply chains. As Whyman points out procurement:

> **can facilitate environmental goals, by encouraging small scale farmers to link more directly with sections of the public sector (i.e. schools, hospitals, elderly care facilities and/or prisons), where the sourcing of local foods could enhance the quality of meals while delivering environmental benefits through shortening supply chains and reducing food miles.[289]**

286 https://www.uk100.org/publications/power-shift; CCC., op cit. p.31
287 Robins, N et al (2021), Just Zero: Report of the UK Financing a Just Transition Alliance
288 CCC, op cit., p.93
289 Whyman, op cit, p.133.

Financing the Just Transition Locally

> **To deliver the volume and quality of investment needed will require reshaping private finance, repurposing central banking, creating a new architecture of international finance that can fund a global just transition, and delivering a transformative expansion in the scale and ambition of public investment.[290]**

Any local Just Transition must factor in on the one hand how to create bottom-up financing strategies to deliver inclusive, job-rich climate action that offers tangible benefits to local people on the climate emergency, and on the other hand connect these with the large pools of capital looking for investable projects. And the problem here is not the lack of investable capital, or even local capital, but rather capital not being invested locally:

> **there is no shortage of capital at a local level to invest in climate action. By one estimate, there is around £4bn of investable wealth per 100,000 people in the UK. Currently, however, the bulk of this asset base flows into funds and markets outside of the communities in which the investor or saver lives.[291]**

Following years of budget cuts, local authorities have limited capacity to lead place-based action for the Just Transition, but, with the right support from national Government and local partners, could coordinate local climate action, helping to align local economic and industrial strategies towards Net Zero goals but also local jobs creation and retention.

Local authorities are restricted by the existing national financial context and the various funding mechanisms that currently exist. Neither are fit for purpose for ensuring local authorities have access to the necessary capital to fund a local Just Transition and contribute to achievement of national climate targets. As McInroy points out, more consideration needs to be given to using LA pension funds to finance climate action: *"local authority pension funds should be encouraged to redirect investment from global markets to local schemes. With councillors across the land on the boards of pension funds, they need to seek to ask questions and consider how investment portfolios can be moved from fossil fuels and redirected to local green economic activity and green energy schemes."*[292]

290 Common Wealth (2019), Roadmap to a Green New Deal https://www.common-wealth.co.uk/reports/road-map-to-a-green-new-deal-from-extraction-to-stewardship#footnotes
291 Robins, N. et al (2021), Just Zero: Report of the UK Financing a Just Transition Alliance
292 https://cles.org.uk/blog/climate-emergency-requires-local-economic-restructuring/

He goes on to suggest that local authorities should, *"Develop climate finance strategies both to mobilise local savings and to attract wider pools of capital to fund the implementation of their climate action plans. It is critical that these climate finance strategies enable transitions to be delivered by and for local communities, rather than being done to them".* One way local authorities can help here in terms of finding the capital and finance for a green transition is in the development of investor prospectuses, identifying priority projects for investor attention.

Here, taking a place-based approach by investors could be most relevant, with local authorities acting as brokers and intermediaries to enable positive engagement between investors and *"local communities to address social risks of transitions to regional economies and promote local wellbeing, with a particular focus on vulnerable groups as well as wider sustainability considerations (such as biodiversity)."*[293] Such a place-based and local authority coordinated approach to climate finance could enable partnerships with local communities so the benefits of Net Zero and resilience investments are shared with them, as well as offering a basis for community engagement and climate awareness opportunities with citizens, businesses and other stakeholders.

It is important to point out that economic benefits and cost-effective climate outcomes do not necessarily require additional funding. Higher building regulations requirements or climate-related planning rules can ensure private capital and infrastructural investment delivers on local authority aims without using council funding. The CCC has summarised some innovative local finance options pursued at the local level:

- Bristol City LEAP will establish a joint venture between the City Council and a strategic partner to deliver more than £1 billion of investment towards Bristol becoming a zero-carbon, smart energy city by 2030
- Greater Manchester´s Environment Fund will support the development, scale and verification for carbon and habitat banking, aiming for a £5 million annual turnover to finance new habitats, tree planting and peat restoration
- West Berkshire Council issued the first Community Municipal Investment through a Bond offer raising over £1 million from 600 investors, a fifth from environmental investments
- Uk100 and Siemens have identified £100 billion potential investment in local energy that could be realised with a public investment of £5 billion
- The £8 million investment in the BEIS Local Energy Hubs has delivered £61 million investment to date and a pipeline of √1.2 billion.[294]

293 https://www.lse.ac.uk/granthaminstitute/wp-content/uploads/2021/07/From-the-Grand-to-the-Granular_translating-just-transition-ambitions-into-investor-action.pdf
294 CCC, op cit., p .23.

Whilst local authorities are largely free to pursue their own climate targets, the lack of a clear national climate action plan and statutory duty on local authorities for targets and delivery plans, is a significant barrier holding back the raising of local investment. This perpetuates *"policy uncertainty, making it hard to create an investment environment that is sufficiently de-risked to attract private investment."*[295]

UK100's identified the potential to unlock over £100 billion of investment in local energy systems by 2030 through partnership approaches enabling industry and private capital to work with UK local authorities to scale up low carbon investment opportunities.[296] This would require £5 billion development funding and increased capacity within local authorities to manage and coordinate such large capital projects and investments, along with consistent policy support (as outlined earlier) and market confidence and clarity.

The role of local authorities in driving economic development and attracting private investment aligns with the task of rewiring the UK's financial system to deliver Net Zero. A key element here, and one to which local authorities are well suited, is engagement and support for the local SME sector, which makes up 99% of firms in the UK, 61% of the private sector workforce and contributing £2.2trn in turnover.[297] Banks are also important for similar reasons in having a good knowledge of and connection with SMEs across different regions and a good understanding of their investment and financing needs. Together with banks, local authorities can jointly champion small firms in multi-stakeholder initiatives for city or regional regeneration. This can help SMEs and their interests to be represented on place-based climate commissions and their needs to be included in deliberations of local enterprise boards, city/city-region deals, 'levelling up' and the Shared Prosperity Fund. The latter fund: *"could help create the zero-carbon market by prioritising funding of SMEs contributing to that goal".*[298] *Given the size and importance of the SME sector, they "need better access to business, financial and legal advice to be able to invest in decarbonisation effectively and be persuaded of the commercial importance and of becoming more sustainable and the negative consequences of not doing so".*[299]

295 CCC, op cit., p .23.
296 https://www.uk100.org/publications/accelerating-rate-investment-local-energy-projects
297 British Business Bank, 2020
298 Robins, N. (2020), 'Financing small and medium enterprises to support a just transition to net-zero emissions in the UK', p.6, : https://www.lse.ac.uk/granthaminstitute/wp-content/uploads/2020/07/Financing-small-and-medium-enterprises-to-support-a-just-transition-to-net-zero-emissions-in-the-UK.pdf
299 Robins, N. et al (2021), p.26

Clustering of green(ing) economic activity means placing greater attention on scale and spatial considerations. A place-based approach is particularly needed in the UK given that its overly centralised governance structures goes against the need for greater decentralisation, devolution, experimentation, divergence and flexibility as work by the CCC and others have pointed out.[300]

> **The net zero transition has a profound geographical dimension and has to be shaped in ways that seek to overcome the entrenched regional inequalities across the UK. As a result, place-based financing becomes a major pillar of delivering a just transition, not least to respond to the needs of localities and regions who are setting out ambitious climate emergency plans often ahead of national targets.[301]**

The Financing the Just Transition Alliance, based on PCAN's work, has suggested the need for Local Climate Hubs (Figure 18).

Green bonds/public finance opportunities

Municipal bonds (muni-bonds) are fixed income securities issued by local authorities to fund public projects. They are a long-standing option for local authorities to raise capital for infrastructure projects. Given that financing climate action whether at global, national or local levels is a major challenge, and that much local climate action will be infrastructural in nature, bond issue is a useful policy tool. However, while long used in the USA by cities and in some European countries such as Germany, municipal bonds have been less used in the UK.

300 Robins, N et al (2019), 'Investing in a just transition in the UK: How investors can integrate social impact and place-based financing into climate strategies', p. 11, : https://www.lse.ac.uk/granthaminstitute/wp-content/uploads/2019/02/Investing-in-a-just-transition-in-the-UK_Full-policy-report_40pp-2.pdf

301 Robins et al (2021), Just Zero: Report of the UK Financing a Just Transition Alliance, p. 2

Figure 18: Local Finance Hubs[302]

Case Study: Developing Local Climate Finance Hubs
Place-based Climate Action Network

Many local communities, cities and regions across the UK have made climate emergency declarations and pledged to achieve climate neutrality by mid-century and in a number of cases much earlier. The Place-based Climate Action Network (PCAN) has been established to bring about transformative change ón the ground, with Climate Commissions in Belfast, Leeds, and Edinburgh and a Finance Platform.

Drawing on its experience to date, PCAN has developed a proposal for a network of Local Climate Finance Hubs (Brogan et al, 2021). The hubs aim to address the needs of four key audiences.

Financial institutions looking to invest in net zero with long term returns, but currently finding it hard to deploy funds.

National govermment seeking to stimulate investment for net zero and levelling up, and needing effective mechanisms.

Local Climate Finance Hub

Local authorities seeking investment to meet climate, social, economic goals, but unable to attract sufficient financial flows.

Businesses and communities with good net zero ideas, but struggling to make them investable and source finance.

These hubs would have a catalytic role and would be locally embedded to develop and maintain a pipeline of high quality, high impact projects informed by a deep knowledge of local opportunities, needs, capabilities and capacities and the benefits that can be realised from place-based projects.

Identify and develop project pipelines → **Support the development of investable business models** → **Consolidate programmes at the scale for securing investment** → **Connect programmes to different sources of finance** → **Unlock systemic investment into place**

A network of such hubs across the country would ensure that they are centrally connected to expertise, knowledge and networks for finance and investment, not least to institutions such as the UK Infrastructure Bank as well as major financial institutions.

302 Robins et al, 2021, p.25

> **In many countries, the muni-bond segment has been an important part of the green bond market with strong potential for delivering the combined environmental and social benefits of a just transition (e.g. through energy efficient low-income housing). This has yet to take off with UK local authorities, however.[303]**

In the last number of years there have been positive developments ranging from the creation of a Municipal Bond Agency to some local authorities issuing climate or green bonds (often with private financial institutions). Examples of these hybrid/partnership renewable energy or climate adaptation/NBS bond issues at local level include Abundance Investment and Swindon Council's issuing of a 'solar bond'.[304] As Robins et al. point out: *"Tapping the interest of residents to invest in tackling the climate emergency is an important dimension"*, emphasising the importance of the place specificity of climate finance.[305] Whilst more research and survey evidence would be needed, local green bonds can mobilise local residents' and institutional investors (such as local authority pension schemes) desire to 'do their bit' to tackle the climate and biodiversity crisis, given the growing public awareness and concern.

Another interesting example of local public-private climate finance is the North of Tyne Combined Authority's Green New Deal Fund that will invest up to £18 million in both low carbon infrastructure and directly into local SMEs to support business growth and innovation. It intends that: *"The Fund will catalyse investment in green growth, stimulate innovation and enable sector and supply chain growth in the areas of heat decarbonisation, energy efficiency, small scale renewable energy generation and local energy systems, low carbon transport and natural capital".*[306] As in Swindon, this green investment fund involves a private finance partnership, in this case Amber Infrastructure, but unlike most other local climate finance initiatives has an explicit focus on NBS and climate adaptation. In terms of new thinking and fiscal policy, there is also a case to be made for the Bank of England to purchase local government bonds (as well as national green bonds) as another way of the Government funding local climate action.

303 Robins et al, op cit., p.31
304 See PCAN research 'Community Municipal Investments – Turning Words into Action', https://pcancities.org.uk/report-community-municipal-bonds-turning-words-action and https://www.iisd.org/sustainable-recovery/news/financing-a-sustainable-recovery-uks-first-local-government-green-bond/
305 Robins et al (2021), p.21
306 'North of Tyne Combined Authority Creates £18m Green New Deal Fund' https://www.northoftyne-ca.gov.uk/news/north-of-tyne-combined-authority-creates-18m-green-new-deal-fund/

Central Government Financing

Estimates of annual spending needed to realise Net Zero as calculated by the CCC is between 1 and 1.5% of annual GDP from now until 2050.[307] The CCC has calculated that it will cost £50 billion a year from 2030 until 2050 to achieve Net Zero, or £1 trillion.[308] For comparison, the UK is estimated to spend approximately the same amount on defence.[309]

NAO has highlighted that: *"The standard approach to Spending Reviews is not likely to provide an adequate analysis of local authorities' resourcing for net zero".*[310] This is, in part, due to spending reviews spanning different and not well integrated government departments, and the process also being ill-suited for long term planning. The NAO's recommendation is that government should:

> **...carry out an overall outline analysis of local authority funding for net zero, to inform the next Comprehensive Spending Review... [and] consider how to improve the way that funding is provided to local authorities for net zero action, so that local authorities have the long-term certainty they need to plan effectively and build skills and resources, and so that an appropriate portion of the money goes to where need is greatest.[311]**

It is impossible to accurately estimate the total funding required by local authorities to deliver Net Zero in the absence of a clear statutory framework laying out their responsibilities in reaching the Net Zero target. There is a strong case to be made for Government to provide secure, zero carbon funding to local authorities alongside existing funding, such as the *Levelling Up Fund*, which has Net Zero and decarbonisation criteria built in.

307 CCC (2016), Phase out greenhouse gas emissions by 2050 to end UK contribution to global warming https://www.theccc.org.uk/2019/05/02/phase-out-greenhouse-gas-emissions-by-2050-to-end-uk-contribution-to-global-warming/
308 CCC (2019), Net Zero: The UK's contribution to stopping global warming, 2 May 2019 www.theccc.org.uk/publication/net-zero-the-uks-contribution-to-stopping-global-warming
309 https://caat.org.uk/news/new-caat-report-on-military-expenditure-and-climate-change/; https://researchbriefings.files.parliament.uk/documents/CBP-8175/CBP-8175.pdf
310 National Audit Office (2021), op cit., p.12
311 Ibid, p. 14.

However, the focus on climate mitigation objectives should be complemented by a focus on climate adaptation, and here dedicated and targeted funding for local NBS (as outlined in Part I), should also be considered by Government. More consideration of the indirect co-benefits also needs to be factored into policy making and financial decisions. As the CCC report notes in the case of transport, *"Developing a business case for a cycle lane or walking infrastructure is challenging, because weighting is given to traffic flow, seen as delivering economic benefits. Carbon reductions, improved health and clean air are not sufficiently valued".*[312]

As identified in the *Power Shift* report, many current public spending calculations and decision-tools and systems are either not aligned with either decarbonisation targets such as Net Zero or (as yet developed) targets for climate adaptation, or actively go against the achievement of those targets. **Therefore, a recommendation for Government is to change its Green Book policy guidance, the Treasury Approval Process and business case tools, to ensure a clear focus on carbon reduction, climate adaptation and the co-benefits from such climate mitigation and adaptation action is factored into business cases and financial appraisal.**[313] It is to be welcomed that in November 2020, HM Treasury issued 'Supplementary Green Book Guidance' around climate change, though this is mostly focused on assessing climate risks of projects, (as opposed to costing and recognising the benefits of climate action or costs of climate inaction), and concentrates, as many policy initiatives do, on climate mitigation and not adaptation.[314] This has since been updated (2nd September 2021),[315] and HM Treasury has also published policy guidance for incorporating ecological impacts in its 2020 Enabling a Natural Capital Approach (ENCA) guidance document.[316]

Proposals for changes to the Green Book have been made recently by GreenHouse think tank.[317] Their report suggests that the knowledge basis which informs its guidance is flawed, does not account for the disagreements about discounting rates and constrains project decision-making with a narrow 'weak sustainability' set of parameters (which is insufficient guidance for decision-making within the context of the challenge and opportunity of climate action).[318] In relation to discounting, a key dimension of cost-benefit analysis of projects with a long life span, Dawnay points out that: *"using discounting techniques as they are currently used - even with lower discount rates for longer-term projects - means that these projects are prone to the problem that the "benefit" of having a liveable planet in the future can be less than the "cost" today of taking action to enable such a future".*[319]

Climate change and ecological degradation are set to continue and interact in complex and unpredictable ways in the years and decades ahead, bringing with them equally unpredictable impacts on economies, cultures and societies, assuming a static and stable world is at best naive and at worst reckless.

At the very least, the Green Book needs updating to include a mandatory requirement that the GHG emissions of projects be included in appraisal processes so that for mitigation purposes, projects are 'climate proofed'. The same should be done for climate adaptation and ecosystem services impacts. Favouring a science-based approach would mean that what matters is not (or not only) the financial or economic value or impact of GHG emissions or ecosystem services, but actual quanta of emissions (tonnes of carbon for example), and ecological functions and capacity to sustain living and non-living systems and creatures. Updating guidance to explicitly include climate and ecological impacts directly (not by translating these only into financial costs or benefits) would offer a more robust and less risky way to appraise the full costs and benefits of projects (particularly large infrastructural and transformational ones).[320]

312 CCC, op cit., p.10.
313 https://www.uk100.org/publications/power-shift
314 HM Treasury (2020), Accounting for the Effects of Climate Change: Supplementary Green Book Guidance' https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/934339/Accounting_for_the_Effects_Of_Climate_Change_-_Supplementary_Green_Book_.._.pdf
315 HM Treasury (2021), Valuation of Greenhouse Gas Emissions: for Policy Appraisal and Evaluation https://www.gov.uk/government/publications/valuing-greenhouse-gas-emissions-in-policy-appraisal/valuation-of-greenhouse-gas-emissions-for-policy-appraisal-and-evaluation
316 HM Treasury (2020), Enabling a Natural Capital Approach (ENCA) https://www.gov.uk/guidance/enabling-a-natural-capital-approach-enca
317 Similar concerns have also been articulated in the UK100 Power Shift report. https://www.uk100.org/sites/default/files/publications/Power_Shift.pdf, p. 21

318 Dawnay, E. (2021), Updating the Treasury's 'Green Book' for the Climate Emergency, forthcoming.
319 Ibid., p.3 (emphasis added).
320 While critical here of Green Book advice, it is clear that there has been a step change in the evolution of HMT thinking as reflected in the number of climate and natural capital related supplementary advice documents produced in the last two years. In particular, there is some indication of more holistic thinking in HMT recognises 'rebound effects' and the need to take this into account and quantify them. Rebound effects are when savings or cost reductions from a policy lead to those savings being spend or used elsewhere, which can negate the savings or positive outcomes of the project. For example, a policy to improve cavity wall insulation in homes would result in both GHG emissions savings and income saved for the household. The rebound effect is when that extra income is spend on goods, activities or services that increase GHG emissions which can mean that overall GHG emissions increase rather than decrease, thus negating the aim of the policy intervention. See HM Treasury (2020), Valuation of Energy Use and Greenhouse Gas (GHG) Emissions: Supplementary guidance to the HM Treasury Green Book on Appraisal and Evaluation in Central Government, : https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1002868/.Valuation_of_energy_use_and_greenhouse_gas_emissions_for_appraisal-2021.pdf

Instead of solely judging the feasibility of projects as 'good value for money', projects could have the requirement that they must result in *net negative GHG emissions, or increase/improve and restore rather than decrease or degrade ecosystems.*[321] To incorporate science-based considerations, the Green Book needs to move away from an exclusive financial focus (monetising climate/ecological impacts) towards using multi-criteria upon which to make decisions. This is not about abandoning financial cost-benefit analysis, but rather to place it as one element in a dashboard of criteria and outcomes that need to be considered in a holistic and science-based manner.[322][323]

UKIB

One of UK100's key recommendations is that government support for local energy Net Zero investment be delivered most effectively through a new Net Zero Development Bank. Therefore, the Government's announcement of the creation of the new UKIB in March 2021, with a dual mandate to tackle the climate crisis and support regional and local economic growth is to be welcomed. The importance of support for local authorities was recognised in HM Treasury's Policy Design brief for the bank that confirmed:

- the UKIB can lend to local and mayoral authorities to support their ambitions in delivering local projects
- supporting local authorities will be central to the UKIB's objectives of Net Zero and levelling up
- of its initial £12 billion of equity and debt capital, £4 billion will be allocated to local authority lending
- from summer 2020, the UKIB will offer loans to local authorities at a rate of gilts + 60 bps for high value and strategic projects of at least £5 million
- the UKIB will develop an advisory service for local authorities and other project sponsors to support project development.[324]

321 This is similar to proposals to integrate spatial and energy planning at the local level and to introduce new planning rules that require new developments be net carbon absorbers or net exporters of generated renewable energy. See Barry, J. (2020), 'Planning in and for a Post-Growth and Post-Carbon Economy', op cit.
322 Here the OECD's 'Better Life Index' and Kate Raworth's 'doughnut economic model' offer illustrative examples of multiple criteria decision making at the macro level, https://www.oecdbetterlifeindex.org/ and Raworth, K. (2017), Doughnut Economics: Seven Ways to Think Like a 21st-Century Economist (London: Random House).
323 Ahmad, E. (2021), 'Financing sustainable investments: national and subnational considerations for building back better' https://www.lse.ac.uk/granthaminstitute/wp-content/uploads/2021/06/Financing-sustainable-investments_national-and-subnational-considerations-for-building-back-better.pdf
324 https://www.uk100.org/publications/opportunity-uk-infrastructure-bank-accelerate-pace-net-zero-investment-our-cities

The role of the UKIB will extend beyond providing capital and facilitating local low carbon energy investment or NBS for example, and will includes project development (identifying and prioritising a pipeline or Prospectus of Zero Carbon and climate adaptation and/or nature restoration investment for example). It will also focus on providing project support, especially important for large and complex infrastructural projects or for smaller local authorities with limited expertise and capacity for managing and delivering such projects. A key role would also be facilitating the 'crowding in' of sometimes 'impatient' private capital alongside more 'patient' public funding, and the UKIB should also consider issuing green+ bonds.[325]

National Green+ Gilt issue

Government bonds, or gilts, are investment securities sold to institutional investors, where an investor lends money to the government for a set period of time, in exchange for regular, fixed rate interest payments.[326] Since launching in September 2021, the government's green financing programme has raised more than £16 billion from the sale of Green Gilts and NS&I's Green Savings Bonds.[327] In June 2021 the Government set out in its Green Financing Framework how the Green Gilt and retail Green Savings Bonds will finance expenditures to help tackle climate change, biodiversity loss and other environmental challenges, while creating green jobs across the UK.[328] The Framework also commits the government to annual allocation reporting and biennial reporting on environmental impacts and social co-benefits, ensuring transparency for retail and institutional investors and other interested parties.[329] The issuing of this bond responds to the suggestion made by Lord Stern in 2020, where he argued that: *"A Green+ Gilt is a key instrument that the Government should deploy to help channel savings into programmes and projects that enable us to build back greener in the places that need it most"*[330]. As Robins pointed out: *"A Green+ Gilt would widen the investor base for gilts at a time of unprecedented public spending requirements, attracting the growing pool of green bond investors, and encouraging international investors to fund UK projects."*[331]

325 Mazzucato, M. (2016), 'Innovation, the State and Patient Capital', in Jacobs, M. and Mazzucato, M (eds), Rethinking Capitalism Economics and Policy for Sustainable and Inclusive Growth, (London: Wiley-Blackwell)
326 HM Treasury, (2021), 'Second UK Green Gilt Raises Further £6 Billion for Green Projects', Gov.uk https://www.gov.uk/government/news/second-uk-green-gilt-raises-further-6-billion-for-green-projects
327 NS&I, (2021), 'Make a Difference with Green Saving Bonds', https://www.nsandi.com/green-saving
328 HM Treasury and DMO, 'Green Financing Framework', Gov.uk, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1002578/20210630_UK_Government_Green_Financing_Framework.pdf
329 HM Treasury and DMO, 'Green Financing Framework', Gov.uk, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1002578/20210630_UK_Government_Green_Financing_Framework.pdf
330 Robins, N. and Szwarc, K. (2020), The Green+ Gilt: How the UK could issue sovereign bonds that deliver climate action and social renewal https://www.lse.ac.uk/granthaminstitute/wp-content/uploads/2020/10/Green_Gilt_Proposal_October_2020.pdf
331 Ibid., p.6.

In 2020 investors with £10 trillion in assets called in a letter to the Government for the UK to issue a Green+ sovereign bond to drive climate action and social renewal in the Covid-19 recovery.[332] Signatories of this letter included AXA Investment Managers, the Association for Financial Markets in Europe, Barclays, BlackRock, the Confederation of British Industry (CBI) and the City of London Corporation. £10 billion was raised from the U.K Government's first Green Gilt issuance in September 2021 and a further £6 billion has been raised in October 2021 through the second Green Gilt issuance.[333] The UK's second Green Gilt is a 32-year bond, maturing in 2053, making it the sovereign green bond with the longest maturity in the world.[334] The order book was 12 times oversubscribed, showing the large demand for the UK's Green Gilt. The Green Gilt will be followed by the world's first standalone retail Green Savings Bonds, issued by NS&I.[335] Green bonds enable savers and investors to finance the transition to Net Zero and the creation of green jobs.

VAT and new central funds

The Government could consider offering discounting VAT for firms (and more specifically SMEs) focusing on decarbonisation, climate adaptation/resilience and delivering social value.[336] And change the current sub-optimal situation regarding VAT on home energy improvements where it is 25% for solar panels but only 5% for a gas boiler. In terms of new government funding the IPPR suggests that: *"the UK government should launch a single Thriving Places Fund for England which would provide money to communities to undertake ambitious climate action".*[337] Others propose a new 'Community Wealth Fund' which would align with the CWB pathway and local economic development model outlined above.[338]

332 https://www.lse.ac.uk/granthaminstitute/news/investors-with-10-trillion-in-assets-call-for-the-uk-to-issue-a-green-sovereign-bond-to-drive-climate-action-and-social-renewal-in-the-covid-19-recovery/
333 HM Treasury, (2021), 'Second UK Green Gilt Raises Further £6 Billion for Green Projects', Gov.uk https://www.gov.uk/government/news/second-uk-green-gilt-raises-further-6-billion-for-green-projects
334 HM Treasury, (2021), 'Second UK Green Gilt Raises Further £6 Billion for Green Projects', Gov.uk https://www.gov.uk/government/news/second-uk-green-gilt-raises-further-6-billion-for-green-projects
335 HM Treasury, (2021), 'Second UK Green Gilt Raises Further £6 Billion for Green Projects', Gov.uk https://www.gov.uk/government/news/second-uk-green-gilt-raises-further-6-billion-for-green-projects
336 Robins (2020), op cit., p.6, https://www.lse.ac.uk/granthaminstitute/wp-content/uploads/2020/07/Financing-small-and-medium-enterprises-to-support-a-just-transition-to-net-zero-emissions-in-the-UK.pdf
337 IPPR, (2021), The Climate Commons: How communities can thrive in a climate changing world https://www.ippr.org/files/2021-03/ejc-climate-communities-mar21.pdf
338 Local Trust (2018), 'Strong resourceful communities: The case for a community wealth fund' https://localtrust.org.uk/wp-content/uploads/2019/03/local_trust_community_wealth_fund.pdf

Functional finance/modern monetary theory (MMT) and funding the Just Transition

Functional finance/MMT is a relatively new way of understanding national finances. In the words of one of MMT's founders Abba Lerner, finance should be 'functional', evaluated by its results on the real economy (the ends) in terms of jobs, production (and GHG emission here), rather than 'sound', shackled by arbitrary, self-imposed budgetary limits and targets (the means).[339] It is a view that the economy should balance, not the budget. A real world example of the MMT analysis of state finances is the extra debt incurred by the Government during the COVID-19 pandemic. The Bank of England has effectively bought the extra COVID debt that the Government has created (approx.. £875bn of government bonds).[340] The logic here is that if such 'quantitative easing' can be done to pay for furloughing workers, spending on PPE and other pandemic policies, the same process of releasing funding could be done for the low carbon transition and climate action.

What is MMT?

A good definition of MMT is the following:

> **MMT maintains that a sovereign government is not financially constrained; it spends through electronic entries in bank accounts and can neither run out of them nor save them for the future. What should constrain the spending of a sovereign government is the nation's available real resources. Excessive spending, therefore, creates problems not in terms of higher government deficits and debt, but in terms of true inflation. Similarly, taxes are used not to finance government spending, but to withdraw demand from the economy, creating space for government spending to move resources to the public sector without causing inflation.[341]**

Governments have the power and capacity to create money through spending, and as much as it needs (though not without limits). Money creation is endogenous not exogenous i.e. governments have the power and capacity to create it, rather than money being something outside of government that it needs to 'earn' or borrow.

339 Lerner, A. (1943), 'Functional Finance and the Federal Debt', Social Research 10:1, pp. 38-51. http://www.jstor.org/stable/40981939
340 BBC News (2021), 'Coronavirus: Where does the government borrow billions from?', https://www.bbc.co.uk/news/business-50504151
341 Nersisyan, Y. and Randall Wray, L. (2020), Can We Afford the Green New Deal?, Levy Economics Institute, p.4 http://www.levyinstitute.org/pubs/ppb_148.pdf

From the point of view of MMT, as a monetarily sovereign, currency issuing Government with a relatively large economy, the UK faces no meaningful financial barriers to taking action on addressing the climate crisis and investing the billions of pounds it will require. The UK Government therefore, from an MMT perspective, can make whatever financial outlays are required, much as it did in fighting and paying for the Second World War. The real question, and this goes to the heart of the MMT perspective, is whether there is sufficient real resources within the economy —skilled and manual workers, equipment, raw materials etc. –that can be mobilised to deliver decarbonisation, Net Zero investments, NBS and all the other necessary investments to deliver effective climate action.

Evidence for the insights of MMT can be seen in how central banks in Europe and elsewhere have since the global financial crisis of 2008 created money (to the tune of trillions of pounds and other currencies). This is an example of Quantitative Easing (QE) as it has been mostly practiced since 2008. QE is the process whereby money is created by central banks crediting the reserve accounts of commercial banks that hold the accounts of corporations and other bodies whose financial assets the central bank is buying via an asset purchase facility.[342] The commercial banks simultaneously then credit these bodies' bank accounts with the same amounts of their own bank-created money.

MMT and climate action

Instead of the Bank of England buying bonds from private traders and passing the capital to local authorities with additional interest, the Government could create the money through the Bank of England and give it 'interest free' to local authorities. Alternatively, the Bank of England could buy local green bonds, thus ensuring local finance for green infrastructure investment which is more responsive to local demand. It is an existing and popular mechanism that avoids duplication.

BoE could finance these programmes directly by buying government bonds and holding them in perpetuity as insurance against misallocation of funds.[343] This effectively bypasses the financial sector and the need for governments to borrow in that the government simply creates as much money as it needs. And since the Bank of England is a part of government, this is the government owing itself money, so the

342 The Bank of England's mechanism for QE, namely the Asset Purchase Facility (APF) had, as of May 2021, a target of £875bn in government bond purchases https://www.bankofengland.co.uk/markets/market-notices/2021/may/asset-purchase-facility-gilt-purchases-may-2021

343 Ibid.,

often misguided but understandable anxiety about 'government debt' does not arise (since the thinking here is based on an exogenous view of money creation, in which governments like households or businesses have to earn money from elsewhere before they spend it.[344] HM Treasury could create bonds as needed to fund decarbonisation and climate action initiatives and the Bank of England could buy it directly from it, bypassing private banks, meaning "in effect, then, the HM Treasury can now run an overdraft at the Bank of England".[345]

Local authorities, together with other organisations and citizens, could collectively lobbying government to use this enormous fiscal power which has been used already, to provide the funds local authorities need to deliver on their ambitions and their community's demands for local climate action investments. Local authorities know what needs to be done, but lack the finance, while national Government has the finance but lacks the local knowledge. MMT offers a way around this conundrum, coordinating the 'nimble fingers' of the local with the powerful 'thumb' of national Government.

A Green New Deal will actually help the economy by stimulating productivity, job growth and consumer spending, as government spending has often done".[346] There is a link here to the discussion earlier about changes to the Green Book. And the connection is the focus MMT brings to the centrality of policy decisions now in the context of the climate crisis to incorporate real material constraints – water, land, carbon absorption limits, ecosystem functioning etc., - and not created and arbitrary financial constraints – 'balanced budgets' and sovereign currency issuing government's 'running out money'.

The MMT view of public finances clearly challenges the mainstream academic and policy understanding of state finances. Yet, it needs to be included in the innovative thinking and action we need to consider to tackle the climate and ecological crisis. At the very least a MMT approach to government action on the crisis would lessen or significantly modify the dominant models for financing local climate efforts based around government grants and direct support (from taxes). What if we need neither?

344 Another rather curious issue that often goes unnoticed in discussions of government debt and especially in terms of those, for whom this debt is dangerous, is that logic would tell us that if the government is in debt, then the private sector or the non-government sector is in surplus by the same amount. Government debt, up to a point, therefore should be seen as a public asset not a threat or a risk. As Alexander Hamilton, the United States' first Secretary of the Treasury noted: "[a] national debt, if it be not excessive, will be to us a national blessing"

345 Murphy, R. (2020), At long last the government can borrow straight from the Bank of England – as modern monetary theory has always suggested it should https://www.taxresearch.org.uk/Blog/2020/03/23/at-long-last-the-government-can-borrow-straight-from-the-bank-of-england-as-modern-monetary-theory-has-always-suggested-it-should/

346 Kelton, S et al (2018), 'We Can Pay For A Green New Deal', Huffpost,https://www.huffpost.com/entry/opinion-green-new-deal-cost_n_5c0042b2e4b027f1097bda5b

What if, notwithstanding that local authorities are 'currency takers' and not like national Government a currency issuer (so still leaving authorities in a subservient position in terms of finance), the 'how are we going to pay for it'? question is ideological and/or based rather on an outdated and dangerous misunderstanding of how money and finance work in a country like the UK.

Crisis mobilisation

The declarations of climate and ecological emergencies made by so many local authorities, universities, and professional bodies need to be translated into demonstrable local climate action that people can see benefits them, as this report and many others like it have outlined. The calls to 'build back better' from the pandemic echo the war effort in terms of the positive social improvements that were called for during the mobilisation of the country. Using government power at both national and local levels to create and build a new economic model, policies, decision-making and infrastructure to achieve both climate mitigation and climate adaptation aims.[347] Nothing short of societal wide and structural transformation in the decades ahead is required if we are to rise to the challenge of and reap the many benefits of climate action. While there are obviously lessons to be learnt (positive and negative) from how governments, citizens and others respond to the pandemic, there are also lessons and insights from looking back to previous 'emergency' responses, especially in relation to the Second World War.[348] There are also many relevant lessons, some still being experienced, in local and central state (and community and business) responses to the COVID-19 pandemic, which can inform local climate action across many domains and issues ranging from effective public communication to emergency response and planning, procurement and distribution, protection of people and scaled up state action.[349]

347 Keynes, J. M., (1940), How to Pay for the War: A Radical Plan for the Chancellor of the Exchequer, (London: Macmillan)
348 Barry, op cit.
349 Inter alia, Barry, op cit., Celasun, O. et al (2021), 'What COVID-19 Can Teach Us About Mitigating Climate Change', https://blogs.imf.org/2021/07/09/what-covid-19-can-teach-us-about-mitigating-climate-change/; O'Hara, L. (2021), 'Lessons from COVID-19 for the climate crisis' , : https://www.apa.org/members/content/climate-crisis-covid-19; Thompson, M. (2021), 'What can we learn from Covid-19 to address the climate crisis?', https://wellcome.org/news/what-can-we-learn-covid-19-address-climate-crisis

As the Rapid Transition Alliance points out: *"Where adaptations and behaviour changes reveal possibilities for more sustainable behaviour – such as avoiding unnecessary travel – they could be encouraged to become the new norm, and made part of the broader response to the climate emergency"*.[350] As a communication and public education tool and frame, perhaps alongside climate and carbon literacy, within a UK context, this crisis mobilisation, while high risk and not presented here as a universally applicable or appropriate frame for local climate action, does have some advantages.[351] Presenting the planetary crisis as the equivalent of the threat of war in terms of its risks and consequences does, to say the least, offer a communication frame which is unambiguous in offering the strongest and clearest language to present the climate emergency. As such it can also be used to justify and explain the disruptive short-term impacts that locally effective responses to climate action (mitigation and adaptation) will bring, as part of the 'collective effort' (national and/or global) to combat the crisis and realise local its multiple co-benefits and opportunities.[352]

350 Rapid Transition Alliance, (2020), 'Pandemic lessons for the climate emergency', https://www.rapidtransition.org/stories/pandemic-lessons-for-the-climate-emergency/. The Rapid Transition Alliance has also examined previous historical experiences of rapid transitions, including but not limited to wartime moblisation, see Simms, A. and Newell, P. (2017), How Did we Do That?: https://steps-centre.org/wp-content/uploads/2017/04/How_Did_We_Do_That.pdf
351 The connection between collective climate action and wartime mobilisation has also been made in other countries; see, inter alia, Seth Klein (2020), A Good War: Mobilizing Canada for the Climate Emergency, (ECW Press),
352 Delina, L. (2016), Strategies for Rapid Climate Mitigation: Wartime Mobilisation as a Model for Action?, (London: Routledge)

Conclusion

It is clear that a lot will be expected of local authorities, combined authorities and regional organisations to deliver national level climate mitigation and adaptation goals, such as Net Zero by 2050, and realise the multiple opportunities and benefits of local climate action.

Much will also be demanded of our citizens, communities and businesses, given the scale, urgency and scope of climate action, and also how mitigation and adaptation policies will have profound transformative impacts on the structure of the economy, lives and livelihoods in the decades ahead.

While there is evidence that local authorities and the populations they represent and serve, are supportive of more ambitious and faster climate action, there are serious barriers in relation to national coordination, clear statutory duties, finance, training and communication between local authorities and national government and horizontally between local authorities. Coordination and collaboration will be needed as the 'low hanging fruit' from the decarbonisation of the energy sector is achieved, and climate action has to move onto heat, transport and climate adaptation. There are also data gaps and/or a lack of consistent GHG emissions reporting for example, and thus the evidence base, while increasing in robustness at pace, needs to be developed and communicated to local stakeholders, as part of a much greater institutionalised co-creation approach to local climate action planning. Work on establishing science-based local targets for achieving Net Zero is further ahead than similar science-based targets for climate adaptation, as seen from 'Net Zero Carbon Roadmaps' developed at city level across some UK cities.[353] Greater support for and recognition by national Government of the role of local authorities in achieving Net Zero would also expand the capacity of the latter to coordinate other local climate actors (anchor institutions for example in the CWB model) and through such coordination amplify their capacity to influence emissions outside their direct control.[354]

353 https://pcancities.org.uk/pcan-net-zero-carbon-roadmaps
354 uk100.org/publications/local-authority-contributions-net-zero

It is evident that the UK is at the start of the journey towards Net Zero by 2050, with a noticeable step change in significant government policy developments and government statements on the climate crisis and climate action (aided of course by the UK hosting COP26 in Glasgow in November 2021). It is a truism that 'all politics is local', and perhaps none more so that in relation to climate action. The national race to Net Zero will be won at the local level, the more citizens, businesses and communities can see and experience tangible benefits of climate action. These benefits range from new green jobs in the nature restoration sector, reductions in home heating bills, improved air quality and more pleasant urban spaces as we move away from the internal combustion engine using fossil fuels, or reductions in climate risks such as flooding which lower home insurance. The multiple economic and non-economic benefits of local climate action outlined in this report (and the costs of climate inaction) are not particularly innovative in and of themselves or unrealistic to achieve. Planting trees or significantly rolling out EV charging infrastructure for example, rather requires innovative and bold thinking in new ways and a willingness to experiment with 'disruptive policy interventions'. To realise the opportunities of the green transformation now (unevenly) underway does, at the very least, suggest the need to move beyond 'greening business as usual' in policy and economic thinking. Local climate action should not be viewed as part of the transition of people and places to a low carbon, regenerative version of our current economy, but rather as a transition to a different type of economy (and society). We should not sugar coat the stark warnings from climate science by succumbing to the temptations of 'business as usual' and climate inaction (hence the importance of a 'crisis' framing). Nor should we treat the climate crisis like other policy areas. Rather, it should be the overarching and integrating policy toward which all national and local governments should focus. Nor should climate action be viewed purely in science-based or negative terms. As this and other reports have outlined, whilst disruptive, the benefits and payback from climate action clearly and convincingly outweigh the costs. Just as crisis is also opportunity, we need to stress both. A positive framing and communication around local climate action is needed and not incompatible with outlining the risks of inaction, something that should be considered as the Government progresses its Net Zero strategy to achieve its Net Zero by 2050.

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