



Analysing climate action plans of selected UK cities for their SDG alignment

Subhes Bhattacharyya, Leticia Ozawa-Meida and Birgit Painter
Institute of Energy and Sustainable Development. De Montfort University, Leicester

Paper presented at the International Conference on Energising the SDGs through appropriate technology and governance, held at De Montfort University, Leicester (UK) between 4-5 July 2019.

Acknowledgement: The work was carried out for the networking grant for UK-Japan research collaboration under the grant ES/S013547/1 (Integrating the sustainable development goals into climate planning in British and Japanese cities) funded by ESRC. The funding support is gratefully acknowledged.

Abstract: In UK, the Climate change Act of 2008 has placed a binding target of reducing the net carbon emission in 2050 by at least 80% compared to the 1990 baseline. With a high share of urban population, the contribution of cities and urban areas towards climate change mitigation and adaptation becomes crucial. UK being a signatory to the Sustainable Development Goals (SDG) in 2016, there is a new emphasis on the sustainability of cities as well. In this paper, a preliminary analysis of climate action initiatives of three UK cities (Bristol, Leicester and Milton Keynes) and their alignment with the SDG is presented. We used a text mining approach to analyse the climate action plans and then use this to map the alignment with the SDGs. We find that climate action plans have not focused on the sustainable development goals or the SDGs and their focus remains limited mainly to mitigation activities through promotion of renewable energies at homes and in buildings and actions on transport. However, climate action plans could influence a significant number of SDGs and an integrated approach could be beneficial for the cities and their residents.

Keywords: climate action, SDGs, UK cities,

1.0 Introduction

According to the UN (2018), only 751 million people (or 30% of the population) lived in urban areas in 1950 but in 2018, 55% of the global population (or 4.2 billion people) live in urban areas. This represents a significant growth in urbanisation and the report suggests that by 2050, another 2.5 billion people will be added to the urban population, taking the share of urban population to 68% globally.

Urban areas now account for 80% of the global GDP (World Bank, 2018) and urban economic activities, particularly industries and services, create opportunities for income generation and livelihoods. However, urban areas tend to be more resource intensive to support higher levels of economic activities and better lifestyle and accordingly, they contribute to environmental degradation and climate change. Simultaneously, cities are very vulnerable to natural calamities and service disruption that can arise because of global warming. The highly concentrated nature of population, infrastructure and facilities increases the exposure to risk and potential for adverse effects.

Facing these challenges, many cities have developed action plans to mitigate climate change effects and adapt to the changed conditions. While this is a step in the right direction, it appears that the city climate action plans tend to be narrowly focused and misses the opportunity to take a more integrated approach. Cities critically rely on interrelated complex systems involving five essential building blocks (see Fig. 1): efficient local government management, effective local service provision, ensuring wellbeing of urban dwellers, promoting economic activities in the city, and ensuring a safe and sustainable environment. Each of these areas could contribute to climate action but the attention is often limited to energy and transport-related activities. This limited scope and a disjointed approach does not appear to align well with the idea of sustainable development, particularly in the urban contexts. Yet, the UN Framework Convention on Climate Change (UN, 1992) clearly articulated the idea of sustainable development in the context of climate change. More recently, the Sustainable Development Goals (SDGs) offer an opportunity to appreciate the whole system perspective of local level aspirations, actions and outcomes. This can be used to identify potential for inter-connections and explore the areas of weaknesses and impediments that influence the outcomes at the city level. This also offers an opportunity to create awareness of SDGs at the governance level as well as at the level of other stakeholders (users, service providers, regulators, financial institutions, innovators, etc.), which is essential for generating wider acceptance of SDG objectives and co-creation of a pathway for realising the SDGs.

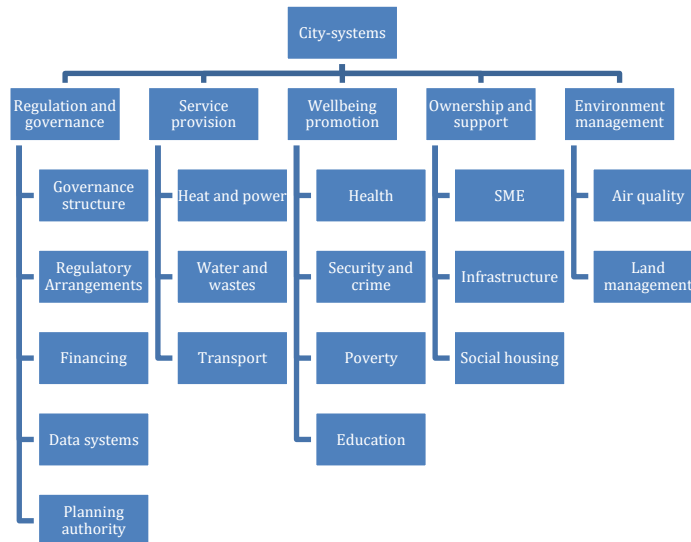


Fig. 1: Graphic presentation of city systems (based on World Bank (2010)).

It also appears that the decision-making in cities favours near-term interventions over strategic long-term visions and the implementation of any plan is greatly influenced by the prevailing conditions in a given city. Depending on the nature of a city (industrial, post-industrial), demographic change (e.g. increasing populations, aging populations, changing social structures), economic condition (growth, recession, economic transition) and social challenges (inequality, poverty, law and order issues, etc.), among others, the implementation of any plan can be affected. Further, given the changes are fast-paced and because cities operate within finite resources (economic, financial, human, natural and social), the trade-off between current and future can affect the preparedness of cities and this influences their SDG readiness significantly.

The case is not very different in the UK. Various urban administrations have adopted plans to mitigate climate change and adapt to the warmer climate and take precautionary measures to manage the consequent risks. Heidrich et al. (2013) have investigated the climate preparedness of 30 UK urban areas and found that while all areas acknowledge the climate change threat, there is significant variation across them in terms of preparedness. Similarly, Heidrich et al. (2016) and Reckien et al. (2018) investigated the climate policies and plans of European cities and find significant variations in terms of plans and actions across cities to deal with the threat of climate change. However, these studies did not focus on the linkage with sustainable development and the SDGs.

This paper presents a preliminary analysis of the integration of the SDGs in the climate action plans of urban areas in the UK. The main objective is to identify whether city-level climate actions have considered sustainable development of cities and whether they have aligned their actions and plans with the SDGs. The paper is organised as follows: the following section presents an overview of local authorities in the UK, maps their roles and responsibilities and highlights the policy context for their climate actions. Section 3 focuses on the methodology and materials used in the

paper. Section 4 presents the main findings and finally section 5 offers some concluding remarks and recommendations.

2.0 Local authority background in the UK

The term ‘local government’ or ‘local authority’ is variously used in the UK. Sandford (2019) indicates two broad categories: principal authorities (comprising of county, district and unitary authorities) and local councils (also known as parish and town councils and represent a tier of government closest to the electorate). The principal authorities serve urban and rural areas but their organisation varies across different countries within the UK: for example, in Scotland, Wales and Northern Ireland, principal authorities are single tier only whereas England has single-tier and two-tier principal authorities. In terms of numbers, there are 418 principal authorities in the UK, with a majority of them (353) in England and the rest in Wales (22), Scotland (32) and Northern Ireland (11).

According to the Committee on Climate Change (2012), different categories of local authorities in the UK provide different services in urban and rural areas. In England, out of 353 local authorities in total (NAO, 2017), there are 125 single-tier authorities serving cities, urban areas and larger towns. They serve 16% of the geographical area of the country representing 53% of the population. These include 33 London borough councils, 36 metropolitan borough councils and 56 unitary councils. In addition, there are 27 county councils in two-tier areas, serving rural areas representing 84% of the area and 47% of the population. There are 201 district councils within the county council areas providing a sub-set of services (e.g. housing, planning permission, etc.). Further, there are 79 single purpose local authorities providing a specific service (such as police, public transport, waste collection, etc.). These local authorities in England are responsible for social care, transport planning, highways, public health, environment, waste collection housing, planning, local tax and leisure (NAO, 2017). Table 1 presents the distribution of English local authorities and their roles.

Moreover, a few authorities have created combined authorities (such as Greater Manchester Authority) and more combined authorities may emerge in the future. These combined authorities have responsibility over transport, economic growth, employment and business support, housing, planning and land disposal, and further education and skills (NAO, 2017).

Table 1: Roles and functions of local authorities in England

Function	Metropolitan		Shire areas		London councils
	Borough Councils	Unitaries	County councils	District councils	
Education	X	X	X		X
Highways	X	X	X		X
Transport planning	X	X	X		X
Passenger transport		X	X		
Social care	X	X	X		X

Housing	X	X		X	X
Libraries	X	X	X		X
Leisure and recreation	X	X		X	X
Environmental health	X	X		X	X
Waste collection	X	X		X	X
Waste disposal	X	X	X		X
Planning application	X	X		X	X
Strategic planning	X	X	X		X
Local taxation	X	X		X	X

Source: Adapted from Climate Change Committee (2012).

2.1 Legal and policy context for climate action by local authorities

A number of legislations in England influence local authorities in their climate change mitigation and adaptation activities (TCPA and RTPI, 2018). Section 19 of the 2004 Planning and Compulsory Purchase Act, as amended by Section 182 of the Planning Act 2008¹ states: ‘Development plan documents must (taken as a whole) include policies designed to secure that the development and use of land in the local planning authority’s area contribute to the mitigation of, and adaptation to, climate change.’ In addition, the National Planning Policy Framework 2019 (Ministry of Housing, Communities and Local Government, 2019) places sustainable development at the heart of planning. It requires that the plans and decisions about development ‘apply a presumption in favour of sustainable development’. The Framework requires local authorities to take a long-term perspective (at least 15 years) by developing strategic policies for the development and use of land in their area. The strategic policies have to make adequate provision for housing needs, provision of infrastructure and services (such as transport, water, energy, waste management, and flood risk and coastal change management, among others), community facilities and protection of the nature and the environment. The framework specifically requires plans to take ‘a proactive approach to mitigating and adapting to climate change, taking into account the long-term implications for flood risk, coastal change, water supply, biodiversity and landscapes, and the risk of overheating from rising temperatures’. The earlier framework (of 2012) also focused on sustainable development and climate change but the new framework better integrates these agendas and requires local authorities to consider an integrated perspective in their land use and planning decision-making process.

In addition, Section 1 of the Climate Change Act 2008 requires the net carbon emissions in the UK in 2050 to be at least 80% lower than the 1990 baseline. Section 61 of the Act empowers the Secretary of State to issue guidance regarding assessing the present and future impacts of climate change in relation to authorities functions and developing policies and plans for mitigation and adaptation. Section 62 of the Act imposes reporting requirements on the local authorities relating to climate change mitigation and adaptation. The Act refers to sustainable development in relation to

¹ available at <https://www.legislation.gov.uk/ukpga/2008/29/section/182>

policies and proposals to meet the emission reduction targets (Section 13), adaptation to climate change (Section 58), and renewable transport fuel obligations (Schedule 7). However, there is no allocation of the carbon budget at the city level and outside the reporting requirement, the Act does not directly impose any obligations on the local authorities.

The Planning and Energy Act 2008² empowers local authorities to require a new development to source a proportion of its energy from local resources. This also allowed the local authorities to set higher energy efficiency standards for new buildings, although the powers related to energy efficiency were repealed in 2015.

Moreover, the Covenant of Mayors, launched in 2008, promoted voluntary actions at the local government level. This is a grouping of local governments in Europe with the objective of exceeding the European targets on climate change and energy on a voluntary basis. The signatories commit to developing a Sustainable Energy and Carbon Action Plan to take practical actions to mitigate climate change and to adapt to it. The signatories also undertake to report progress every two years. Many UK cities are signatories to this group. 47 urban councils in the UK are signatories to this Covenant, of which 10 are from Scotland, 2 from Wales, one from Northern Ireland and rest 34 from England³.

The policy context is complex but the recent emphasis of the policy framework is to pay attention to climate change and sustainable development.

3.0 Materials and methodology

In order to develop the big picture regarding climate action plans of UK cities and their alignment with the SDGs, we have started with a macro-level perspective. Based on the list of signatories to the Covenant of Mayors from the UK, we considered a selection of 26 local authorities from different geographical location of the country. This selection was informed by availability of information about the urban area, its population (e.g. small sized cities were excluded), and resource constraints. Some basic information about these cities was then collected to develop an initial scope of the cities. This also involved a quick scan of council websites to find any relevant information about climate mitigation, adaptation and sustainable development plans. This indicated that all 26 cities have climate mitigation plans. Most of them also have an adaptation plan but very few have a separate plan for sustainable development goals. Bristol has articulated its thoughts about the SDGs while cities like Oxford, London, Glasgow and Milton Keynes have also taken steps to work towards these goals. However, at this stage, the alignment of the climate action plans with the SDGs was not considered.

In order to investigate the city climate action plans in a systematic way, we relied on text analysis using software. Although a range of software options is available, we have used NVivo and Voyant Tools (an online package) for a quick analysis of some texts. The statistical analysis of words in each document and the graphical representation either in word clouds or word trees generated a better idea of how

² http://www.legislation.gov.uk/ukpga/2008/21/pdfs/ukpga_20080021_en.pdf

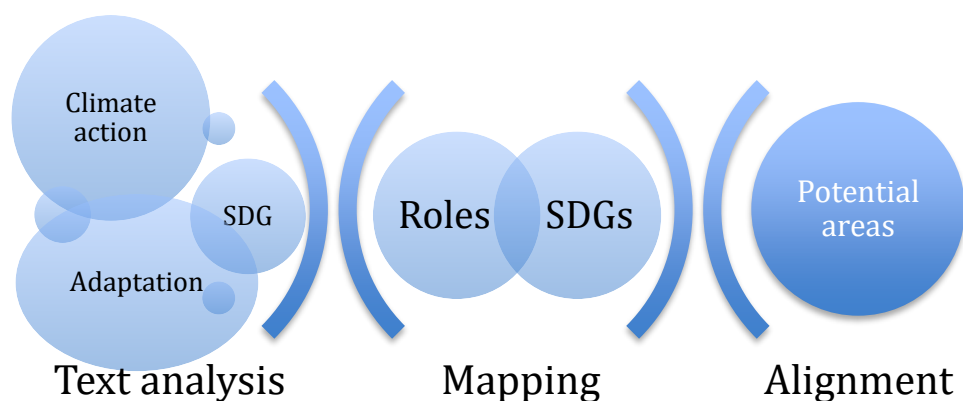
³ <https://www.covenantofmayors.eu/about/covenant-community/signatories.html>

different themes are associated in the documents. The text analysis was done for Bristol, Leicester and Milton Keynes.

Parallel to the document / text analysis, a mapping of local authority services and the related SDGs was attempted. This allowed us to identify the SDGs that could be targeted at the city level and which of them could have a link with the climate change theme. This mapping exercise was then compared with the results of the document analysis to explore to what extent cities are directly or indirectly influencing the climate-driven SDGs.

This is a work in progress and we are only reporting a preliminary analysis here but it produces interesting results, a more detailed analysis would be considered for a wider range of cities in the UK.

Figure 2: Work flow diagram



4.0 Analysis and discussion

We first present the results of our text analysis and then the mapping of local authority roles and the SDGs will be presented. Finally, we discuss the alignment of climate actions of UK cities with the SDGs.

4.1 Text and document analysis

As the Climate Change 2008 is a relevant legislation for climate change mitigation and adaptation, we started with this document. In this document of 38,890 words, 'climate change' appears 323 times, but 'sustainable development' appears 4 times although the word 'sustainable' appears 17 times in the text. The word cloud of the commonly occurring terms in the act is shown in Fig. 3. It is interesting to note that

the terms ‘city’ or ‘urban area’ or ‘mitigation’ does not appear in the act but ‘local authority’ appears 11 times and ‘adaptation’ appears 28 times. This confirms that the Climate Act does not directly impose any climate change mitigation and adaptation obligations on cities. This may also suggest that the Act places greater emphasis on adaptation.

Fig. 3: Climate Change Act 2008 word cloud



We then considered the climate framework of three cities, namely Bristol Climate Change and Energy Security Framework, Leicester 2014 Low carbon plan, Milton Keynes 2012 Low carbon plan. For each document, the statistical summary is presented in Table 2 while the links between the key terms are presented in Fig. 4, 5 and 6. It can be seen that Bristol has the longest document whereas Milton Keynes has the smallest document of the three. In terms of frequently used words, energy, carbon and programme/ framework/ action appear in all these documents along with the city names. In the plans of Bristol and Milton Keynes, transport also appears as one of the top ten frequently used words, whereas in Leicester, this term does not appear in the top ten list but terms like ‘people’ are mentioned. It is interesting to note that ‘sustainable development’ has received limited attention in these action plans and even ‘adaptation’ appears in the Bristol plan and not in the other two cities. Considering that these plans were adopted before the launch of the SDGs, the emphasis on sustainable development may be limited but being climate action plans, omission of key terms like mitigation and adaptation is somewhat surprising.

Table 2: Comparative statistical overview of city climate action plans

Statistics	Bristol	Leicester	Milton Keynes
Word count	21,949	5,183	2,807
Unique words	2868	1327	719
Most frequent 10 words	Energy (398) City (274) Bristol (270) Emissions (192) Carbon (154) Climate (113) Targets (102) Framework (100) Transport (99) Industrial (90)	Leicester (81) City (56) Energy (52) Carbon (29) Programme (29) Change (27) New (26) People (23) Reduce (23) Climate (22)	Energy (47) Carbon (43) Plan (35) Low (30) Action (29) Milton (22) Keynes (21) Existing (19) Transport (18) Strategy (17)
Most common collocated words	1) Bristol-city – energy – council; 2) Energy – security – Bristol – climate – city – framework – efficiency; 3) Climate – change – security – framework – energy -	1) climate –change – programme – action 2) Leicester – getting – city – healthy – active – communities 3) energy – efficient – use – project	1) low – carbon – action – plan; 2) carbon – plan – action – emission – living; 3) energy – efficiency – schemes – develop – use - transport
Occurrence of key terms (frequency)			
Sustainable	31	16	8
Development	28	8	3
Sustainable development	2	1	0
Mitigation	4	0	0
Adaptation	4	0	0

The word linkages shown in figures 4 -6 bring out the distinctive focus of each plan. For example, energy-related carbon emission reduction in Bristol comes out quite clearly. Ensuring energy security is given a strategic focus, where the cost of service appears as a driver. In the case of Leicester and Milton Keynes, on the other hand, the focus on the community and businesses becomes clear. The emphasis on developing plans for businesses and the community distinguishes Milton Keynes’ plan from that of Leicester’s but by including homes, people (including children and youth) and their health, Leicester’s plan appears to have a wider scope compared to the others.

Our test with climate plans of three UK cities shows that a systematic analysis of text documents using available software can be a suitable approach undertaking a quick

and macro-level analysis. This can highlight possible themes for further analysis and can be easily used to develop a comparative picture.

Fig. 4: Word linkage for the Bristol city climate action plan

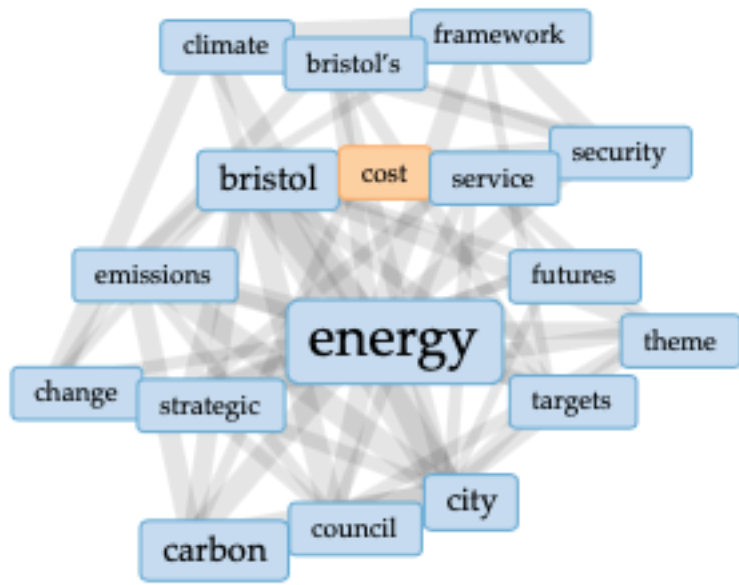


Fig. 5: Word links for the Leicester Low carbon city plan 2014

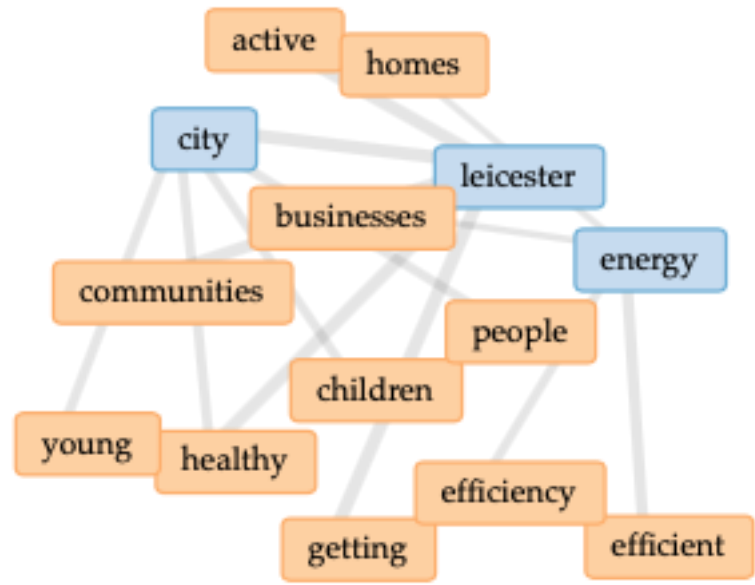
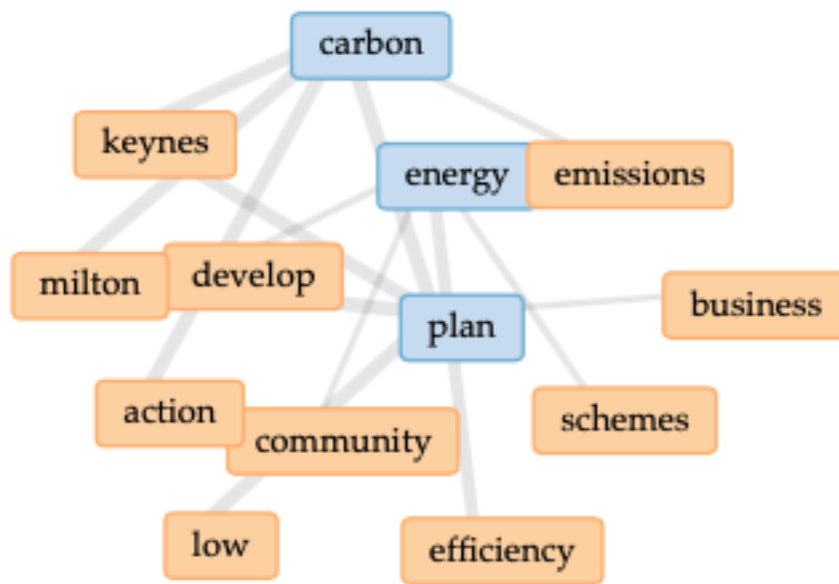


Fig. 6: Word links for Milton Keynes low carbon plan 2012



4.2 SDG mapping of climate actions

The Sustainable Development Goals launched in 2015 by the United Nations are global goals to be reached by 2030. A number of goals are relevant at the city level, with goal 11 directly relevant for cities (aiming at sustainable cities and communities). The goal 13 (climate action) is particularly relevant for the climate challenge but several other goals (such as poverty, hunger, water access, energy access and efficiency, education, health and wellbeing, production and consumption, etc.) are all relevant at the city level.

Nilsson et al. (2016) proposed a mapping framework to identify the interaction of one SDG with the rest. They suggest a seven-point scoring scale to distinguish the interactions that can positively influence from those that can hinder the progress. They suggest that the mapping should start from one SDG and consider its interaction with the remaining 16 to identify the possible trade-offs. Nerini et al. (2018) have mapped the energy-related SDGs across other SDGs. The evaluation relied on evidence from available literature and interactions with experts. However, a detailed mapping exercise using the above approach is a demanding task and within the limited time and resources, this could not be adopted here. This could be an area of future work.

A simpler approach is used below which considers an example of possible city level SDG targets and which of these are influenced by climate actions positively or negatively. Table 3 presents the details. The city level SDG example is adapted from Bristol (Bristol Green Capital Partnership, 2018). This table indicates that goal 7 is inextricably related to SDG 13 while climate action reinforces several other SDGs (namely 1, 3, 6, 9, 12 and 15). For majority of the remaining ones, climate action has an enabling effect while climate action may have a constraining effect on goal 10 (inequality among countries) and may not have any important role in goal 16 (peaceful and inclusive societies). This suggests that climate action at the city level

has the potential to influence a range of SDGs but this requires a careful integration of the SDG agenda.

The current action plans are more concerned with mitigation of carbon emission through promotion of renewable energies at homes and in buildings as well as through action on the transport sector. The adaptation is mainly concerned with flood prevention and managing the flooding risk. A broader integrated approach could create co-benefits and achieve a better outcome at the city level.

Conclusion

This paper presented a preliminary analysis of city level climate actions in the UK to find out whether they are aligned with the SDGs. It has initially considered 26 cities, which are signatories of the Covenant of Mayors and then taken three cities, namely Bristol, Leicester and Milton Keynes to undertake a more systematic analysis. The climate action plans were analysed using text analysis software to identify the similarities and differences in them. The SDG mapping was then used to see where climate action could influence the SDGs. It is found that the Climate Change Act 2008 does not directly impose any obligation on the cities, as the act does not even mention the term ‘city’. However, there is a reporting obligation of local authorities to inform their policies and progress in terms of contribution to the overall national objective of greenhouse gas emission reduction. The city level plans differ significantly but the link to sustainable development or sustainable development goals is limited, mostly indirect. Our mapping however shows that climate actions can influence achievement of a large number of city level SDGs and accordingly, a better alignment of the climate action plans could be beneficial for the local authorities and the citizens.

Further work is required to map the SDG targets against the climate action objectives. A more thematic analysis of the documents will also be useful and insightful. This is the agenda for further work.

Table 3: Mapping of SDGs on climate actions

Goal	Aim	Examples of City Goals	Effect of climate action	City level climate actions Goal 13
Goal 1	End poverty in all its forms everywhere	50% less people in poverty in the city compared to now	Reinforces the achievement of Goal 1	Climate resilience positively improves potential for poverty reduction
Goal 2	End Hunger, achieve food security and adequate nutrition for all and promote sustainable agriculture	End all forms of malnutrition, including children under 5, adolescent girls, pregnant women and older people	Enabling effect	Climate adaptation measures reduce the risk of food insecurity Climate actions reduce pollution, promotes sustainable activities to support this goal
Goal 3	Attain healthy life for all at all ages	Reduce by 1/3 all premature deaths from non-communicable diseases	Reinforces the goal achievement	
Goal 4	Provide equitable and inclusive quality education and life long learning opportunities for all	Ensure access to quality early childhood care and education and significantly increase the number of people with relevant skills for decent jobs	Enabling effect	Climate actions create new opportunities for jobs and skills New opportunities offer potential for a non-discrimination
Goal 5	Attain Gender equality, empower women and girls everywhere	End all forms of discrimination against women and girls	Enabling effect	Climate resilience to improve awareness of efficient water use
Goal 6	Secure water and sanitation for a sustainable world	Substantially increase efficient use of water	Reinforces the goal achievement	
Goal 7	Ensure access to affordable, sustainable and reliable modern energy services for all	Significantly increase renewable energy use and improve energy efficiency	Indivisible - inextricably linked	Climate action and Goal 7 go hand in hand
Goal 8	Promote strong, inclusive and sustainable economic growth and decent work for all	Decent employment for all	Enabling effect	New businesses and skills improve the opportunity for decent jobs Climate action drives adoption of clean technologies
Goal 9	Promote sustainable industrialization	Better resource efficiency and cleaner technologies for industries	Reinforces the goal achievement	New technologies could increase exclusion of certain section of the population
Goal 10	Reduce inequality within and among countries	Reduce exclusion in the society	Could be constraining	Climate action supports affordable services in cities
Goal 11	Build inclusive, safe and sustainable cities and human settlements	Inclusive, safe and affordable housing and services for residents	Enabling effect	
Goal 12	Promote sustainable consumption and production patterns	Substantially reduce waste and improve awareness of consumption	Reinforces the goal achievement	Climate actions support awareness about consumption and production
Goal 14	Attain conservation and sustainable use of marine resources and seas	Reduce marine pollution and resource use	Enabling effect	Cleaner production contributes to waste reduction and resource demand
Goal 15	Protect and restore terrestrial ecosystems and halt all biodiversity loss	Ensure conservation and sustainable use of ecosystem	Reinforces the goal achievement	Effective land management contributes to ecosystem protection Climate action likely to reduce the risk of damage and hence social tension
Goal 16	Achieve peaceful and inclusive societies, rule of law, effective and capable institutions	Reduce violence and related death	no direct influence	
Goal 17	Strengthen and enhance the means of implementation and global partnerships for sustainable development	Promote different forms of partnerships	Enabling effect	Climate action promotes different partnerships

References

Bristol Green Capital Partnership, 2018, Driving the Sustainable Development Goals Agenda at City level in Bristol, Bristol Green Capital Partnership, Bristol (see https://bristolgreencapital.org/wp-content/uploads/2018/07/Bristol-Method_Driving-the-SDGs-agenda-at-city-level-in-Bristol_17-Jul-2018.pdf)

Committee on Climate Change, 2012, How local authorities can reduce emissions and manage climate risk, The Committee on Climate Change, London.

Diana Reckien, Monica Salvia, Oliver Heidrich, Jon Marco Church, Filomena Pietrapertosa, Sonia De Gregorio-Hurtado, Valentina D'Alonzo, Aoife Foley, Sofia G. Simoes, Eliška Krkoška Lorencová, Hans Orru, Kati Orru, Anja Wejs, Johannes Flacke, Marta Olazabal, Davide Geneletti, Efrén Feliu, Sergiu Vasilie, Cristiana Nador, Anna Krook-Riekkola, Marko Matosović, Paris A. Fokaides, Byron I. Ioannou, Alexandros Flamos, Niki-Artemis Spyridaki, Mario V. Balzan, Orsolya Fülöp, Ivan Paspaldzhiev, Stelios Grafakos, Richard Dawson, 2018, How are cities planning to respond to climate change? Assessment of local climate plans from 885 cities in the EU-28, *Journal of Cleaner Production*, 191: 207-219.

Heidrich O, Dawson RJ, Reckien D, Walsh CL. Assessment of the climate preparedness of 30 urban areas in the UK. *Climatic Change* 2013, 120(4), 771-784.

Ministry of Housing, Communities and Local Government, 2019, National Planning Policy Framework, Ministry of Housing, Communities and Local Government, London
(https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/810197/NPPF_Feb_2019_revised.pdf).

NAO, 2017, A short guide to local authorities, National Audit Office, London
(<https://www.nao.org.uk/wp-content/uploads/2017/09/A-Short-Guide-to-Local-Authorities.pdf>).

Nerini F, Tomei J, To LS, Bisaga I, Parikh P, Black M, Borrion A, Spataru C, Broto V, Anandarajah G, Milligan B, Mulugetta Y (2018) Mapping synergies and trade-offs between energy and the Sustainable Development Goals. *Nat Energy* 3:10–15. <https://doi.org/10.1038/s41560-017-0036-5>

Nilsson M, Griggs D, Visbeck M (2016) Map the interactions of sustainable development goals. *Nature* 534:320–322. <https://doi.org/10.1038/534320a>

O. Heidrich, D. Reckien, M. Olazabal, A. Foley, M. Salvia, S. de Gregorio Hurtado, H. Orru, J. Flacke, D. Geneletti, F. Pietrapertosa, J.J.-P. Hamann, A. Tiwary, E. Feliu, R.J. Dawson, 2016, National climate policies across Europe and their impacts on cities strategies, *Journal of Environmental Management*, 168: 36-45.

Sandford, M., 2019, Parish and town councils: recent issues, Briefing paper no 04827, House of Commons Library, London (<https://researchbriefings.parliament.uk/ResearchBriefing/Summary/SN04827#fullreport>).

TCPA and RTPI, 2018, Planning for climate change: A guide for Local Authorities, Town and Country Planning Association and Royal Town Planning Institute, London (https://www.rtpi.org.uk/media/2852781/TCPA%20RTPI%20planning%20for%20climate%20change%20guide_final.pdf).

UN, 1992, United Nations Framework Convention on Climate Change, https://unfccc.int/files/essential_background/background_publications_htmlpdf/application/pdf/conveng.pdf, United Nations, New York.

UN, 2018, World Urbanisation Prospects: The 2018 Revision, Economic and Social Affairs, United Nations, New York (<https://esa.un.org/unpd/wup/Publications/Files/WUP2018-KeyFacts.pdf>).

World Bank, 2010, Systems of Cities: Harnessing Urbanisation for Growth and Poverty Alleviation – The World Bank Urban and Local Government Strategy, The World Bank, Washington D.C.