

**The UK Heat and Buildings Strategy: A sub-national governance place-based investigation drawing on two city regional case studies in England between 2019-2022**

**Matthew Kennedy**

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**Abstract**

This research explores the concept of place-based governance and asks if the emerging system of sub-national governance in England can support a place-based governance approach. It applies the theoretical framework of Systems Theory to sub-national operations in England and investigates the ability of Combined Authorities to implement national climate change policy in the context of the UK Heat and Buildings Strategy. It critiques both the place-based governance approach and systems theory dynamics as emergent paradigms within sub-national development. The research extends the concept of place-based governance through the application of systems theory dynamics and incorporates the principle of integrative adaptivity to the place-based governance concept. The regional disparities and slowdown of England's sub-national economies since the financial crash of 2008 and the COVID-19 pandemic have grown alongside English spatial disparities of north and south; this has been associated with a renewed interest in city regional development and the role of 'metro mayors', articulated around new financial arrangements such as Devolution funding streams or 'Devolution Deals'. The spatial effectiveness of larger city regions to deliver national policy remains uncertain in rebalancing the national English economy and there is confusion between city regions and local authorities regarding implementation of the UK Heat and Buildings Strategy. This research uses preexisting principles of place-based development to examine contemporary sub-national governance institutional ability to support SMEs and implement national policy by focusing on two case studies from the north of England. The thesis makes an original contribution to knowledge through its unique exploration of the place-based concept and extension of this through the application of a longstanding theoretical framework. In doing so, it provides detailed empirical and critical comparison of sub-national governance institutions and governance relationships through the analysis of policy rhetoric. The research concludes that the current approach to sub-national city regional development is unlikely to be supportive of the UK Heat and Buildings Strategy nor a place-based governance approach in its current format.

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**Declaration**

I declare that the work contained within this thesis has not been submitted for any other award and that it is all my own work. I also confirm that this work fully acknowledges opinions, ideas, and contributions from the work of others. Any ethical clearance for the research in this thesis has been sought, approved and granted by the Business and Law Faculty Committee on the 1<sup>st</sup> of November 2022.

I declare that the word count for the thesis is 83, 094 words.

Name: Matthew Kennedy

Signature:

M.Kennedy

Date:

**17/01/2024**



## **Chapter 1 - Introduction**

### **Outline**

This chapter provides an overview and background to the research by outlining the context of the study, its sets out the aims and objectives of the study and explains the need for the research which focuses on the implementation of UK national policy objectives and Mayoral Combined Authorities (MCAs) leading on The Heat and Buildings Strategy rollout in conjunction with Small and Medium Enterprises (SMEs). The chapter identifies the importance of SMEs in the UK government's economic agenda and introduces the rationale and context for the study, it starts by outlining the aims, objectives and rationale for the research, then moves onto explain the need for energy efficiency improvements in buildings. It then goes onto introduce the concept of place-based governance (PBG) within the context of alternative governance models and central-local relations in England. Previous economic approaches of relevance to city regional regeneration and background to the betterment of human capital inherent in the research are introduced and this helps situate the study in relation to low carbon installations. The chapter concludes with a brief overview of the original contribution to knowledge the research makes, which is considered as an extension of the place-based governance concept and an integration of 'systems theory' and Dooley's Complex Adaptive System (CAS) paradigms (Dooley, 1997) (Dooley & Vande Ven 1999).

### **Aim and objectives**

The actions of sub-national governance bodies can radically influence the operations of Small to Medium Enterprises (SMEs) in any given 'place'. This research aims to investigate sub-national governance operations relationship to UK national policy in the form of The Heat and Buildings Strategy (Department for Energy Security and Net Zero & Department for Business, Energy & Industrial Strategy, 2021a), in two main ways. The first aim of the research is to get underneath the sub-national political and organisational relationships that currently exist at a sub-national governance level in England and investigate whether contemporary institutional relationships can implement national policy in an effective way by using a place-based governance approach. It applies systems theory as an explanatory interpretation to place-based

governance of which SMEs are regarded as an important part, not only as of the place-based concept but to the roll out of national policy, cited recently in The Net Zero Strategy:

‘Although they [the principles] were developed with the public in mind, many of them equally apply to green choices taken by businesses, **particularly medium or small enterprises.**’ (Emphasis added) (Department for Energy Security and Net Zero & Department for Business, Energy and Industrial Strategy, 2021b, p276)

The emphasis of this statement stresses the importance of the principles of contemporary industrial strategy in England (Department for Energy Security and Net Zero & Department for Business, Energy & Industrial Strategy, 2021c), and is made alongside the most recent government publication, The Heat and Buildings Strategy.

It implies a crucial role is to be played by Small and Medium Enterprises (SMEs) to achieve the UK government’s decarbonisation targets, both through their business services and product production; indeed, the statement supports the assertion that SMEs play a crucial role in UK and worldwide economies. This point is also reinforced centrally and supports the importance of SMEs in the reduction of the UK’s carbon footprint through betterment of social mobility, improvement in employment opportunities, and the ability to advance the objectives of decarbonisation of buildings. The second aim of the research is to investigate sub-national governance barriers that support place-based SMEs to implement low carbon technologies within buildings. Sub-national governance institutional roles, institutional contributions, and interworking within sub-national governance are analysed by identifying the opportunities, challenges, and difficulties in the delivery of low carbon installation projects. The study investigates ways governance institutions can improve delivery of low carbon energy projects which are referred to throughout this research as ‘low carbon installations’. Mayoral Combined Authorities (MCAs), Non-Mayoral Combined Authorities (NMCAs), Local Enterprise Partnerships (LEPs), and Local Authorities (LAs) are the governance institutions of focus and are referred to as ‘sub-national governance institutions’. The research aims to progress an understanding of how place-based institutions operate sub-nationally and how they can influence delivery of low carbon installations in buildings with their contemporary power and leadership

models. The potential influences on fiscal and sub-national policy strategies are reviewed and in doing so the research evaluates systems theory dynamics, and more specifically, Dooley's paradigms within a theoretical model of place-based governance.

The specific research objectives are:

- To identify and explore adaptive challenges that hinder the improvement of sub-national governance practices and implementation of low carbon installations for buildings.
- To assess the ability and roles of sub-national governance institutions in delivering a place-based approach.
- To evaluate the advantages and disadvantages of sub-national governance authorities when supporting SMEs.
- To inform and influence delivery of low carbon power energy projects in buildings at a sub-national governance level and produce recommendations for more efficient delivery.

### **Rationale and Context**

The overarching reason for the research is the problem of global warming, warnings regarding increasing carbon emissions and scientific evidence of harm to the global environment is indisputable (Helm & Hepburn, 2009). Scientific evidence demonstrates that global warming is becoming more rapid, carbon emissions are steadily increasing from building stock and these are becoming a matter of priority within political circles (Sovacool, 2016). Added to this, the issues of increased energy and power prices are impacting negatively on the global and UK economy, both through household energy bills and increased carbon outputs from buildings. Globally, within the built environment, buildings are large consumers of combustible resources and are contributors to some of the most serious global and local environmental challenges, including increased flooding, increased global temperatures, and reduction of fresh water supply (Barbier, 2016) (Barbier & Markandya, 2013). Around half of all non-renewable resources that humankind consumes is within energy consumption, this includes old buildings which are now

abundant in 'left behind' places due to a lack of investment and previous industrial heritages. Existing energy generation supplies in buildings, such as central heating gas boilers and electrical supplies are substantial contributors towards global warming (Braun & Clarke, 2013) (Nassen et al, 2007) (Hawkin, 2005). Collectively, buildings, and associated energy systems within buildings, are responsible for 32% of emissions in England (Department for Energy Security and Net Zero; Department for Business, Energy & Industrial Strategy, 2017), furthermore, it is estimated that the built environment globally is responsible for between 12% of all freshwater use, 30% of greenhouse gas emissions, and between 30-40% of global energy consumption (IES, 2010) (UNEP, 2011). These emissions figures add to the need for research into carbon reduction measures, similarly, SMEs are significant users of energy in the UK via their own building stock, the government estimates that 55% of all business energy is used by SMEs, 34% is used by small and micro businesses, and 20% in medium sized businesses. 43% of energy used in buildings is by SMEs (Department for Energy and Net Zero; Department for Business Energy & Industrial Strategy, 2017).

Four main reasons are identified to justify the need for this research. Firstly, the ongoing question of how to deal with high energy consumptions and carbon outputs from buildings continues to confound governments that are making no major forward progress on the issue in decades. Secondly, ongoing supply issues in relation to gas and fossil fuels that produce energy for buildings have become more difficult following an increase in international tensions surrounding the Ukraine War and other global economic factors, this has subsequently increased the need for alternative low carbon energy in buildings. Thirdly, the increase in fossil fuel prices directly contributes towards the current cost of living crisis through higher fuel costs in England which means other solutions are needed. Fourthly, there is a need to investigate sub-national governance institutions' ability to implement national policy due to the changes made by the coalition to sub-national governance since 2010. The new climate change agenda within the context of The Heat and Buildings Strategy and the introduction of the MCA governance model alongside city regions collectively requires assessment; additionally, the resounding intention of government to involve SMEs in decarbonisation of buildings demonstrates their importance to the economy and The Heat and Buildings Strategy roll out. This research views the need to involve

place-based SMEs as crucial, the ongoing projected political support for SMEs over the past decade and the political encouragement to develop SMEs economically, is seen as paramount to enhance economic development. This involvement is set against a backdrop of sub-national governance systems led by combined authorities which differ in constitution, some combined authorities can have a mayor (MCA), but some do not (NMCA). The longevity of SME involvement and previous political sub-national governance failures to historically support SMEs are reflected on by Heseltine in 2012:

‘Without equal focus on the needs and competitiveness of our large and mid-sized businesses, the Government does a disservice to the very SMEs it wishes to support.’ (Heseltine, 2012, p6)

As this statement was made over a decade ago it is important to discover whether this perspective has changed in relation to the government’s ‘Net Zero’ agenda or in harmony with developing sub-national governance arrangements. To this end, the research will focus on sub-national governance support for SMEs in the implementation of points 7 and 10 of the UK Governments Ten Point Plan (Department for Energy Security and Net Zero & Department for Business, Energy and Industrial Strategy, 2020a). The ability of sub-national governance institutions to support SMEs to deliver job growth through sub-national governance policy strategy within the context of The Heat and Buildings Strategy will be the focus. SMEs are considered uniquely placed to provide a potential opportunity to deliver low carbon installation projects in buildings; due to their flexibility in business operations, size, ability to innovate, and ability to influence the climate change agenda. SMEs can influence regional economies with a scope to operate in a more place-based way because of their geographic location, operationally, SMEs are posited to create opportunities in niche areas and given the government’s agenda contained within The Heat and Buildings Strategy to decarbonise buildings, it will be SMEs that play a vital role in the objective of low carbon installations through their business practices and processes. It is therefore crucial to understand how relatively new levels of sub-national governance institutions are interacting with SMEs on such important topics as climate change and The Heat and Buildings Strategy.

Prior to The Heat and Buildings Strategy being published, the government released the White Paper ‘Powering our Net Zero Future’ (Department for Energy Security and Net Zero & Department for Business, Energy and Industrial Strategy, 2020b), to address the challenge of climate change and carbon emissions. The White Paper highlighted goals of:

- Supporting up to 50,000 jobs by 2030
- Improving energy consumption in both existing and new buildings
- Transforming homes and workplaces to use clean energy sources.

Given the increase in number of workers required for new low carbon installations projects in both new and old buildings these goals will need support from highly skilled workers. For this to occur a general scaling up of labour and demonstration of the importance of human capital in the installation process will need emphasis, in addition, other economic events such as COVID 19 and Brexit have created employment gaps that provide an extra stimulus for employment growth in ‘green growth’ areas. Low carbon installations provide the possibility of training opportunities and potentially contribute towards the UK government’s ambitions of ‘Levelling Up’ (Department for Levelling Up, Housing and Communities, 2022).

These new policy objectives create a conceptual and empirical gap in knowledge and the literature needs to be evaluated at a sub-national governance level, the processes, communication, and interworking of the relationships between institutions and the private sector towards central government policy requires investigation. The research explores questions around sub-national growth strategy and policy, it asks whether it is possible for existing sub-national governance structures to provide adequate implementation of national economic policy to successfully roll out central government policy in a place-based way. Undoubtedly, the private sector will have an important part to play in the delivery of low carbon installations to achieve government targets. The private sector has the potential to influence social problems by decreasing unemployment and poverty in deprived areas through training opportunities, indeed, some SMEs are by their very nature more likely to be place and sub-nationally based. It is therefore important to

understand what support they have from sub-national governance public sector actors, as this will influence the implementation of The Heat and Buildings Strategy. Areas such as access to finance, skills and vocational training courses will be needed to deliver low carbon installations (BMG, 2023) (Whittington, 5th July 2023).

As far back as 2010, the UK government itself highlighted that it would need:

‘a rapid response by employers and the skills system, to provide the right training to new entrants to the construction market and to up skill the existing workforce’ (Department of Energy & Climate Change, 2010, p. 56)

Recently however, sub-national institutions, who collectively carry responsibility for skills programmes have seen drastic cuts in funding over the past decade, the potential consequential effect from the reduction of low carbon installation projects is therefore quite foreseeable. Reduced funding and changes to sub-national governance structure has caused a problem for SMEs to upscale and implement low carbon building projects. This is a contentious issue, particularly considering sub-national governance changes following the introduction of the Localism Act 2011. Sub-national governance institutions are underfunded organisations but are heavily involved with skills programmes within a city regional setting, recent surveys from the sector show that skills and skilled employment in low carbon energy remain a concern (Autio & Webb, 2015).

Sub-national institutions in the form of MCAs, in combination with LEPs, are responsible for producing strategies at a sub-national level to collectively assist businesses and sub-national economies by increasing growth and encouraging SMEs to change to low carbon business models. So far, at the time of writing, funding to the sub-national level has mainly filtered through to the private sector in three forms:

- Grant funding from central government.
- Finance through hybrid, private sector banking.
- Devolution Deals

This research provides an analysis of the type of financial strategies that are in place to support SMEs in relation to low carbon energy in buildings and provides analysis and recommendations for improvement. The research concerns itself with types of funding and investment arrangements, overarching governance structures, and the capabilities of SMEs that install low carbon installations. Research exists in relation to private sector investment that shows a low uptake of carbon emissions projects by SMEs, even using incentives which provide high rates of return and do not require capital investment are often not taken up (Mallaburn, 2016) (Parker et al, 2009) (Revell & Blackburn, 2007). The reasons for this are investigated and the research aims to fill the gap and contribute towards the scarce research regarding sub-national governance institutions involvement in this area.

The frequently used approach to address the problem of low uptake of carbon emissions projects and innovations is the range of barriers and opportunities concerning low energy building development (DECC, 2014) (Henriques & Caterino, 2016). It is argued throughout the research that skills and people development are of paramount consideration to implement The Heat and Buildings Strategy successfully and the issue of financial capital investment is also crucial, as are the decision making process of SMEs in relation to issues such as increasing human capital in conjunction with sub-national governance. The thinking behind the implementation of skills training in relation to low carbon installations is in its infancy, with a clear question mark surrounding SMEs decision making in relation to development of skills for new technologies within the building energy efficiency sector.

More broadly, this research seeks to address the gaps in knowledge surrounding the delivery of The Heat and Buildings Strategy by investigating the challenges and barriers that sub-national governance institutions are facing within the wider scope of difficulties faced by SMEs between January 2019 and March 2022. It explores the political policy agenda and subsequently makes conclusions to improve sub-national governance working. The research focuses on capital investment constraints and education workforce planning in a sub-national governance context and aims to influence the implementation of low carbon technology delivery. The broader perspective provides discussion surrounding skills and funding within the current



literature and aims to expand on the influence of social, cultural, and regulatory influences within a place-based and sub-national leadership context (Banks et al, 2012) (Cooremans, 2012).

### **The need for energy efficient buildings**

To expand on the studie's rationale, carbon emissions from buildings are the second highest sources of emissions in the UK (Department of Energy Security and Net Zero, 2023). Carbon emissions are steadily increasing from buildings, in the past few decades they have become a matter of priority within political circles (Sovacol, 2016), and consequently, this has reinforced political objectives towards low carbon buildings by addressing carbon emissions from buildings. Physical installations such as solar panels, heat pumps, improved glass installation, and loft installation, have all been suggested as possible solutions. Low carbon installations and physical infrastructure are required in both new and existing buildings, both public and private, to achieve the UK government's 2030 goal.

The Climate Change Act 2008 has committed the UK to achieving an 80% reduction in carbon emissions by 2050 using 1990 levels as a starting point (Shepherd, 2020), this target was recently updated in the UK government's Net Zero agenda (Department for Energy Security and Net Zero; Department for Business, Energy and Industrial Strategy, 2021 a). The specific flow of emissions from pre-existing buildings has become a specific and significant policy issue, of rising carbon emissions are discussed in the context of the growing problem of the 'triple challenge' (Kelly, M, 2009), which combines elements of climate change resilience, energy security, and long term energy sustainability. The UK's existing building stock contributes significantly to this challenge and the ongoing question of how to deal with the triple challenge has confounded governments over the years. Currently, there are two ways that exist to reduce carbon from the atmosphere; carbon avoidance and carbon removal. The former includes a method of avoiding the production of carbon to decrease the output of the gas; the latter, removes carbon in the atmosphere to decrease the amount in circulation. In relation to buildings, the general approach has tended to favour the reduction of carbon emissions via the reduction of output via short term consumer incentives rather than via carbon removal, sub-national

governance authorities have the potential to influence the amount of carbon through policies geared towards both reducing production and increasing removal.

The goals, set by the UK government for 'Net Zero' are set out in national policy in the form of The Net Zero Strategy, which has coincided with the publication of The Levelling Up Strategy (Department for Levelling Up, Housing and Communities, 2022), these policy documents are further supplemented by local authorities declaring climate emergencies with associated decarbonisation strategies for their geographical areas. Additionally, MCAs produce Strategic Economic Plans (SEPs) (South Yorkshire Combined Authority, 2021a; West Yorkshire Combined Authority, 2016), which are sub-nationally produced economic development documents at city regional level that contain intentions to develop skills within the city region's workforce and bring forwards the installations needed for buildings to become low carbon. The effects of globalisation have meant that a 'spatial disparity of people' or movement of highly skilled people to other areas to command higher salaries; contributes to a shortage of skilled people in left behind places and general skills shortages (Migration Advisory Committee, 2023). This suggests that the movement of people is not consequential of space blind economic policies but a natural occurring event and a 'people-based' perspective towards economic growth is therefore crucial to the delivery of The Heat and Buildings Strategy and place-based governance. The ongoing movement of skilled people away from deprived areas may also partially explain the lack of productivity in some northern city regions. Summarily, the human spatial element in terms of skills training is a central theme to place-based governance and is necessary for The Heat and Buildings Strategy to be successful and low carbon buildings to be produced.

In the context of this research the UK government can 'seize the day' and assist struggling northern economies as there is the scope for potential expansion of regional export bases for 'Net Zero' goods and products. In the process, there are possibilities to resolve sectoral imbalances in city regional economies and combat financial inequalities (Gardiner et al, 2013), combined with the opportunity improve skills for local people within deprived areas.

## **Place-based governance**

Regional and spatial inequalities in England are thought to be longstanding (Martin, R, 2015), due to the unevenness of economic development caused by the post-industrial era which meant most northern cities now demonstrate an inability to recover from the loss of manufacturing industries based in the north of England. Similarly housing stock standards are in decline following budgets cuts and crossover of services to some social housing providers being transferred from the public sector to the private sector or housing associations. The regional deprivation apparent has only increased unemployment rates in the northern hemisphere and the two city regions under investigation. The technological revolution has set a backdrop of deindustrialisation which has additionally increased skills and educational needs in the north. Ongoing issues of globalisation, changes to employment structures, and legislation changes in the UK have made lower skilled manufacturing jobs less prevalent and less secure. In turn, this has led to a change in the need for a particular 'type' of labour in the North of England, to focus on jobs that are more technologically proficient and require a higher standard of education, what some refer to in the literature as the 'spatial fix' (Harvey, 1982).

The focus of this research relates to the economic downturn in sub-national economies and central-local relations that leads to an emerging 'new' type of place development referred to in the literature as the 'place-based approach' or referred to in this research as 'place-based governance' (PBG). This section briefly overviews the contemporary situation concerning central-local relations in England and identifies the concept of MCAs as a place-based governance approach in the context of a sub-national spatial scale. It outlines the historical governance and economic approaches at a sub-national level and the relationship between place-based governance and other governance theory. By way of introduction, the historical focus attributed to a 'place' is a consistent theme within the literature in relation to place-based governance (Martin & Sunley, 2006), as is, the typology and strength of leadership, added to this, the withdrawal of the central State in England sub-nationally has caused a gap in agency that has required 'a new breed' of leadership at a sub-national governance level. This has taken the form of combined authorities

with mayors, or ‘metro mayors’, which contain multiple institutional stakeholders with mayors as guardians of governance sub-nationally.

Currently, the institutions responsible at a city regional scale are MCAs and LEPS, who collectively have a formal institutional basis with responsibility for the development of local places and city regions. A central element of sub-national governance is the inclusion of a democratic element in the approach, although as Deas (2020) has argued, decision making that is devolved closer to the local citizenry is not generally more open or democratically accountable. The institutions that make up the sub-national level of governance can be considered to bring together knowledge that combines and creates new foresight in innovation, additionally, endogenous economic thinking effectively resolves the State for responsibility in economic growth matters sub-nationally and, from a financial perspective, this is reflected in different ways. A lack of democratic involvement in the processing of financial funds lends itself to capitalist forms of interest and further causes restrictions with allocation of funds sub-nationally. The advent of the added perceived responsibility of finance being given to MCAs and LEPS to implement low carbon technologies through their own development strategies, may enhance collaboration through place-based governance; but some authors have argued that due to the lack of State leadership and involvement at a sub-national level in the production of new spaces of interaction, this has encouraged the private sector to promote economic growth (Harrison, 2020).

In other literature, Tomaney asserts that:

“‘place-based’ approaches involve attempts to tap into economic potential that remains unused’ (Tomaney, 2010, p. 10)

In terms of definition, no universal definition of ‘place-based’ exists, indeed, as (Gray & Pugalis (2017) affirm:

‘Actors and institutions may adopt it in different settings to mean distinctly different things’ (ibid, p34)

More broadly, place-based governance is a concept that per se can be considered complex (QCOSS, n.d), these views reinforce the appropriateness of place-based governance to identify, interpret, and critic the suitability of place-based measures. Other lengthier definitions are available which reinforce these points and further explore the interaction between non-governmental bodies and traditional government, one factor that seems consistent is the assertion that place-based governance relates to specific places, as this impacts on the context in which the concept is discussed (Bentley & Pugalis, 2014a). An important aspect of place-based governance, particularly in the context of low carbon installations, is the emerging 'green economy', given the wider social and broader impact of the subject on skills and employment. It has been suggested that the 'tapping into' potential skilled labour markets can only be possible by local involvement and using the 'local' private sector through hybrid modes of modelling and good interconnections within city regions. A further argument drawn on in the research is that sub-national bodies which should not only develop unused potential, but develop new innovation potential, which can be generated in relation to low carbon installations as the concept relies on new technological advances that requires new skill sets, training, and innovation.

Throughout the research the two concepts of collaborative and network governance are used comparatively in a theoretical sense against that of place-based governance. A collaborative governance approach has taken hold between the State, voluntary groups, and third sector relationships, and this closely relates to place-based governance but with nuanced differences. Generally, the accepted definition of collaborative governance contains elements of heterogeneity with multiple actors. a collaborative approach concerns the arrangements applied to public service traits. (Ansell & Gash, 2008). Alternatively, network governance is based on the principle of trust, negotiation, and mutual interdependence (Wang & Ran, 2023). Other authors have different perspectives, Bingham (2010) maintains that collaborative governance has emerged from public policies which focuses on replacing traditional control through legislative means with a multi actor approach, whereas Purdy (2012), posits a collaborative process is more responsive to complex situations and the acceptance of the public's involvement is preferred in comparison to traditional governance processes. Collaborative governance as a topic is not studied in the sense of

providing a functional analysis of central government's Heat and Buildings Strategy agenda but there is confusion in the literature around the best collaborative practice and governance process to implement it. There is no consensus about how to construct the 'best practice' in collaborative governance, indeed, Emerson et al (2012) reinforces that there is a need to investigate further the components that are essential to a successful collaborative process including how to identify where collaboration is taking place.

Collaborative governance has been defined as a locus, in the case of this research, MCAs are where decision making and leadership activity takes place with other social actors. State participation and public management systems often demand broader civil society and participation of the market to emphasise that governance is not limited to administrative aspects, but the culmination of multiple interactions between State and society. These assertions support some of the arguments for a place-based governance mechanism and MCAs to enhance sub-national economic development, however, given the failures of previous market driven capitalist approaches which are introduced later in the form of sub-national economic approaches, forms part of the arguments in relation to development of low carbon installations. The alternative and differential components highlighted, develop an understanding of how contemporary sub-national governance institutions are thought to work, this is through a process whereby the State effectively 'loans out' power to other agents via the relationship between central government and local governance institutions.

The concept of central versus local is of paramount importance when examining the concept of place-based governance, over the past few decades the decentralisation of State functions has appeared in many countries in a political and administrative sense. City regional authorities are on the increase in relation to decision making in many countries (Hooghe et al, 2016), the view that this type and scale of decision making will be important in a variety of economic situations is influenced by a change in political views on the economic and social benefits of place-based governance. In England, central government has chosen the MCA at city regional level as their preference to develop economic strategy and this is reinforced by current political

thinking, in that, place-based governance can enhance local and sub-national planning decisions and economic development by reducing the scale of economic control. Across the UK, devolutionary power reforms have galvanised the UK with reforms in Scotland, Wales, and Northern Ireland, and in recent times in England. The introduction of elected Mayors and assemblies has created a paradox of governance that is an unbalanced and uneven form of governance within England sub-nationally. This sets a backdrop to the roll out of The Heat and Buildings Strategy and the gradual inception of place-based governance. The MCA governance model has gained traction over the past decade led by the Conservative Government's rapid extension of sub-national governance through combined authorities and enactment of the Cities and Local Government Act 2016. This has transformed governance models and leadership arrangements sub-nationally by decentralising some limited powers to mayors, but it is questionable whether the MCA model is substantial enough to effect policy implementation.

Certainly, new arrangements introduced this decade are correlated to the potential ability to roll out national strategy on issues such as transportation projects like the Northern Powerhouse. The MCA approach is categorised by some as either, 'hands off', 'hands on' or at 'arm's length' (Ayres et al, 2009, 2018), these authors have made a case for a 'new' mode of sub-national governance over the MCA approach, with a central importance on decision making and city regional economics. This includes the involvement of 'elites', or substantial elements of the private sector that have taken control of some sub-national institutions (LEPs). These institutions are arguably not necessarily codified as 'place-based' due to the unique concentration of business interests now apparent sub-nationally in these institutions in England.

### **Introducing sub-national economic approaches**

Throughout this research principal issues are raised surrounding the relationship of modes of sub-national governance which can heavily influence economic output and low carbon buildings using local means. Authors have written extensively on the topic of place-based governance in the context of the civic sector (Hambleton, 2019), local government (Hambleton & Howard, 2012) and leadership of institutions (Sotatauta, 2019). Different schools of thought exist regarding the best way to develop 'places'

economically and the role of institutions in achieving place prosperity, this is typically a trade-off between place infrastructure investment versus people development. Some authors define place-based governance as a progressive approach that uses institutional reforms and local knowledge to progress local and regional economies more adequately, particularly in relation to institutional learning and knowledge gain (Pike et al, 2015). The progression typically occurs due to the increase of 'agentic activity' present in any place where the rescaling of the State in England causes a reduction in the creation of different levels of governance since 2010. This is alongside the emergence of the concept of place-based governance which acknowledges a broad interest of contingent conditions for regional growth and economic perspectives (Martin & Sunley, 1998). Historically in England, there is a longstanding and growing concern over regional inequalities concerning sub-national economic growth and this is run alongside the UK government's intention to roll out The Heat and Buildings Strategy as part of The Net Zero Strategy announced in 2021.

Within the literature there has been a shift in concentration to account for spatial factors to rebalance England's regional equalities and contemporary governance systems which typically demonstrates a concentration of 'top-down' approaches, associated with this, is the domination of physical infrastructure regeneration, alluded to earlier, this is the priority over any other economic growth drivers previously. The perceived failure to adequately address regional inequality and growth has led to a need to incorporate new modes of governance and 'bottom-up' economic policy development to be directed at more local or sub-national governance level and put local resources close to those that need them, an approach inherent in The Levelling Up Strategy and investigated as part of this research.

Various theoretical conceptions of economic growth exist which can aid the reduction of regional inequalities; these include Krugman's 'new economic geography' which is a central influential theory to redistribute wealth and resources and is mooted to reduce overall national efficiency (Krugman, 1998). Others include Martin (2015), who asserts agglomeration and promotion of economic growth in 'falling behind places' stems from a market driven approach to economic growth that promotes policies which are aimed at inclusion and equality (Martin, 2015). Whilst



agreeing that there is a need to shift away from a purely market driven approach, Martin introduces agglomeration economics to enhance national growth and wellbeing of citizenry which concurs with other literature on theoretical thinking for SME productivity (Tiwasing, et al, 2020) (Dogaru et al, 2014), other authors put forward theories of economic development in the form of capital accumulation in relation to both fixed and mobile infrastructure (Harvey, 1982, 2002). Collectively, agglomeration economics is a term that refers to a perceived shift in economic productivity, towards higher skilled jobs and employment surrounding more knowledge based intensive workloads which leads to an accumulation of capital. This capital can be physical in nature and is generally more suited to cities like London due to the capital investment available, these points can support the case for investment in low carbon and associated.

One factor of Harvey's considerations is the factor of physical attributes to places and place-based governance, whereas Martins's approach concerns itself with a focus on the importance of history and the relationship between the governing institutional bodies and incorporates the value of local knowledge and leadership in maximising endogenous economic potential; whilst Harvey emphasises elements of how capital is accumulated. Place-based governance highlights the importance of 'the place' in the sense of history and relationships with the broader social and economic system within a given territorial scale. The role of sub-national governance institutions is seen as paramount, as are the institutionalist perspectives of place-based governance and the intrinsic thinking behind this. The history of a place is central to a place's economic trajectory, and it is argued in this research that social and institutional approaches incorporate unique points of a place, the history, and the concept of path dependency. The approach can be more effective in rolling out strategies such as The Heat and Buildings Strategy which simultaneously combats regional inequalities found in England. The issue of path dependency, a principle that continues to be influential with a focus on long term development, promotes proximity to natural resources with technological lock in and is a highly influential theory in broadening interpretation and encouraging a place-based way of governing.

Place-based governance approaches to economic regeneration and employment development within the context of climate change is highly influenced by institutionalist perspectives (Pike et al, 2016). The concept of seeking to explain the underlying causes of economic development and quality of place with specific institutions are described in the literature as ‘institutional thickness’ (Amin et al, 1995), this concept identifies multiple actors involvement as a crucial cog in the wheel, the key to a well-functioning institutional framework and policy implementation as to what place-based governance is, and what it is not. This is an important concept to understand as there is potential confusion as to place-based governance intrinsic complexities. Some describe place-based governance as an area based or purely spatially targeted policy intervention (Hildreth & Bailey, 2014), whilst others describe the approach as a combination of spatial orientation and place neutrality (Barca, 2009). Furthermore, some academics accept that the approach can be people focused whilst also accounting for spatial factors (Garcilazo & Martins, 2010), although place-based governance in essence does not reject any of these assertions; it is plausible for this approach to contain a combination of structural theories and institutional support that influences low carbon installations and sub-national or city regional economic growth. It is these issues that this research will address through investigation of a crucial underpinning factor to place-based governance, that of ‘people development’. It is important to realise that people development matters in place development and the principles incorporated from part of a counterpart global aspect to the topic under scrutiny. Climate change is accepted in the literature to amount to a ‘wicked problem’ (Rittel & Webber, 1973) and requires multiple actors to be involved, including consumers and citizenry action. Based upon extensive reading the author has identified conceptual themes which ultimately contribute towards the concept of what place-based governance is and the well-established place-based principles (Gray & Pugalís, 2017), combined with systems dynamics, they are used to inform the research questions and in later chapters analyse the findings.

### **PhD Structure**

The thesis is set out into seven chapters. This, the first chapter, introduces a starting point for the context for the research, the second and third chapters are the literature

review but with nuanced objectives, the second chapter sets the policy story and context for the research and explains the contemporary national and sub-national institutional structure with associated explanation of policy, whereas, chapter three extends on the focus of place-based governance and provides an overview of the current literature surrounding the concepts used. Chapter 3 expands on the theoretical model of ‘systems theory’ and uses strands of Dooley’s paradigms to propose a theoretical model for the research analysis. Chapter 4 is the methodology; this chapter provides background of the researcher’s positionality for the research and reviews different philosophical perspectives to justify the chosen methods and analytical interpretation of the data collected. Chapter 5 presents the findings of the research and links the methods used, it describes the way the data is collected and how the data relates to the findings, it describes how the data is analysed using examples in the appendices. Chapter 6 comprises of the discussion chapter which links the findings of the research with the concepts found in the literature review to develop conclusions and recommendations. The recommendations are presented in Chapter 7 which acknowledges the limitations of the study and expands on the original contribution to knowledge of the research.

### **Original Contribution to Knowledge**

The research provides an original contribution by informing national and local government, the private sector, and other interested parties on how to make sub-national governance more effective to business in low carbon energy delivery. It also provides recommendations to improve sub-national policy making and governance processes, it presents an original contribution by investigating the contemporary situation regarding the implementation of The Heat and Buildings Strategy in the form of two city regions at a sub-national governance level in England. It investigates, extends and clarifies the application of ‘systems theory’ and elements of Dooley’s paradigms in relation to sub-national governance in England. The research provides an exploration of the normative position of a place-based governance system and integrates them using ‘systems theory’ (aka complexity theory) to consciously imposes a fifth principle to place-based governance, this extra principle is described here by the author as the integrative adaptivity principle. The research interprets the progressive and implicit nature of place-based governance using systems theory and

presents policy recommendations based on the barriers to implement concerning national policy and highlights challenges with the contemporary sub-national governance structure in England. An original contribution to knowledge is demonstrated in several ways, the research:

1. Presents a theoretical unpacking and extension of place-based governance.
2. Incorporates 'systems theory' and more specific elements of Dooleys paradigms CAS dynamic to places and city regions.
3. Provides justification for relational thinking and geography surrounding place-based governance.
4. Produces potential solutions for more effective short and long-term implementation of The Heat and Buildings Strategy through place-based governance acting as a conduit.

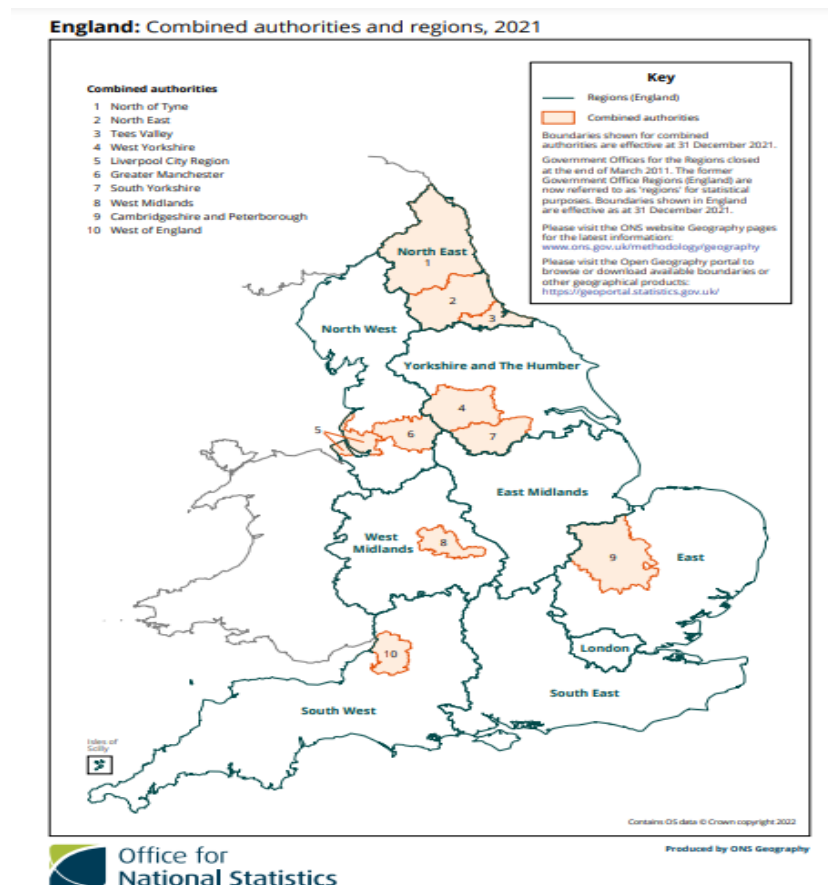
Chapter 2 now goes onto introduce the literature review for the research.

## Chapter 2 – Literature Review (1) - Contemporary sub-national governance place-based policy context in England: The Heat and Buildings Strategy

### Outline

This chapter introduces the reasons for the research and reviews the literature in relation to sub-national governance in England, it sets the scene and outlines the policy context, financial inequalities, political and spatial issues apparent in which contemporary sub-national governance institutions operate. The chapter starts by setting the scene for the research and explains the background of relevant economic approaches. It then moves onto explain the issues surrounding sub-national governance, the policy, the scalar issues, and the inherent constitutional problems that are relevant to the research at a city regional level. The chapter concludes by introducing the importance of human capital in the context of SMEs and The Heat and Buildings Strategy. Figure 1 illustrates where the two city regions under investigation are geographically situated.

**Figure 1 - The city regions under investigation numbers 4 and 7**



Source: ONS (Office for National Statistics, 2022)

### **Economic governance**

Historians reflect on the years 1978 to 1980 as a revolutionary turning point in the world's social and economic history, in 1978, Deng Xiaoping took the first momentous steps towards the liberalisation of a communist ruled economy in a country that accounted for a fifth of the world's population, the approach that Deng defined was to transform China in two decades from a closed economic country to an open centre of capitalist market dynamism. Alongside this, in 1980, Ronald Reagan was elected President of the United States and had a similar political agenda as the UK Prime Minister to curb the power of labour and increase financial services deregulation. The resulting liberated powers of finance availability, both internally and externally on the world stage, caused revolutionary impulses which spread around the world. Leaders created a new economic world from the shadows of relative obscurity with a particular doctrine that went under the name of 'neo-liberalism' and transformed economies under one central guiding principle.

Neo-liberalism is a theory of political economic practice and is applicable to this research given the focus on the private sector and change to English sub-national constitution since 2010. The economic approach itself proposes that a human's wellbeing can best be advanced by liberating individual entrepreneurial freedoms and skills within an institutional framework, characterised by strong private property rights, free markets, and free trade. It posits that the role of the State is to create and preserve the institutional framework appropriate to neo-liberal practices and approaches of securing military, defence, police, legal structures and functions to fulfil the securement of private property rights and guarantees the proper functioning of markets. Furthermore, if the 'the market' did not exist, areas such as land, water, education, health care, social security, or environmental pollution, must then be created by the State if necessary. Beyond these tasks it is posited the State should not venture, State interventions in markets, once created, must be kept to a bare minimum because, as this approach advocates that the State cannot possibly possess enough information to second-guess market signals and the powerful private sector actors leading LEPs will inevitably distort and bias State interventions, particularly in a democracy designed for their own benefit.

According to the theory, the neoliberal State should favour strong individual property rights, the rule of law, and the institutions of freely functioning markets and free trade, these are the institutional arrangements considered essential to guarantee individual freedoms. The legal framework in which the ideology operates is that of freely negotiated contractual obligations between individuals but also includes procurement exercises of State bodies and the private sector. The overriding principle of contracts and the individual right to freedom of action, expression, and choice, is paramount. While personal and individual freedom in the marketplace is guaranteed, everyone is held responsible and accountable for his or her own actions and wellbeing. This transposes into this research by the allocation of responsibility given to MCAs and LEPs sub-nationally, more broadly, the neo-liberal principles extend into the realms of welfare, education, health care, and even pension planning. Individual successes or failures are interpreted in terms of entrepreneurial success, an example being not investing significantly enough in one's own human capital through education. The State withdraws from welfare provision and diminishes its role in areas such as health care, public education, and social services with the social safety net reduced to a bare minimum in a favour of a system that emphasises personal responsibility.

This broader theoretical perspective influences historical economic approaches pertinent to place-based governance and English economic development sub-nationally and are found in the literature (Jessop, 2002) (Brenner, 2004) (Giddens, 2011). Jessop describes sub-national governance as a process of 'hollowing out', whilst Brenner describes the 'rescaling' of the UK State via governance rather than centrally via government. Brenner view's governance as a means of encouraging independence, whereas Jessop moots that a change from a Keynesian economic model to a Schumpeterian one is consequently causing a reduction of State power to act, which results in an enlarged private sector and capitalist movement. Jessop asserts that a Schumpeterian microeconomic workforce approach increases reliance on knowledge and innovation within sub-national economies through agency, this argument corresponds with the shift from Fordism to Post Fordism and movement from mass production to a knowledge economy found in the literature (Storper & Scott, 1992) (Jessop, 1993). In a supportive sense, Giddens (2011) argues that the

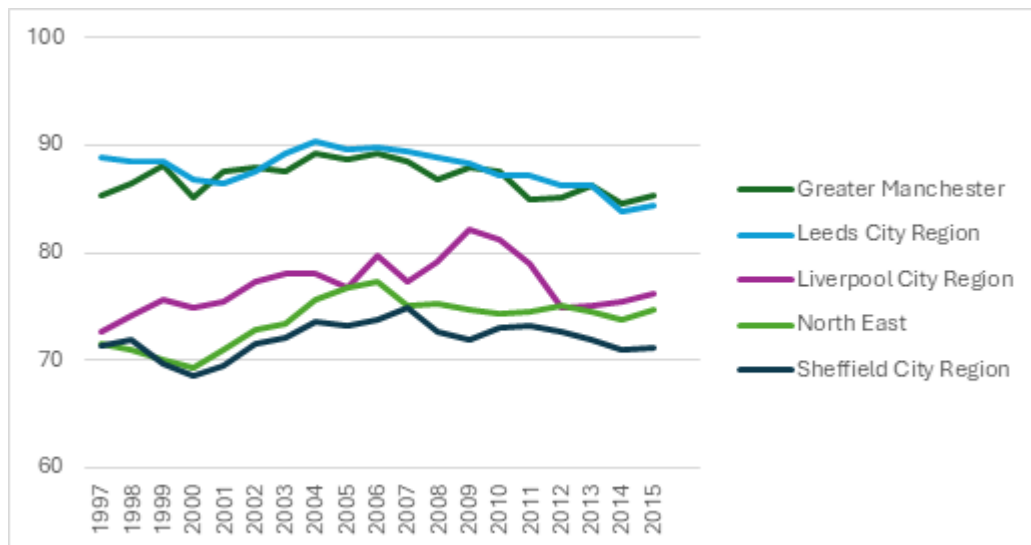
role of the State is not strong enough to make headway on economic strategy on issues such as climate change independently, he argues that an ‘enabling’ state does not demonstrate a ‘strong’ enough position to adequately deal with the issues at hand; whilst no direct reference is made to strong or weak leadership (Bentley et al, 2014), nor mayoral models of governance, Giddens acknowledges the point of overlap between State responsibility for leadership, sub-national bodies and that of ‘contested spaces’ (Shutt & Liddle, 2020). Giddens uses the term ‘enable’, to describe an approach which favours increased but non-restrictive regulation and specific accountability amongst State actors, furthermore, Giddens posits enablement can only be achieved with two caveats; firstly, the latter point of accountability must be assured, in the context of this research this may well constitute a difficulty; given part of the responsible authorities under investigation themselves (LEP’s) are not democratically elected and have a strong private sector involvement; secondly, there must be convergence; politically, economically, and financially; convergence here, refers to how elements of public policy come together as an effective method to achieve an agreed common goal, or in this research the ‘functions’ of sub-national institutions discussed in Chapter 3. Relevant areas include security of energy production and technological innovations which require co-ordination of political, economic, and fiscal financial policies. Giddens’s approach also replaces arbitrary measures such as GDP as the predominant measure for economic output, whereas the alternative measurement, social value, is one of societal benefits, or the value of a particular matter on society more generally rather than just monetary. In this sense, convergence reflects the issues of policy development in low carbon installations per se and the results and outcomes of measuring the social impact of low carbon housing on economies can be done through the concept such as social value. Giddens’s work is important to this research given the two overarching principles that relate to low carbon growth, the ‘polluter pays’ and ‘precautionary principle’ (Giddens, 2011), are principles that assert whoever produces the most carbon emissions should be charged financially, relating to how much harm they cause, or put another way, those causing the damage should pay the most. These principles align with the financial aspects of capitalism and can be transposed into an economic environment through consumers and residents in the form of subsidies or tax incentives to increase uptake of low carbon initiatives, hence, removing some of



the burden of the State to deal with the problem of climate change independently. In addition, these mechanisms can improve market demand for products and new technology, but may also cause difficulty, in that, they extend culpability for harm to groups such as consumers and business. Consequently, they have the potential to have a negative effect on market initiatives, examples include, large landlords being given the same accountability as single family tenants, or the private sector paying less than the public sector to encourage investment in low carbon technologies, or SMEs having the same access to finance as larger corporations. All these issues can be influenced by strong sub-national leadership with adequate powers at a sub-national governance level within a democratically elected combined authority, provided there is the political support centrally. In the context of this study, these two principles can influence the drivers of low carbon technologies via both institutional policies and business decision making.

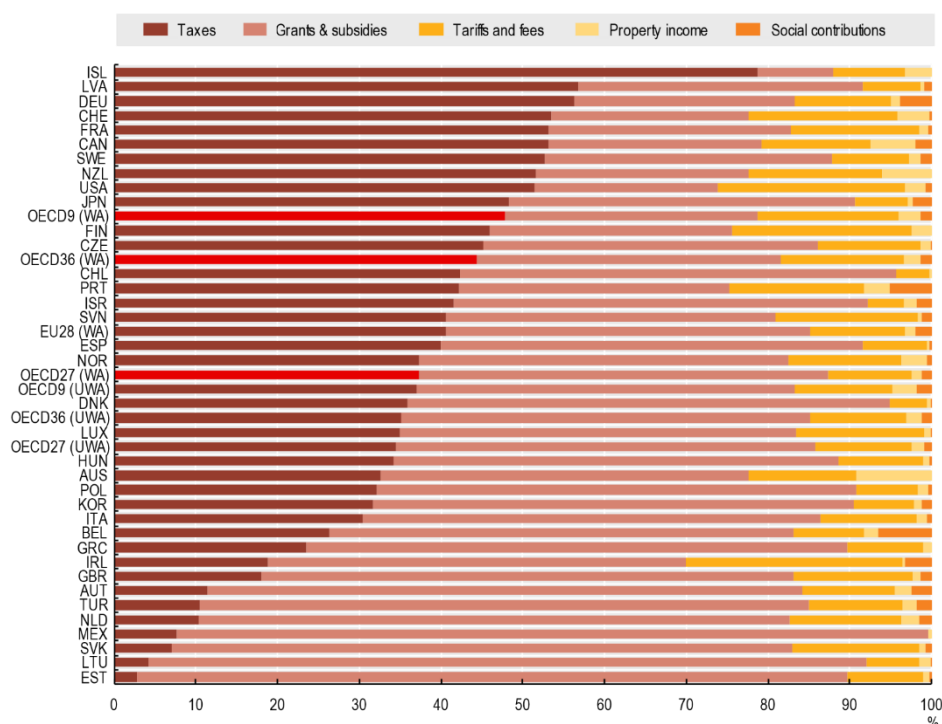
### **Setting the scene – regional economic differences in England - a north / south divide**

Regional and spatial equalities in England are higher than any of the OCED or EU countries (Cheshire et al, 2014), the UK government has responded to this with the introduction of The Levelling Up Strategy, alongside a 'Net Zero' agenda contained within The Heat and Buildings Strategy and The Net Zero Strategy. These documents are central policy documents in relation to climate change and building decarbonisation in the UK and have been received by some with a tentative response, citing a more place-based approach and investment is needed to achieve policy goals (Liddle et al, 2022). Regional inequalities in England are reinforced by quantitative data from the Office of National Statistics (ONS) which demonstrates a high level of disparity within alternative city regional economic growth figures, see Figure2.

**Figure 2 – GVA per head of population: LEPs for Northern Cities**

**Source: ONS (Office for National Statistics, 2022)**

LEPs are one form of sub-national institutions in England, in the North they are 'behind' in terms of productivity when measured using quantitative data available (Department for Business, Energy & Industrial Strategy, 2019, 2020a, 2020b). The 'productivity gap' has amassed over the past few decades due to under investment and following significant economic events such as the 2008 financial crash, COVID, and Brexit, all of which have influenced the ability of sub-national institutions to implement national policy in the present day. Currently, from a fiscal perspective, less tax is set sub-nationally in the UK than in Organisation for Economic Cooperation and Development (OECD) counterparts, with only 18% granted from tax sub-nationally (18%) and a high reliance on central government grants (65.1%). The only effective change since the conception of the Coalition government is the increase in local tax raising powers in the form of Council Tax and Business Rate levies to generate income locally, which accounts for only a small percentage of local authority budgets, origins of regional income in different European countries is provided in Figure 3.

**Figure 3 – OECD Regional income**

**Source: OECD Regions and Cities at a Glance 2020 (OECD, 2020)**

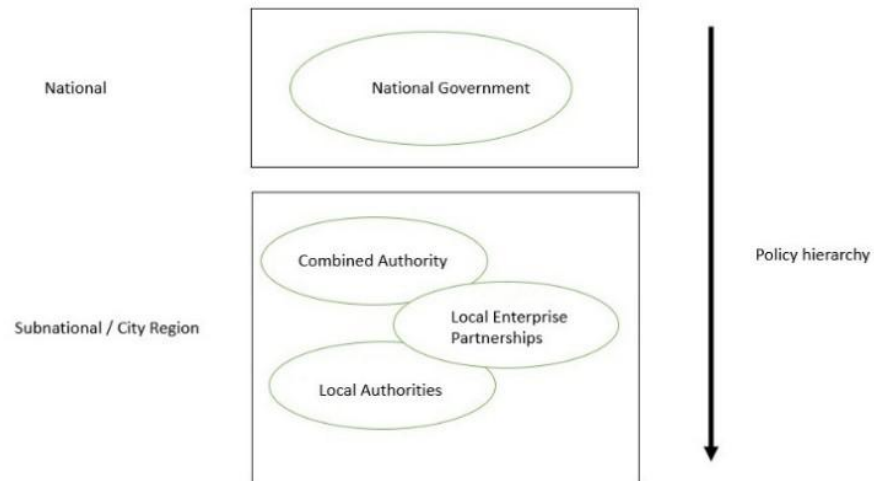
Martin et al (1998) highlights that the economic dominance of London with its ever-increasing concentration of service led employment has not changed in economic typology in recent times, it is within this economic situation that the UK government's 'Net Zero' agenda, The Heat and Buildings Strategy, and climate change objectives are to be developed. The progress of The Heat and Buildings Strategy is highly reliant on political drivers of city regions and the leadership within them; however, political leaders are predominately mayors who operate in a complex policy network.

### Policy Context

An examination of English sub-national governance policy literature uncovers multiple policy producing organisations and institutions, given the fragmented nature of English sub-national governance systems for economic growth to occur, the actions between the institutions must be effective. The communication and intrinsic networking between the contemporary sub-national level of organisations are currently available and must operate coherently and succulently to be able to implement the roll out of The Heat and Buildings Strategy. The governance structures in which the place-based sub-national governance model is examined is illustrated in

Figure 4, although the reader should note this reflects a typical hierarchical ‘type’ of contemporary governance found in England at present, not necessarily the most effective way of operating at a sub-national governance level, nor a true reflection of governance working.

**Figure 4 – Contemporary governance processes and institutions in England**



**Source: Authors Own**

Sub-national policy approaches changes over time as policy approaches adapts to institutional dynamics (Ayres, 2022), the literature presents a changing governance system that adapts to address central-local relations and follows a non-linear pattern by adjusting political perspectives. Most recently, The Net Zero Strategy and The Heat and Buildings Strategy are two policy directives that have been published in accordance with the ambitions of the UK government to implement climate change initiatives through the fragmented structure of sub-national governance in England. This is a policy approach that is consistent with that implemented from the end of World War Two through to the 1970's when a shift in policy became more growth orientated due to the economic depression at the time. During the 1980's, neoliberal views took precedence, and the Conservative government tried to use the private sector to influence policy planning on a large scale through Urban Development Corporations (UDCs), later in the 1990's New Labour's Regional Development Agencies (RDAs) are established. MCAs and LEPS are the latest public institutions to come from central government in 2010 with strategic policy making powers through the Cities and Local Government Devolution Act 2016, MCAs are collectively

responsible for a place or a set geographical area, in this research two city regions are investigated with associated relational geographies, MCAs follow the post War Labour government's spatial regional policy of redistributing economic development activity through strategic planning responsibilities assigned to them in the form of SEPs, whereas in contrast, LEPs are responsible for a more funding dissemination role. The focus of the research on economic policy development demonstrates a change from the pre-war model when regional policy is thought to be more socially oriented, via distribution of wealth via grants, loans, and retraining industrial development certification outside of specific areas, this is now shifted in a more national growth orientated approach due to overcentralised of powers and policy being made more centrally in England.

The real interest in the concept of regional governance bodies to enhance effective economic growth is identified through The New Labour government and RDAs, these now defunct agencies were designed to focus on regional growth and development of their own policy frameworks; they included growth of business orientated bodies in the form of Chambers of Commerce alongside a more local theme. Pike & Tomaney (2009) describe this period as moving towards a focus on supply side measures, this includes skills, competitive bidding, and a typical 'bottom-up' approach, this approach is reflective of place-based governance. Presently, The Levelling Up Strategy alongside other government announcements propose that MCAs develop strategic proposals to address the city regional inequality dilemma within England. The Levelling Up Strategy describes an approach led by twelve missions, these missions are intended to set a platform to deliver a program of change encompassing all the 'social, economic, and environmental challenges' (ibid, p118) and to roll out a 'Net Zero' or low carbon program on masse. Table 1 illustrates the publication of relevant policy in relation to the research.

**Table 1 - Key UK Government Policy documents**

Date	Event
March 2021	Build Back Better: our plan for growth published
October 2021	The Net Zero Strategy: Build back Greener published
October 2021	Heat and Buildings Strategy published
February 2022	Levelling Up the United Kingdom
September 2022	Mission Zero: Independent Review of Net Zero published
February 2022	The new department for Business, Energy and Industrial Strategy announced
October 2022	Local Skills Improvement Plans (LSIP)

**Source: Authors Own**

The Levelling Up White Paper alongside the Energy White Paper (Department for Energy Security and Net Zero & Department for Business, Energy & Industrial Strategy, 2020b) indicates that a ‘place-based approach’ is the most appropriate way to meet the agenda on energy efficiency, stating:

‘a single solution will not be appropriate for every location’.  
(ibid, p90)

The inference is that local leadership within any place can play an important part in sub-national governance changes with the emphasis on local leadership, it refers to a twelfth mission statement which emphasises the government’s intention to reinforce local leadership and states that leadership should be combined with Devolution Deals, including the aim of:

‘By 2030, every part of England that wants one will have a devolution deal with powers at or approaching the highest level of devolution and a simplified, long-term funding settlement’ (Department for Levelling Up, Housing and Communities, 2022, p. 234)

The issue of The Conservative Party ‘Levelling Up’ pledge within their manifesto contained a promise to invest specifically in towns, cities, rural and coastal areas with the most deprivation occurring over recent decades, theoretically, contributing towards city regional inequalities and the North South economic divide in England. Early research in this area concludes that most of the allocated Levelling Up funding to towns and cities is yet to be spent or allocated (Forbes et al, 2022) and questions whether this is a serious objective of central government. The Conservative government chooses to pursue a mission orientated approach to economic growth in The Levelling Up Strategy with the twelve strategic missions in The Levelling Up White Paper being given a goal date of 2050. Part of the Government’s focus towards the need for investment across all parts of the UK are the missions which cover areas including local leadership, employability, and economic renewal, with additional aims to support people into high quality skilled jobs and a broader remit of improving wellbeing. The White Paper commits to increased long term funding over at least 10 years through Devolution Deals with an increased chance of success for long-term funding agreements within combined authorities led by a mayor (Liddle et al, 2022), crucially, six capitals or drivers are apparent and form the central base on which The Levelling Up Strategy is written, these are summarised in Table 2.

These capitals are interchangeable in nature and in some circumstances impossible to separate, however, this research focuses on the first capital, human capital in the context of people development and training for low carbon installations as this is known to be a factor towards a lack of innovative growth. The capitals tabularised above corresponds to the medium-term missions in the strategy, financial capital is acknowledged throughout the document as a key enabler and initiator of all other capitals, hence a conduit by itself and a focus of this research, additionally, Mission 12 focuses on the need to:

‘Empower local leaders and communities, especially in those places lacking local agency’ (Department for Levelling Up, Housing and Communities, 2022, p. 95)

**Table 2 – Example of capitals in The Levelling Up Strategy**

<b>Capital Type</b>	<b>Example in practice</b>
<b>Human capital</b>	skills, health and experience of the workforce, education, skills, and health
<b>Social capital</b>	– the strength of communities, relationships and trust, pride in place and crime
<b>Tangible and intangible capital</b>	innovation, ideas and patents, housing, R&D, transport, and digital connectivity
<b>Institutional capital</b>	social leadership, capacity, and capability
<b>Physical capital</b>	infrastructure, machines, and housing
<b>Financial capital</b>	resources supporting the financing of companies

**Source: Adapted from (Department for Levelling Up, Housing and Communities, 2022)**

The concept of leadership is particularly pertinent to the research, given that ‘local leadership’ is a requirement of place-based governance and is a broader contextual backdrop to the implementation of The Heat and Buildings Strategy.

### **Interpreting place-based governance economic development**

Barca (2009) originally discussed the ‘place-based’ concept in a report regarding spatial strategy for the European Union (EU), more recently, the term is being used increasingly in policy documents in the UK, for example, UK government policy in the form of the National Planning Policy Framework (Department for Levelling Up, Housing and Communities, 2024) and climate change strategies sub-nationally (Leeds Climate Commission, n.d).

The place-based theme and mode of governance is viewed by some as emergent; but the concept remains a relatively new one in England and the effect of this mode of governance is yet to be tested in a general economic sense, as well as in relation to climate change and economic policy. Place-based governance is yet to be consistently defined. Two contrasting governance principles exist that are firmly embedded in the literature which constitute the substance of place-based governance, these are collaborative, and network governance introduced in Chapter



1. Expanding in network and collaborative governance introduced in Chapter 1, these are core concepts that influence and ‘overlap’ with place-based governance thinking, both are to some extent interchangeable and include conceptual entanglement which clearly exists throughout all three governance approaches. For example, network governance contains a core theme of fusion between public goods and service provision, with collective policymaking as an adjunct (Isett et al, 2011). This is described in the literature as containing principles of trust, reciprocity and mutual independence with an additional negotiation element. The approach originates from subject areas such as state theory, policy networking and corporatism. In contrast, collaborative governance is described as rooted in liberalism with the primarily motivation being a self-serving with one additional element of mutual trust, both perspectives of governance capture the emerging and flexible nature of the topic of governance found within the literature and can be place-based governance.

Due to the nature of contemporary sub-national governance in England the principles of governance are applicable because of the constituent nature of MCAs and LEPs; both include elements of place-based governance and some of these principles’ ‘overlap’ with the theoretical framework of systems theory, see Chapter 3. Place-based governance is described by Tomaney (2016) as an implicit progressive approach that rejects a centralised governance model and that of a decentralised or devolved one, hence, a conflict exists between place-based governance and the over centralised structure of English politics. Additionally, it presents difficulties from a spatial perspective as the definition of ‘local’ or ‘regional’ geographic areas is interpreted differently by individuals and institutions. Some sub-national governance authorities includes place-based governance at the heart of their strategies (Tomaney, 2010) (West of England Local Enterprise Partnership, 2019), however, in academia there is a view that more attention and clarification is needed pertaining to the concept itself as governance integrity is deemed to be reliant on spatially targeted policy interventions or centrally designed policy interventions (Pugalis and Bentley 2014)b. The concept of a place-based approach is entertained at a sub-national governance level increasingly over the past decade and the logical idea that a place-based problem can be solved through locally led policy formation and introduction of a place led governance system that employs much of the language centred within the

place-based debate, this is why the approach of place-based governance is so highly pertinent to city regions and MCAs.

Recent government policy documents employ the term in a context of local leadership and financial city deals with the UK government's recent flagship Levelling Up Strategy asserting:

‘By 2030, every part of England [place] that wants one will have a devolution deal with powers at or approaching the highest level of devolution and a simplified, long-term funding settlement’ (Department for Levelling Up, Housing and Communities, 2022, p. 121)

The understanding of the interpretation of place-based governance seems to be centred, in central government eyes, on leadership and governance approaches of MCAs through economic development via Devolution Deals, with LAs having the choice whether to support this form of governance. Collectively, the policies that MCAs and LAs produce, can be argued to make for more of a place-based intervention, rather than the standardised hierarchical and centralised form of policy intervention in relation to low carbon buildings. Reasons for this include knowledge regarding local geography is better, and development of policy sub-nationally is better reflective of collaborative, network, and place-based governance approaches.

Hildreth & Bailey (2014) expand on two forms of economic policy approaches, ‘place less’ and ‘space blind’ (ibid, p367), both are shown as difficult for central government to implement, and successive UK governments have attempted to implement policies to promote growth and restore regional equality within England by combining the two approaches. Most recently, through the Devolution Deal process, a process started to replace the historical method of finance and funding to create a sub-national level of regular centralised grant funding which is crucial to The Heat and Buildings Strategy delivery. However, the spatial imbalance of funding on which this relies remains significant, in recent decades, fragmented spatial funding has increased more so than in other European countries, with the associated issue of the UK being the most fiscally centralised country in the OECD, demonstrated by UK GDP coefficient

variation per capita in 2011 of 0.45, compared with an EU average of 0.22 (MacKinnon, 2017).

Leading up to the production of The Heat and Buildings Strategy, the Coalition government came to power in 2010 and made regional institutions RDAs redundant. Prior to this, RDAs were responsible for economic development implementation through 'bottom-up' regional development policy which is undertaken in a 'top-down' hierarchical fashion (Bentley et al, 2010). Following the abolition of RDAs, financial control at a sub-national level is introduced under LEPs who are responsible, in conjunction with MCAs, for development of strategic plans to implement national government policy. Notably, the Devolution Deal process at the time is a bigger part of governance implementation strategies sub-nationally and some powers were transferred to mayors through the decentralisation process. The UK Government produces the 'Net Zero' agenda due to the growing public concern on the issue of climate change and associated policy consists of central policy outputs including The Net Zero Strategy and The Heat and Buildings Strategy. These central policies overlap with sub-national policy in the form of Strategic Economic Plans (SEP) and Investment Plans (IPs) produced by the MCAs and LEPs. This outlines the broad policy context for the research.

### **Functions of governance and the 'spatial fix'**

The matter of policy development requires discussion of the associated matter of decentralisation. Decentralisation per se can be split into political, fiscal and administrative and these factors contribute towards policy making with a central factor of a 'political and regulatory function'. The structure of central-local power relations in the UK provides that central government has an overriding responsibility for policy formation centrally in the form of The Heat and Buildings Strategy. Political decentralisation, however, is the main economic driver sub-nationally and is one of the main factors inherent in rolling out national policy at a sub-national level. Central government in England is responsible for the selection of the most appropriate way to achieve economic growth via appropriate instruments and policy goals to meet UK governments objectives. To implement national policy, central government currently assigns subsets and certain powers to the sub-national governance level, a process

known as decentralisation. This process that has been reviewed in the literature (Bentley et al, 2017) and can be defined as:

‘... not just about weakening the central authority, nor is it about preferring local elites to [command] central authority, but it is fundamentally about making governance at the local level more responsive to the felt needs of the large majority of the population’. (Bardan, 2002, p. 202)

Oates (2005) points out that analysis of decentralisation is incomplete without robust consideration of the governance and institutional framework in which the concept operates, including that of central-local relations and the amount of political decentralisation to MCAs is an issue of debate (Dardanelli & Kincald, 2016).

Political decentralisation can be split in essence into two separate distinctive parts, political autonomy or self-rule, and combined decision-making or shared-rule, both include the potential to effect economic decision making in city regions. Political decentralisation takes on increased importance all over the world and shows a trend that political decentralisation can influence central government targets for socio-economic policies. The overriding objective is to equalise city regional inequality and the quality of decentralisation in any given country influences the level of voice, accountability, political decision making and regulatory effectiveness available. The quality of governance provides the backdrop for the distribution of political power from the State to sub-national tiers of governance and will shape the distribution of a city region’s direction and economics.

There are three central reasons why political decentralisation may affect the quality of governance. Firstly, the transfer of authority powers to sub-national tiers of government can lead to improvements in equity in the economy long term, city regions and individual stakeholders are found to be more efficient in a centralised system through ‘fiscal federalism’ (Oates, 2005), this is mooted to be due to local information advantages that local governance is over central government which allows more efficient application of specific public policies (Kyriacou et al, 2011). Secondly, increased mobility of people and skilled labour who select a local area, based on their choice for public service and goods, and can bring skilled talent and

labour to that area or city region. Canare et al (2020) points out that differing scales of sub-national governance provide better information ‘on the ground’ and the geography of sub-national governance institutions can help design and implement economic policies, scale also enhances the process of public goods and services that are tailored to local need, this is theorised to subsequently improve social wellbeing across geographic areas. The ‘Preston Model’ (Preston City Council, n.d) is an example of this principle which has also been applied to MCAs such as Greater Manchester. Thirdly, decentralisation provides a unique method of fiscal responsibility, Longlong (2015) raises the possibility of decentralisation leading to a more equitable method of revenue collection that raises the possibility of city regional inequalities being dealt with more efficiently (Carreras, 2016). If city regional governance institutions interact with central government through shared rule, they can together decide on redistributive issues towards more equitable outcomes that can be associated with a reduction in social inequalities with similarities to federalism. Although some have argued that the classical theory of fiscal federalism shows that redistribution of wealth is more efficiently performed by central government, and that regional inequalities are best dealt with by central government and not sub-national or regional governance authorities (Shoup, 1959). Theoretically speaking, increasing regional authority or increasing self-rule may hinder the capability of central government to redistribute wealth in a more standardised way, such as through increasing income from tax revenue, sales and property to pay for regional distribution of wealth. Alternatively, Beramendi (2012) posits that the quality and quantity of reduction in regional inequalities relies on a political union and centralisation of power, with central government collecting taxes and controlling distribution of funding streams, like that in England.

Decentralisation tends to be preferred if there is a mix of ideas and heterogeneity without spillovers across governing boundaries, a perspective consistent with that of the place-based approach and more local leadership through MCAs. Indeed, this approach is supported by Hodler (2005) who found that the transfer of income and wealth from high ability to low ability areas reduces inequality of rivaling groups. There is also evidence in the literature that regional inequalities are made due to the theory of capital accumulation, which links to decentralisation, described as a

significant paradigm shift in humanities and social sciences the period known as the 'spatial turn' in geography, academia opened this debate on connecting geographical space and socio-cultural variables. One of the most notable and influential authors in this area is David Harvey, introduced in Chapter 1, who coined the concept of the 'spatial fix' in the 1980s, and alongside this, the concept of capital accumulation, these concepts being discussed in a series of publications (Harvey, 1975, 1982, 2002, 2001). Following this change in perspective, space and spatial factors are not only perceived as a given physical and geographical entity but gained recognition as an essential social element providing that space was 'produced' (Lefebvre, 1991). This 'spatial turn' movement was influential in the connection of geography and social theory and gave rise to several innovative theoretical frameworks with the 'spatial fix' counting as one of them. The concept can be understood as a general theory of space and geographical development, in the context of capitalism it can be better grasped alongside Harvey's theory of capital acceleration. In parallel with the idea of motion and acceleration due to the compression of space and time, the concept of the spatial fix rather looks at inertia as a law of space production. The spatial fix theory explains the process of geographical expansion and development as a solution to the crisis of capital over-accumulation. 'Fixing' is primarily meant here as a solution and an answer to 'fix a problem' or to resolve a difficulty (Harvey, 2001). Harvey also describes another meaning of the term, namely the attribution of a physical space which refers to something being pinned down and secured in a particular locus. The idea is that something is secured in space so it cannot be moved or modified, for Harvey, capitalism inevitably leads to breaking points when capital is over-accumulated, and this causes an:

'insatiable drive to resolve its inner crisis tendencies" (ibid, p. 24).

To absorb surplus capital and labour force, geographical expansion or restructuration is required, this repeatedly leads to capitalism engaging with space making and space reshaping. Harvey's theory of the 'spatial fix' has been widely discussed in the recent decades, while some authors have underlined the necessity to replace Harvey's ideas in the context of historical materialism and Marxist views (Das, 2017), it remains an often-quoted theory in geography and social sciences. Recent

academic work also proposes to use it in the field of digital media and virtual expansion studies (Greene & Joseph, 2015). Harvey's own historical interest invites the exploration of the applicability of the concept of the spatial fix in other historical and geographical contexts which causes some to use the concept to explain the entanglement of economical and religious factors; to understand religion as a significant actor of space production in the urban context via the accumulation of wealth and resources. Investments in religious monumentality can thus be interpreted as a spatial fixing of capital, changing the character of religious practices by firmly tying them to urban or peri-urban space and rendering them more attractive to visitors from inside and outside the city region. There is also an acknowledgement of cultural influence on economies within Harvey's work.

The collective advantages of decentralisation can be incorporated into a city regional governance system in the form of six key themes for productivity, developed from the literature thus far are; independence, political freedom to meet the needs of citizenry, better ability to meet local preferences, the mobilisation of underused resources, a more collaborative not competitive working environment and a ruling governance structure that is closer to the people. Generally, decentralisation of powers and resources to sub-national governance institutions can increase accountability and responsibility for implementation of policies such as The Heat and Buildings Strategy. More responsibility is thought to affect the decision making process for policy making, given that policies are more likely to be written to benefit the local population, furthermore, decentralisation can generate the provision of goods and services across geographic areas through:

‘... greater transparency and bring [ing] to the fore differences in the provision of goods and services.’ (Rodriguez & Ezcurra, 2010, p624)

In accordance with Morgen's theory regarding interests of organisations (Morgen, 2014), if decentralisation is conceived in a way that promotes self-interest, the process may be aggravated and confused by the motivations of elites and capitalism, this is mooted to be the case with LEPs causing spaces of contestation. If public sector accountability is absent or weak then local vested interests of the private sector or 'elites' may undermine the process of political decentralisation. The quality

of institutions depends on the extent to which the responsible institution is accountable for its actions and tailors to ensuring that self-interests of the leader are not overbearing or contrary to that of the citizenry. The literature generally discusses how the political and leadership governance mechanisms impact at a city regional level on the process of change and the quality of decentralisation that contributes towards national policy implementation. Two points are important to take away in relation to central-local relations and political power, the first, is that of the importance of efficiency of institutional politics to help attract private investment, and second, the effect of private investment on income and subsequent betterment of financial and social inequalities in the city region, in the latter point, one way of doing this is through skills and employment.

### **Constitution and accountability: Institutions**

Place-based governance can incorporate theories such as self-interest and the literature concerning governance internal structures within institutions (Fenwick & Elcock, 2014) (Fenwick, 2015). The English sub-national governance system is a regular source of institutional change that has resulted in recurrent changes to policy making, this occurrence is mooted historically in the literature as a barrier to effective sub-national governance and low carbon installation development (OECD, 2006). The literature refers to one sub-national institution, the LEP, that has emerged from the coalition government changes as the ‘holder of the purse strings’; potential barriers are cited in terms of a lack of capacity, resources, and authority to resolve policy making and economic problems sub-nationally. Pugalis & Townsend (2012) outline continuing themes between early formations of LEPs and previous governance arrangements, they put forward the view that, in practice, the spatial solutions cited are really to be found in historical collaborations and institutions. Moreover, the associated development of new institutions and sub-national policy, in the form of MCAs and Devolution Deals, creates an ongoing problem of competition for funds which indirectly hinders deprived areas given the existing lack of skills to apply for such funds. LEPs are also criticised due to the virtual complete takeover of the institution by the private sector, particularly as, at the same time public sector institutions are held back by austerity measures (Business, Energy and Industrial Strategy Committee, 2020). The LEP sub-national governance institution has a lack of



democratic and accountability elements (Liddle, 2007), following Morgen's public administration theory, again, this may well be detrimental to economic progress due to differing or competing interests.

The 'private ownership' of LEPs raises the question about private sector interests, the constitution of sub-national institutions, and whether they can dominate sub-national policy within the context of low carbon installations and SMEs. Some authors moot the argument that the private sector, in the form of large corporations, influence strategic outlook and sub-national institutions (Harrison, 2014). Other indications, from analysis of the role of private sector in the literature, raises questions about the involvement of private sector led finance, particularly as regional banks such as the UK Infrastructure Bank (UKIB) are publicly owned but led by private actors in charge of public sector money. This raises the possibility that sub-national governance policy, increasingly being led by the private sector, is an alternative to the State leading decision making finance strategy, and initial implications for large infrastructure schemes such as 'heat networks' for low carbon installations would therefore be of relevance (Harrison, 2014) (Etherington & Jones, 2018) (Mazzucato, 2021).

The notion of open and democratic institutions is an important aspect to the principles of place-based governance as this approach emphasises the strengths of all stakeholders being able to contribute to the implementation and planning of projects and plans. Whilst adding to the diversity of constitution of institutional boards and hence accountability for decision making, in some authors eyes, the intrinsic nature of the actors involved has led to a reduction or absence of professional values within the public sector (Liddle, 2021), with newly created governance institutions blurring the boundaries between the State, the market, and civil society (Geddes, 1997). The revised form of contemporary privately led governance has made the requirement for good inter-organisation and institutional communication a must. To operate efficiently, the plurality and multi-agency approaches found at the sub-national governance level is needed, the element of plurality is also considered in a normative place-based governance position, with the resulting governance spaces described as either 'hard' or 'soft' spaces of interaction

(Haughton & Allmendinger, 2008). Hard spaces are more likely to follow formal rules and hold statutory responsibilities, soft spaces, at times operating ‘behind closed doors’ to address specific issues to achieve ‘soft outcomes’, such as Public-Private partnerships. LEP institutions fit the definition of soft governance but interestingly have a strong leadership role in dissemination of finance sub-nationally, both ‘hard’ and ‘soft’ methods of institutional influence have the potential to complement each other when building constructive implementation programs. However, the implementation process can be hindered by the notion of ‘fuzzy boundaries’ (Allmendinger & Haughton, 2009), whereby implementing institutions find it difficult to proceed with planning projects due to multi agency involvement. This can be considered a disadvantage to pan regional types of governance like the Northern Powerhouse, in terms of accountability, the functional implementation of policy initiatives and the concept of fuzziness makes it, in theory at least, easier to be adaptable and flexible, but may produce a lack of integration and accountability necessary to be successful in policy implementation.

### **Powers: Decentralisation & available finance**

Accountability requires power and control, some authors have suggested that to succeed in this context, decentralisation requires the support of popularism and citizenry (Blunkett & Richards, 2011). There appears to be a narrow scope between policy making and long term accountability in contemporary sub-national governance arrangements, given the interchangeable nature of institutions at this level. Other authors have discussed the ‘post-political’ substance of sub-national governance in England and argued that the political process at this governance level tends to be surrounded by a relatively small number of ‘approved partners’, both in economies and in relation to the private sector where there is little accountability and scrutiny.

Accountability issues are linked with the introduction of MCAs and LEPs as sub-national governance authorities as this provides the possibility that LEPs control of decision making processes are heavily influencing the thought processes of mayors (Pugalis & Bentley, 2013) (Pike et al, 2015) (Shaw et al, 1992). The consequence of this intermixing of accountability has produced an increase in the interdependence of sub-national governance authorities through dependency on each other and fewer

effective smaller independent institutions. The concept of fewer sub-national institutions has been supported in the literature by recurrent governments, the idea of more mayors and less political figures in fewer local authorities presents favour within central political circles (Fenwick, 2015) (Heseltine, 2012). The literature refers to a general frustration with the overcentralised powers of Whitehall (Smyth, 2021) (Cheshire et al, 2014), decentralisation of powers and fewer political figures holds many advantages to the city region to produce drivers of growth that can be harnessed and developed, rather than being driven by spatially blind or place neutral economic policies. Sub-nationally, politicians are constantly requesting more powers to implement changes for sub-national economic development to occur, added to this, whilst strategic plan making powers are welcomed, without the power to adequately implement planning or policy documents, the current sub-national governance power base is relatively weak. In a climate change sense mayors tend to have control over transport in their geographic area, for example, buses, but little else in terms of powers to act independently, for example, decisions on planning permissions to influence new build low carbon housing, moreover, they tend to have control of strategic housing policy but little independent control over funding streams to implement policy directives, in contrast, LEPs, which have an element of financial control but lack of independence in policy making. Rees & Lord (2013) found that LEP boundaries are more likely to be formed and constituted with the board consisting of existing partnerships with the alliance concentrated on a focus of existing place principles such as social and economic arrangements. Similarly, Pugalis (2012) found existing boundaries of LEPs and of existing relationships with city regions creates a competitive ‘winners and loser’ environment within the geographical area, essentially this causes ‘elites’ to fight over scarce resources. Finance initiatives with a spatial element are delegated from central government and described in the literature in a variety of forms; enterprise zones, investment zones, tax free zones. All these initiatives tend to be attached to a competitive bidding process which has become a transitional measure to compensate for the abolition for RDAs and economic growth (Fenwick, 2015). As the competitive bidding process is biased towards areas of affluence, as opposed to disadvantaged deprived places, they are likely to have less skills to be able to apply for such financial assistance. In current times, funding for low carbon installation projects is gradually becoming increased through funding

streams like that of Innovate UK, this institution provides grant funding to both the public and private sector through competitive bidding. Alternatively, the Devolution Deal process offers a channel of communication between sub-national governance institutions and central government (Waite & Sullivan, 2013). The two funding streams differ, in that, Innovate UK is more a 'see what you get' working arrangement, with the available money financed through a very strict application criteria with little negotiation, whereas Devolution Deals rely on a negotiatory element dependant on the abilities of the incumbent mayor, or if 'mayor less', responsible collaboration of local authorities. 'Deal making' can therefore be seen as more aligned with the future of policy making as finance initiatives with a spatial governance element are favoured by central government through its commitment to increase MCAs. Some deal making can bring up similarities in funding streams, as the 'zonal' approach alluded to earlier is very much spatially reliant. Collectively, the initiatives cited tend to be attached to a competitive bidding process which becomes a transitional measure to compensate for the abolition for RDAs when economic growth reduced (Fenwick, 2015). The funding streams are described in the literature as one of the main overriding issues found within the literature regarding MCAs and economic development as is the scale of governance that is attributed to scale of Devolution Deals.

### **Scale and polycentricity**

Scalar and territorial issues are paramount to place-based governance and central government's intention to roll out more MCAs. In the 1960's the Red-cliff Maude report (Royal Commission on Local Government in England, 1969) and previous PhD research (Smyth, 2021), both moot the possibility of the restructuring of geographic boundaries into Functional Economic Areas (FUAs) rather than the current system of English local councils and county boundaries, or indeed, city regions. The MCA and Devolutionary Deal process is seen as the start of that process, with a strong focus appearing in academia to demonstrate an interest in the process, both theoretically and empirically (Martin, 2015). Forming MCAs has been described as a disjointed and segmented process (Shutt & Liddle, 2019), with both boundary formation of MCAs and associated constitutional structures causes production of multiple climate change strategy documents by MCAs and LAs. The National Audit Office (2023) is concerned regarding the manner of using a 'touch base' approach in assessing the

political ambiguity, accountability, monitoring and evaluation of results for funding of Devolution Deals. Similar concerns have become evident regarding low carbon projects, The Net Zero Strategy, and The Heat and Buildings Strategy.

City regions are a recent concept in the UK sub-national governance system and are a subject of debate regarding whether their spatial context is effective (Healey, 2004). Recent UK policy in relation to sub-national governance boundaries is steering towards FUAs as a way forwards for sub regional and regionally focussed growth, moreover, the literature also provides the concept of Polycentric Urban Areas (PUAs) which conceptually has flexible and moveable boundaries based on economic activity (Harrison et al, 2022). This differs from FUAs in that the spatial boundary is defined but there is no one single point of central importance, put another way, there are multiple cities or focal points of economic growth in any given spatial territory leading to more 'secondary cities'. Policy thinking at a sub-national level demonstrates a certain amount of tension between cities and rural areas within city regions. Geographic tensions between institutions and within city regions are also apparent:

'... there is a lack of geographical alignment and co-ordination between functional policy areas and institutions across the local authorities, combined authorities, LEP's education, health, police, transport and other partners and sectors.' (Pike et al, 2016, p16)

The tension and behaviour between new institutions are important when considering the interrelationships between governance institutions in a fiscal sense. The theoretical literature on spatial interaction and fiscal decision making has paid attention to local governments, for example, MCAs when making decisions concerning fiscal policies and public spending (Ferraresi et al, 2018), demonstrates an assertion that local city regional governance mechanisms engage in local public service delivery by considering the behaviour of neighbouring city regions. This principle is important in a sub-national governance economic remit as it maintains decision making among sub-national institutions is not purely made on traditional factors. Decisions made on fiscal issues such as tax revenue, fiscal transfers, demographics, and socioeconomics or political characteristics, can be influenced by

the institutions ‘next door’. The Ferraresi principles are one way of explaining sub-national governance decision making through an economic funding perspective between governance authorities, or in the context of this research, between city regions. The Ferraresi principles include the political yardstick, tax competition, spillover effect of public goods, or political trends and enhancement of knowledge. There is evidence that suggests that inter-governance competition with moveable tax bases may help public expenditure and improve policy outcomes (Weingast, 2009). The difficulties of a lack of fiscal control at a sub-national level in England in relation to tax rising powers may reflect the focus of spatially blind policy making. Hildreth & Bailey (2013) have examined economic thinking from an institutional perspective and conclude a ‘mixed picture’ in terms of a space blind or agglomerate approaches and found instead an FUA approach supports a place-based perspective. There is a strong rhetorical city focus within city regions, consistent with the FUA with Martin (2015) referring to the ‘New Urban Economics’, following on from work by Krugman (1998). The original roll out of spatial selectivity from central government tends to favour cities and city regions due to negotiated Devolution Deals with MCAs, these deals are often referred to in policy documents interchangeably and within contemporary political and academic spheres to promote sub-national growth, particularly when they contain core cities with associated local authorities.

City regions are historically a priority for notionally competitive and freely available funding streams via more recently negotiated Devolution Deals, the subject of pan regional or city regional economies of Leeds City Region (LCR) and Sheffield City Region (SCR) are a key theme, as are the administrative boundaries surrounding them. This is unsurprising given that the city regions are large northern urban areas with associated rural areas on the periphery. The concept of larger agglomerates like The Northern Powerhouse (for an overview of the Northern Powerhouse concept see (MacKinnon, 2017, 2020; Lee, 2017), emerged primarily as a transportation project, the concept provides a backdrop that can be used in the housing sector and low carbon buildings, and it has become the most recognised aspect of current English sub-national policy. Notably, it relies largely upon following and taking advantage of policy mechanisms in city regions via combined authorities and LEPs to be effective. As with many governance principles there are debates around the definition and

constitution of the Northern Powerhouse which is reflected in enthusiasm and concerns expressed by stakeholders in each place. The neighbouring City of Manchester, is portrayed as the centre of Northern Powerhouse, interpreted as a counter agglomeration to London, as well as the cited exemplar in Whitehall (Haughton et al, 2016). However, this acknowledgement contributes to political tensions, more so in LCR than SCR, with fears that some city regions may miss out on policy development opportunities in what is seen as ill defined policy for potential future funding. In the original development of the pan regional agenda, the conception of the Northern Powerhouse the then Chancellor George Osborne in a speech highlights the emphasis on the importance of polycentricity and agglomeration.

‘Modern economists have spoken about the economic benefits when a critical mass of people, businesses and infrastructure are brought together in a large city. The whole is then greater than the sum of its parts’ (Osbourne, 05 August, 2014).

The alternative PUA approach is flawed with ambiguity, from bottom-up manoeuvring amongst city regional leadership and the alternative growth engines such as the Midlands Engine, which is a prominent feature of the older Northern Way initiative under the previous Labour Government (Lee, 2017). Discontentment with the civil service confirms conflicting perspectives on the urban agenda within Whitehall itself and other policy actors at a central level agree there is some merit in the claim that agencies outside of Whitehall, either within FUAs or PUAs scalar level, are carrying forwards city regional agendas. The high profile Centre for Cities think tank being the most obvious sub regional ‘growth hub’, set up to encourage local growth of SMEs, with at times, a prioritisation of cities and city regions. Furthermore, it is not always clear that emergent policies and interventions at the local level reflect an agglomeration agenda, firstly, while transportation projects feature heavily in the various deals, there is comparatively little by way of specific policy designed to facilitate connections between urban centres in the north relating to The Heat and Buildings Strategy, secondly, the transport element of the northern Powerhouse is partly instigated by a collaboration of local authorities and LEPs, although to date, the ambition is not matched with similarly ambitious investment. Perhaps more

pragmatically and importantly, the Northern Powerhouse still largely relies upon policy mechanisms from central government and lacks any fiscal devolution with a remaining reliance on decentralisation. An example is the deal mechanism including the ongoing Devolution Deal process and the Growth Deals, which predate the Northern Powerhouse. More broadly, the Northern Powerhouse concept meets with an enthusiasm for a northern focused agenda and is relevant to some theory through Harvey's theories alluded to earlier surrounding lowering transportation costs when accumulating capital.

The Northern Powerhouse model can be useful when trying to deal with issues such as climate change and heat networks which require large geographic scales to be successful. The concept does not reflect building decarbonisation per se but in its current form influences transport, the point here, is that it can be synthesised to include re-generation of buildings, both house and commercial. New plans and housing strategy within broader governance approaches are an alternative to what is available at present, from a governance perspective, stakeholders in northern cities show a definite perception of political motivation underpinning the push for a Northern Powerhouse concept. This can lead to some hostility, partly due to large scale funding cuts to local government since 2010 which has hit northern urban areas hardest, although in normative terms, there is a question of a lack of belief in central government intentions to fund such collaborations. Simultaneously, the issue of governance and scale uncovered during the literature review provides the idea that central government's lack of commitment runs parallel with a view that the available current policy making processes are insufficient in some circles to deliver low carbon buildings. While there appears recognition amongst many actors in northern city regions that rebalancing from the south to the north in a serious sense is well beyond the scope of current policy, it is posited that there should be a determination to make the most of the policy available to make this happen.

Ironically, the Conservative Party being the party of business demonstrates little by way of specific policy and funding intentions, despite government rhetoric to improve this, and demonstrates a general disdain that places can begin to make some progress independently. When considered alongside political mishaps and broken



promises, the opportunity to improve local development policy for small business means city regional leadership is proactive in the uptake of the Northern Powerhouse brand but requires powers to progress this concept to fruition. The concept itself of pan regional thinking could influence implementation of The Heat and Buildings Strategy and The Northern Powerhouse provides the clearest aspect in which previous policy is said to have a northern focus in England. It holds an exemplar status in the literature as a collective leader which consists of a consortium acting as an exemplar role model for decentralisation and local economic growth with its highlighted status initiated by local leaders over several years (Haughton et al, 2016). Relevant to this research, in recent times the model has incorporated skills training through the SCR and part of the allocated £2 billion skills fund, furthermore, in those areas where Northern Powerhouse activities can be distinguished from city regions, they tend to be top-down interventions such as large scale funding for transportation projects or learning programs. In this context, Lee (2017) identifies a substantive policy tool of the Northern Powerhouse as a centralised political governance system ruling technocratic decisions such as the cost benefit analysis of transportation projects which has the potential to be applied to low carbon installations.

### **Place-based Small and Medium Enterprises (SMEs)**

Small and Medium Enterprises (SMEs) are defined in the literature by the OECD as independent companies that employ less than a given number of employees and are non-subsidiary. The number of employees is quoted differently internationally, the upper limit in New Zealand is 20, the EU 250 employees, the US 500, and in China 1000 (International Energy Agency, 2015). Most countries also sub divide the SME category into various sizes, usually sole trader, micro, larger small and medium enterprises with different categories of SMEs used for data collection and policy purposes. This research concentrates on SMEs are thought to be place-based and focuses on their recruitment, business processes, and expenditure in a set geographical area inside the MCA boundary. Given the central government rhetoric in relation to the importance of SMEs to economics this type of business will be essential to the provision of human capital. On a global level SMEs constitute around 99% of all enterprises (International Energy Agency, 2015). In the UK they make up 99.8% of businesses and there are 5.7 million SMEs in total, this accounts for 60% of

employment and 52% of private sector turnover (Department for Energy and Net Zero; Department for Business Energy & Industrial Strategy, 2017). ‘Turnover’ here, includes value of sales, work done, and services rendered. SMEs are active in almost every business sector, and they occupy a full range of property types, from large commercial premises to smaller residential buildings operationally and they can be service providers with no business premises, to manufacturing businesses operating across multiple sites. Collectively, this demonstrates the impact and scope of SMEs potential to have an influence in low carbon installations in both commercial and residential buildings. In the context of this study however, the focus is support for SMEs as it is these businesses that are responsible for the installation of low carbon technology for buildings. Low carbon installations are carried out by enterprises and sole traders with manual and professional skills already apparent in the trades of plumbing, electrical installation and plastering. For the purposes of this research the definition for an SME is the same used by the UK government:

‘SMEs encompass micro (less than 10 employees and an annual turnover under €2 million), small (less than 50 employees and an annual turnover under €10 million) and medium-sized (less than 250 employees and an annual turnover under €50 million) businesses.’ (Department for International Trade, 2020, p. 5)

To understand the broad categories and role of SMEs involved in The Heat and Buildings Strategy roll out, it is necessary to further look at the types of SME in an environmental or low carbon context. Having introduced how SMEs are defined, it is necessary to describe the different types of SMEs in relation to low carbon installations. Broadly, SMEs can contribute to the protection of the climate, environment, and biodiversity, through their products, services, and business practices. In terms of low carbon installations, SMEs can offer both services and products to clients and/or consumers, some SMEs focus on reducing their environmental footprint through resource efficiency processes and others concentrate on their green outputs or products and services such as renewable energy. Put another way, SMEs incorporating low carbon technology can fall into one of either two categories, one, through performing the relevant activity – green performers – or two, those that look to improve their business performance through innovation – green innovators (OECD, 2018). The literature review identifies three

categories of SME that fit into a certain typology, these are named as eco-innovators, eco-adaptors, and eco-entrepreneurs, and are categorised based on the functions they offer. Generally, three types of SMEs work in the specific area of low carbon technology or 'eco-SMEs' (OECD, 2018). The first, eco-innovators are SMEs that engage in eco innovation, in that, they create new or improved products or services, hence, the environmental benefits are not kept just to firms but wider society, in which eco-innovation has the potential to benefit society through changing social norms, cultural values, and institutional structures (OECD, 2009). Eco-entrepreneurs alternatively share similarities with normal entrepreneurs, they look for new opportunities because of a change in preferences, regulations, or specific problems, this subcategory develops and commercialises green technologies to introduce it to the market and implements it in practice. The third group, eco-adopters who are representative of most small SMEs and sole traders, as they act as implementors throughout the uptake and put into practice new technology, they perform an action to implement eco-innovation and are the focus of the research. Practically, the issue of sustainability in the first two groups is unlikely to be one at the core of the business model, as the main issue for them is to how to comply with environmental regulations. Because of this, the benefits are sectoral specific and they need to sell new products into the market to provide a more concise focus on the market. Due to their intrinsic nature of implementation, installation and making changes to physical infrastructure to buildings, they require highly skilled labour in the form of human capital.

**Table 3 – Types of ‘Eco-SME’**

Performer or Innovator	OECD typology	Characteristics
Innovator	Eco-innovators	Engage in implementing new or improved product service, process, marketing method or organisational business practice, work practice or external relations. This behaviour can be either technological or non-technologically based. Smaller firms such as SMEs are also more likely to pioneer radical and disruptive innovations (OECD, 2018).
Innovator	Eco-entrepreneurs	Not a heterogeneous group nor uniform in characteristics. A ‘mix and match’ of companies and traders that move between business models. Occasionally adapt between green measures and convention.
Performer	Eco-adopters	An important and fundamental aspect to this group is that they rarely implement holistic measures, possibly due to their size, and often act singularly rather than in an integrated manner. This is due to the pressure of costs pressures introduced in the previous section, and the technology adopted is more likely to be ‘end of pipe’. Put another way, technology they implement tends to be without changing their own business processes, lightbulbs, heat pumps, for example it is these that are crucial to the low carbon installation roll out.

**Source:** Taken from (OECD, 2018)

### **Human capital as a driver of low carbon installations**

Central to the place-based governance constitution is the need to ensure that ‘local’ people are best placed to increase knowledge and skills, low carbon installations provide the opportunity to develop SMEs within a city region geography and to add to a ‘place’ economically. For the purposes of this research, SMEs are considered more place-based businesses, particularly smaller, micro, and sole traders that undertake low carbon installation work. The very need for installation projects in buildings provides the opportunity to increase human capital capacity through both retrofits and new builds, skills training in city regions provides potential to increase low carbon installations in buildings. Low carbon installations provide the potential to enhance societal benefits by increasing employment, the complex interplay between business and sub-national governance institutions are crucial to success for the roll out of

installations programs, given the variety of institutions involved in training and education schemes, ideally with employers as leaders. Following the Keynesian economic theory approach, low carbon installations have the capacity and ability to provide a quick cash injection and financial stimulus into a city regional economy, given the correct policy support measures are in place. Low carbon installations have many positive economic points, they are urgently needed, are high in economic value, and are also thought to be ‘shovel ready’. Their activities are known to be labour intensive; these include production manufacturing and parts production for low carbon technologies alongside the labour required for fitting the technology. This upturn in labour has the potential to provide societal benefits as they create a demand for low skilled workers effectively ‘replacing’ low skilled jobs that have diminished in northern territories due to deindustrialisation. Collectively, these points provide the opportunity to increase productivity of city regional economies with short-term capacity for local employers to engage, particularly SMEs, to assist in the low carbon transition. All these elements combine to produce an approach that assists local or city regional economics with a stimulus providing the opportunity for SMEs to develop as a business through a shared learning environment. The issue of funding initiatives and who should ‘foot the bill’ for additional skills training costs required to achieve building energy efficiency is an ongoing cause of disagreement contained within the literature. Specific groups of businesses are required to implement low carbon installations, identified previously as eco-adopters, they need to be identified as a specific group of businesses that are crucial in developing and installing the technology needed for low carbon homes to be built. Skilled professionals need to be available quickly and need to be able to work up to the relevant standards to drive sub-national economies, the predominant factor gleaned from the literature for sub-national governance institutions is how to generate the necessary skilled occupations to adequately support central government’s agenda for The Heat and Buildings Strategy roll out.

It is suggested that a multitude of factors will a part:

‘differences in institutional settings and business practices, difficulties in managing international partnership relations and lack of financial and human resources. (Institute for Prospective Technological Studies, 2033, p68)

Originally cited 20 years ago this statement has even more relevance given the COVID pandemic, Brexit, the ongoing need for skilled professionals in England and the UK (Department for Education, 2022a, 2022b). Many OECD governments see low carbon installations supply chain as a promising sector for the creation of well paid, skilled, and long-term jobs (OECD, 2012a). This may be more common in city regions as the exploitation of major renewable energy resources is space intensive, and more likely to occur in these areas, as opposed to purely inner urban areas (OECD, 2012b). The deployment of low carbon installations to residential and commercial buildings is increasingly seen as a key development opportunity for city regions and a way for governments to give leverage to their climate change commitments. Despite this, economic and workforce development opportunities are often constrained by similar challenges to other new economic activities in city regions, such as limited infrastructure, or limited availability of small businesses necessary to implement the transitional change, for example, SMEs with a large enough workforce to deal competently with new sectors or modern technology (OECD, 2012b). The need to address these challenges and tap into a place's knowledge base through improved learning capacity by accumulation of competences in skilled areas is important. Local governments and sub-national institutions have the potential to be central agents in the success of the transition in city regions via low carbon installations (OECD, 2012a, 2012b, 2012c). The deployment of this technology to residential and commercial buildings is increasingly seen as a key development opportunity for city regions and a way for governments to give leverage to their climate change commitments. Despite this, economic and workforce development opportunities are often constrained by similar challenges to other new economic activities in city regions, such as limited infrastructure, or limited availability of small businesses necessary to implement the transitional change. SMEs with large enough workforces to deal competently with new sectors or modern technology need to address these challenges and tap into a place's knowledge base through improved learning capacity and the accumulation of competences in skilled areas. Local governments and sub-national institutions have the potential to be central agents in the success of the transition in city regions of delivery of low-carbon installations in city regions (OECD, 2012a, 2012b, 2012c). Fiscally, in some instances, local authorities set and control the regulatory limits for extraction and discharge activities (UNEP, 2012). In England

Council Tax and Business Rate levies may be an example of this, in a city regional context, economic responsibility is incorporated into the Devolution Deal process. SCR and LCR have now both negotiated Devolution Deals that encompass adult skills training, given the low carbon growth agenda, and the strategic importance of MCAs driving skills policy in relation to low carbon installations in city regions is an important of the broader aspects of delivery of national policy. LAs typically hold multiple roles as decision makers, alongside MCAs and LEPs, with operators of local energy providers in the private sector working closely with these institutions. Local governments also have a large degree of influence on adult educational services of the human capital needed in low carbon installations, a fact which the study now expands on with a spatial consideration, in some instances, local authorities set and control the regulatory limits for extraction and discharge activities (UNEP, 2012). In England, Council Tax and Business Rate levies alluded to may be an example of this, in a city regional context, economic responsibility is incorporated into the Devolution Deal process. SCR and LCR both negotiated Devolution Deals that encompass adult skills training, given the low carbon growth agenda and the strategic importance of MCAs driving skills policy. Local governments also have a large degree of influence on adult educational services because of the human capital needed in low carbon installations, a fact which the study now expands on with a spatial consideration.

### **Human capital in a spatial context**

Keynesian theory of economics has influenced sub-national economies by limiting interventions in the sub-national economic area with the introduction of mobility schemes and ‘special areas’. These are similar in principle to Investment Zones (HM Treasury, 2022), recently produced by the UK government and provide pockets of spatial areas with tax incentives to induce economic growth, they support the idea that place-based SMEs work closely with sub-national authorities. This collaborative working style has been long standing, even though the periods of privatisation in the 1980’s developing the argument that the most successful national economies are built on strong independently run regional economies (Storper, 1997).

Within the context of low carbon installations, central government policy literature is set out to outline a positive political appetite with Whitehall at the centre; to guide the

reformation of energy efficiency and heat production in buildings and to keep the citizenry and businesses happy regarding fast rising residential and commercial energy fuel costs. This has occurred alongside the developing roles of mayors in MCAs and an agenda to reduce regional and spatial inequalities referred to earlier. However, the issue of sub-national inequality changes depends on political influence and opinions, and it is notable that this study is conducted in a very turbulent political time. In terms of extra human capacity needed nationally, carbon emissions from power account for 21% of total UK emissions and, given the difficulties and well established problems of poor quality buildings in the north (Bell, 16th June 2021), the abundance of old building stock due to the previous Industrial Revolution and the shortage of new residential and commercial buildings has caused a need for action. Buildings generally are thought to account for 20% of UK carbon emissions, 22% coming from heat, 17% from residential, 4% from commercial and 2% from the public sector (Department for Energy Security and The Net Zero Strategy; Department for Business, Energy and Industrial Strategy, 2021b). The extra human capital needed to roll out low carbon buildings has caused an obvious need for extensive training input; it is posited that SMEs are in an ideal position to contribute and lead on this issue via a place-based governance approach within city regions. It is important to relate the human capital element in this research, as in the context of austerity it provides potential to increase employment, particularly, given the huge budget cuts sub-nationally to local government over the last decade. The idea that 'doing more with less' in terms of using finances only adds to the argument for more local and sub-national powers and involvement of local people in financial decision making. Central government finance cuts have seen targeted economic development and reduction in regeneration funds has hit the most deprived areas first (Gray & Barford, 2018) (Kitson et al, 2004). Following this, inflation population growth and local government spending powers have been reduced by an average of 22.4% (Innes & Tetlow, 2015). Again, these cuts influence areas most reliant on central government grants, particularly affecting the city regions under investigation as the 5<sup>th</sup> and 7<sup>th</sup> highest recipients of central grant funding in 2017 (Department for Business, Energy & Industrial Strategy, 2019). The national economy is stalling recently, unemployment has rising, and the emerging climate change crisis provides an ideal opportunity to increase human capital via 'green jobs'. The consistent emerging trend within the



literature is relational on the notion of a ‘city region’ and FUA geographies which demonstrate an advent of bimodal governance through MCAs in England since 2010. This is thought harmonious with the proposition of endogenous development in the context of low carbon buildings and the scalar arguments of a city region, and indeed, the scope to increase human capital through the ideas of agglomeration, FUAs and PUAs, directly relates to the idea of multi-level governance within a place-based city region.

### **Summary**

Low carbon installations are a crucial part of The Heat and Buildings Strategy roll out, the notable regional spatial inequalities and imbalance between London and the rest of the UK provides an underlying substance that is reliant on an uneven geography and presents a functional geography that is ambiguous without firm boundaries. The literature review in this chapter shows that flexible boundaries are also present within governance, and this focuses a need to develop a ‘local’ policy designed for project implementation. The chapter posits the argument that using a place-based sub-national governance authoritative figure to address these spatial inequalities are apparent within economic literatures. The chapter has provided the policy background for the study in relation to SMEs that work with low carbon installations projects. This can be sole traders working on physical infrastructure within buildings or larger SMEs working on physical infrastructure surrounding buildings, for example heat networks. SMEs also have different typologies. The regional inequality referred to in the chapter is an important aspect of the national and regional economies and relates to tax revenues via employment and building developments. This is through a system of spatially targeted policy making and political decentralisation which influences the debate regarding powers of sub-national policy making institutions and refutes that decentralisation alone will increase sub-national economic growth and associated public services (Tomaney, 2016). An alternative suggestion is a more adaptive institutional approach to sub-national governance (Koontz et al, 2015), these assertions are consistent within the literature.

## Chapter 3 – Literature Review (2) - Systems theory dynamics and governance

### Outline

This chapter extends on Chapter 2 by introducing the theoretical framework for the research, it expands on the meaning of place-based governance within the literature and contrasts the differences that surround governance typologies. The chapter integrates the theoretical model of systems theory dynamics with that of the place-based governance model and starts by providing a brief account of the origins of ‘system theory’, it then moves onto dissect some the different concepts of systems theory dynamics found in the literature and place-based governance, it then provides the reasons as to why the theoretical framework chosen is suitable for the research and reviews the concept of governance on which the research is based before applying the theory to public sector institutions.

### Systems theory dynamics

Aristotle’s claim that knowledge is derived from an understanding of the whole and not each single part reflects Marxism philosophy which forms the basis of what is referred in this research as ‘systems theory’. For years, researchers have struggled to explain and agree on a definitive version of system theory dynamics, its constitutive parts, content, and relative inner workings are areas of investigation that have therefore evolved into a wider extensive body of academic literature (Gare, 2000) (Mele et al, 2010) (Laszlo, 2023). This apparent change in understanding has caused a shift in attention within systems investigation and governance theory, from investigating the whole of a system, to the parts of a system, using a variety of subject areas and contexts. ‘Systems’ can be found in nature, in science, in society, and in an economic context all systems have the distinctive characteristics that they have developed simultaneously across various disciplines causing emergence of knowledge; they contain associated concepts that are interchangeable and extended from one another. Examples include natural and ecological sciences, organic aspects and homeostasis (Hannan & Freeman, 1977), chemical and biological aspects such as autopoiesis (Varela et al, 1974), and information technology such as cybernetics (Beer, 1995). As a result, the contemporary landscape of systems theory dynamics demonstrates several kinds of perspectives and reinforces the advances in human

knowledge brought about by scientific method. One explanation of the underpinning approach to systems theory dynamics found in the literature is that of Kant (Stacey, 2003) who identifies a dual approach, the first element posits that there is an actual reality containing knowledge with substance which he refers to as noumenal, the second element is an appearance of reality which consists of knowledge that is not known, which he refers to as phenomenal. In this way, Kant includes both perspectives and acknowledges that there is an innate idea which imposes order on experience so that knowledge and truth are not simply relative or linear but dependant on external variables and non-linear in creation. Kant further provides a philosophical justification based on Aristotle, through a mechanistic understanding of the world based on science, this approach theorises that multiple parts functioning well as a 'system' are derived from the parts functioning well as a whole, both internally and externally. Importantly, Kant views 'the parts' as autonomous that can make individual decisions, this perspective has altered slightly in the development of systems theory dynamics in terms of the application of organisational and social policy situations. Forrester (2022) furthered Kant's approach in the 1950's by developing an understanding of systems through positive and negative feedback mechanisms and non-linearity, consequently, developing a new paradigm whereby the whole of a phenomenon is thought of as a dynamic learning system in which all sub system parts are contributory to the knowledge creation that emerges.

The literature describes new systems thinking as developing along two distinct pathways, that of first order and second order thinking. The former has emerged through structural mechanistic and dynamic interactions, the latter developed through the perception that human beings determine the world they experience, consequently, the operations within the world are based upon their own experience and understanding. First order thinking has developed along three main pathways, the first, general systems theory, retains the central concept of homeostasis which ensures that a strong, self-regulating tendency of order and stability is present, it posits that this is only possible with permeable boundaries that require openness of interactions. The second, cybernetics, are systems that self-regulate and are goal directed, they adapt to their external environment, a common analogy is that of the

central heating system; the resident sets the temperature using a control, a regulator detects a gap between the actual temperature and the goal temperature, and therefore, the heating system switches on and off dependant on the goal set. The third type of system, systems dynamics, reflects a changing system over time, importantly, the third type differs from the first two system models as it does not move towards an equilibrium status, as a result, the system becomes no longer self-regulating but self-influencing and may become self-sustaining or self-destructive if power sharing dynamics are unchecked; external influences on the system can be heterogenous creating opposing views within the system potentially causing a chaotic state. The systems model used in this research uses aspects of all these contemporary systems models, systems theory, complexity theory, or complex adaptive system theory are collectively a dynamic that all rely on multiple aspects of thought written through application of management theory. The varying perspectives of system theory are referred to interchangeably throughout this research as 'systems theory dynamics' or simply 'systems dynamics'. From a system theory perspective, the process for sub-national governance can be understood as:

'[sub-national governance] is understood, not as parts adding to a whole, but as a system in which the interactions between its parts are of primary importance' (Stacey, 2003, p29)

Considering this definition, it is imperative for any governance system to be an open rather than a closed system for the necessary interactions to occur in accordance with systems theory dynamics, and, based on this basic definition the application of systems dynamics can apply to many different situations. For example, working with multiple actors, a governance institution such as an MCA can produce knowledge creation through a required set of skills and competencies that enables the production of new knowledge by policy making which subsequently stimulates innovation in a city region. This can add value, characterised by business creation which links to other related sub systems such as research and development activities or supra systems like city regional governance bodies. To increase quality of services or availability of finance, sub-national governance institutions require links and relationships within all units of the system to operate, this ensures that interaction occurs with the outside environment and the system itself. Examples can include

MCAs co-operating with national government outside of the city region or MCAs interacting with SMEs within the city region, these interchanges develop a complicated web of macro and microeconomics both within and outside of the city region and coexist with some of Harvey's arguments introduced in Chapter 2. In the context of this research, MCAs and their constituent parts need to function well within their own city regional 'system' but also need to function well externally to a city region alongside national government to be functional.

At times, systems theory dynamics uses the biological sciences to explain organisational behaviour applying the theory in different management scenarios. It is appropriate in this research study therefore, given its typology and following the principles uncovered in Chapter 2 of semi-autonomous governance institutions, like MCAs and LEPS; which occur at different levels of cognition and sub-national governance action in England but also acknowledge that governance 'levels' are intermixed. The three strands of systems theory dynamics alluded to developed in the 40s, 50s and 60s and originated at similar times alongside the concept of 'open systems'. The concept of openness is of paramount importance when assessing interaction and discusses complex and multi-level interconnections in governance structures. The 'open system' relies on the interrelated and interdependent nature of sub systems consisting of flexibility and fluidity rather than a rigid structure, an open system requires subsystems to be interrelated and interdependent on each other, it has added elements, in that, they are connected to external environments or supra systems and are a part of a larger system; in this case a larger sub-national governance system. Incorporating an 'open' criterion into the research is relatively simple. In each city region the constituent governance institutions must liaise with externalities such as national government during Devolution Deal negotiations or local businesses within the city regional scale, moreover, each sub system has a boundary separating it from other subsystems, in this example, MCAs, LEPS and LAs, need to cross geographic boundaries to operate, indeed, the boundaries themselves are incongruent within other subsystems and flexible. Taking the same institutions as an example, people that occupy roles and conduct activities within sub-national institutions must have interrelationships with each other to function effectively and this is why systems theory dynamics can be used to explain organisational working,

the open system interpretation provides a tool to understand technical aspects alongside societal ones. First order system thinking theory, contains general systems, cybernetics, and systems dynamics, all identify dynamic interactions between parts of any system and environmental influences, whereas second order systems thinking, stresses the importance of the understanding of an observer, either within or outside of the group under investigation. One prominent second order theory is that of complex adaptive systems, or CAS dynamics (Dooley, 1997) (Dooley & Vande Ven, 1999). The two 'orders' of system theory are reflective of everyday sub-national governance institution operations and have perspectives that are similar, producing themes that 'fit' the philosophical debates that impacts methodological considerations discussed in the next chapter. A first order way of thinking sets out a structural element to knowledge creation, second order thinking involves participants within the system and concentrates on elements of human perception. Second order thinking is closely linked with the philosophical approach of social constructivism which perceives that multiple actors involved in research are 'observers'.

### **Sub systems and constituents in a place-based governance context**

A place-based governance approach has flexibility at its heart and involves multiple actors, it is collectively accepted as a 'government to governance' approach (Bonnsfoud & Pesqueux, 2005). It is distinctly different to that of previous New Public Management and Public Administration governance models and contains elements of both collaborative and network governance which are described in the literature, this combination leads to a mix of intrinsic elements within the place-based governance concept. Consequently, the approach is heavily reliant on the interpretation of what it means to be a 'place', this per se, is a variable depending on where you are and where you reside in England and to some extent individual views. Reflected in systems theory dynamics through consideration of path dependency and local versus global debates, the individuality of a place or city region is reflected in flexible and porous governance boundaries in MCAs, since 2010, the implementation of sub-national governance structures, such as LEPs and MCAs, have been developed in a piecemeal way across the country, this in turn, has influenced economic strategies and SME development approaches with some city regions being more advanced than others in the Devolution Deal mechanism negotiation process.

Conceptually, place-based governance itself depends on flexibility and specificity, it uses a particular way of thinking to be effective and views of multiple actors working towards a common goal. This links closely with systems theory dynamics, given the multiplicity involved and the common theme of either self or external regulation. Applying a systems theory dynamic approach in a sub-national governance context demonstrates an interconnection depending on the nature of the systems dynamics (either first or second order). Second order theory is a relevant element to the research given the expansive subject areas which include desired goals, resources, and learning, which are applicable to effective working of sub-national governance institutions like MCAs. Additionally, second order thinking addresses the perception of 'participants within the system' which is deemed relevant. To outline and identify elements of second order theory to the review process of systems theory dynamics for the research, Dooley's paradigms are subjected to content analysis and some of the principles extracted into Table 4.

**Table 4 – Three Paradigms of management theory for sub-national governance**

Complex Adaptive System (CAS) Dynamic Characteristics		
System theory (Desired Goals)	Population Ecology (Resources)	Information Processing (Learning)
Control mechanisms Analytic logic Change is strategic Change relies on nature of the environment and externality, are dependant on each other Uncertain markets need informal authority Open communication Distributed decision making Fluid roles	Darwinian landscape, inferior structure loses Need to establish induced variation Oversight via institutional controls - Heterogeneity Transmission of knowledge through short term frames Assumptions of substitution Innovation requires 'critical' value Need exogenous input	Cognitive approach Influenced by bounded rationality. Adapt to uncertainty by changing info processing. Learning through feedback

**Source: Adapted from Dooley (1997)**

These paradigms are used in conjunction with the characteristics of casual systems found in Table 6, however, individually they are relevant to place-based governance which can be described and conceptualised as not entirely new, but a 'mix and

match' or codification of numerous environmental and economic objectives, ultimately aiming for some separation and decentralisation from the centralised government body currently controlled by Whitehall (Hazell, 2006). Heterogeneity is central to place-based governance and conceptually, the approach involves separate subsystems. Systems theory dynamics as a concept involves agentic activity that is a crucial element in governance to stimulate economies. The actors involved maintain an overriding power to implement change as opposed to actors within government who are merely part of bigger enterprises that make up the 'governance'. City regions contain many elements such as local institutions, local actors, and civil society, that generally make an effective sub-national governance machine with varying amounts of responsibility and power that require different facets of responsibility to develop agentic activity. There is overlap here with systems theory dynamics, given the multiplicity of views and 'ordered' thinking needed to cause emergence via agentic activity, theoretically, systems theory dynamics can be split into sub systems; described by Kant, they can be either heterogenous or homogeneous. In the context of this research, the 'system' can be illustrative of public and private sector perspectives and when contrasting these sectors different governance 'types' with common conceptual themes becoming apparent; expanded on from previous chapters are collaborative governance, network governance.

Three characteristics are identified in relation to collaborative and network governance (Wang & Ran, 2023). Firstly, resource dependence includes inter-organisational collaboration and independent actors exchanging information to achieve common goals dependant on the specific resources available; secondly, leadership, which is extensively covered elsewhere (Northouse, 2015), is crucial to achieving common goals that are intrinsic to systems theory dynamics. Leadership can include personal characteristics and behaviours and can construct networks, empower members of a group, facilitate interaction, encourage collaboration, minimise conflict, and contribute to improved efficiency; thirdly, trust is particularly important when relying on mobilisation of partners towards a common goal as this is thought to increase reputation and frequency of interactions to embed networks. These strands and the conceptual elements of systems theory dynamics seem to have similarities with the definition of governance found in Kemp et al (2005):



‘a mode of social co-ordination ... governance is how one gets to act, through what types of interactions (deliberation, negotiation, self-regulation or authoritative choice) and the extent to which actors adhere to collective decisions. It involves the level and scope of political allocation, the dominant orientation of state, and other institutions and their interactions (ibid, p17)

It is therefore apparent from the literature when applying systems theory dynamics to sub-national governance, to have effective interaction is fundamental, and governance should be orientated in a way to deal with complexity with some form of authoritative figure present, pluralistic, and include methods of involvement guided by a process that is integrated to develop collaborative policy approaches.

### **Defining governance and integrating systems theory dynamics**

The concept of governance is changing over time as is that of systems theory dynamics, both discussed alongside economic theory that fluctuates over the decades. Some consider the concept of governance to be the dominant discourse among many innovative ideas and practices in the social sciences (Dawley et al, 2010a, 2010b) (Pike et al, 2017). In relation to the development of social and economic development, ‘local’ economic development is key to the approach, and consequently, the development of economic policy must consider structural shifts in the capitalist system that have run alongside centralist government mechanisms in England.

Changes to the public administrative and governance system that surfaced in the mid to late 1970s reflected changes to neoliberal thinking, with the private sector apparently an influential factor in contemporary sub-national governance institutions. Literature indicates that place-based governance is still in its infancy and is thought to be under theorised with loose conceptual strands (Bentley & Pugalis, 2014a), this is extended on and clarified in later work indicating there are intrinsic mechanisms of place-based sub-national governance that surround four conceptual principles, these are: meta-governance, decentralisation, multi-level governance, spatial relations and institutional support (Gray & Pugalis, 2017). Using a modified version of the available conceptual strands identified, the following suggests how the conceptual principles of place-based governance and systems theory are congruent,

whilst no direct comparison is possible the following describes how the two concepts are interlinked and why the theoretical framework chosen is appropriate. The four existing principles of place-based governance found in the literature have differing elements; the first principle, meta-governance involves the engagement of multiple actors, it encourages flexible policy geography and emphasises a small state at a more local level with participants from 'ordinary' citizenry. The second principle, decentralisation or conditional localism leads on from the first, power to implement change is passed to a lower level of governance via the subsidiarity principle to design and make policy as leaders see fit, powers to act are passed to the lowest governance level possible. The third principle, multi-level governance, follows on from the second, multi-level governance can take various forms and ensures an adequate intrinsic dimension to a place and influences overall governance spatial structure; 'levels' can be ill defined with variable strengths of hierarchical relationships. The fourth principle, institutional support, spatial relations and knowledge, attempts to ensure that there is an open democratic process with policy making providing the maximum number of actors available at any given spatial scale. These are discussed in relation to elements of Table 4 and systems theory dynamics more generally to provide an overarching theoretical model.

### **The first principle - Meta-governance**

The absence of State involvement in sub-national governance structure identifies and leads to the use of the term 'meta-governance' (Gjalteam et al, 2020), this is described in many forms and is acknowledged here as the 'government to governance' approach, this term can be described as:

'questioning the nature of governance as pure self-organising networks in which governments fulfil a limited steering role' (ibid, p14-15)

The term provides an alternative working process for any local government framework (Jessop, 1998), and is used here in the context of low carbon installation project implementation to describe the process by which the State in effect lends power to other agents, whilst retaining a co-ordination role by setting the rules in which sub-national governance institutions operate (Jessop, 2002, 2019) (Fenwick et al, 2012), other authors have also tried to refine the definition in relation to informal governance

(Osterberg & Qvist, 2022). There appear to be three main areas surrounding meta-governance sub-nationally in England, the political and regulatory, administrative and fiscal. Political refers to an executive with legislative power control, having the resources to act, this loosely corresponds with the principle of 'distributed decision making' of Dooley's paradigms; administrative, contain elements of the principal 'oversight of institutional control' in population ecology and refers to the responsibility to develop policy and have a certain amount of control over strategic policy, similar to the mechanisms discussed in second order systems dynamics as part of the desired goals and cognitive thinking; fiscal, refers to having control of fiscal rules currently set out by central government and this includes lending by sub-national banking or influence of private finance lending requirements. Meta-governance as a term has been used in a variety of diverse ways, but the term itself refers to an internal process of governing which controls and delegates power to other agents and institutions whilst maintaining some degree of control through the elements discussed above, this method of self-regulating behaviour is apparent in cybernetics. The process itself can be considered intrinsic or at the control of internal actors, in relation to capitalism, the term is used as a way of dealing with the increased complexity of the State in a capitalist democracy with delegated authority. For example, a United States Federal State with Governors, or the Mayor of New York, who have significantly more fiscal powers than any mayor in England and control the direction of decision making through more complete powers is a crucial part of place-based governance. Powers and responsibilities can be directed in different directions, 'upwards' towards larger institutions like the European Union or directed 'downwards' towards old style QUANGOS or community groups, such as neighbourhood planning groups or LEPs and MCAs. Given that modes of governance are central to the roll out of low carbon installations the influence and involvement of the State is an important concept to entertain sub-nationally.

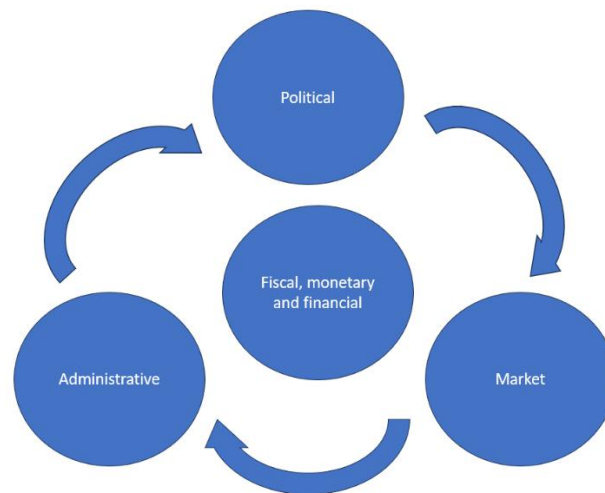
### **The second principle - Decentralisation - conditional localism**

Decentralisation is a commonly used term and there are varying theories surrounding the concept, it refers to powers, responsibilities and resources, delegated sub-nationally in England, the most common responsibilities already alluded to are political, administrative, and fiscal, these subsections cover the main governance

issues in relation to sub-national operations generally and this section aims to outline their applicability to LCR and SCR in their contemporary governance forms.

Contemporary place-based governance concentrates on the use of decentralisation or conditional localism through a financial lens and a model outlining decentralisation from the author's perspective is illustrated in Figure 5 and briefly expanded on in Table 5.

**Figure 5 – A model of decentralisation**



**Source: Adapted from (Ryan & Woods, 2015, p36)**

**Table 5 - Elements of decentralisation**

Political and regulatory	The delegation of the executive involves decision making powers to lower levels of government. Full strategic policy control is required to operates effectively as is the legislative making ability with regulatory control.
Administrative	The decentralisation of responsibility and resources for policy areas in which the centre can retain varying amounts of strategic control. Provides the opportunity to influence policy frameworks.
Fiscal, Monetary and Financial (*adapted)	At present the sharing of funding streams to sub-national institutions through a variety of state controlled sub-national banks, private and hybrid equity. In a fully efficient sub-national city region, monetary, fiscal and investment control is required.
Market	A tool to deliver low carbon projects via capitalism, the market relies on monetary investment, it requires interdependency and interaction with the state via politicians, administration and financial sector.

**Source: Adapted from (Ryan & Woods, 2016)**

At the very centre of the argument surrounding decentralisation is the principle of central-local relations and collaboration, introduced earlier. The degree of power contained within the decentralisation mechanism and the amount of State involvement and dissemination is used to control and influence sub-national governance structures; this is crucial the power dynamics of sub-national institutional autonomy. Decentralisation influences the ability that sub-national bodies have over low carbon installations (Pratchett, 2004) (Tsukamoto, 2012). As a result, the ability of sub-national bodies can make decisions on policy regarding low carbon growth mechanisms and strategy, this is directly consequential to the amount of autonomy they have from central government. Some authors argue that the system of governance in place at a national level indicates weaker level of powers and leadership sub-nationally under centralised systems of governance (Beer, 2014). Beer argues this arrangement demonstrates a need for stronger leadership under localist systems of governance, whilst Bentley et al (2017) on this point argues the concept of strong versus weak leadership via categories of sub-national governance and proposes various subcategories of governance systems. This typology is dependent on power share and responsibility, essentially discussing at length elements of meta-governance from a conceptual standpoint in a hierarchical context. The principles of meta-governance and decentralisation align closely with that of multi-level governance.

### **The third principle - multi-level governance**

Multi-level governance as a concept was originally discussed in The Barca report (Barca, 2009) and came to the UK from the European Union. The concept of multi-level governance is itself split into alternative subsections, authors describe horizontal and vertical methods of governance (Liddle, 2018) (Bentley et al, 2017), whilst other authors describe 'diagonal' governance, also referred to as Type 3 (Torfing et al, 2012). The vertical here, is seen as a largely hierarchical type of working arrangement, whereas the horizontal is typically associated with a more inclusive approach. Diagonal governance refers to the crossing over of the vertical and horizontal whereby actors move freely between sub-national, national, and transnational governance arrangements but in the process have little regulation due to the freedom they possess. This makes a complex web of governance rather than a simple straight forward hierarchical type of management, subsequently, in a theoretical sense, it makes it easier to interchange ideas and work efficiently. It reiterates the appropriateness of systems theory dynamics as an analytical tool as systems theory dynamics evolves around complex scenarios with progressive diagonal governance in situ.

There are disadvantages to Type 3 or diagonal governance, it is this type of governance that is thought most likely to have had an overarching impact on the 2008 financial crash due a lack of adequate independent regulation and subsequently has the potential to have a negative effect on economic growth. Also referred to as 'interactive governance' by Torfing, this concept can be applied to sub-national institutions but with different amounts of regulation. Indeed, this has been seen in the EU with the attempt to mobilise the 'institutional gap' with regional structural funds. In terms of sub-national governance in England, authors use the concept to explain the possibility of fiscal decentralisation and support the levelling up argument for more sub-national fiscal powers. The differentiation of multi-level governance can therefore be described as Type 1, Type 2 and Type 3 governance, or 'vertical', 'horizontal' and 'diagonal' respectively, diagonal also known as 'task specific' (Marks et al, 1996) (Flinders, 2004) (Faludi, 2012). All three provide slightly nuanced perspectives. Perhaps the most qualified perspective of multi-level governance is that of Faludi who considers Type 1 to qualify as governance and Type 2 not to qualify

as multi-level, Faludi describes the Types as patterns of diffuse interactions, concurrent with Torfing's perception of diagonal governance, critiquing this view of governance, Liddle (2018) posits that a major flaw of this type of categorisation between Type 1 and 2 governance is the missing territorial element in the analysis, this is a pertinent point to city regions given their unique geography and spatial focus of the research. Governance is 'all the processes of interaction', whether the interaction is through formal legal methods or informal norms of an organised society, it can be implemented by the State, the market, or by other appropriate governance structures. The related theme of network governance is crucial to the implementation of The Heat and Buildings Strategy due to a mixed knowledge of networks that are required to produce change through institutions and can be described as a process that exists in and between formal and informal institutions (Bevir, 2012). The horizontal, vertical, and diagonal descriptions of governance presented here all support the need for the subsidiarity principle to be incorporated into English sub-national governance. This principle simply states that any task that can be delegated to a lower level of governance should automatically result in powers and accountability being shifted to the lower governance level, although the degree to which this can be implemented is dependant there on institutional ability and knowledge.

#### **The fourth principle - Institutional involvement, spatial relations & knowledge**

Institutions have been described differently in the literature; the strength and quality of institutions are thought to influence economic growth, institutions can be both formal and informal and they can follow both 'hard' and 'soft' rules (North, 1990). Alongside social norms; as a guide, institutions can contribute to sub-national governance authority functions by increasing drivers and capitals for city regions and can be found embedded in various guises and contemporary institutions. Too much institutional involvement can hinder economic growth, and institutions can be developed at different paces. Storper (1997) asserts that institutions are different to organisations and posit that institutions are more successful if the relationships and social situations in which they operate are effective. Place-based governance at a sub-national governance level reinforces the need to have strong institutional support to progress local business to create an effective working environment for the

economy to develop. Institutions based sub-nationally are important to bring together local ideas and knowledge regarding economic development. Institutions can be classified as both 'open' and 'closed', open is described as having an inclusive and community 'feel', whereas closed adhere more strictly to internal rules not routinely divulging information or having any public involvement. Similarities with open systems are therefore apparent, diversity of involvement is a crucial point when explaining place-based governance as, at the sub-national level of operation, inclusion of all individuals from different sectors is required to achieve a truly place-based meaning. The 'inner workings' of an institution are paramount to understand if a place-based approach is to be implemented. Alongside the principles of democracy and participatory governance, the concept of internal participation in city regions, such as government officers and citizenry are apparent in systems dynamics within the areas of desired goals, resources, and learning influenced by these people, more broadly, these elements are part of second order system thinking.

Devolution Deals are fundamental to the substance of this research and reinforce the point that fiscal decentralisation in the broader context of sub-national governance is one of the most contentious and central issues in relation to decentralisation, this is a typical example of an external or exogenous influences in systems theory dynamics. The fiscal element, part of city regional governance system, relies in turn on the understanding that local people can better understand how to spend money within their own city region, this is based on more intricate knowledge of their own area including economic knowledge which relies on cultural and historical factors in the industrial, economic areas, and current 'geopolitics' (Hildreth & Bailey, 2014) (Jessop & Ngai-Lang, 2018). A prime example of these principles in practice in both city regions under investigation is control of the Adult Education Budget (AEB) as part of the agreed Devolution Deals. The argument for the transfer of fiscal responsibility aligns closely with fiscal developments and is central to other elements of power transfer at a sub-national level. Perhaps one of the disadvantages of decentralisation is the influence of local 'elites' which produces similar flaws to market failures due to 'rent seeking' behaviour (McCann & Rodriguez-Pose, 2011), this when actors extract value from a scenario without making any contribution to actual productivity; rent seeking has been particularly relevant in the finance sector (Haselmann & Vig, 2018)



and particularly ineffective to grow economies when aligned with ‘weak’ institutions (Hildreth & Bailey, 2014). The content of the fourth principle can potentially therefore vary enormously in city regions depending on the governance structures in place and potentially varies in non-mayoral and mayoral controlled areas. Theoretically, knowledge via institutions is affected by spatial relations, cognitive approaches, learning through feedback, and transmission of knowledge, all are elements of systems theory dynamics both through first and second order systems thinking.

### **The additional fifth principle – A summary of integrative adaptation**

To effectively use Dooley’s paradigms and the broader concepts contained within systems theory dynamics, there is a need to rely on a variety of factors both internal and external to a city region. Businesses, community groups public and private institutions, all require an element of integration as agentic agents produce economic activity and all contribute to an increase in economic growth. This fifth principle is suggested to extend on the place-based governance concept and provides the ability to use systems theory dynamics to produce the theoretical model in Figure 6 as a functional analytical tool.

Place-based governance has intrinsic elements which constitute the central tenets of the approach, these principles are undoubtedly influential and can be applied in the economic development of a place; through the influence of microeconomics of business and endogenous growth, mobilisation of the local population, and the attribution of economic growth through a ‘bottom-up’ process. The place-based governance concept is used in different ways in the context of academia and policy fields to provide a range of interpretations of what constitutes a ‘place’ using governance structural principles, pre-requisites, and assumptions that all places can grow economically. The term ‘place-based’ provides an alternative to classic economic theory of competition or ‘only the strongest survive’ approach, favouring instead a collaborative approach. This corresponds to the suggestions in systems theory dynamics that multiple parts are more important than the whole and is another reason place-based governance is suitable for the application of systems theory dynamics. The concentration of agentic agency activity present sub-nationally is a conduit for economic growth, inter-agency working is an important part of the

collaborative governance theme uncovered as part of the literature review and the principle of interaction is forefront of both place-based governance and systems theory dynamics, as it incorporates other elements and principles that are directly relevant to place-based governance. The Health Foundation (2010) describes second order thinking of systems dynamics as agentic agents that interact, agents that are influenced by other agents' decisions within the system. Agency is described as having non-linear behaviour, openness of boundaries, historical influence, that all shape decisions and agents in any system, these points are found in a practical sense in place-based governance and city regions. Different dimensions exist within systems theory dynamics, more specifically, CAS contains elements of second order thinking.

Buildings on Dooley's paradigms, Dooley and Vande Van (1999) specify how paradigms are implemented given the nature of interactions between causal factors and linear development, this contrasts with non-linear working to promote, in their view, four 'dimensionalities'. They posit nuances between independent linear thinking, causality, and whether path dependant approaches should take a global rather than a local approach. The dimensionalities support the interactive elements, described as 'factors' or 'variables', five to six or more of these elements are classified as many, fewer than five classed as few. In their view, these factors are required in systems theory dynamics in the sense that variables rely on each other to constitute interaction. Interaction and are categorised as typically independent to interdependent, global versus local, either with path dependency or without. Table 6 highlights how the characteristics are reliant on each other.

**Table 6 - Characteristics of Casual Systems and Observed Dynamics in CAS**

Dimensionality of Casual System				
Nature of interaction	Low Dimensional (below 5 variables)	Description	High Dimensional (5/6 or more variables)	Description
No interaction or Linear Interaction	Periodic	If the observed dynamics of the time series are periodic, then one should consider a causal theory that contains <b>few significant factors or variables</b> acting in an <b>independent or simple linear fashion</b> . If the system in question involves a multitude of human action, <b>significant control and/or cooperative mechanism</b> should be hypothesised; this mechanism may be <b>managerial, adaptive, institutional and/or self-induced in nature</b> .	White Noise	If the observed dynamics of the time series are random then one should consider a causal theory that contains <b>many significant factors or variables acting in an independent fashion</b> , the theory should <b>support a lack of path dependency</b> .

Dimensionality of Casual System				
Non-linear Interaction	Chaotic	<p>If observed dynamics of the time series are chaotic, the one should consider a casual theory that contains <b>few significant factors or variables that act in an interdependent fashion.</b></p> <p>The nature of interaction between casual factors should be <b>global rather than local in nature. The theory should support path dependency.</b> If the system in question involves a multitude of human action, <b>significant control and/or cooperative mechanisms</b> should be hypothesised; these mechanisms may be managerial, <b>adaptive, institutional and/or self-induced in nature.</b></p>	Pink Noise	<p>If the observed dynamics of the time series are pink noise, then one should consider a casual theory that contains <b>many independent factors acting in a constrained fashion and interdependently.</b> The nature of these <b>constraints, or feedback loops</b> should be <b>local rather than global in nature.</b></p>

Source: Adapted from Dooley & Vande Van (1999)

In summary, in the context of low carbon installations and the general trends found in the literature, sub-national governance is situated as a unique concept that is facing ongoing constraints due to a lack of decentralisation from Whitehall, it is potentially susceptible to the influence of Type 3 or diagonal governance and its associated problems highlighted earlier and risks exposure to capitalism.

### **Systems theory dynamics in context**

The inherent element of competition that exists sub-nationally is part of the introduction of New Labour's education and social policies in the 1990's that sought to reconcile neo-liberalism with a commitment to social cohesion and inclusion, described by some as 'third way' politics (Giddens, 1998). This competitive element continues with the introduction of MCAs and LEP's and has influences on policy making within England, although it is recognised that notions of social cohesion and inclusion are developed by promoting a limited application of social justice within sub-national policy, which is usually predominantly secondary to economic priorities. This section discusses advantages of systems theory dynamics in the context of 'new localism' (Prachett, 2004), one such advantage of systems theory dynamics is of how the concept incorporates both social and economic perspectives into its explanation of 'how things work', this way of thinking in some respects advances the application of systems theory dynamics, as for both first and second thinking to be applied constructively, innovation is required and a causal link between economic achievements and social outcomes must be demonstrated via the casual characteristics in Table 6.

In the case of MCAs, given the perceived accountability to the public, the salience of social policy arguments and implementation against the background of austerity, it is MCAs that will provide the governance model in which interventions such as low carbon installations are delivered. Interventions in the form of decision making takes for granted the competitiveness and social inclusion that should operate within policy development; particularly relevant to this research is skills training as well as corresponding models of social formation and society inclusion. In turn, these global issues influence policy development through agentic activity and the casual

characteristics as identified. Prior to the Coalition government, this type of governance strategy sought reform to develop and;

‘[provide] emphasis on "empowering citizens, as set out in its recent statement of its vision for public services’

(Select Committee on Public Administration, 2008, paragraph 67)

The literature review indicates that this approach may produce too many top-down targets that can be counter-productive and may limit delivery, overly prescriptive and top-down targets that are now thought to constrain professionals and sub-national institutions introducing innovative and creative practices. These constraints may hinder the agentic activity and work alongside a different ‘mix’ of casual characteristics as displayed in Table 6. In addition, collectively, the literature reveals that users and citizens need to be empowered so that they have more choice and control over the services they receive.

Broadly, the agenda that applies to the delivery of public services whether health, education or other areas of State provision, carry with them a localising emphasis which includes notions of empowerment, responsiveness, and adaptability; it is only by placing policy interventions in their local context that institutions will be able to respond creatively to the needs and demands of communities they serve. These arguments form the basis for what is described as ‘new localism’, the necessity to develop policies that serve the locality and communities (or in this case the city region). To deliver such services, sub-national institutions need to be free from overly tight surveillance by the central State with effective sub-national strategic leadership indicating the ‘direction of travel’ to be pursued. The introduction of new localism is not in fact new, but merely a re-formation of past relations, an example in the educational sector is that of the incorporation of Further Education Colleges in 1993, when this policy area was placed under the ‘democratic’ control of their respective local authority. Expanding on this point, Coffield et al (2007) illustrates the way a regional and sub-regional presence can enhance strategic plans through employer voice increasing apprenticeships through the articulation of local training and development needs, agreeing with the principle of systems theory dynamics that external institutions need to be evaluated as part of a collective system, in this case

MCAs to employers. This directional approach has been discussed by Newman & Gilbert (2005) who suggest that developments are represented as a shift from bureaucratic State-directed forms towards more fragmented types of service delivery which reinforce the policy networks that come to play an important role (Rhodes 1999). Policy networks will be placed not only at national but also city regional, sub-national, and local levels, bringing together policymakers, administrators, users and actors of various kinds using multiple policymakers who form different 'levels' of governance that interact towards a central goal. Networking measures only reinforce the use of systems theory dynamics as an analytical tool with shared themes of multiplicity and heterogeneity needed in the analysis.

New localism is thought to have the potential to re-establish local democratic accountability through the current emphasis placed on local operations by the State, systems theory dynamics has the potential to investigate this through its examination of 'all the working parts' rather than using a global analytical tool. In addition, there is a hint that new localism addresses the democratic deficit through the recognition of political processes that can move beyond those restricted to the ballot box. This can be seen in the inclusion of user voices in the shaping of regional public services and the call for accountability of providers which relates to bounded relationality and knowledge principles of Dooley's paradigms in UK government documents (Communities and Local Government Committee, 2006). Stoker & Evans (2022) argue that 'democracy is made real' through its practice at the local level and can be expressed through user voice as opposed to ballot box politics or users of a particular service. These academic and practical perspectives only add more weight to the argument for systems theory dynamics to analyse sub-national governance operations using a combination of first and second order thinking and using more organisational intrinsic elements to the city region such as human capital.

In a biological sense, in the context of 'wicked issues' systems dynamic principles can be used to explain organisational behaviour change with adaptivity inherent in place-based governance, congruent with systems theory dynamic principles and Dooley's paradigms, the adaptivity perspective of CAS is subsequently extended into work with a leadership focus surrounding large public sector institutions to

investigate service like the National Health Service by Uhl Bien & Russ (2007, 2009).

CAS as a subsection of systems theory dynamics is used to describe and explain organisational sub-national governance systems and how they work through the application of thought of a group of semiautonomous agents, or organisations that can act in an independent or collaborative way to produce a system of patterns and influence behaviour of agents. It focuses on agency as opposed to structure, and as a result, requires the thoughts and beliefs of individuals to influence patterns of behaviour or action, it relies on some of systems theory dynamics and second order thinking. CAS is considered highly relevant due to the 'gel' with the principles of place-based governance and contains elements of resource dependence theory (Werner, 2008), feedback loops (Liddle, 2018), emergence, dynamic processes, adaptivity (Koontz et al, 2015) and population ecology. The proximity of CAS overlying the fundamental outlook of 'bottom-up' decision making, governance processes, and policy making, makes it highly relevant to place-based governance and 'new localism'. The codification and progressive nature of a place-based governance way of working provides a perspective based on values and social factors, implementation by place-based actors generally, with a need to work with opposing market driven forces of neo-liberalism. This research views the two 'ends of the spectrum' with respect for societal values and capitalism as these are relevant in the roll out of low carbon buildings, place-based governance, and sub-national economy delivery.

Collectively, place-based governance and systems theory dynamics can work towards producing strategies to optimise growth conditions, certainly, the literature highlights that 'wicked issues' or 'adaptive challenges' are common and complex issues, they are not seen to have the constitution to be dealt with in accordance with a hierarchical types of governance system:

'Adaptive challenges are not amenable to authoritative fiat or standard operating procedures' (Uhl-Bien et al, 2007, p300)

This research applies systems theory dynamics to place-based sub-national governance and relies on Dooley's paradigms and 'systems thinking' to explain findings alongside the intrinsic principles of the place-based governance approach.



In summary, the three paradigms from Dooley; systems theory, population ecology and information processing, are applied to sub-national governance institutions alongside the six broader principles of systems theory dynamics.

Complex systems include adaptive leadership and accountability frameworks that are intrinsic within other governance systems in Europe, the German Federal governance system for example, operates at a sub-national level of governance and offers an alternative mode of governance using concepts such as ‘scaling up’ and ‘policy diffusion’ (Eckersley et al, 2023; Kern et al, 2023), which have managed to some extent to limit ‘scalar dumping’ (Peck, 2012, Waite & O’Sullivan, 2013). In a theoretical sense, systems theory dynamic ‘fits’ within the Type 3 governance model discussed earlier and has advantages over purely the vertical and horizontal approaches alone; through the introduction of adaptivity, flexibility, integration, and ‘intermingling’ of ideas. Hence, systems theory dynamics in a sub-national context has the potential to increase the agentic activity needed for economic stimulation by producing innovative and new ways of working.

### **Applying systems theory dynamics to city regions**

Sub-national governance institutions responsible for city regions in England are working within a contemporary political climate that revolves around an extraordinary and unprecedented set of demands. Systems theory dynamics is increasingly being discussed in public sector services as a way of combating this, for example, many sectors including the police (Herrington & Colvin, 2015), the civil service (Government Office for Science, 2022), collaborative policy making (Cairney & Toomey, 2025) and health care (Bigland et al, 2020). This may well be due to the challenges in these sectors being characterised as a ‘perfect storm’ (Ghate & Welbourn, 2013, p. 6), due to the collective increased need for public services and expectations in England. In addition, the reduction in resources and capacity of sub-national institutions, discussed in Chapter 2, underlines underlying problems for current political leaders that convey complexity, unpredictability, and fragmentation, when dealing with persistently ‘wicked issues’ including low carbon installations. Wicked issues require more than one solution and the complexity of issues within a city region reduces the chances of one person alone in the form of hierarchical

governance types formulating a solution. The constitution of a city region requires a need for collaboration of institutions within defined geographical areas which require inclusion of multiple agencies with key personnel at all levels, this results in a fluid and permeable governance system as jobs and teams that were once separate are merged.

The evidence gathered as part of the literature review in relation to place-based governance culminates in the argument that systems theory dynamics is a crucial framework to understand sub-national governance and the interactions under investigation within a city region. Current important elements that influence sub-national governance such as fragmentation of financial incentives, the introduction of risk and decision making, the utilisation of innovation, all require communication and are interdependent. Applying systems theory dynamics to the phenomenon under investigation requires multiple input from various institutions. The open systems model alluded to provides a way to investigate and identify ways of working; by providing an environment to apply complexity theory to governance and investigate complex problems in the context of low carbon installations. The hierarchical 'top-down' method of governing sub-nationally may well be slowly changing in certain parts of England, LCR and SCR being two city regions in which this applies. The rank authority of mayors is also slowly changing, this leads to an ideal situation in which to apply complexity theory. A 'bottom-up' approach, alongside a diagonal governance type, is considered to have a better understanding of institutional ability to govern sub-nationally, as well as the 'real world' in their own city region and concurs with the agentic activity principle within systems theory dynamics.

There are two main reasons systems theory dynamics is appropriate for this research, the first, as personnel, employees and staff within MCAs are encouraged to work more closely with each other, increased networks and new ways of working towards constructive policy development are required; new mechanisms require analytical arrangements to develop collaborative policy and solutions. The second, is that systems theory dynamics allows for relational analysis between constituent parts of systems through its subject content that encourages relevant theoretical

analysis to city regions; the resultant 'cross governance' system of working can cause a situation where structural, cultural, and people orientated issues can occur. Collectively, therefore, there is a need for a cross boundary and 'complex' analytical tool to investigate these phenomena within a city region, complexity, as it is argued in this research, can be solved through the application of systems theory dynamics as this provides a way to analyse multiple and complex phenomena by providing a broad spectrum of subject areas; alongside relational theory, to assist analysis due to the heterogenous nature of both the theory and city regions. Systems theory dynamics also provides a means to assess ways of thinking, assess actual implementation, and can assess relationships and the 'people' within the city region. Systems thinking is a framework for seeing the interconnections of institutions and businesses within a system of governance which realises the extent of fluid boundaries to governance within England, how they all relate to each other within a city region, and how they can generate new insights and solutions. Put another way, how far a researcher 'zooms in' or 'zooms out' depends on the problems encountered, and, in this research, which institution is being investigated. The ability to apply systems dynamics to different governance institutions is apparent which means that different institutions responsible for different areas of governance can be investigated, for example, that of the LA, MCA, or central institutions. The five-step process described by the Government Office for Science (2022) in relation to system thinking confirms that a shared goal and understanding of multi-faceted problems are required, before moving onto a multi-pronged interventional approach with adequate testing and monitoring. Systems theory dynamics provides for these requirements, given the multiple agencies involved in contemporary sub-national governance in England and the reduction of traditional public administration approaches to governance referred to in Chapter 2.

The need to work towards a more transformational way of working, rather than the purely transactional one, is also apparent, this approach 'fits' with the concept of social value introduced earlier. Systems theory dynamics allows a more fluid way of assessing and analysing transformational change, the different types of governance - hard and soft, found in the literature aligns with the concept of systems theory dynamics and are deemed to complement governance investigation. Collectively,

perhaps better termed ‘systems governance’, the combined approach of systems theory dynamics and governance theory provides flexibility and a framework that can analyse governance processes that are inherently interdependent and at the same time greater than the sum of its parts (this aligns with the philosophical approach detailed in Chapter 4). At the core of MCAs functional structure, is the collaboration of actors outside the city region that contribute to policy development, the complexities of which are becoming more diverse and complex over time. These ‘additional elements’ can be seen to require the self-organising elements of some systems. Another main theme of systems theory dynamics is the resultant outcome, known as emergence, thought of in this research as policy outcomes or economic growth. The term emergence can be interpreted in different ways and can include scoping new policy, managing changing timelines and delays, identifying delivery risks, designing policy, developing robust appraisal evaluation, and contributing to strategy development. Due to the heterogeneous nature of city regions, systems theory dynamics also provides a means to assess ways of thinking and assess actual implementation, it provides the ability to assess institutions that are increasingly thought of as ‘ambidextrous’ in nature (Herrington & Colvin, 2015).

### **The theoretical model outlined**

To apply the six principles of systems theory dynamics within the context of this research and to investigate the intrinsic working of sub-national institutions using Dooley’s paradigms of management and governance application; the concepts and principles are extracted from the literature (Preiser et al, 2018). These are presented in Figure 6 as the theoretical model for the research, designed by the researcher, in combination with Dooley’s paradigms in Table 4 and characteristics of casual systems in Table 6, unearthed in the literature review. To explain the model, the six principles can be applied to any complex adaptive system or system dynamic, these are: constituted relationally, adaptive capability, dynamic processes, radical openness, contextually determination and complex causality all resulting in emergence (Dooley, 1997). The constitution of second order thinking of CAS organisations is defined by interactions and components, rather than the components, these are relational to the processes involved between the external environment and institutions themselves both sub-nationally and centrally. This is

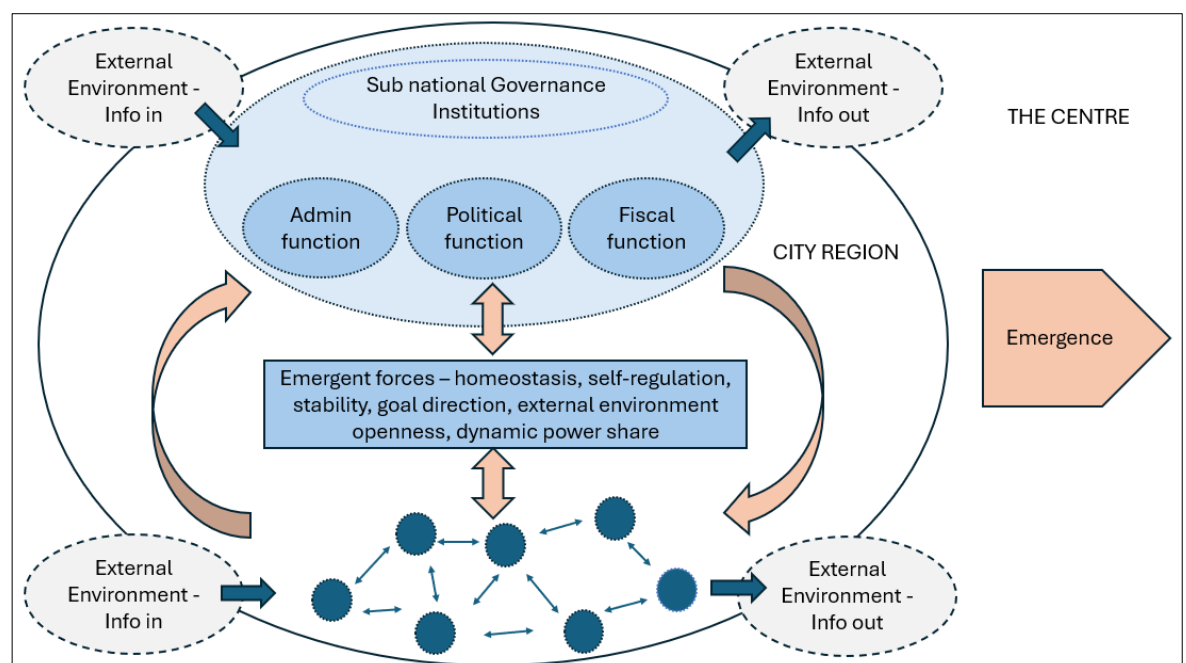
demonstrated in Figure 6 by arrows of different sizes and colours and lines, either full, dashed or dots demonstrating more porous lines of communication and information exchange boundaries. Each circle represents a 'function' of sub-national governance responsibilities introduced earlier, the control and attitudes if these functions influence a sub-national governance institution's ability to operate efficiently in the city region. From left to right in the model, the functions include administrative, political and regulatory duties, and fiscal. Firstly, the administrative section provides support for the executive, sometimes with delegated powers and essentially ensures policies are written in accordance with the executive's wishes; secondly, the political and regulatory influence accounts for executive powers and decision making; thirdly, fiscal considerations can align closely with the market, which has a strong association with the finance sector and can influence a variety of decisions when implementing projects. All these sectors revolve around the central theme of information flows (Geng & Doberstein, 2008), and are set within central government, 'The Centre', in the background.

The flexibility of institutions is reliant on their adaptivity, including responding to feedback and efficiency of information flows of external organisations, information exchanges are depicted as described, the different lines, full lines, dashes and small dots, represent the cross over of information and differential 'boundary' line as information crossover is more constrained than others. Dotted lines with boundaries indicate a more porous and fluid boundary for information exchanges and policy making than the larger dashes. The non-linearity inherent in systems theory dynamics within the theoretical model is characterised by arrows, lightly coloured arrows show internal feedback and information exchanges, and dark blue coloured arrows for internal and external feedback from central government into the city region. The essential ingredient of openness is demonstrated in the model using circular oval shaped spaces to separate crucial areas of practice in governance and systems theory, within the function of the city region.

Dynamic interaction is a culmination of the illustration and facilitation of innovative practices that are led by agentic activity or dynamism increasing information exchanges, institutions using the principles of systems theory dynamics are seen as

institutions that are run by non-linearity and need to influence contextual change for institutions to function. The agentic dynamic activity is depicted with dark blue smaller circles representative of SMEs are the result of emergence is represented in the model by the large arrow on the left indicating innovative practice development. The resulting emergent activity is therefore drawn from non-linear, multiple processes within in a complex system which differs from a complicated system that is drawn from linear processes. Figure 6 visually illustrates the interaction and relationships of place-based governance and elements of systems theory dynamics.

**Figure 6 – Applied theoretical model for sub-national governance**



**Source: Authors own**

### Literature review conclusions

The concept of place-based governance is surrounded in controversy and systems theory dynamics, whilst developed to understand complexity, is complex. The most effective way of governing at a sub-national governance level requires intrinsic mechanisms that form a well-functioning and effective governance structure that can take several approaches, some take a pragmatic view in policy development and are more descriptive to ensure that boundaries are respected through robust measures, for example, housing figures are quantitative in nature in planning policy; others take

the view that policy development should take a dynamic approach and require qualitative input in the sense that place and relational views are incorporated into policy. How these differences are interpreted through decision making processes can influence policy making, from relational elements to more territorial or spatial constructions, this in turn, influences how policy makers write policy. The ‘geography of governance’ in the sense of whether policies are ‘spatially blind’ are a crucial focus to the investigation. Dependency elements and other strands contained within CAS are imperative to contain and evolve economic policy development in a place-based fashion.

Different approaches to policy development and governance of territory can conflict and crossover, hence different approaches have influence in delivering central government policy. This is irrespective of the level of governance, whether local, city regional, or sub-national, the main point of economic policy is for an economy to grow (Barca, 2009); however, initial economic growth should be focused on the geographical spatial territory concerned with the place. Currently, the landscape for a space neutral approach to economic development seems fundamentally flawed (Pugalis et al, 2014a, 2014b) the place-based way of working offers conceptualisation to potentially offer the scope through supportive institutions. A collaborative governance approach that is tailored to unique geographies or city regions and offers place-based governance as a panacea for embedding multi-scalar solutions for complex capabilities, knowledge sets, and assets. Takeaways from this chapter should be:

- Place-based governance can encapsulate various theoretical perspectives of governance and can facilitate ‘bottom-up’ policy development to implement central government strategy.
- Decentralisation and multi-level governance can promote a more inclusive way of policy making and economic development initiatives through the principle of subsidiarity, increasing power share among lower levels of governance, limiting neoliberal ‘overkill’ and potentially harmful capitalist behaviours.

- The concept of diagonal governance (Type 3) potentially offers a more cohesive way of governing and policymaking, although experience from the financial sector shows this can cause accountability issues.
- Local knowledge gained through institutions can have the potential to increase endogenous growth within a set geographical area, importantly, having the ability to motive innovation in relation to technological advances.
- Systems theory dynamics provides various analytical perspectives which can be used to analyse organisational processes, change, and effectiveness at a sub-national level.
- Principles of systems theory dynamics include interdependency, dynamism, and adaptivity, these principles can support interrelationships when working between institutions at a sub-national governance level.
- The element of integration is essential in a city regional governance structure and an extension and combination of systems theory dynamics and place-based governance is a useful analytical tool applied to this research.

### Research questions

The two literature review chapters have highlighted the need for the following research questions to be answered, the research will be led by an overarching research question of:

- **To what extent can sub-national governance institutions support a place-based approach to delivery of The Heat and Buildings Strategy?**

The research questions are the sub divided into:

- How can sub-national governance institutions address barriers to the implementation of low carbon installations?
- How can sub-national governance institutions facilitate endogenous economic development and deliver low carbon installations?
- How can sub-national governance institutions influence appropriately resourced city regional policy to improve delivery of The Heat and Buildings Strategy?



## Chapter 4 - Methodology

### Outline

This chapter explains the methodological approach undertaken in the research and provides justification for the choice of research design and strategy; the chapter explains how the research strategy was informed by the choice of method. It also highlights the current debates surrounding the chosen method, that of the case study design. A methodology describes the philosophical approach that underpins a study, from both an ontological and epistemological perspective, it establishes the problem which drives the research, the methods employed throughout the design, development, and type of study (Levy & Ellis, 2006) (Ellis et al, 2008). The research strategy was decided using a theoretical and philosophical approach that was supported by academic literature. The chapter is divided into two halves the first half explains the theoretical philosophy that influences the research strategy, it starts with an acknowledgement of a need for flexibility within research design to account for flexible geographies, the researcher's positionality is then stated, and the philosophical approaches of the research are then explained. The chapter then moves onto contrast relativism and realism before explaining the broader principles of qualitative research. The second section describes the research design, methodology and methods used, and explains how the research was conducted, discussing how data collected was analysed and how the findings were produced. The chapter justifies the chosen methodology and method for the research.

### Cases studies with fuzzy and flexible geography

This research relied on a multiple case study design against a backdrop of flexible governance boundaries under investigation. Economic geography research historically viewed investigations purely in terms of the inner workings of whatever mechanism was in place in the geographical area under investigation, for example, capitalism, feudalism, or imperialism. More recently, alongside the rise of a Marx's philosophical perspective during the 1970s, the focus of economic geography research changed and sought how to discover connections between the inner workings of capitalism, the associated social relations, and the constitutions of public sector institutions. This included academic work and introduction of the term

the 'spatial fix' (Harvey, 2001), the concept of the 'spatial fix' could be said to be the geographic spatial equivalent to what Marx described as 'a technological' fix, or the replacement of labour in the production process with machinery; within the 'spatial fix' concept, Harvey expressed many principles but two are particularly relevant to this methodology; firstly, the expression of a link between the political-economic aspects of capitalism and the development of uneven geographies, and secondly, that uneven development through capitalism was an active process and not merely a side effect of 'normal' development. These two principles resulted in a theory that put forward capitalism as a creation of a particular spatial configuration and came from an understanding of what capitalists had created, for example, capital investment generated secure surplus value, which in turn involved actively shaping landscapes for both production and consumption, or the enhancement of more capital; in the case of this research the production and consumption of carbon to influence climate change. Harvey argued that, due to the reduction of State involvement, the capital invested in any geographic must consist of infrastructure, or put another way, investment must be in physical or social infrastructure, hard or soft, such as buildings, transport, education and research. The simple view of the 'spatial fix' was two-fold, the surplus or accumulation of capital produced by capitalism should be displaced within long term investment, such as long-term capital projects or education, to defer any further surplus in the future; secondly, surplus capital should be displaced spatially by opening new markets and put into social and labour possibilities elsewhere. This could be either with or outside of the city region the context of this research, however, this had potential consequences, in that, if capital was moved outside of an area this caused more flexible boundaries geographically. This theoretical proposition was transposed into the methodology in a city regional economic sense by either exporting capital outside the city region or keeping it within the city region's boundary. Furthermore, the proposition could also be applied to discussion in labour movements concerning workers within the city region, which was appropriate to skills development, another topical issue within the research. The primary application of Harvey's concept showed that any research methodology used must be flexible and adaptable to account for flexible geographies.

### **The researcher's positionality and professional knowledge**

The researcher was originally from Northern England, had a State school education, and had worked for most of his career in the public sector. The researcher's perspective came from work experience gained predominantly in the public and planning sector, as part of this work experience the author had observed successive governments change national policy in relation to the planning system and had first-hand knowledge of national policy implementation whilst working on strategic planning projects. It was acknowledged that previous work experience in local government may shape the researchers' perspectives and could influence the research questions posed and how data was collected and interpreted. During the data collection phase, the researcher, as an interviewer held a submissive position compared to the participants who were mainly in authoritative positions in institutions at varying levels of authority in England. This may have influenced interviews in relation to power dynamics, in that, the researcher was 'underneath' the participants in terms of power dynamics. The research took predominately a philosophical position of reductionism, and critical realism, in that, the researcher attempted to explain the process via assessment and evaluation of a system's constitutive parts and interactions; from an empirical perspective the researcher had seen the implication of how 'processes' influenced decision making and strategy within sub-national governance systems within England. It was accepted that this may have influenced the design and interpersonal relationship of the study's findings as the author had witnessed the pros and cons of collaboration and collective working versus working in isolation. However, previous work experience may also have provided a positive, in that, this had provided the researcher with the ability to see the empirical, actual, and real elements from a critical realist perspective. For example, the topic of sub-national low carbon installation in The Heat and Buildings Strategy could be broken down into institutional and business elements to create units of analyses from experience. Empirically, the research had not observed any evidence of an increase in low carbon buildings prior to starting the research.

### **Philosophical principles**

The researcher's ontological and epistemological assumptions situated the overall research design within a particular paradigm (Bryman & Bell, 2015) (Punch, 2013). The methodology for this research arose from the researchers' belief that there was a need for social interaction to construct knowledge but also to understand effective implementation and collaboration, the processes of which required an objective perspective. The research was based on the philosophical assumption that a collective knowledge base and social interaction from a group was required to investigate, understand, and explain the phenomenon under scrutiny within a wider scope of objectivity. The use of a specific philosophical approach influenced the understanding and interpretation of the research design and results; participant's perceptions towards low carbon installations and type of sub-national governance were the subject of the investigation and this was thought to be understood through a process of decision making by a collective interaction. This view was related to making decisions by leading through social interaction as a collective group and distributed responsibility was fundamental to interaction and interdependence. It was posited that both the individual awareness, their beliefs and views, would affect the collective effort towards a particular governance type. The type of decision making would result in a particular typology of policy formation, furthermore, the methodology investigated the ability for sub-national governance institutions and businesses to enhance a place by using agentic models as a collaborative body.

Social interaction was also considered a fundamental factor to implement development and choice, the research was based on a premise that believed in a collective governance model, containing the assumption that whilst businesses, owners and managers, and governance bodies took responsibility for their own perceptions and views; low carbon installations was a socially interactive process, not solely an individual one and reliant on the outside world. The study also recognised that perceptions were often unconsciously held, and it was hypothesised that, if perceptions regarding low carbon installations were held by sub-national actors, these could be determined from descriptions of their own experiences in collaboration within a socially interactive process. The positionality for the research included placing value on all local economic, environmental and social perspectives.

The researcher believed that economic perceptions were a result of personal experience, and that perceptions of place-based governance and low carbon installations were socially constructed and could influence actor's perspectives. The requirement to collaborate with sub-national governance authorities was a cornerstone of the philosophical underpinning, however, it was important to note that, whilst the researcher was also looking for casual mechanisms beneath the surface, referred to earlier as the 'real', or in Kants description phenomenal; it was postulated that perceptions were a result of experience and active practical involvement. From a qualitative approach this was deemed necessary to encourage research participants to describe their experiences through an interpretative approach to analyse those descriptions and determine perceptions. The case study design assisted with expanding on data to 'firm up' conceptual validity in qualitative research, some phenomena, like data collected through interviews was difficult to measure quantitatively, for example, a researcher might study and contextualise comparisons across dissimilar or similar contexts or places which could provide a higher level of conceptual attainment.

### **Ontology & Epistemology**

Ontological research questions investigated the nature of the world and related to what sort of things exist, epistemology meanwhile, was concerned with how researchers understand the social world, through scientific methods and evidence which supported conclusions. Ontologically therefore, the research focussed and investigated on the implementation of low carbon installations from the outside looking in and from multiple realities, the principal of plurality was particularly in common with place-based governance, through ontology, implementation as a concept was viewed as a scientific body of knowledge and set out rules and procedures that were applied to reach answers to problems. Implementation as a concept could be seen using an 'it is as it is' approach with no need for understanding; alternatively, the contrasting ontological perspective would view implementation as a phenomenon of human conceptualisation that was witnessed in the world around us; that needs to be understood and explained through epistemology. In this research, to make sense of implementation of low carbon installations, the concept was seen as a collective one as it incorporated social

construction as a catalyst. This was an argument supported by Burr (2015) who acknowledged that an objective reality existed through critical realism but with a sense that a social constructionist view was needed to understand ideas arising from interests, activities, and practical involvement. Critical realism also had an element of subjectivity in relation to understanding regarding an objective 'thing' but to a lesser extent. The researcher viewed problem solving and solutions through an active and interactive process, whereby, activity itself was crucial for participants to make and discover knowledge through a collective basis (Szydlik et al, 2003).

Associated with these perspectives was interpretivism, a branch of ontology associated with the philosophical approach that focused on the process by which meanings were created, negotiated, and sustained. Taking a view from this perspective, the focus for the research was not the subject of governance implementation itself, nor the actors involved, but the relationship between the two. By its very construct, this perspective was considered relational and fluid. It was considered here that through 'relationality', or put simply, what was learnt between the business (SME) and the appropriate institutional body (MCA, NMCA, LEP) was what needed to be understood. This determined participant's perceptions of implementation and how decisions were made through social interaction which focused on the relationship between the process and experience of such, added to this perspective, was what knowledge had been contributed and developed through social interaction towards the governance process formation and was a contributory factor to the study. Learning around the concept of governance processes, inherent within a second order system dynamic introduced in the previous chapter, involved qualitative experience which was dependent on the interpretation of participants understanding and commitment towards a shared common goal; this was the main objective towards the production of knowledge and place-based governance theme and was also continuous with systems dynamics through actors' interdependency. From an epistemological viewpoint, implementation of low carbon installations was perceived as existing, it was created, shared, and viewed as reaching an understanding through social interaction, facilitated by active implementation with participants in an active, flexible, and problem solving way. Interaction of agentic agents led to communication through an open system (of governance).

## **Social Constructionism**

Social constructionism, also known as constructivism, rejected ontology and represented an epistemological approach to understanding knowledge through social interactions, importantly, it used language for understanding. Social constructivism could be applied both to verbal interactions in interviews and through written documents such as economic strategies which were developed by governance institutions. Historically, social constructionism originated some thirty years ago and its origins in sociology were associated with the post-modern era, the approach had emerged as an attempt to expand on the nature of reality, some authors viewed the approach as a subtle mid-way point between realism and relativism (Hammersley & Atkinson, 2007). Other authors provided the added caveat of a need to understand the concept of social constructs through collective individual experiences and included social and cultural knowledge as crucial to place-based governance (Young & Collin, 2004). Several versions of social constructionism had emerged in the literature, and different authors projected different views (Schwandt, 2003) (Burningham & Cooper, 1999) (Charmaz, 2006). The cultural aspect was more pronounced in the literature when using the alternative term social constructivism and this perspective looked at the learning that individuals gained from group interaction, this term was the philosophical explanation of what was learned (Hyslop-Marhison & Strobel, 2008), or in systems theory, emergence.

Alternative versions of social constructionism existed with nuanced alternative understandings and were slightly different perspectives of the same approach. Two distinguishing marks of social constructionism included the rejection of assumptions about the nature of mind and theories of causality, this emphasised the complexity and interrelatedness of many facets of individuals within their communities and supported an open system approach. Schwandt (2003) differentiated between radical and social constructionism and viewed social constructionism as created by construction in society, in contrast, Burningham & Cooper (1999) discussed constructionism in terms of being either contextual or strict, both author's viewed similarities in this view of social constructionism which recognised, to some extent, an objective reality. In the case of Schwandt, this was radical, in the case of Burningham, contextual, the alternative concepts from both authors maintained a

relativist position and the belief that multiple realities existed. Put another way, the way the world was only known in relation to peoples' experience of it and not independently of that subjective experience, this added to the justification for the methodology as the phenomenon under scrutiny, that of the place-based governance relied to a great extent on local knowledge.

### **Critical Realism**

This was an alternative approach to social constructionism but had some similarities, this approach took a realist stance, rather than an ideological commitment to a particular methodological paradigm and focused on an objective reality looking at phenomena from the external looking in (Hammersley, 1992). A realist perspective accepted that there was no single definitive interpretation of reality, and not all interpretations carried equal weight. At first glance, this approach seemed to contradict the existence of social constructs and individual experiences seemed more applicable to the research, given the acceptance of internal and external influences. However, Sayer (1982) and O'Mahoney et al (2014) put this approach into context and mooted an individuals' knowledge and experience of reality would be rooted in the real material world but in an incongruent way, hence, critical realists also saw the world as relational to the objective 'thing', for example, Marxist thinking would argue that the social world was larger than the sum of its parts, or the individuals that make up the world comprise of relationships between different agents, and, like social constructionism, the approach used language as a tool. In some respects, this philosophical approach was more in accordance with second order systems thinking given the need for agentic activity as smaller parts of a system.

Critical realism saw language as independent for the individual rather than as a collective, another important aspect to critical realism was the concept of ontological depth, this concept explained that underneath the surface of any phenomena there was another reason that explained why that phenomenon occurred, referred to as the 'actual' level; taking Marxism again as an example, this perspective explained that it was social class that underlined the explanation for any phenomena (O'Mahoney et al, 2014) (Naess, 2015), human actors were not seen as



totally independent but human action, agency, society, and associated structural components were mutually dependant with cause and effect on each other. Actors were therefore subjected to external social forces and could make independent and reflective decisions in some ways contrary to the structuralist Marxism view. Systems dynamics and complexity theory also 'fit' with this way of thinking given that 'the whole' behaviour, in this case sub-national governance and SMEs as the agentic activity, occurred alongside an open system. From a systems perspective, critical realism endeavoured to broach the tension between structure and agency through a dynamic process but acknowledged an 'outside world' (Sayer, 1982) (Craib, 1992) (Naess, 2015). Some authors had discussed this approach within the context of systems open and closed systems and emergence (Scott, 2005). Actors transformed social structures and situations by enabling agency to act independently of one another, this element of dynamism was also apparent in systems theory introduced in Chapter 2 but through a collective process, as a result, there was an overlap between the two approaches of critical realism and social constructionism. The multiple and pluralist nature apparent in both but also had a collective process with casual effect. The different types of governance already discussed, network and collaborative, also 'fit' with this way of thinking with individuals or actors making changes to the social structures that they themselves constrained, or alternatively, enabled agentic agents to exist independently of one another but in a collaborative way.

Critical realism had a variety of versions (Jessop, 2005) and it was worth probing and describing some of the key propositions of this approach to be able to compare the variety of views of structure and agency. Ontologically, critical realism had the position of distinguishing between real, actual and empirical, but a relational element emphasised that the approach relied on external relations between internal and external dimensions. Indeed, critical realists held the properties of the approach to be both:

'Necessarily contingent and as contingently necessary' (ibid, p42)

This approach further aimed to discover the necessary and sufficient conditions of a given phenomenon, simple empirical generalisations were only acknowledged in the absence of knowledge about casual powers or mechanisms. An important point here made by Ringer (2004) on Max Weber's approach was the need for social scientists to consider the social and historical specificity, and spatiality, of the social forms under investigation, for example, the feudal versus the market economy, which was directly appropriate to place-based governance.

### **A contrast of the two approaches**

Social constructivism and critical realism were two very contrasting approaches but contained important elements of realism and relativism to contextualise each approach. The former consisted of multiple realities open to subjectivity, whilst the latter was purely objective; both concepts were centralised around two separated spheres of realism and relativism. A realist position ignored the way the researcher constructed and interpreted findings and assumed what was reported was objectively correct. The reality of knowledge was an independent action of external forces, whereas relativism, acknowledged that nothing could be definite or certain and multiple realities were influenced by external forces. There were also contradictions as to which approach should take precedence when studying a social phenomenon like low carbon installations in the context of place-based governance; as project implementation involved multiple actors and a 'place' was, per se, a physical reality.

Authors held different views on this relationship. Berger & Luckmann (1996) made no ontological claims but epistemological claims only, they accepted the view of a relational element between implementation and governance structures and that reality was socially defined, by the subjective experience of everyday life. They argued that conversation was a means of understanding a subjective reality, through language and conversation, knowledge could therefore be shared and transposed into meaning and understanding which was significant for society as regards the nature and construction of knowledge. Interactions of individuals created within society were central to a subjective understanding (Cojocar, 2013). Burr (2015) also provided various examples through what she termed macro and micro

constructionism using a combined interpretation, she cited examples such as gender and suggested that knowledge originated not from inside the person but from the social realm conducted through the medium of language. Burr argued that language made thoughts and concepts possible and not vice versa. Language came before concepts and provided a means of structuring the way the world was experienced, consequently; agency was dynamic through language as a better means of communication, but language ensured that structural elements provided a more complex means of interaction. In contrast, Charmaz (2006) provided a different view through discussion of a skin disorder such as psoriasis. Initially, this might be thought of as a contagious disease, but as knowledge increased regarding the condition, attitudes towards it and how it was viewed also changed. In this sense, the disease was socially constructed, had an ontological status, but incorporated an objective and relativist perspective. The recent coronavirus pandemic was another example of this approach surrounding knowledge development, here a disease was reflected in a different light as knowledge was increased. Summarily, realism and relativism represented two polarised perspectives on a continuum between an objective single reality at one end, and multiple realities on the other. Both positions relied on qualitative research, a realist position ignored the way the researcher constructed interpretations of the findings and assumed what was reported as a 'true' interpretation of a knowable and independent reality. Relativism led to the conclusion that nothing could ever be known for definite and multiple realities existed, none of which had precedence over the others.

### **Justification of approach**

Both social constructionism and critical realism were relevant and consistent with the principles of place-based governance and implementation of low carbon installations in buildings for different reasons, both had a relational element and normative dispositions of the phenomena under scrutiny. However, the aim of the study was to identify, explore and understand the underlying structures and mechanisms that were enacted by systems theory dynamics through the implementation of The Heat and Buildings Strategy. The research undertook a documentary analysis of data related to governance institutions with a qualitative interpretation as well as interviewing staff. This was particularly relevant as the units

of analysis were both organisations, acted as a collective, and relied on policy documents, for example, the concept of relational economic processes discussed earlier were consistent with the epistemological position that emergence in systems theory dynamics and innovation within 'places' were constructed through social action by inherent path dependence whilst an objective reality was acknowledged. This was independent of the individual and in effect a collective action. In this context, the research sought to explore some of the underlying neoliberal economic mechanisms and facts that shaped the development of sub-national low carbon development infrastructure and economic policy in England. It was clear social constructionism accepted that there was an objective reality as it was concerned with how knowledge was constructed and understood. Importantly, it had an epistemological not an ontological perspective. It also seemed that the current trend within qualitative research was not to draw such a sharp distinction between realism and relativism (Denzin, 2005). Debates and criticisms that surrounded realism and relativism were most important to the phenomena, as great emphasis was placed on everyday interactions between people and how they used language to construct their reality, social constructionism regarded the social practices of how people engage in the focus of enquiry, Charmaz (2006) had argued that constructivism was compatible with relativism, and hence, constructionist grounded theory was based on the associated epistemological assumptions that may have seemed compatible with the idea of social constructionism. Given the phenomena under scrutiny with the context of the study, critical realism was more appropriate to the study's design and objectives, the underlying motivation behind the intention of the study was to discover subjective beliefs pertaining to objective matters surrounding sub-national governance working, there must therefore have been cultural and 'essential' physical aspects to the data that was collected. In addition, critical realism also acknowledged the physical 'outside' world which was congruent with Harvey's perspectives. A critical realist view was therefore indicated.

To reaffirm, fully understand, and investigate the subject in question, a critical realist approach was taken; this was for three reasons; critical realisms started via ontology and the objective perspective where much of reality existed and operated independently of our awareness or knowledge of it. Secondly, notwithstanding a

belief in an objective reality, the approach acknowledged the need to accept that knowledge of the world was always relative to who we were and what we were doing to acquire understanding and knowledge through epistemological relativism. Thirdly, the principal underlying critical realism related to the judgments that we made in co-ordinating research which was relative and followed on from a realist stance in respect to ontology (Scott, 2005) (Brant & Panjwani, 2015). There was also a set criterion for decision making within the world, in this sense, this approach provided a more plausible model for inquiry whilst maintaining an element of subjectivity within qualitative research.

### **Qualitative Research**

It was the difference between social constructs, objective reality, realism, and relativism that influenced the methodological approach to the research. These were central factors to the choice of methods, research design, and data collection of the chosen methodological strategy and methods which were qualitative in the form of case studies with interviews. This was because the research questions were defined to probe participants views on low carbon installations and a qualitative methodology was best suited to this goal. This approach assessed participants beliefs, views and understanding as to the substance of the topic of the research question, the qualitative approach was primarily concerned with the assessment of a human being's experience in a humanistic and interpretive sense. The methodology, in any research study, asked the question of why data was best collected in a certain way and had, in this study, the advantage of being 'thickly descriptive' because of the detail involved in the data collected.

The qualitative methodology of the research study was also chosen as it explained how the enquiry should proceed by indication of what the problems were, highlighted by the literature review. The methodology was considered appropriate to investigate the principals of systems theory concepts, as a result, the researcher developed data generation through data collection and hence drew an analysis and made conclusions. However, qualitative research and particularly case study research had been criticised for a lack of evidential robustness. Regional economic research was increasingly populated by vague concepts that lack evidential analysis and clarity;

this had been expressed by Markusen (2003) who had commented on the difficulty of testing such concepts due to them being 'fuzzy', and in themselves, loose or too flexible for investigation. Case studies were considered difficult to test or operationalise as the analyses of such could be criticised due to the reliance on anecdotal or singular case studies, indeed, Markusen suggested 'qualitative accounts often fail to make the case that the particular case study was representative or that the findings from it were generalizable' (ibid, p705).

These perceived flaws were voiced to have been accompanied by a developed detachment from political and policy advocacy and was centred on institutions, agents, and the individual behaviours rather than the processes involved; both during their own decision making and the development of the methodology within the research itself. As a result of this, there was a voice for more research in accordance with social science norms of conceptual coherence, causal theory in the context of agents' behaviour, structural elements, and theory development were more rigorous evidence. Added to this, there was a call for a greater commitment to entering into the policy debate by making results accessible and informative to policymakers, regional planners, and political activists ensured that this strengthened the body of research and its usefulness.

The qualitative methodology chosen had a synergistic relationship with the methods used in the study and were based on the philosophical stance put forward in the previous section using critical realism as a philosophical component as advocated by the researcher (Kaplan, 1964). By using qualitative kinds of enquiry, the researcher identified that texts and other social objects, such as language, were suitable for analysis when data was collected via different options, described in more depth in the next section. The qualitative approach provided methods that explored the 'what' was said, either in text or via language, and the 'how' it was said. The research questions were 'how' questions, which justified a different method of interpretation and more complex examination not typically orientated or explained through numerical understanding nor a quantitative approach.

## Research design

The research design was decided by a combination of the philosophical and methodological approaches discussed, an understanding of the positives and negatives of any research method or design strategy was required. The study design was a multiple case study with interviews, the case study design employed qualitative interview techniques. Validity of qualitative mechanisms consisted of proposed validity challenges, emphasised in the literature in relation to the use of the qualitative design. Mitigation techniques were incorporated which tried to improve the validity and reliability of qualitative methodology, particularly triangulation, transferability, and the concept of thick description were used.

According to Jackson et al (2007) the case study approach was preferred in the following circumstances:

1. the researcher wanted to answer 'how' or 'why' questions.
2. the researcher had little control over the contemporary real-life context to be studied; and
3. when the boundaries between the context and phenomenon were not clear

Given that the topic of the study surrounded issues such as sub-national governance and climate change, in themselves cross boundary in a geographic and political sense and for the reasons discussed in the previous sections of the chapter, it was felt a case study approach was necessary to adequately investigate the phenomenon under scrutiny.

## Validity and Reliability

In terms of validity issues, qualitative research had a history of criticism in terms of holding a lack of scientific rigour, lack of adherence to systematic processes and procedural flaws that could be considered a weakness (Yin, 2018). Yin described three types of validity in the Table 7 below, with the additional element of reliability included for clarity:

**Table 7 – Tactics for Validity and Reliability**

Type of test	Question the test seek to answer	Research Tactic
Construct validity	Are data measuring what it claims?	Use multiple sources of evidence. Key informants to review drafts
Internal validity	Can relationships be established between conditions?	Pattern and explanation building. Address rival matches through use of logic models
External validity	Can findings be generalised?	Theory for single case studies Replication in multiple case studies Analytical generalisation
Reliability	Can the study be repeated?	Use a case study protocol. Use case study database and maintain a chain of evidence

**Source: Taken from Yin (2018)**

To counter issues of validity and reliability the study used a case study research design which had a clear and well explained design with unambiguous research questions before data collection proceeds. Described in more detail later in the chapter, the research presented units of analysis(es) which were linked between the research questions, the data collected and had a clear planned approach for analysis (Yin, 2018).

The research questions were developed following a review of the literature that surrounded the concept of low carbon installations within the context of the geographical under investigation. The research was of a qualitative nature, which per se, gave rise to multiple branches of qualitative research design and data analysis which provided a richer flow and quality of data. Indeed, the strengths of the research methodology selected in this study were reinforced by the definition of ‘qualitative’:

‘Relate to or measured by quality’ (Waite, 2014, p740).

It was different from quantitative research in three main ways:

1. there was a distinction between explanation and understanding as the purpose of inquiry;



2. the distinction was between a personal and impersonal role of the researcher;  
and
3. the distinction was between knowledge discovered and knowledge  
constructed (Stake, 1995)

Therefore, from a research validity viewpoint, a case study design strategy with interviews, as selected for this study, always tended to raise questions around reliability, validity, and generalisability when in comparison with a quantitative strategy as described by Markusen (2003). Whilst taking into consideration the subjectivity of qualitative research there was always a question of whether the results would demonstrate what they claimed, in terms of external validity and generalisability this required a note of caution throughout. The ability to transfer findings to other groups through quantitative means (Braun et al, 2013) (Lincoln & Guba, 2015), when compared to the qualitative equivalent concept of ‘thick description’ (Geertz, 1973), was deemed to enhance the description of data and provided strengths for a qualitative selection. The notion of ‘thick description’ was supported by Bryman & Bell (2015) and Hammersley (1992) who added to the argument that questions of validity in qualitative research could be addressed by notions of plausibility and credibility. Yin (2018) also described the case study method in a positive light as it provided the opportunity for ‘analytical generalisation’ (ibid, p40) and allowed for a type of generalisation that used a particular set of circumstances in which a conceptual model was reinforced, elaborated on, or detailed a particular way.

Notwithstanding these arguments, interviews were not a natural environment, the case study approach used here sought to generate insights into a way of thinking and how things were done in specific were. Through the interpretation of participant views, data was used in a practical way (Hyde, 2000) (Yin, 2018). However, this approach was potentially problematic for qualitative researchers who saw reality as fundamentally dependent upon context and interpretation but was also consistent with the realist position (adopted in this research). The concept of reflexivity was used throughout the study to describe the nature and context of the relationship between the research and the researcher, it considered the researcher as part of the research.

Therefore, this may have introduced bias, even unconsciously and without intent. Reflexivity per se, was considered a concept that could be viewed in two different ways, firstly, it was an opportunity for the researcher to reflect on their own views and preconceptions (Gray, 2009) (Rose, 1997), but secondly, it also provided the opportunity for the researcher to reflect on their own positionality through their own development. To counter any bias arguments, a broad selection of data was used following the principle of triangulation, this principle was a process of moving the research focus between different information sources, for the purposes of this study, these were between primary policy documents and interviews which ensured each data stream was explored for different aspects of information to answer the research questions. In this research, triangulation was employed and demonstrated a more robust internal validity, more specifically, method, theory, and data triangulation (Carter et al, 2014). Another technique considered to better validity was that of member checking (Jackson et al, 2007), this was used in this study to a limited extent but only when follow up with participants was possible.

In relation to the case study with interviews method, this had advantages and disadvantages, a disadvantage was the problem of a lack of generalisability to the broader world (Silverman, 2014), but the advantage of the case study design was the ability to explore more complex phenomena, including studies with complex political, economic, and institutional working arrangements. The opposite quantitative method of to this approach was a survey which was more regular and synthesised (Bryman & Bell, 2015) (Punch, 2013), but did not provide the details of qualitative methods, additionally, the case study approach was considered particularly useful in answering 'how' and 'why' questions to study contemporary situations within a real life context; and when boundaries to the context and phenomena were not clear, all of which were applicable to this study given the flexible nature of governance itself (Coffey & Atkinson, 1996) (Jackson et al, 2007). It was important to note that even though the researcher decided on the philosophical stance and qualitative methodology in the format described, other qualitative methods were also available; focus groups for example, provided the opportunity to gain data from multiple sources in one go with the researcher acting as a moderator providing large amounts of information for analysis. However, because focus groups were viewed as

unnatural, it was thought that the data may be tainted as the data could become biased depending on who participated, also the logistics for setting up a focus group were more difficult than interviews.

This research used a multiple case study design including interviews which provided the ability to increase validity through replication which a single case study did not, the ‘case’ was defined and the unit of analysis(es) established, the case study was then ‘bound’ (Yin, 2018). Other options included either single or multiple case studies, with or without embedded units of analysis, both had key research questions focused on the implementation of low carbon installations by sub-national institutions and the support given to SMEs. This was in the context of construction and energy sectors within two city regions, referred to in this research as ‘low carbon installations’. Embedded units of analyses were in the form of sub-national institutions which could probe issues such as finance and skills training. Whilst governance was a topic that was expressed in the literature review as a flexible and fluid concept, the research attempted to define definitional boundaries, the definitions below were used.

An SME definition was the same used by the UK government, more specifically:

‘SMEs encompass micro (less than 10 employees and an annual turnover under €2 million), small (less than 50 employees and an annual turnover under €10 million) and medium-sized (less than 250 employees and an annual turnover under €50 million) businesses.’ (Department for International Trade, 2020, p. 5)

An institution was defined as:

‘An important organization such as university, bank, [or authoritative body]’ (Waite, 2013, p475)

The term ‘implementation’ was defined as:

‘put a decision or planned changed into effect’. (Waite, 2010, p457)

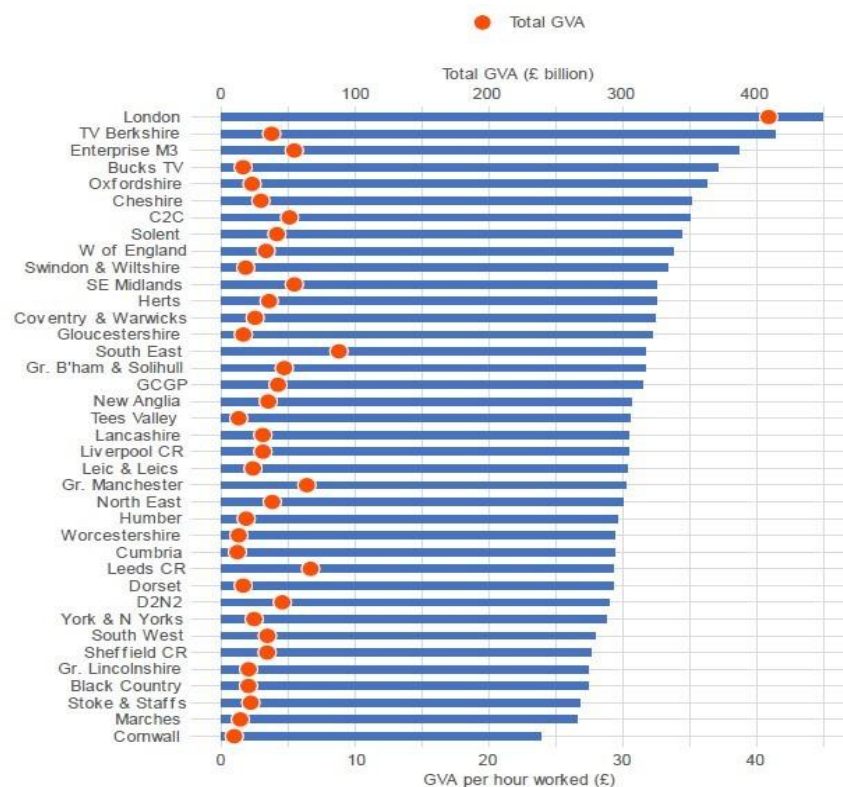
To bind the cases, the spatial boundary for each of the places under scrutiny was defined by the relevant city regional boundary. Given the overriding spatial dimensions with the associated projects in relation to low carbon installations in city regions, it was logical to use the same geographical boundaries as MCAs and LEPs for the respective city region. From a temporal perspective, the time the study commenced to the time of completion was between January 2021 and January 2024. The term ‘low carbon installation’ used a reference to all low carbon measures being installed for buildings.

### **Cases for Analysis – city region selection**

The study selected two city regions, LCR and SCR. Both were designated as city regions and had similar problems with pre-existing building stock from previous industrial economies. Both had mayoral modes of governance, SCR benefited from a mayor since inception, and LCR became an MCA in 2021. Both city regions were conceived at the same time and LCR operated as a NMCA, both had LEPs which supported the MCA implement low carbon projects, both residential and commercial, and both had developed Growth Hubs for development programmes to support SMEs and low carbon projects. The involvement of city regional governance structures in decarbonisation programmes included projects to decarbonise buildings and were of interest to the researcher. It was decided which city regions were selected followed specific reasoned justification, the selection of two city regions used the two phased approach described by Yin (2018), quantitative data was the initial data used to reduce the number of LEPs to investigate, this was to ensure there was a manageable number to select from. All LEPs figures in England were reviewed. This included LEP reports and performance indicators of LEP information (Department for Business, Energy & Industrial Strategy, 2019, 2020a, 2020b). These data covered elements such as demographic information, LEP activity, and history of origin data, this approach was consistent with the two phased approach described by Yin (2018), whereby, if there were over 12 possible cases (in this case LEPs), a two phased approach was indicated. The first phase narrowed the possible cases via quantitative means by using indicators of productivity of LEPs, LEPs were selected as these were the main financial organisations responsible for economic development alongside MCAs at a sub-national governance level and produced figures for

business productivity. Both LCR and SCR were in the bottom third for economic productivity in England (ONS, 2022) (Department for Business, Energy & Industrial Strategy, 2019), see Figure 7.

**Figure 7 - GVA for all industries 2016 (hours worked) and 2017 (LEPs)**



**Source: Department for Business, Energy & Industrial Strategy (2019), p49**

Twelve LEPs were taken forward to the next phase of selection. As the SMEs were businesses embedded as a unit of analysis in the study the type and productivity of SME was also a factor in city region selection. The second phase then used a screening process based on 'a set of operational criteria' (Yin, 2018, p105). The second phase used city regional specific data in the form of quantitative data formed from SME type in combination with local knowledge of the city regions. For example, city regions that were known to be climate change positive and were selected as the most appropriate city regions to be investigated. In this case the question of whether the MCA had a specific climate change agenda in place, in combination with SME type was used (For detail on the phased approach see Yin, 2018, p105-106). The data in Tables 8 and 9 shows that a similar typology and mix of SMEs was apparent in each city region and all the pertinent information concerning LEPs, and SME typology was

evidenced by a ‘gap’ figure between service and process. The SMEs in LCR a SCR had a similar gap in ‘types’ of SMEs, presented in Figure of 6.6 and 6.3, which demonstrated a similar typology and concentration of SMEs.

**Table 8– SME data in individual LEPs**

LEP	Phase 1	Phase 2		
	GVA for all industries (per hour worked)	Product / Service Innovation	Process Innovation	Gap
Cumbria	29.3	21.3	20.5	0.8
Leeds CR	29.2	26.3	19.6	6.6
Dorset	29.2	28.1	20.5	7.6
D2 N2	28.9	22.8	19.4	3.4
York and N Yorks	28.8	23.9	18.3	5.6
Heart of the South West	27.9	25	17.3	7.7
Sheffield CR	27.6	22.1	15.8	6.3
Gr Lincolnshire	27.4	20.9	17.6	3.3
Black Country	27.3	28.5	19.9	8.6
Stoke and Staffs	26.7	24.8	14.6	10.2
Marches	26.5	23.2	19.2	4
Cornwall	23.8	21.6	N/a	N/a

**Source: Department for Business, Energy & Industrial Strategy (2020b)**

**Table 9 - Key figures for the two city regions selected**

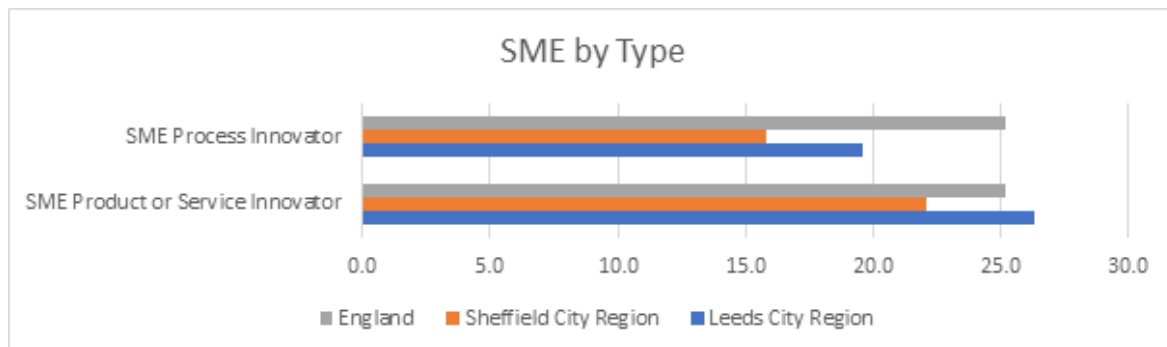
	Leeds City Region (LCR)	Sheffield City Region (SCR)	England
Unemployment (16+)	4.7 (%)	5.6 (%)	4.5 (%)
Working Age Population	1,927,537	1,172,309	34,950,948
Premises with 4G service indoors	82.76 (%)	78.14 (%)	78.29 (%)
Governance lead	Mayoral (from 2021)	Mayoral (since 2012)	N/a
Devolution Deal	No – required to bid for funding on ad hoc basis	Yes (Since 2012)	N/a
Business Count	125,900	67,255	2,697,205
SME Product or Service Innovator	26.3 (%)	22.1 (%)	25.2 (%)
SME Regional GVA	66,469 (£)	34,048 (£)	1,498,232 (£)
SME Process Innovator	19.6 (%)	15.8 (%)	17.0 (%)
SME undertaking R&D activities	21.4 (%)	19.7 (%)	21.0 (%)
SME productivity	29.23	29.62	34.13
Controlling Combined Authority	West Yorkshire Combined Authority	South Yorkshire Combined Authority	N/a
Controlling Local Enterprise Partnership	Leeds City Region LEP	Sheffield City Region LEP	N/a

**Source: Department for Business, Energy & Industrial Strategy (2019, 2020a, 2020b)**

In summary, the first phase of LEP data revealed poor productivity in LCR and SCR compared with the English average. The second phase revealed SME product, service and innovation data were similar in both city regions, the gap between percentages of different typologies of SME was similar in terms of process and product innovators within the two city regions. This demonstrated a similar ‘business type’ pool of different types of SMEs and of mayoral governance bodies in economically underperforming CAs. Additionally, the data suggested that SME performance in both

city regions was similar, shown in Figure 8; for these reasons LCR and SCR were selected for investigation.

**Figure 8 – SME by type in the two city regions**

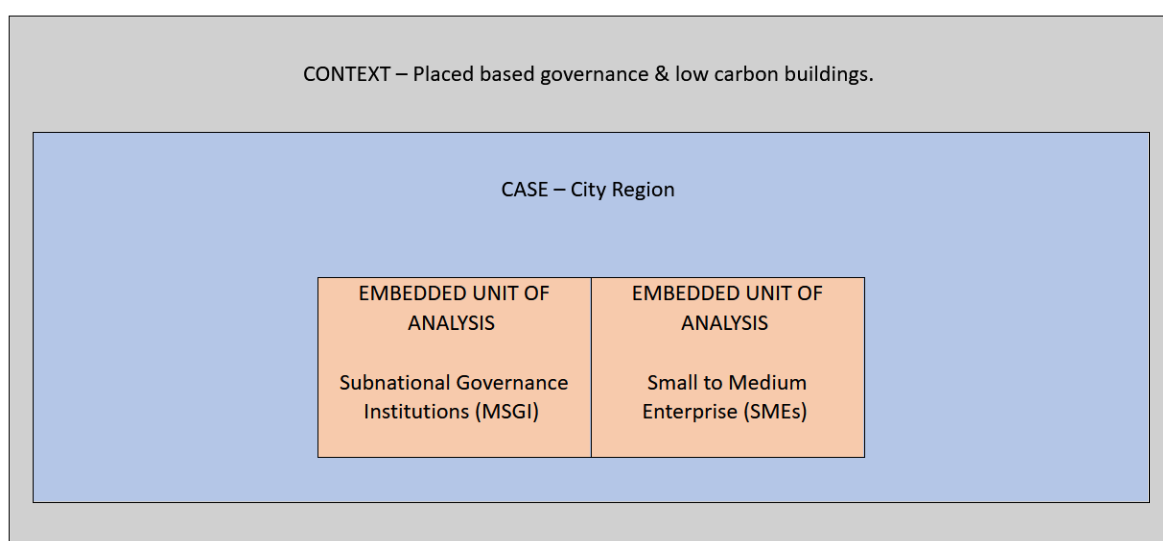


**Source: Department for Business, Energy & Industrial Strategy (2019, 2020a, 2020b)**

### **Embedded units of analysis**

Both city regions main institutional implementation bodies in the form MCAs and LEPs were under investigation as a collective in relation to the roll out of The Heat and Buildings Strategy. Figure 9 illustrates the case study units of analysis that were used throughout the study.

**Figure 9 - Case Study Unit of Analysis**



**Source: Adapted from Yin (2018)**



The context of the study included projects such as room heating, water heating, solar systems, immersion heaters, and heat networks. To assess the concept of interaction between the private sector and corresponding governance structures that surrounded the projects participants were selected based on knowledge within that field. Participants were actors and multiple actors from the city region that were involved with low carbon installations and was had a working relationship with low carbon buildings. Businesses selected for inclusion were SMEs and the primary delivery vehicle in each respective area. Senior management, project leaders, and staff from each of the respective business and political leadership were invited to be involved in the corresponding political jurisdiction and city region.

## Methods

Methods chosen were two-fold; firstly, deep observational documentary analysis was the primary research tool in the initial phases, secondly, the interview was guided by an open-ended interview guide, see Appendix 2. A variety of methods were employed to maintain a broad perspective and the project was broken down into main tasks identified in Table 10 and documents reviewed available in Table 11.

**Table 10 – Summary of methods used**

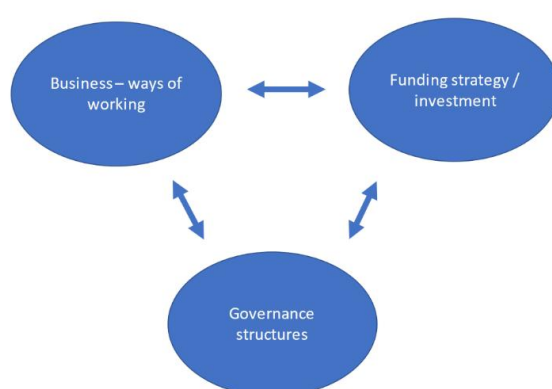
Task	Approach
Desk-based research - Literature review of baseline evidence	<p>This research:</p> <ul style="list-style-type: none"> <li>• identified immediate issues, literature gaps</li> <li>• identified key issues to sub-national governance institutions in relation to low carbon buildings.</li> <li>• reviewed challenges to SME in changing business models</li> <li>• identified relevant stakeholders; both public and private sector surrounding The Heat and Buildings Strategy</li> <li>• reviewed policies of the MCAs</li> <li>• reviewed key technology changes in the built environment for low carbon housing</li> <li>• reviewed theory and history for regional economic growth</li> <li>• reviewed trajectories likely to impact skills and labour in future years.</li> <li>• reviewed market profiles in relation to low carbon technology</li> </ul>

Qualitative research - Stakeholder Interviews	<ul style="list-style-type: none"> <li>• confidential interviews were conducted with:</li> <li>• industry leading experts and practitioners working in low carbon building/construction sector.</li> <li>• local and combined authority officers, institutional staff, central government staff</li> <li>• SME directors and sole traders' responsibility for installation programmes 20 interviews were completed, and the findings were summarised into themes.</li> </ul>
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**Table 11 - Table of main policy documents reviewed**

Document
The Heat and Buildings Strategy
The Levelling Up Strategy
Leeds City Region Skills Report
Sheffield City Region Skills Report
Leeds City Region Strategic Economic Plan 2016-2036
Sheffield City Region Strategic Economic Plan 2021-2041

Three subtopics were used to create the interview questions, summarised in Figure 10, these subtopics were gleaned from the literature review as highly pertinent topics for the research and 'fed into' the interview design guide in Appendix 2.

**Figure 10 – Sub topical analysis process model**

**Source: Authors own**

Questions in the interview guide were derived from gaps identified in the literature and the sub analytical model in Figure 10, as more data was collected, the questions were expanded on and in some areas more specific data was created depending on participant's responses to questioning. This was achieved through the creation of a spider diagram available in Appendix 3 that interpreted the themes collected and 'linked the data'. The policy documents were 'linked' through a brief content analysis exercise available in Table 12. The interview guide was informed by information found in the literature review, expanded on in Table 13. Collectively this information demonstrated how the interview guide linked to the documentary policy information.

**Table 12- Links between national policy and sub-national policies as themes of the research**

<b>National document - The Heat and Buildings Strategy theme</b>	<b>Leeds City Region Strategy (WYCA)</b>	<b>Sheffield City Region Strategy (SYCA)</b>
1.4 Devolution and decarbonisation - Decarbonising heat and buildings will require joined-up change throughout the UK, but also represents different opportunities and challenges across the four nations.	Discussed the regional Devolutionary agenda in the context of the northern powerhouse, although highlighted time scale and first Devolution Deal agreed 2015	Contained a 2021-2041 vision and a promise to embrace devolution and promote anchor institutions that will promote local growth
2.1 Green recovery – Sets out the importance of urgency and scale of opportunity for buildings decarbonisation to drive green recovery.	Contained ‘headline initiatives’ that centred around economic development, some green skills and more green infrastructure	Emphasised to build vibrant, resilient places and build an economy around a ‘green’ economy
2.2 Jobs - Central government will increase jobs to offer workers new apprenticeship and a range of skills in the ‘green buildings sector’.	SEP promoted 35,00 additional jobs to increase £3.7 billion of economic output and claims to achieve better paid jobs for residents of the city region	Emphasised jobs to the betterment of social value, value for money and higher pay with a specific reference to supporting ‘net zero’ growth
2.3 Skills – Creates a promise to develop a low-carbon workforce and to invest in skills, both through retraining the existing workforce and developing the next generation of skilled worker	Contained policies that combine skills with other issues such as tackling health inequality. Further it discussed the economy as a system and skills as an enabler	Focused on the development of skills but on the issue of tech skills and analytics, did not focus on low carbon skills
2.4 Levelling Up – an entire section devoted to the promises to better homes and buildings with associated benefits to better quality of life and economic activity that offers an opportunity to assist deprived regions in the UK	Dated prior to the concept of ‘levelling up’ this strategy document did not mention this directly although it referred to integrated spatial priority within the city region	The concept of ‘levelling up’ was referred to only briefly in the revised SEP despite it being produced in 2021 after The Levelling Up Strategy in 2022

5.1 Measuring energy performance – a specific section set out energy performance could be measured and improved through different Interventions in buildings	Referenced to historic spending review in 2015 with an overall sectoral commitment to go for low carbon growth and measurement mechanisms for each of the priorities	Whilst the strategy had a section on energy demand and supply it does not refer to any specific s on energy performance measurement
5.2 How to improve our buildings - policy which has the intention to drive and enable improvements across the UK building stock the UK building stock	Had specific measurements for new development	Had policy to transform buildings to low carbon
6.2 Green finance - green funding and finance options needs to be available to prevent this from acting as a major barrier to uptake	Priority 1 of the strategy, linked finance to the pan-northern agenda, links access to finance to grow business	Contained extensive policy on extended commercial activities, help uneven distribution of finance and discuss this in the context of companies, Co-operatives and social enterprises
6.4 Public engagement – has element of need to take action to change the way consumers heat their homes and workplaces	Engagement was embedded throughout the strategy, referred to in several passages throughout the document but not as a specific section on its own	Engagement was embedded throughout the strategy, referred to in several passages throughout the document but not as a specific section on its own
6.5 Continuous improvement – there was a specific section review and improve our policy and regulatory approach to decarbonisation. We will monitor and evaluate progress and this section was solely about monitoring	Each of the four priorities in the strategy demonstrated expansive and detailed key actions on the priority areas	Had extensive indicators with specific targets for 2040

**Table 13 - Theoretical model and interview guide relationship – A linkage**

<b>Interview theme</b>	<b>Reasoning through the theoretical model and interview questioning (Appendix 2)</b>
Funding / Skills	This section started with questions and queries surrounding the personal experience of participants, it aimed to ascertain the relationships between the actors in the model in Chapter 3. The model contained blue coloured arrows that demonstrated the interaction between externalities and between multiple agentic agents. The thematic questioning moved onto, who the actors were in the city regions, and then attempted to probe the relationships between the actors and how these relationships worked. Closer questioning asked participants to describe the processes and probed institutional accountability. Further questions were designed to establish powers regarding funding streams and how this linked with strategic planning powers of mayors, this fitted into the model in Chapter 3 and established the power dynamics reflected by the blue arrows. Questions then moved onto find out more information surrounding funding and mayoral influence in this area, this aimed to link in the orange-coloured arrows and whether this influenced power dynamics that were direct (larger arrows) or indirect (smaller arrows). The questioning then tried to link policy in through both powers and funding steam topics, finally, a spatial element was incorporated into the data collection.
Policy	The questioning surrounded the thematic areas of policy aimed to discover the partners or organisations, and businesses, which could be considered as ‘externalities’ and had influenced sub-national governance institutions. It aimed to uncover the extent of involvement of these externalities in policy making and the views of stakeholders in the funding bid process. The questioning, again, attempted to make links between the interaction of stakeholders through processing (blue & yellow arrows).
Spatial equality	The questioning in this thematic sub section aimed to bring about discussion on the overall context of the model itself in terms of the model being a city regional one and contained externalities such as national government policy to adhere to. The questioning in this section aimed to collect data in relation to broader issues that influenced the city region at a scalar level, but were controlled by central government, such as jobs and skills.

## Data Collection

Pertinent policy was highlighted through online internet searching, identification of appropriate policy material and searches of the MCA and LEP websites for policy documents as the study sought to identify policy data as a main unit of data collection. The researcher identified key policy productions at a central, sub-national, and local government level and policy documents were reviewed from 2019 onwards, although, it became apparent to accurately compare some policy documents this had to be extended to 2016 as This was when the Leeds City Region Strategic Economic Plan was published, 2019 was provisionally chosen as this was when the local authorities in the two city regions declared climate emergencies.

Preliminary screening took place to identify suitable participants who had experience of low carbon installations in buildings, this was based on the participant's prior involvement with low carbon installations in relation to buildings, the two city regions identified were searched for relevant institutions, businesses, and specific events relevant to low carbon installations. The participants were sought out due to their unique knowledge of the area which required investigation. Multiple participants from different backgrounds were used to provide a multi-purpose perspective, prior to interviews taking place, participants were to be approached either in writing or verbally and provided with a participant information form and consent form in Appendix 1. One week was provided for potential participants to consider whether they wished to participate and ask any questions. Braun & Clarke (2013) have stated the number of interviews for a large study should be 20, in this study 20 participants were interviewed in total for both city regions, this did not include personal communications via email, nor informal discussion, nor discussions with people at events. Interviews were conducted with open-ended questions in an unstructured manner to focus on the participants rich experience which depended on the specialism of the participant, a consequence of this was that participant sometimes 'strayed' from the point of the question and produced additional data. Following 20 interviews it was felt that a point of data saturation had been reached, in that, participants were answering questions along the same thematic lines and similar content. There was, at times, difficulty in obtaining the specific participants for the initial recruitment rounds, this was solved by broadening the search criteria which

included other institutions that were not originally supposed to be included, but still operated within the relevant geographical scale; for example, participants were selected from other institutions to broaden the perspective of smaller institutions such as trade associations of small SMEs, which was not originally the intention.

The interviews were conducted in a virtual environment, recorded, and transcribed, if possible. If not possible, the researcher made written notes. This was because some participants did not want to be recorded, or the way the IT system was working made it impossible to record audio or transcribe at the time. The decision not to record all interviews was a learning point for the researcher as it was found that notes influenced the clarity of the data gained and it would have been useful to have an original transcription to adequately interpret the data. The interviews were conducted electronically and asked for open ended questions regarding governance issues in relation to the private sector and low carbon installations. The researcher, when appropriate, guided the interview but also questioning depended on the response from the participants. Participants that took part in the study were listed in Table 14. Personal communications were included in Table 14 but did not count towards the number of participants interviewed.

**Table 14- Participants by geographical area and institution/business**

Institution and geographic area	Code	Number	Description
Trade Association Director	TA 1	1	This participant was a director of a Trade Association that represented small SMEs and sole traders in their business operations regarding low carbon installation in buildings. The director had worked in this area for years and had a significant influence in operations at the trade association
Combined Authority Sheffield	CA 1-3	3	These participants fell into the categories of a general policy officer, and two officers with more of an economic regeneration background. Their responsibilities collectively were to write policy response and design economic regeneration strategies
Combined Authority Leeds	CA 4	1	This participant worked within the strategic housing department and was responsible for the rollout of 'net zero' initiatives in relation to buildings, more poignantly energy initiatives in social housing
University staff	U 1-2	2	One person was an academic and researcher who specialised the field of small SMEs and low carbon technologies. The



			second was a Professor of Energy at a sub-national educational institution and had over 20 years' experience in implementing research projects surrounding low carbon projects and alternative energy sources
Local Authority Leeds	LA 1	1	This participant worked in the Local authority planning department and was responsible for processing planning applications
Local Authority Sheffield	LA 2	1	This participant specialised in skills production for the City Council and was responsible for rolling out skills initiatives
Local Authority Gateshead	LA3	1	This participant specialised in energy projects for the Borough Council and was responsible for rolling out low carbon projects
Small to Medium Enterprise Owners	SM 1-2	2	These two participants held board level positions in limited companies that were smaller builders, one produced exclusively low carbon homes whilst the other produced 'normal' new build houses
Labourers / workers (SMEs)	SM 3-4	2	These participants were sole traders; one was an electrician the other a plumber both were recruited following attendance at an external event – both had business expansion idea in the field of Heat Pumps
Civil servant (regional) QUANGO	CV 1	1	This participant worked a subregional skills institution, and held a post at director level, he was responsible for rolling out skills programmes / apprenticeships in relation to all areas in addition to low carbon programmes
Sub-national Educational Institution	ED 1-2	2	These participants worked in the educational/apprenticeship level education environment, the institution they worked for was responsible for implementing work programmes and training in conjunction with employers at a subregional level
Councillor	C 1	2	These participants were elected officials of the local authority, they had no specific duties in relation to low carbon buildings but had an interest in taking part in the study
Sub-national institution	SU 1	1	This participant was a high-level senior manager position in a sustainability institute that focuses on issues of low carbon technology and sustainability
Personal Communications	PC 1-4	-	Personal communications received as part of the research development (not counted as participant for participant numbers as not interviewed formally)
Total		20	

In addition to interviews, the researcher attended numerous events over the data collection period ran by trade bodies, specialist organisations, and the commercial sector in the field of low carbon housing at the researchers own expense. Attendance at several leading events such as those ran by Westminster steering groups also added to the data collected, full transcripts were requested and available after the event which were analysed in the same manner as described for the interview and

process in Appendix 3. The event covered different areas and sectors; a full list is available in in Appendix 4 of events attended.

### **Data analyses**

The study was one of qualitative construction with a structure for analyses being the substance of the case study data. Data was analysed with a linear structure and ‘subtopic processes’ (Yin, 2018, p229), that were dependant on the findings in the literature review and followed a circular pattern of conceptual development. The data collected for analyses had different advantages, for example, policy documentation provided a stable evidence base that was uniquely retrievable and provided a broad setting for analyses, whereas interviews were ideal to make a targeted attempt to reach specific groups as this was the intention in this study. The methods employed to collect data were specific to ‘how’ research questions and were thought to be especially sensitive to explore key events, through exploratory case studies.

Interviews in themselves produced a very rich data source, the qualitative nature of interviews complex and were therefore congruent with systems theory dynamics. Quantitative data was unable to do this in the same depth, additionally, the beliefs, knowledge and view of participants, were particularly important to gauge given the research questions posed. The themes created were developed from policy analyses and combined interview data interrogated through coding and identification of key themes from data collected synthesised. The researchers read the appropriate transcript, highlighted answer, concepts, and responses of interest and tabularised them into themes. A spider diagram was produced as interviews went on and this assisted in the collection of thoughts for the discussion chapter. One example of interview coding and thematic development with spider diagram is available in Appendix 3.

The qualitative data collected was analysed thematically in a narrative sense and categorised to carry out a thematic analysis (Birks & Mills, 2015), the same analytical method was conducted throughout. Documentary analysis, case study evidence, and interviews facilitated multiple sources of evidence to corroborate findings, reduce bias, and aid triangulation. The analyses and methods used were considered the most appropriate given the nature of the research questions posed and their own

unique qualities. The type of analyses conducted was dictated by the type of research design, in this case, a multiple case study design. The study focussed on the ‘how’s’ of the process and outcomes in relation to low carbon installations in buildings with the data collected predominantly from text and language through a combination of policy, committee reports, and interview data, both verbal and non-verbal. The chosen analytical method was a bimodal hybrid of content and narrative analyses as these two methods provided the opportunity to analyse the ‘what’ of the data, either through language or spoken, but also the ‘what’ and ‘how’ of the data for the latter. Content analysis was used, this was a generic name for a systemic and objective way to textual analysis that involves comparing, contrasting and categorising a set of data, it established codes for the data that the entire data related to. Narrative analysis comprised of a functional and structural form of analysis which revolved around how a story was developed and organised, or and the ‘how’ of low carbon installations in relation to buildings were organised. It produced a narrative based on people’s experiences and chronicles of an actual event with reflexive thematic analysis that retained flexibility between an inductive approach informed by the literature review and deduction informed by the research data. As the analyses progressed themes that developed, through production of the spider diagram, subsequent tabular themes were formed from two ‘rounds’ of analysis, the first specifically targeted themes that were found to be of interest, or the proximate factors taken from the literature review, in this case finance and skills training. The second round of analyses concentrated on distal factors which influenced and promoted other factors, in this case spatial factors, institutional constitution, and governance networks, see Tables 15 and 16. The second phase relied on themes emerging from the data rather than on preconceived ideas from the literature review, this loosely followed the grounded theory approach (Glaser & Strauss, 1967) (Birks & Mills, 2015). Six recommended phases were used as found in the literature combined from multiple sources of Braun (2022) (Glaser & Strauss, 1967) (Mills et al, 2015), these stages were:

1. Familiarisation
2. Coding – using a fine-grained analysis.
3. Generate initial themes – here the analysis may have digressed from the traditional separation of thematic analysis, in that one section was conducted

with thematic codes in mind and one section occurring ‘naturally’ – through writing memos a spontaneous occurring process.

4. Develop and review themes.
5. Refine, define, and review themes.
6. Write up matter for analysis.

Collectively this evaluative iterative process culminated in the identification of key drivers and barriers available in Tables 15 and 16.

**Table 15– Driver and themes developed for analytical generalisation – 1<sup>st</sup> round**

Six Key Drivers / Barriers	Developed Key Themes Round 1
Financial capital Supply and demand networks Governance Technical Knowledge Information flows Company culture	System Governance Finance and Funding Capacity and Skills

**Source: Authors own**

**Table 16 – Driver and themes developed for analytical generalisation – 2<sup>nd</sup> round**

Six Key Drivers / Barriers	Developed Key Themes Round 1	Developed Key Themes Round 2
Financial capital Supply and demand networks Governance Technical Knowledge Information flows Company culture	System Governance Finance and Funding Capacity and Skills	Spatial factors Institutional constitution Governance networks

**Source: Authors own**

The next chapter moves on to outline the findings of the research.

## Chapter 5 - Findings

### Outline

This chapter presents the findings of the research and discusses the barriers and challenges found in the data collected as part of the research. It provides themes to start to answer the research questions surrounding sub-national governance structures and SMEs and delivery of The Heat and Buildings Strategy as part of a place-based governance approach within the two city regions identified. It probes the issues, particularly that of financial support in the contemporary political climate and describes findings in the context of low carbon installations. Several barriers to investment in low carbon installations are identified and outlined. The chapter sets the scene for further discussion on finance sub-nationally in the form of Devolution Deals and throughout the presentation of findings provides the data produced following the processes described in Chapter 4. The chapter lays the ground to discuss the barriers found against the theoretical model identified in Chapter 3 in the discussion section.

### Findings of governance spatial scale

Both West and South Yorkshire Combined Authorities, or LCR and SCR respectively were recognised through the economic geography of their area and discussed extensively in the sense of FEA. This had not necessarily developed into standard geographic practice within England but rather stood out as a more recent geography of governance. Geographic governance scales were often built around existing geo-political and institutional relationships and geared towards a particular geo-political scale (Pugalis & Bentley, 2014b) (Rees & Lord, 2013). As a result, city regions were found to be a relatively new geographic concept associated with ‘Devolution Deals’ which were negotiated sub-nationally and had developed later into major funding streams for sub-national governance institutions such as MCAs. These institutions had historically revealed ambiguities in the government’s approach to sub-national governance economic development, at times, conflating geographic scales of MCAs, LEPs, and the FEA. More specifically, the FEA approach contradicted some of the geography of contemporary climate change strategies as authorities such as MCAs, LEPs, and LAs, all operated at different spatial scales and produced climate change

strategies within the same geographic ‘place’ or city region. It was debatable exactly how Devolution Deals contributed and developed to implementation of low carbon buildings. The FEA approach highlighted possible advantages to achieve low carbon buildings via decentralisation, particularly, as over the past decade, different Devolution Deals revealed settlements that had been agreed with different MCAs. Content of Devolution Deals was found to depend on negotiating ability and political pressures but only the most recent Devolution Deal included clean energy specifically. The content of Devolution Deals was different in both city regions investigated, in the case of the West Yorkshire Combined Authority Devolution Deal £101 million for climate change flooding issues was included but only promised for more strategic coordination of low carbon energy without any specific commitment to low carbon buildings in the future (Ministry of Housing Communities and Local Government, 2020).

Findings demonstrated that historically, West Yorkshire Combined Authority (WYCA) and South Yorkshire Combined Authority (SYCA) scalar geographies were both separated from Westminster, this followed discussion on different configurations for pre-existing areas with ideas regarding LEPs subsequently progressed at different stages as MCAs developed and it was found that this governance make up was influenced by the principle of path dependency previously referred to, the abolition of the pre-existing governance structures in Yorkshire in 1986 left the County without a single authority covering the whole area. Since April 2007, LCR Partnership had evolved to coordinate activities across LCR, this included Barnsley in South Yorkshire, the City of York, and three districts of North Yorkshire as well as the whole of West Yorkshire. Strategic local governance decisions had been made by the joint committee of LCR Leaders Board, and a multi-area agreement was established in 2008. Since 2011 economic development was supported by the LCR LEP and a ‘City Deal’ was proposed in 2012, although a Devolution Deal was not made until 2020 which corresponded with a newly elected ‘metro mayor’. In contrast, South Yorkshire Combined Authority had a smoother transition into what became the SCR, this was one of eight city regions defined in the 2004 document *Moving Forward: The Northern Way* and was originally a collaboration between the three northern Regional Development Agencies (RDAs). MCAs were established by statutory instrument

under the Local Democracy, Economic Development and Construction Act 2009. In contrast, in the SCR, a Devolution Deal was agreed between central government and the MCA in 2015. The agreed devolution of powers influenced local economic growth as SCR obtained more control over elements of skills, employment, business support, transport, and housing policy, over a longer timescale. The focus was on the collective Devolution Deals settlement agreed after the Sheffield City Deal and other themes of Devolution which were included in Growth Deals. Additional responsibilities were focussed on transport, housing, skills, and business support and most recently, the SCR Devolution Deal provided further devolved powers in relation to these areas of policy. It was therefore posited that a difference in historical evolution and constitution of each MCA may well have influenced the current day governance position through path dependence.

### **The barriers identified**

Several barriers were identified in the study's findings that negated a positive roll out, particularly for place-based SMEs; these barriers needed to be addressed for low carbon installations to be rolled out on masse, in particular, the financial challenges for sub-national governance institutions who advocated and supported SME businesses in their corresponding development plans and through strategic policy. The problem of trying to initiate or start up low carbon installation developments were apparent; this chapter discusses findings using five thematic areas developed as part of the study. The literature review findings and data collected was condensed into more easily recognised analytical sections consistent with those put forward by the Climate Change Committee (2023). While perceived subtle economic benefits were found for places in the adoption of low carbon installations, the findings identified several pre-existing barriers from the data collected. The first section deals with arguably the most important, issues found with 'the market'.

### **Market and financial barriers**

A focus of the research was the financial ability for sub-national governance institutions such as MCAs, LEPs and LAs to implement national policy. It was found they were all dependent on other external factors which controlled and influenced decisions on spending commitments to support SMEs. In a system theory sense, this

would be referred to as the ‘External Environment’ as illustrated in Figure 6, or in Dooleys’ paradigms described as ‘Resources’. The findings of this research agreed with the literature, in that, a lack of capital and access to finance was one of the most frequently as a barrier to the adoption of change to business models (Trianni & Cango, 2012). Another major finding was that participants generally expressed views that it was not the place of government to ‘replace’ the market or fix market failures, this agreed with previous literature (Mazzucato, 2021).

More broadly, findings suggested that for sub-national governance institutions to be effective in changing SMEs behaviour from a traditional business model to a low carbon business model, adaptative influence was needed. The ability to support SMEs to promote low carbon and innovative projects, was found to be more likely to succeed if adequate start-up capital, or capital investment, was available to cover the initial periods of trading, this was highlighted by one participant:

‘..... the most difficult thing with the low carbon building is getting business to take the chance on it, some will and some won’t, they’ll want to ensure their money is safe first’ (LA2)

SME investment in city regions from sub-national governance institutions was found and was needed to encourage, logistical networks, product innovation, and workforce planning (Kok et al, 2013) (Dervojeda et al, 2014). A combination of factors was needed to progress, it was not just down to access to funding but the supporting elements surrounding this, for example, due to the time and investment involved in adaption SME business models were found to have generated upfront costs that could be both direct and indirect. The indirect time of human resource costs, skills training, and the timescales associated with investment returns were found to be particularly important. New innovator SME businesses and institutions, both product and process innovators were found to be generally more vulnerable to additional costs, this resulted in a lower number of innovative businesses (SMEs) as opposed to larger corporations (Oakdene, 2011) (Rademaekars et al, 2011). This point was highlighted in SME business models, for example, product service business models for leasing services had a higher demand of upfront costs in sale transaction business models and additional costs in product service development (Kok et al,



2013), therefore, to increase low carbon installation delivery, which required a mix of innovators and performers, there was found to be a need for sub-national governance institutions to support and initiate new ideas for place-based SMEs to increase their number across the different typologies of SME referred to in Chapter 2. This was not to be happening. City regional macroeconomics and sectoral growth were important to the development of city regional markets which supported low carbon installation production and this was proposed to partly be achieved through the funding mechanisms available; however, sub-national governance financial arrangements and SME finances were found to be highly dependent on market conditions to the extent that sub-national governance institutions had marginal control over their own geographic economies, this influenced SME development and low carbon installation roll out.

Interviewees generally felt that without State subsidies and financial assistance for specific projects the notion of low carbon buildings within central government timescales was impossible. To 'bridge the gap', one method of starting to meet the problem of city regional finance for SMEs and business was presented by participants, that of locally decided taxation, this was mooted as a possibility to assist with city regional economies and sub-national revenue streams; indeed, some revenue streams were changed by the Coalition government in previous years, but importantly, sub-national governance institutional powers were altered to incorporate an element of tax raising ability. LAs, for example, were given powers to make changes to Council Tax precepts and Business Rate levies and keep the increase. This provided a means to increase local taxes, and, to some extent, provided power to lower governance levels to change local taxation without central government approval. A watered down version of the principle of subsidiarity used in Europe. Similarly, MCAs could set precepts under certain circumstances for services such as police and fire services, however, the amounts raised through these two mediums were found to be relatively small in comparison to previous government grants, sub-national governance institutions were therefore still largely dependent on the tax raising powers of central government in England and reliant on government grants. No specific independent funding was found in relation to low carbon installations, whilst it was the finding of this study that there was a need for more tax raising fiscal powers

for mayors to stimulate the city regional market and support business, this was found not necessarily to be the 'cure' for the problem. This was because sub-national governance institutions in city regions of high deprivation may have difficulty in recouping increases in tax revenue; as the existing local economy was already weak, and did not have a large tax base on which to rely to invest financial capital or pay taxation. Moreover, a further difficulty for sub-national governance institutions in increasing investment at a city regional level for low carbon installations was that of investors attitudes towards this suggestion as some held that this idea was a threat to current business production models and productive business (Besch, 2005) (Kang & Wimmer, 2008) (Mont, 2002).

It was also found that there was a need to continuously monitor and improve investment capital at a city regional scale, this was both for soft and hard city regional infrastructure projects to keep investors, such as employers and consumers, motivated. A lack of resources prevented this. Several sources of funding were found to be available at the sub-national governance level, but external financing and innovation grants were difficult to obtain (Bradstreet, 2018), both for SMEs and sub-national governance institutions (Hoevenagel et al, 2007). Funding was very much centrally led with strict application criteria and, as such, private financing was found to be difficult to obtain given the lack of sub-national financial control (Dervofeda et al, 2014) (Hyz, 2011), additionally, this was also to protect private investment due to the investment risk of new technology. The market was found to want to avoid economic recession and this added to pressures on access to finance capital for low carbon installations following Brexit and COVID. There was also found, through new methods of sub-national finance cited in the literature, availability of finance to promote innovative business models; but the public sector to support SMEs in England was relatively small and disadvantaged as funds were not in one central fund (Heseltine, 2012). Specific disadvantages of finance were found and included a lack of control of funds, banks lacked robust data on financing needs of SMEs at the appropriate geographic scale, environmental performance indicators were not considered in funding or viability assessments, a lack of capacity and demand for sustainable finance products, all of which limited long term finance (McDaniels &

Robins, 2017). A further disadvantage highlighted by one participant from an MCA perspective was the lack of fiscal control for sub-national governance institutions:

‘.... we need more powers to produce investment on our own rather than relying on grants and short-term funding commitments, ..... more fiscal powers are needed’ (CA 1)

However, it was notable that this method of fiscal control handed to sub-national governance institutions over the past decade had not always been successful, the local authority of Thurrock Council who, in effect, declared bankruptcy through over investment in the solar panel sector (Butler, 2023). In some respects, newly formed financial institutions assisted and integrated financial support for low carbon installations, but in addition to this, it was found that a major flaw was that sub-national financial institutions lent only large amounts suitable for big corporations, not small SMEs, or sole traders, who may wish to expand in the heat pumps sector installation for instance, this meant there was a problem with the principle of the supply and demand network for finance, a main part of any macroeconomic system. Consequently, at a sub-national governance level there was no long-term commitment of cash flow. This point was reinforced by another participant:

‘.... finance ..... we have to bid for money there is no way to create a long-term funding source at a city regional level except making a deal’ (CA 1)

It is this point of supply and demand that was found to be a confounding factor by both sub-national governance institutions and businesses in relation to place-based governance, it was revealed that sub-national institutions understood business requirements in relation to cash flow needs but were unable to help to any great extent. Businesses were dependent on suppliers’ and customers’ engagement to be financially successful within the low carbon installation sector and, in turn, sub-national governance institutions were dependent on successful business investment to develop a successful city regional economy. This dependency on external factors was illustrated in Figure 6, demonstrated by spheres of ‘externalities’ which were a pre-requisite for emergence. It was found that the successful implementation of low carbon installations required a collaboration of all parties across the supply chain to

support SMEs within the current literature (Dervojeda et al 2014) (Van Buren et al, 2016). The ability to develop an adequate sub-national economic system for low carbon installations resulted from the development of a business ecosystem, although, sub-national governance institutions could be more influential with long term powers through planning permissions and joint strategic objectives of mayors and councillors. A lack of collaboration, not only from the private sector, but from sub-national institution's political members existed and was detrimental to the implementation process. The participation of both was found to have created a particular culture for economic drive in city regions, in addition to this, suppliers and service partners were found to be reluctant to get involved in the low carbon installation and innovative processes, the problem highlighted by one SME owner as 'the industry itself'. This perhaps reflected signs of fear of loss of current market share, the general 'uncertainty' of the low carbon installation market returned to the point on supply and demand, a main point here was that supply directly influenced demand and as a possible solution it was suggested a method of open communication was needed instigate behaviour change.

Furthermore, this finding conflicted with other SME literature on perceptions of SMEs losing their competitive advantage that did not prioritise low carbon economy practices in new build developments (Luthra et al, 2011). This added to problems implementing sub-national governance strategic planning to implement policy changes as one influenced the other. This consequently hindered sub-national governance ambitions, additionally, it was theorised that, with adequate public sector funding this 'gap' could be filled in the new build low carbon installations market by LAs building low carbon buildings like when social housing schemes were built by the public sector. A situation was needed whereby LAs retained the statutory authority to influence housing policy and MCAs had strategic housing policy responsibility, and both worked in conjunction with each other. Current powers were not enough to directly influence low carbon new build housing development market directly. Taking this point further, sub-national governance institutions with adequate powers and local knowledge of local businesses had the potential to influence low carbon installations and influence SME behaviour. However, there were concerns with this suggested approach, it was mooted that this method of governance may

encourage ‘local elites’ to ‘fill the gap’, reinforcing the Type 3 or diagonal governance arrangements discussed in earlier chapters with potentially poor results. A further finding was this fluid type of governance had advantages and disadvantages in relation to funding, some thought funding could be more adequately disseminated because actors moved freely from one level for governance to another, whereas some thought that this caused an elite movement to take over. The concept of flexibility was thought to have the potential to support the transition and low carbon installation projects but needed adaption of business practices in the long term. There was discussed the possibility that this may in turn increase the complexity of interrelationships throughout the business supply chain with possibly negative impacts. It was hypothesised that SMEs could be supported by increasing powers in areas such as regulation and information processing via sub-national governance institutions to comply with systems dynamics more adequately.

A collective finding therefore, was that sub-national governance institutions had an important part to play, given the fact that MCAs, and particularly LAs, had control of decision making over housing strategy and planning permissions, not only in the context of writing policy but with regard fiscal capacity. In this context, issues relating to governance, such as ownership of infrastructure, share of costs, and benefits along the value chain, needed to be dealt with so an effective public institutional business model could be rolled out for both SMEs and sub-national governance institutions. In terms of infrastructure for low carbon buildings, much depended on ownership of land, intentions of the owners, and energy providers wishes alongside MCA policies. A further problem identified was that of managing low carbon installation supply chains which could be time consuming, expensive, and may require collaboration with new market actors (Kok et al, 2013) (World Business Council for Sustainable Development (WBCSD, 2011). This was found to be influenced by a geographic governance area’s history, this was emphasised by one participant:

‘ .. in terms of old buildings, we find it more difficult to do older conversions .... there’s simply too much old land and it costs more’ (LA 2)

Due to geographic differences, tactics employed to promote supply chains and develop low carbon installations in buildings differed depending on the 'place', hence, the 'lock-in' and distribution channels varied. This supported a place-based governance approach with different barriers in some places than others, flexibility and adaptivity were required on behalf of sub-national institutional powers (Sivertsson & Tell, 2015). Importantly, the concept of integration was referred to by participants in an indirect manner but on numerous occasions in this context, integration of the market, and leadership at a sub-national level of governance, was found to be an important part to play in microeconomic development of a city region and place-based governance by association.

### **Skills, Resources (Human capital) and Regulation**

When the coalition government came to power in 2010 there were significant changes to the institutional framework surrounding local economic development. When New Labour introduced institutions such as Regional Development Agencies (RDAs), sub-national governance arrangements in England saw some control of strategic skills policy and economic development policy. More recently, funds for Adult Education Budgets had been included in Devolution Deals in both LCR and SCR. The rationale behind this move was to devolve powers and provide the ability to ensure growth through local means and objectives made through a statement at the beginning of the coalition government's first term:

'to unlock full potential, we need a major shift in the powers available to local leaders and businesses to drive economic growth' (Clegg, 2011)

A continuing theme throughout the research findings was that of supply and demand as already alluded but not only in the sense of finance, but in the sense of skilled labour. This was found to be a major challenge, labour supply was simply lacking in highly skilled areas such as low carbon installations (Linder & Williander, 2015) (Autio & Webb, 2015). However, the powers of mayors to implement policy in relation to skills training with the labour shortages was seen as an advantage and reinforced the argument for a place-based governance structure to better position and identify supply skills and labour in city regions. The ability to write skills policy by MCAs was seen as an advantage but without further powers to implement policies

independently and adequate funding streams, there was limited scope, this had already been confirmed by the regional skills boards under New Labour. Currently whilst skills were the main strategy requirement and a responsibility for both MCAs and LAs these predominately remained under central government control, there was felt to be a certain lack of freedom from central government departments, like the Department for Education as to new skills implementation, this had recently been the case for emerging technical skills provision programmes in Manchester (Burnham, 2023) (Gains, 2015). This finding concurred with skills training during the New Labour years when there was a revival of interest in industrial policy at both national and local levels following the repeated failure of capitalism to produce or contribute to a longstanding skills base. The UK Labour market exhibited a relatively long trial of low wage employment with work itself, often characterised by the limits of demand needed by employers for skilled employees (Sissons et al, 2014).

This research found that a lack of technological knowledge and skills currently presented in relation to low carbon installations had hindered sub-national governance institutional support of SMEs. The lack of knowledge slowed the transformation of SMEs longstanding or usual business models into a model conducive towards low carbon installation skills uptake (Liu & Bai, 2014) (Rademaekers et al, 2011) (Van Eijk, 2015). This finding was supported by the acknowledgement of ‘skill gaps’ to act on climate change within LCR (West Yorkshire Combined Authority, 2022), moreover, the lack of powers in the area of skills meant that, whilst both MCAs and LAs had strategic skills policy, the financial commitment in the early years of implementing skills policy remained absent. This consequently influenced the ability of sub-national governance institutions to put forward innovative skills policy since the advent of the Net Zero review in 2021.

Another major point that persistently came up was issues surrounding regulation of low carbon installations, both in relation to courses about how to teach low carbon skills such as heat pumps and the regulation of work currently being completed; the former seemed to be put down to the fact that there was a lack of leadership and guidance from the Department of Education on specific issues (Willis, 2024). It was mooted that this could be solved by the private sector ‘filling in’ through collaborative

working by Further Education colleges and private sector training providers. Indeed, it was found that central government's intention was to improve skills more locally through Local Skills Improvement Programmes (LSIPs). LSIPs were being rolled out through DfE but with limited funding, originally legislated for 'a few years ago' with a target date set by central government of 'Net Zero' 2030. Furthermore, it was found that colleges and educational providers were tending to think 'in small boxes' or 'out of sync' with other colleges that had already started to produce courses around low carbon installations independently. This was due to a lack of centralised control from a body that coordinated educational requirements for low carbon installations, moreover, on further investigation the Further Educational colleges concerned were all designing courses with different specifications and outcomes due to the lack of national policy on the how to provide training in the low carbon installation speciality. This culminated a very fragmented institutional landscape to design nationally recognised courses that produced professional trades people to a set standard. This was reinforced from an interviewee who confirmed that the majority of 'Hubs' to aid The Heat and Buildings Strategy roll out did not involve MCAs or LEPs, they gained funding directly from Innovate UK. This independent and fragmented way of working was contrary to the overriding principle of systems dynamics which required exogenous input and feedback loops to consistently change ideas for innovative practice to occur, in this context, training schemes for low carbon installations were not adequately controlled by MCAs.

The matter of skills training was also linked to the previous point on longstanding low wage work in England and the matter of sub-national inequalities discussed in earlier chapters. The innovative technology sector, particularly relevant to SMEs when assessing the low carbon technology sector required technologies beyond simple linear technologies and were found not to be widely established in current business practices. In keeping with city regional economies sub-national institutions were locked into their current forms (Kok et al, 2013) (Martin & Sunley, 2006), therefore, this was found to discourage SMEs from moving traditional business operations to produce new sustainable production methods and training associated with low carbon installations; generally, the small number of SME staff interviewed felt it was the risk associated with new technologies that hindered low carbon installation



development. Notwithstanding this, the demand for environmentally friendly technologies from consumers was deemed to be too low to ensure profitability.

Given the costs concerns for consumers, the inadequate technical capacities for SMEs to mass roll out simply did not have the demand in some instances and collectively the lack of technical knowledge and skills found in both city regions resulted in SMEs continuing to use linear business models that they were familiar with and dependent on. On associated point, the suggestion for increased innovative technical solutions without long term funding effectively created a business model against low carbon growth (Calogirou et al, 2010), moreover, the insufficient investment in technologies focused on low carbon product operations and designs (Van Eijk, 2015). A lack of advanced resource efficiency technologies (Zhu & Geng, 2013), coupled with the high pricing of supply materials (Van Buren et al, 2016), were factors that were likely to hinder the adoption of low carbon installation service adaptations. The increasing complexity and variety of materials in new products, made their production and installations quite challenging when considered alongside a lack of physical infrastructure and human capital (Forin et al, 2015).

To expand on these points, on a positive point within the Devolution Deal process there was potential and opportunity to influence skills training, evidence of this assertion was found in SCR, that a more advanced and nationally recognised skills training programme for SMEs was present in contrast to LCR. The extended time of a mayor in control possibly explained why SYCA had more advanced skills training programmes. Noted for its excellence at Westminster forum events (Phipson, 2022), the South Yorkshire Skills Bank (SYSB), had a unique way of planning for skills training that was 'employer led'. However, the study found that this institution had been outsourced to Calderdale College through procurement measures to run operations and this fell under LCR geographic scope of responsibility. Administratively, the same college ran the SYSB, these conflicting governance issues and boundaries caused confusion as to the governance relationship of the institution and only reinforced the Type 3, diagonal governance style alluded to in earlier chapters. In addition, this presented an unexplained anomaly, when the researcher and undoubtedly many SMEs became confused by the attempt to develop employer led skills development

programmes for low carbon installations. It also raised the argument that the operating institution, Calderdale College, may have had very little input into the corresponding skills policy as they were outside the corresponding MCA geographical area to develop the relevant skills policy. It was this area of skills development and the associated problems of a fragmented governance system that would have been better situated within the same city region that wrote the with skills policy. If permitted by central government, this was an area that sub-national governance institutions could lead on, given their proximity to local businesses and local educational providers, as has been the case in Manchester City Region. The procurement process was pointed out to be a lengthy and protracted process which added to delays, lacked flexibility, lacked adaptively, and hindered the ability to 'set things up fast'. There was also found to be a mismatch between the funding requirements below and the length of contracts for running the SYSB through outsourcing, assumedly to save money. One of the many myths that outsourcing saves taxpayer's money (Mazzucato, 2021) (Hill, 2022), was already inherent in previous Public-Private procurement, as previously with Unitary Development Corporations (UDCs) under Margaret Thatcher. This research found that SMEs were generally dependant on others for their skills supply and this could be detrimental to productivity and The Heat and Buildings Strategy implementation, this resulted from a lack of adaptive interaction between central government and sub-national level of operations.

### **Information flow barriers**

A main principle of place-based governance was the assumption that 'local knowledge' was a primary factor to resolve some of the regional inequality issues presented in earlier chapters and delivery of The Heat and Buildings Strategy. Sub-national governance institutions were found to be limited by how much information they could process and the principle of bounded rationality, particularly with the institutional capacity issues identified. Information flows were considered a prime factor for effective organisation and institutional working both within city regions and central government. This research found that effective decision making by SMEs surrounding the implementation of low carbon installations and innovative business models sub-nationally was restricted due to a lack of communication of clarity in the

information communicated by both central and sub-national institutions. This was, in part, due to a lack of powers and true devolutionary power sharing attached to the decentralisation approach. Rather than full Devolution; partial decentralisation caused a lack of information flows, inadequate feedback loops, and excessive administrative responsibilities between sub-national governance institutions and external institutions such as the Innovate UK.

The evidence uncovered as part of the research showed that a lack of information provided to SMEs about the benefits of providing low carbon services was poor, as was the environmental legislation, and regulation accompanying it. This agreed with some literature, in that, a central barrier to the implementation of low carbon installations was slow-moving information resources (Murillo et al, 2011). This supported the assertion that the successful transition to low carbon buildings could only be achieved through a collective effort that required knowledge exchange and dissemination of information. Information flows in relation to funding and low carbon projects were generally poor, particularly in LCR geography, this was due to requests for information being denied and only provided when legally compliant freedom of information requests was made under the relevant legislation. This was another reason why LCR was found to be somewhat behind SCR in terms of skill activation policy, due to a lack of communication with externalities to the institution. Information flows were crucial to produce innovation among different stakeholders, including sub-national governance institutions, although the same institutions were found to have poor long term communication problems causing constraints for SMEs. A consequence of these findings was passed onto the supply chain, supported by neoclassical economic theory, as the value of a product was dependent on consumers and citizenry which could heavily influence decision making. Hence, if communication problems saw consumers thinking negatively regarding 'a product' in this case low carbon installations, the demand for this product would be low.

Reconsidering the theoretical model of systems dynamic became relevant, as the fuzzy, multi-level, multi-scalar and flexible governance structure seemed to have had influenced delivery of national policy in the absence of adequate communication and rejection of true place-based governance in practice. Furthermore, it was found that,

whilst central government produced national policies such as The Heat and Buildings Strategy for publication, there was a lack of cohesive explanation regarding the technicalities of the process involved in installing low carbon technologies in buildings. Limited explanation of developments was given to consumers regarding technologies and this was left, by enlarge, up to the private sector in its limited and reduced capacity. This point highlighted fundamental problems with sub-national governance information flow problems for SMEs but also added to difficult decision making for the citizenry or consumers who were the SMEs client base. It was also found that it was often the case that information and innovative improvements in technology were guarded confidentially by companies for commercial reasons to prevent companies losing their competitive advantage referred to in the previously (Van Eijk, 2015) (Van Buren et al, 2016). In specialised fields, some employees found it difficult to articulate their knowledge, this prevented the broader dissemination and development of low carbon production business models and shared innovative practice. This influenced investment decisions as private sector investment ‘needed to know’ to make investment decisions, the same principle applied for sub-national governance institutions when making strategic economic development plans, another finding in relation to flows of information that surrounded low carbon installations was the difficulty MCAs had relying on information from central government to assist SMEs.

Expanding on the innovation sharing theme, in terms of highlighting transitional approaches such as low carbon installations, smart specialisation was found to play a significant role in policy strategy to invest in innovation at a city regional level (Billing et al, 2019), however, it was implemented in the two city regions at different paces. This was due to two main reasons, firstly, there was collaboration but also tensions in central-city regional relations that caused deal making delays and slowed down negotiations towards agreeing a Devolution Deal; secondly, the alternative governance type put forward, mayoral or non-mayoral influenced the already lengthy negotiation process for Devolution Deals and extended the time taken to implement policy objectives. As with anything new, there was a ‘lag phase’ to implement new business models from an SME perspective, particularly when there was a lack of demonstrable financial success and profits in new projects. Associated with this, was

consumer uncertainty that influenced business uncertainty (Kok et al, 2013). The lack of a publicly led information exchange system constituted an additional barrier to the effective adoption of business models for SMEs and extended the argument for open systems of governance.

Other issues were also apparent, such as, inhibition of knowledge sharing in relation to product production regarding low carbon technologies, this formed a barrier to information dissemination as the private sector was by enlarge wholly responsible for new technologies such as heat pumps, solar installation, wall insulation and boilers. It was found the sub-national governance institutions could do little to improve this themselves and could only try and get SMEs to act themselves and try and stimulate the private sector and SMEs into action, effectively, losing the element of control for SMEs intrinsic to the city regional economy as well as externally of the city region towards central government and the national economy. However, there was evidence that sub-national governance institutions had tried to collectively combat this problem, through voluntary collaborative efforts. An example was the collaboration in LCR of the Northeast and Yorkshire Net Zero Hub (Northeast & Yorkshire Net Zero Hub), which provided a collaboration of six MCAs and LEPs in the respective geographical city region area. This contrasted somewhat with the 'local' approach put forward in the Accelerating Net Zero report (Saunders & Dowling, 2022) which suggested the formation of 'Local Net Zero Hubs' at a different geographical scale would be more efficient. This point reinforced previous discussion on problems of geographical and spatial anomalies, as MCAs were outsourcing to partners that could confuse SMEs and the public as it was outside the 'normal' spatial designation of a city region. Designed to be an information tool regarding dissemination of policy and central source of information in the low carbon and 'Net Zero' area, the idea that a 'one stop shop' for expertise was absent, this was a major function of RDAs before they were abolished by the Coalition.

Information flows were referred to in the literature and SME performance factors were also linked to information flows, the findings in this research that there was a relatively good understanding of the transition but still a remarkable 'gap' between a firm's awareness and actual behaviour change was previously described by citing a

variety of contextual and cultural factors as a cause (Liu & Bai 2014). This was considered directly in agreement with this study's findings due to a lack of place-based governance. Furthermore, confidentiality, a lack of trust in sub-national governance institutions, a lack of product information shared among companies formed a barrier to co-production, innovation, and the effective management of products and services (Romero & Molina, 2011).

### **Behavioural barriers**

The attitude of sub-national governance institutions in making decisions was highlighted as an influence and identified as a further barrier towards SME behaviour and the emerging sub-national governance institutional culture which surrounded low carbon installations. This had become a crucial element in ensuring more positive steps were taken towards increasing low carbon installations, the institutional environmental culture referred to the philosophy, habits, and attitudes of institutions which used both principal and agency apparent (Romero & Molina, 2011). The implementation of low carbon installations developments provided a more efficient economic business practice for SMEs (Liu & Bia, 2014), although, this barrier was found to be heavily reliant on organisational structure. As an example, many sub-national governance institutions had a dual role for responsibility of implementing central policy as well as working out how to fund central government wishes. This finding was linked to a significant influence over strategic decisions, in this context, some politicians and institutional stakeholders had a more positive attitude towards carbon installations, while others did not, in terms of SME owners, they had a different perception of risk associated with low carbon installations (Fernandez-Vine et al, 2010). It was found this affected willingness to invest in projects with a strong risk averse attitude on the part of managers and businesses that hindered the enactment of low carbon installations. Even following the evaluation of the benefits associated with its implementation (Liu & Bia, 2014), the additional issue was highlighted of decision-making within sub-national governance institutions, who, it was found, had a need to estimate the value of proposals before embarking into new business markets such as low carbon installations to develop city regional economies. This perspective took a mainly financial form through assessment of implementation costs, consideration of the risks, and changes to business

environments. However, assessment also took a non-financial form in the assessment of social value, but this was found to be less important within the context of low carbon installations. Progress on low carbon technologies was known to be possibility detrimental to LAs, particularly given recent financial problems found at Thurrock Council in Essex (Butler, 2023). The uncertainty of a more long-term business model adaptation within the public sector would certainly influence decisions concerning labour, future apprenticeships, and human capital; in SMEs organisations participants perceived that this would require sub-national institutional support in any city region. Resistance to change, despite best efforts to encourage business to change with sub-national governance institutional support was a factor that did come up during the interviews, some interviewees with an SME business background mooted objections due to finance:

‘... as a housing developer we constantly see a call for more housing from central government, however, this usually comes with some sort of caveat and very little incentive for me to follow calls for lower carbon housing, it depends on viability’ (SME 2)

It was here that sub-national governance institutions had their work cut out, as it was felt that there was a desire to keep business models locked into their conventional models and this constituted a major stumbling block in city regional development (Besch, 2005). The attitudes and behaviour of institutions also fell under the same scrutiny; while working for an environmentally conscious institution, it was felt some employees were motivated, others were more reluctant, or were unaware of how to change business-as-usual operations, or may have even perceived green practices as an additional workload (Chan et al, 2014), this was one main reasons initiatives such as Low Carbon Literacy training programmes were being rolled out in organisations.

Finally, the administrative burden in relation to sub-national institutional practices and central government added to constraints and behaviour of SME and institutions. Monitoring and reporting environmental performance data with increased costs and overheads was unpractical for sub-national governance institutions due to capacity issues. An example was that institutions were required to submit the same environmental data in various authorities and in different formats, but the expertise

for that often needed to be sought from external consultants (Calogirou, 2010) (OECD, 2010), this was expensive and increased the cost burden. In addition, the adoption of new business models entailed more complex and costly management and planning processes (Kok et al, 2013) and given the importance of SMEs to city regional economies generally, the above points highlighted recurrent barriers found within the literature that surrounded SME performance and decision making on low carbon installations. These points were all ultimately depended, to some extent, policy making either sub-nationally or centrally.

### **Fragmented and ‘fuzzy’ policy**

Perhaps as a culmination of all the previous points, it was found the place-based governance added a positive aspect to city regions due to the encouragement of a more ‘local’ supply chain. In Preston for example, the opportunity to interact with sub-national governance institutions provided a better understanding of their own locality and SMEs which influenced policy (Preston City Council, n.d). The mountains of emergent policy published within MCA and LA governance institutions were found to have rested upon familiar economic development themes; these were either physical infrastructure or people development and were predominately in the hands of MCAs through adopted Strategic Economic Plans (SEPs). SEPs were considered the most relevant strategic economic plan document for analysis in the hands of MCAs, as this contained economic development themes and associated ambitions to assist The Heat and Buildings Strategy delivery. The assessment of skills policy in the form of local skills control uncovered that SEPs were designed to introduce a broad discussion of skills policy but additional supplementary skills policy such the Local Improvement Skills Plan (LSIP) was necessary.

LSIPs were plans in the hands of employer representative bodies (ERB), either LAs, MCAs, or CAs, and were introduced to achieve positive influence through market changes and adequate skills planning. Collectively, sub-national institutions certainly had responsibilities for skills development, it was found that there was general support for these powers to enhance skills at a sub-national level in England in relation to low carbon installation projects. Generally, participants viewed this to be a positive step towards a more effective roll out of The Heat and Buildings Strategy,



particularly in relation to fiscal authority and skills training discussed previously. The findings of the study revealed a main barrier to be a lack of co-ordination between labour supply and demand networks in relation to skills training. Reviewed as part of the research was the Employment and Skills Framework (ESF), presented in each SEP in both city regions. To combat the lack of co-ordination apparent the SCR had focused on creating training courses with employers rather than central government directly, one of the disadvantages of this was the spatial boundaries of this institution. Advantages, however, was the assurance that local city regional skills supply issues could be dealt with readily, the cross-boundary nature of these services was found to be a source of confusion but perhaps, as a reflection, demonstrated the advantages of flexible governance structures in places where actors could move freely across boundaries. Because of this free movement and multiple policy provision at different levels of governance, skills policies were found to have contributed to inefficient implementation of policy due to their number and multiplicity. The findings demonstrated that there was a need for a sustained and committed supply of labour which was confirmed in the literature dealing with commitment of all actors in the supply chain (Dervojeđa et al, 2014) (Van Buren et al, 2016). It was found that for the policy making process to be effective and have positive influence, policies needed to be aligned across all governance levels, a lack of collaboration and fragmentation in the process, not only from SMEs but other sub-national governance institutions, were found to be detrimental as both created a particular culture for economic drive in any city region.

Admittedly, the researcher had some problems accessing staff at WYCA to discuss their views on their skills policy as published, this was due to the policy staff not wanting to discuss policy implications externally to the institution (PC1, 25<sup>th</sup> March, 2022). In SCR, Sheffield City Council wrote separate policies to that of the MCA and asked about this they stated they didn't really co-ordinate or liaise with the SYCA on skills policy, moreover, it was found that difficulties with suppliers and service partners as there was a reluctance to get involved in innovative processes and sector change or policy making as a result of a lack of coherent skills policy. This added to the perception of SMEs losing their competitive advantage and this concurred with other literature (Luthra et al, 2011).

From a city regional policy perspective, it was found that the intention to produce policy that was tailored to a place did not always enhance the particularities of a place, this may have been better addressed independently by setting standards at a local or regional level in each city region. Furthermore, it was found that actors contributing to low carbon installations supply side skill chains found it time-consuming and expensive, for both sub-national governance institutions and SMEs, as collaboration was required with new market actors. Due to nature of low carbon installation skillsets, it was difficult to 'get started' as the available skills were relatively new, both within SCR and LCR. SEPs and LSIPs were found to be written in a very generic manner not citing specific causes of action. Lock-in of distribution channels were also a main barrier and this could be linked to historical factors through the principle of 'path dependence' (Martin & Sunley, 2006). It was found that skills documentation lacked the specifics for skills development for highly skilled labour in the low carbon installation area referred to as 'green jobs' and 'green economy skills' in a very generic manner. On these issues, it was mooted that a more locally or regionally led policy making system in relation to low carbon installations was required. Indeed, this was supported by participants attitudes in ensuring that labour supply for skills. Additional findings, such as sourcing from local suppliers to support the local economy and use of sustainability related accreditations for SMEs who tried to employ correctly skilled people were found to be a factor in encouraging and contributing towards a broader process of social transformation. This was mainly via skills training at a city regional level and was found to be positively supported by sub-national governance policymakers. This was summarised by one interviewee working in a skills related post:

'... at the end of the day employers want the right skilled people for their business, they want good quality to do they can sell quality into their customers and they want it at the right price' (ED 1)

A central argument on the issue of skills training sub-nationally related to the decentralisation of policy making, decision making, and delegation of powers to a sub-national level. These points were surrounded by policy areas of regulation development and standards in building infrastructure such as installation of heat pumps. All these issues needed to satisfy SMEs also. Within the barrier remit of

government and governance, the support and implementation of energy efficiency measures were cited as crucial to the effective support for SMEs. The involvement of city regional mayors and MCAs, not only within the context of economic policy but skills policy was also found to be important; interviewees generally expressed the importance of, not only clarity in policy, but the need to legislate and regulate low carbon installations. This had been in the form of a need to increase work towards to a more ‘people centred’ model of regional policy development (Bentley & Pugalis, 2014a). In addition to the issue of employment and the essential interactions between employers and job seekers there was a requirement and need to work towards a more ‘people centered’ model of regional development using legislative powers available sub-nationally (Bentley & Pugalis, 2014b), this would be consistent with a place-based governance approach. Summarily however, it was extremely difficult for MCAs to influence these points as their powers did not extend far enough to independently change and implement skills policy outside of central government and the Department of Education.

### **The EPC training fiasco – a personal reflection**

The researcher attended a practical skills course to issue EPC certificates connected with low carbon buildings which provided empirical experience for the data collection phase of the study. This experience was reflected on following attendance on an accredited course to qualify as an On Construction Domestic Energy Assessor (OCDEA), this training was found to be solely in the hands of private training providers. The private sector ran several courses, the OCDEA was just one, all courses led to a qualification to produce Energy Performance Certificates (EPCs) which were a statutory requirement when selling or renting out any type of building. The EPC was one of the main measurable outcomes that government had applied to The Heat and Buildings Strategy, it essentially provided an alphabetical scale to measure the energy performance of a building. This was the final step towards obtaining the EPC rating which was the outcome and rating scale for buildings when any low carbon installations had been installed and was a central outcome measure cited in The Heat and Buildings Strategy.

As part of the fieldwork for this study the researcher undertook the OCDEA course with a private company at significant expense. Selecting a course was difficult whilst only three companies were found that delivered the relevant training, they all offered slightly different courses, a classroom option, online option (most courses were online) and courses that lasted different lengths of 3 to 5 days long. On undertaking the course, it became apparent, in the view of the researcher who has experience in a variety of teaching environments, that the material was out of date and dated back to the 1980s when EPC certificates were conceived. There had been no effort to update the course materials despite several changes to the legislation over the years, the course itself was rushed and, in the eyes of the researcher, the trainer got through things as quickly as possible. Upon finishing the course, the student was required to complete a portfolio of work and the support in place was completely inadequate. This highlighted some of the problems that could be encountered when relying heavily on the private sector to deliver training. Initially, when searching for a course, the research uncovered only two private companies that were able to run these courses with regulation by the awarding body. Upon complaining to the regulatory body regarding the poor quality of course delivery, the researcher found that the regulatory body was reluctant to take any action whatsoever, instead preferring to support the private enterprise without any formal investigation. This mimics the Type 3 or diagonal governance model discussed in earlier chapters, with actors freely moving through different levels of governance but presented in the private sector rather than public sector. This highlighted the dangers of regulatory bodies acting in close relationship to providers as in the 20008 financial crash cited earlier. In the end the course fee was refunded to the researcher after threatening County Court action, this simple example highlighted some of the possible problems with the private sector leading in some skills training.

### **Case Study - The LEP Energy Efficiency Accelerator and the Leeds (PIPES)**

A second empirical example that provided evidence of barriers encountered in relation to large physical infrastructure projects associated with low carbon installation was that of The Leeds PIPES heat networks and Energy Efficiency accelerator programme, a public-private partnership with Leeds City Council (2025). This was a heat network programme designed to add to the decarbonisation of

buildings, PIPES supported information uncovered in the literature review regarding the importance of human capital in city regions and provided an example of how finance was obtained without the input of a mayor. It exemplified some of the associated issues with low carbon installations such as skills shortages and data were gleaned from the information collected to add context to the analysis and discussion. The project allowed for more buildings in new areas of LCR and had a direct influence on low carbon housing, this example project demonstrated the advantages of public bodies working in collaboration with the private sector (larger SMEs). PIPES also benefited from direct finance from the Leeds Growth Deal, a precursor to the more recent Devolution Deal and showed a positive step in sub-national funding streams, notably, funding was arranged when the NMCA was in existence without a mayor as a leader.

The PIPES heat network was currently in the third phase of extension following funding via the Heat Network Investment Project, this funding, like the recently announced Green Heat Network Fund was provided by central government. The networks included installation of underground pipes that connected and expanded connections to buildings and developments located in the area. Owners could choose to connect at any time, part of the scheme had recently included publicly owned buildings such as Leeds Combined Court Centre and Leeds Magistrates' Court. These buildings were connected as part of a wider programme of energy upgrades and the scheme was produced in conjunction with Vital Energi, a larger SME, and delivered through a public and/or private partnership. Whilst this scheme obviously demonstrated the benefits of such Public-Private partnerships, problems were experienced obtaining skilled labour and implementation delays were reported due to a lack of appropriate skilled professionals. As alluded to earlier, from a governance perspective, this project was conceived through a Growth Deal before a mayor was elected to WYCA, therefore, by the nature of the empirical evidence available this questioned the true leadership of mayors as projects such as this were feasible without a mayor as they were obviously able to 'get off the ground' without them. Moreover, the PIPES heat network example, whilst leading to successful project implementation, also revealed a broader collective problem with the very legitimacy of sub-national public spending on low carbon installations. It was found

that there was a lack of clarity and accountability over sub-national authority responsibilities and capacity for effective long term infrastructure planning projects. This was due to an inconsistency and uncertainty in funding commitments made by central government, this raised the argument for more independent fiscal powers for sub-national governance institutions, furthermore, whilst the research found difficulties finding staff directly involved, such as project managers, as they tended to complete a project and moved onto other projects, other participants were able to comment on the points and the relationship between SMEs installing low carbon technology for buildings and the associated infrastructure.

One interviewee from a small SME who installed low carbon installations put it:

‘the big guys [meaning large SMEs] like to rule the roost, but they don’t like talking about the issues’ (LA 1)

This case study also raised the issue discussed previously regarding a lack of co-ordination and communication, not only between sub-national institutions, but also between the private sector themselves due to competition. This was not expanded on in the interview, but the possibility was raised that this was due to the over competitive bidding situation found in the procurement processes of English government which consequently influenced communication channels. Furthermore, the recent COVID-19 pandemic and fuel crisis, both themselves external factors, were found to have further exacerbated the financial resource pressures and reduced the scope for discretionary action, governance, and institutional change. These issues of communication and lack of resources available influenced sub-national institutions to act systematically on clean energy development. As a collective, within the context of a city region, this very point was highlighted by a politically active interviewee in the form of a local Councillor:

‘in my experience large infrastructure projects need to be developed together [in the context of central versus sub-national bodies], there is too much telling us what to do and when to do it and it also leaves out the smaller people’ (C1)

The point of ‘smaller people’ was not expanded on as to whether the participant meant smaller residents or businesses, however, in an empirical context of building

infrastructure, sole traders, and small SMEs were found crucial for example, in supplying parts. This point of 'smaller' influencers, in the context of small SMEs and sole traders, was a crucial point to the overarching theoretical framework principles of systems dynamics such as 'agentic activity'. In the context of larger projects such as PIPEs, it was important to remember the problems of smaller SME agents with regard funding; there was a lack available money to borrow to help with the outlay of costs for SMEs to initiate smaller projects which caused delays to larger projects and a lack of interest from smaller SMEs; due to the fact they had to wait for government payment for work already done, the potential lack of involvement from smaller SMEs threw into doubt the potential finance available in terms of funding from central government and SME investment.

The total estimated capital investment to achieve 'Net Zero' was £50-60 billion each year, with the intended investment coming from the private sector (HM Government, 2023), an example for the housing sector was the Boiler Upgrade Scheme, which was intended to help businesses and residents get heat pumps or biomass boilers fitted to their properties, whilst it was a grant not a loan and centrally funded, the problem with this type of grant was that the amounts were relatively small compared to the total costs of the infrastructure work, overall making consumers responsible for the majority of the bill. Similarly, the logistical cost referred to for SMEs might be shown in the cost of a heat pump of £12-15,000, with a central government grant of only £5000, less than half the total cost. The SME was required to fund the full amount themselves in advance and this caused obvious cash flow problems for the SME. These financial matters did not entice people to generally uptake such schemes, never mind people from deprived areas like SCR and LCR.

### **Summary**

This chapter has reviewed the findings of the research and has set the scene to answer the research questions posed, some of the barriers presented in relation to the roll out of low carbon installations provided the following initial takeaways to carry through to the discussion chapter:

1. A variety of barriers existed in relation to the development of low carbon installations, most poignantly since 2010, there was a lack of finance initiatives for low carbon installations, a lack of skills influenced the ability of sub-national institutions to implement them. Sub-national institutions could not solve this issue due to lack of fiscal and limited dependant control of sub-national finance Devolution Deals.
2. Inadequate financial schemes and lack of skills training were the primary factors that hindered low carbon installation delivery and a major concern to both sub-national governance institutions and SMEs. A lack of independent control influenced long term financing for sub-national institution's ability to solve this issue.
3. Sub-national governance institutions lacked sufficient market influences and capacity to adequately support SMEs in relation to low carbon installations.
4. SMEs were reliant on their market and consumer influence to push low carbon installation into the market and train new staff to increase skills in the area.
5. Whilst there was interdependency in accordance with systems theory dynamics there was an unequal relationship between central government and MCAs, and sub-national institutions and SMEs, this hindered adequate communication and information flows.
6. Legislative powers of mayors were needed to make actions statutory requirements rather than purely policy requirements and these were relatively absent in relation to low carbon installation funding streams.



## Chapter 6 – Discussion

### Outline

Chapter 5 outlined the findings of the study and described the barriers found. This chapter goes on to discuss and answer each of the research questions in turn considering the research findings. It examines contemporary sub-national governance institutional ability to roll out The Heat and Buildings Strategy via MCAs and LEPs. It critically assesses, discusses, and provides analytical synthesis to interpret findings and does this by evaluating the findings from earlier work conducted as part of the literature review, it incorporates this into a discussion surrounding institutional structural responsibility for low carbon installation delivery. The chapter contrasts institutional capacity and constitutional makeup relevant to low carbon installations, whilst applying the chosen theoretical model for the research. It highlights the increasingly formal nature of governance institutions currently available to deliver the UK Heat and Buildings Strategy and explores the potential confusion surrounding the current roles and responsibilities for mayors collaborating in new institutional forms. It then moves on to question whether the constitutional makeup of such institutions is adequate to provide access to all those needed and deliver on national policy in a place-based governance manner. The chapter is written using five broad sections: the context of spatial scale and focus of funding, institutional constitution and powers, capacity, and the role of policy making.

### **How can sub-national governance institutions address barriers to the implementation of low carbon installations?**

The next three sections answer the first research question and focus on the current funding mechanisms available that offer potential solutions to some of the barriers identified against a background of spatial scale considerations as identified within the literature.

### **The barriers discussed**

Governance geography was found to be a key point in relation to the funding available for low carbon installations which influenced the ability of sub-national institutions to overcome some of the barriers found. The strength to deal with barriers associated with low carbon installations all relied on effective spatial governance with adequate funding streams, this relied on the ‘functions’ available to city regional governance institutions as put forward in the theoretical model and illustrated in Figure 6.

The ‘functions’ centred around a lack of scale and ambiguity and concentrated on notions of agglomeration to assess financial capabilities of subnational institutions, alongside a detailed understanding of both the leadership and constitutional formation of subnational institutions; these points were crucial to enhancing financial and fiscal autonomy for MCAs. More broadly, the government had made it clear that it favoured FEAs within the context of city regions to drive economic development rather than any other spatial option. As the mayoral type of leadership landscape was already set to increase in England (Smyth, 2021), local policy actors needed to ensure that they were familiar with the debates on FEAs and the crossover between low carbon installations and access to funding. The alternative spatial scale discussed in the literature review was that of PUAs which had the alternative of concentrating on multiple settlements or cities (places of growth), rather than one central city focus within the same spatial governance scale. PUAs were new to the discussion on spatial scale and in combination with adequate funding streams provided a possible solution to some of the barriers identified. The PUA debate was seen as an extension of some of Harvey’s concepts and linked to accumulation theory discussed previously of centrality of growth in either single or multiple areas and the central principle of keeping capital accumulation inside or outside a given geographic area a common thread.

The main barriers identified from the evidence collectively fell into specific themes, these were: finance, skills training, information flows, behaviour of SMEs, and policy fragmentation. The sub-national governance impact on low carbon installations in these thematic areas was limited, in earlier chapters a review of the literature showed that LEPs were potentially a geographically flexible way of implementing a place-

based governance approach (Pugalis & Bentley, 2014b), whilst in other literatures, concerns were found surrounding the accountability of the private sector apparent in LEPs and spatial developments (Harrison, 2014) (Harrison et al, 2022). From a theoretical standpoint, the development of systems dynamics had caused a confused picture as the multiple perspectives of place-based governance as a concept ensured there were various alternative theoretical interpretations of what systems dynamics was. On the evidence available, the barriers and boundaries identified spatial abnormalities and hindered the development of solutions to low carbon installation delivery, examples cited in the data collected included Devolution Deals that were negotiated at different times and by different MCAs, how finance filtered down through to the sub-national level of governance and incorporated into skills training was a problem, as only three private companies taught the skills necessary to produce EPC certificates. Training quality was of questionable standard and caused difficulty for businesses to obtain information regarding funding schemes and policy dissemination. This way of working was against a backdrop of unrealistic timescales, and it was therefore difficult to see how sub-national institutions could independently bridge the gap in skills training themselves. The only possible way to develop the relevant capacity in skills was in conjunction with the private sector or change the governance spatial scale to enhance powers sub-nationally to those responsible for skills policy development. However, this was problematic; as LSIPs, the most recent localised skills training document, had central government instructions to be created by several potential institutions, not one, for example, it could be an MCA or a LA that led in this area, which meant some of the institutions were working in isolation on this type of document. Before LSIPs were introduced, MCAs simply produced Local Skill Reports (West Yorkshire Combined Authority, 2022; Sheffield Yorkshire Combined Authority, 2021b). The multiple overlap of policy documents defeated the point in relation to low carbon installations as the development needed was a single cohesive skills structure with standardised teaching and qualification assessment. An absence of collaboration in this area also distinctly rejected principles of the theoretical model developed through the literature on collaborative and network governance (Wang & Ran, 2023).

Expanding on this point, German and United States Federal systems had consistently shown the ability to regenerate economically and implement regeneration programmes at speed through a more efficient sub-national governance system (Eckersley et al, 2023; Kern et al, 2023). This alternative way of working led to more efficient dissemination and created policy at an appropriate scalar level and, importantly, ‘scaled up’ the policy during implementation and put into practice many of the principles discussed in Chapter 3 regarding the theoretical model and Dooley’s paradigms. PhD research had previously indicated that a larger spatial scale was preferable (Smyth, 2021), and political perspectives in England had mooted the advantages of forming institutions that covered a larger area. This ‘new spatial approach’ held several possible advantages; it created an opportunity to address the capacity issues identified in the findings section, existing skills in the public sector could be used more effectively over larger areas with more SMEs, reduced staffing could be required to cover a larger geographical area with a smaller number of public officials, an opportunity was created to improve communication streams to combat some of the information sharing issues identified; and there was the opportunity to save money from ‘downsizing the workforce’ to name of few.

The barriers identified collectively hindered endogenous growth in relation to The Heat and Buildings Strategy, these were explained by the identification of the continuing central role for the public sector through a process of increasingly formal methods of governance, this point was reflected in the theoretical model by boundaries identified as lines of differing levels of ‘porousness’ for information exchanges with dashed, dotted and dashed lines. Applying Figure 6 to the issue of hard versus soft, or informal or formal governance communications; in this context, it was apparent from the findings that ‘within’ the city region the three institutional functions were not fully under one institution’s control. This resulted in soft and informal governance spaces (Haughton & Allmendinger, 2008), with a knock-on effect of increased confusion about ‘who was dealing with what’. The argument for a larger spatial governance area controlled by a singular institution was congruent with the theoretical model in several ways. Reflecting on previous chapters, the first barrier that of the market and fiscal perspective, showed a lack of the principles of place-based governance and the typology of sub-national institutions involved seemed to

produce a 'halfway house' with a Type 3, or diagonal governance model. This was reinforced by the ability of private sector actors in some respects 'cosying up' to central government to secure a good Devolution Deal. The absence of the 'fiscal function' was a crucial element to financial debates, the intrinsic substance of Devolutions Deals with endogenous growth was absent due to a stark lack of fiscal power making on the part of mayors, fragmentation in the process to increase taxation within the city region was a 'bottom-up' process as the powers to raise taxes were given to LAs by way of Council Tax and Business Rates adjustments, these however were inadequate and both were general taxations, not specially ring fenced for low carbon installations. Mayoral tax raising powers in the two MCAs investigated were virtually non-existent except for the ability to make decisions on how to invest local government pension money.

In relation to the second point on skills training, actors within the SYSB were reliant on contracts and outsourcing to maintain a service via Calderdale College, this demonstrated a confusing picture in relation to governance boundaries. Notwithstanding this, the theoretical model chosen for the study went some way to explain the arguments for and against this approach to sub-national governance working. The absence of a truly independent administrative function for sub-national institutions impacted on their ability to design coherent and implementable skills policy for the city region. To some extent flexibility of influencing skills mattered within the Devolution Deal available to MCAs but funding amounts on skills issues had no impact in relation to low carbon installations. The governance of skills training was demonstrated to be fragmented as the evidence pointed to a general trend to outsource skills training to the 'third' or private sector, this led to questions on whether there was any actual value in doing this given the researcher's experience of training in the building energy performance sector as outlined in Chapter 5. This demonstrated a disadvantage of using informal or soft governance spaces and emphasised a move towards 'post political' behaviour within contemporary sub-national institutions. Given the incongruent relationship sometimes encountered at a sub-national governance level, this point on delivery of skills policy objectives encompassed the broader aspect of inclusivity sub-nationally and demonstrated a clear lack of responsibility for delivery of associated skills policy. Sub-national

governance needed to be more integrated to deliver objectives, rather than having a 'dual policy' approach to LSIPs. A singular policy approach seemed to be needed with intrinsic elements of systems theory dynamics in Figure 6 which required communication with externalities to encourage emergence forces in a joined up way within in the city region to promote development.

In relation the third barrier identified, that of information flows, the fragmentation of sub-national governance institutions exacerbated problems with communication, this consequently affected institutional ability to make decisions surrounding both Devolution funding and skills development, the main tactic employed to resolve the latter was to rely on the private sector. Systems dynamics would advocate that the 'political and regulatory function' shown in Figure 6 should have been responsible for this, rather than the private sector which was included under 'External Environment' and was indicated to more of a 'follower' role. Expanding on the point of actors involved in decision making among both MCAs and LEPs, there appeared a conflicting picture of leadership, in that, there was an obvious conflict between leaders of MCAs who were public officials and leaders of LEPs who were private sector actors; to combat this, it was mooted that a leadership team with common goals in line with second order systems theory thinking was necessary. This finding was concurrent with the theoretical debates contained within systems theory, in that, MCAs were failing to perform against central government targets, not only because of inadequate powers to resolve the barriers identified on their own, but also because of an inability to influence the private sector in the form of SMEs to assist. This demonstrated the applicability of some systems dynamics, in that, as per Figure 6, externalities (small dark blue circles - SMEs) were needed to 'feed into' the institutional implementation agenda. This point agreed with the literature in Mazzucato (2021) and raised the issue in the debate of the role of the public sector in innovation risk taking, the extent to which risk should be taken by either the public sector in isolation or public sector in conjunction with the private sector was questionable. Sub-national governance institutions in their current form were concluded to be a mix of public and private sector bodies, but neither seemed to want to take the risk on low carbon installations and the commitment of the public sector in relation to innovation projects was a doubtful. It was concluded that there was a real need for the public sector to

stimulate the private sector and take risks in investments themselves to be successful. This linked into the theoretical model given the influence of MCAs on strategic decision making, who lacked control of planning and building regulations, with certain 'functions' being absent. The constitutional makeup of a sub-national institutions did not help resolve this as the make-up of MCAs and LEP members where inherently different, either public or private sector respectively. This, per se, did not lend itself, nor fit with, the theoretical model of a self-organising system put forward from Kant's perspective regarding system dynamics, nor second order system thinking, the system was unable to self-organise due to different goals of the system. On the issue of information flows, the main objective of some main infrastructure projects like the Net Zero Heat Programme (Innovate UK, n.d) which included information to collect and make information available on housing in England; to assess energy efficiency in buildings in a 'nationally consistent way', was found to be pointless, as, LAs already had the information that was being collected on buildings in their respective areas. The data collection function as part of the Net Zero Heat Programme heavily involved the private sector and seemed redundant.

The previous barriers identified surrounding finance, skills, and information flows; all influenced the fourth barrier identified, that of SME behaviours. SMEs were unable to obtain finance and unable to employ or train skilled staff to complete low carbon installations. There was a lack of accurate information for SMEs to change their own business practices, SMEs were therefore reluctant to take on changes to business practice independently due to viability risk. Additionally, despite the more formal structures of sub-national governance institutions alluded to, the identification of a lack of democratic engagement in contemporary sub-national institutions influenced SME behaviour. This lack of democracy found in sub-national policy in England was cited in previous literature which highlighted accountability issues (Deas, 2013a) (Deas, I, 2013b) (Haughton et al, 2016). On the evidence, this was one factor that influenced how the identified barriers could be resolved at a city regional level, as it was not clear who was ultimately responsible or accountable for the implementation of The Heat and Buildings Strategy. In turn, this influenced the perspective of SMEs as to whether they complied with requests to assist in skills training and change business models. An additional factor to this barrier was the approach of LEPs

operating sub-nationally, who seemed to lack motivation to develop low carbon installation production, this was posited to be due to the emergence of LEPs as soft spaces of governance which were thought to be designed to bypass statutory local government procedures, similar to previous attempts such as Urban Development Corporations (UDCs) and Enterprise Zones. 'Harder' spaces of governance were therefore recommended, however, in accordance with Figure 6 these hard spaces required the flexibility to cross boundaries to some extent for the 'system' to operate effectively, hence, communication lines and information flows needed to become 'looser' and more open. In this context, the evidence presented from this research demonstrated the reluctance of SMEs to implement low carbon buildings in the current soft governance spaces in which these businesses operated. Thus, leadership changes in the form of a 'one leader' approach of a mayor with powers over the MCA and LEP was needed, evidence suggested that there were ambiguities demonstrated surrounding the openness of sub-national governance institutions and accountability of leadership of sub-national institutions.

In terms of the theoretical model, the lack of behaviour changes reduced agentic activity in Figure 6 and had a consequential effect on emergence within the city regional economy. The final barrier identified, policy fragmentation, was also thought to be due to a combination of the other barriers found, to put this into current policy context, The Levelling Up Strategy, followed the flagship The Net Zero Strategy and when announced by central government caused a situation where it was difficult to see how some of central government's commitments or 'missions' could be achieved. The financial capital element of The Net Zero Strategy relied on the ability to disseminate funding quickly and in response to the needs of business, however, the evidence pointed to the conclusion that this was simply not happening with businesses finding it difficult to wade through the large amounts of 'red tape' to obtain funding. The role of LEPs and sub-national governance institutions responsible for finance was fundamentally flawed, as the institution was separate from MCAs, this concurred with earlier analysis of post 2010 policy in the literature (Shutt & Liddle, 2020). The election of the Coalition government focused on the appointment of LEPs and 'growth drivers' for city regions to develop the private sector in conjunction with public sector, the evidence demonstrated limited involvement of



LEPs in the sub-national low carbon installation policy making process. The heterogeneous nature of the city region became apparent with serious limitations identified by the SMEs interviewed, which led to lack of assistance in The Heat and Buildings Strategy roll out, instead, LEPs seemed to have brought about a role of financial disseminators without a policy implementation role. LEPs consisted of the typical soft space of governance referred to earlier and this institution tended to be separated from the corresponding MCA. In this sense, the ability of the private sector to drive growth was hindered, as alluded to in previous chapters, LEPs lacked the information and skills to adequately implement skills training and investment capacity to achieve central government's 2030 target.

### **Funding Mechanisms**

Building on the fiscal and financial barrier theme another central finding was inefficiency surrounding the mechanisms involved in types of finance and funding streams available to sub-national governance institutions. The advent of the process of deal making sub-nationally was developed through a process of City and Growth Deals that advanced onto Devolution Deals. Devolution Deals were created by the coalition government alongside MCAs and were negotiated finance arrangements that took over as the central type of contemporary funding mechanism sub-nationally.

To explore whether this type of 'deal making' and funding available was place-based in its current format or helpful to low carbon installation delivery the research identified the key documents as outlined in Chapter 4, Table 11. A key finding of this assessment was the interdependent nature of the deal making process, this provided an example of low carbon installation funding schemes that could be interpreted using systems theory dynamics but was confounded by multiple actors requiring multiple information flows as demonstrated by arrows in the theoretical model in Figure 6. The fieldwork that took place for this study emerged in an ever-changing political environment that followed quickly changing circumstances, the emergence of 'new deals' a constantly evolving process of agreeing Devolution Deals with individual MCAs occurred at different times throughout England (Pike et al, 2016). The Deals themselves set out conditionalities on the participating MCAs, this study

uncovered that whilst broad climate change issues were contained in more recent Devolution Deals, they tended to be supplementary to matters contained within the Devolution Deal process, rather than a specific issue of low carbon installations. LCR and SCR Devolution Deals themselves were evolutionary and progressive processes and the content very much depended on when the Devolution Deals were finalised; as there was an element of central government control on what the content of the actual Devolution Deal would be. More specifically, both SCR and LCR Devolution Deals depended on how the ‘political and regulatory function’ of sub-national governance operations, whether a mayor was in situ or not, and what powers they had. This impacted on the application of Dooley’s theory of casual characteristics.

The Devolution Deal interaction itself had two possible applications following Dooley. The first was SCR with a mayor in situ, this interactional type was examined and the process of working within the city region, as fewer than five variables existed, (the mayor was acting independently negotiating a Devolution Deal with central government - albeit in conjunction with a cabinet), therefore, according to the casual characteristics in Table 6 as ‘few’ variables existed the interaction could only be classified as either periodic or chaotic. As the mayor and central government acted interdependently with externalities (central government depicted in Figure 6), this meant that the mechanism was categorised as global rather than local (central government was a global participant). The overarching dimensional causality in this Devolution Deal mechanism was therefore ‘chaotic’ and required an ‘adaptive institutional’ mechanism.

In contrast, the Devolution Deal mechanism in LCR without a mayor resulted in a high dimensional characteristic, as the factors or variables were ‘many’ in number (at the time WYCA had no mayor), the constituents of the WYCA were acting independently but were interdependent on each other internally to the combined authority to agree a Devolution Deal, this was local rather than global in nature compared to the previous example because the main activity was between the constituents of the combined authority. These agents acted independently but in a constrained fashion and were interdependent on each other. This analysis therefore resulted in a ‘pink noise’ characteristic. A further application of Dooley could be put in relation to

Council Tax and Business Rates, this mechanism corresponded with a 'periodic' low dimensional casual system given that the LAs were independent to change the tax themselves, they were acting in a simple linear fashion compared with the Devolution Deal mechanism. Hence this was a more linear and non-complex way of working.

In some respects, sub-national institutions were in a 'chicken and egg' situation and had the difficult task of both operating in an independent manner but at the same time were required to work in a collaborative fashion. This meant that sub-national institutions had to ensure that the multitude of interested parties in progressing low carbon installations needed to ensure that parties or actors benefited from the production of low carbon installations. Co-ordination between businesses, skills training bodies, institutions, consumers, and other political bodies, all required responsible and accountable institutions. This had consequences in the way institutions interacted with the private sector, the approach followed the basic premise of good business sense in terms of each party must see a 'mutual benefit' to close a deal. The interaction of sub-national governance institutions and the internal institutional actors within the MCA, for example LAs, could be seen to have been ineffective in negotiating Devolution Deals, as no mayor led the LCR Devolution Deal, more parties were involved as there were more constituent parties of the MCA. This increased tension referred to in academic work on CAS (Uhl Bien & Russ, 2007, 2009), and second order system theory thinking came into play because of the multi-dimensional process of the Devolution Deal process, more so than the first example. During negotiations, tensions would be created as each constitute member of the MCA had alternating views on what the Devolution Deal should consist of. This assisted with agentic activity generation, concurring with the theoretical model for the research, but when these tensions became too strong, this led to a situation that reduced the production of emergence via policy and innovation and slowed progress. As a result, there was an increased lack of participation from LAs as they would need to agree but had an independent vote to 'scupper' the Devolution Deal if they wanted. The level of interdependency between sub-national institutions, central government, and the multiple actors within the city region was reliant on emergent networks and dependant on each other's goals of having a common sense of purpose, or in a system theory sense, there was a reliance on externalities, for example, national

government targets were found to control when and how Devolution Deals were negotiated.

It is worth noting at this point, that whilst the examples are efforts to categorise Dooley's casual characteristic theory into the different types of different mechanisms to provide a solution for the barriers identified, it is not quite this simple. Given the governance modes identified in the literature review, particularly Type 3 or diagonal governance; actors are moving in and out of situations on a revolving basis, therefore, to take the first two examples of Devolution Deals, whilst actors were involved in the deal making process at some point, it was quite foreseeable that actors may 'move on' or out of the process within different timescales. Hence, the variables would constantly change and this may cause a particular situation to move from one casual characteristic to another casual characteristic very quickly, for example, the Devolution Deals examples given depended on the level of independence and interdependence and who the mayor was reliant on in making the deal, this was a problem when attempting to apply two conceptual theories that have loose flexible boundaries. More locally, in the case of Council Tax and Business Rates this was not a foreseeable problem due to a more linear and independent way of working.

Moving on and thinking more broadly, climate change as a topic was formed as a central theme to Devolution Deals which were themselves negotiated and progressed through years on a case-by-case basis, such an example was the 'clean energy' theme contained within the recently adopted WYCA Devolution Deal (Ministry of Housing, Communities and Local Government, 2020), however, the lack of true independence of mayors during negotiations as part of the Devolution Deal process itself was highlighted as a barrier with this type of funding arrangement. Mayors had to deal with multiple actors as part of the 'wicked issue' of low carbon installations and as part of the Devolution Deal process. Issues such as, labour supply for low carbon buildings, type of existing housing, constituent elected members, geographic boundary issues and influence of local SMEs all contributed to low carbon installation delivery. Considering decentralisation in contrast to Devolution and collaborative funding, Devolution Deals were regarded to be a form of sub-national financial governance that had relied on bargaining between two parties and could not

be seen as a fully developed process that was consistent with a place-based governance approach. This was due to the lack of any democratic element or involvement of citizenry and other actors in the process, however, at the time of writing this was mooted to be on the increase due to citizens juries (King & Wilson, 2023). In the context of systems dynamics, the current approach of sub-national deal making depended on whether the agentic agents could operate independently but lacked complete fiscal powers to fulfil their functions. This applied to both institutions and SMEs.

This was referred to by one participant:

‘... its better when deciding on how to raise money locally because we can contact and ask local people’s opinions first’ (LA 2)

The content of Devolution Deals was, in part, was found to be reliant on agreement with LEPs who’s priorities differed depending on the intrinsic goals of the LEP, this raised questions surrounding national guidance and appropriateness of the mission orientated approach in The Levelling Up Strategy and the true motivation to deliver national policy. In theory, this type of dependency on each other in a competitive bidding process (which is what Devolution Deals were), had inspired groups in LAs to act collaboratively to obtain a Devolution Deal funding.

The Devolution Deal process was a lengthy process, in the case of LCR it took until 2020 to be agreed, a more recent Devolution Deal was agreed in Lancashire as a Combined County Authority (CCA) in 2023 (Department for Levelling Up, Housing and Communities, 2023). These Devolution Deals called into question the very substance of this type of funding on two points; firstly, the need for mayors, as both were negotiated without one, and secondly, the length for time taken to agree such Deals, as both were finalised nearly a decade after the Act was enacted (Cities and Local Government Devolution Act, 2016). Devolution Deals were also seen to have other flaws, as one participant pointed out money for low carbon buildings was taken from other funding streams:

‘they tend to give it with one hand and take it away with the other’ (SME4)

An extension to the principle of Devolution Deals was that of grant or match funding via the mayors 'pot of money' and decision making through the MCAs. Funding for SME grants was found in LCR, although the information available to the public regarding funding streams available but was found to be severely lacking, this pointed towards a practice of 'talking up' funding by mayors who advertised that money was available within a set criterion when in fact it wasn't. The information provided demonstrated perhaps a 'red herring' to some extent as the fund turned out to be match funding, whereas the publicity material suggested grant funding, perhaps advertised alongside an ulterior motive to talk up funding announcements for political gain and to win votes. These match funds also linked with the previous information flow challenges point, discussed in the barriers chapter, in this case, the author requested further information on this type of funding and was initially told that none was available (PC2, 4<sup>th</sup> July 2023), further to this, a freedom of information request provided the relevant information (PC3, 1<sup>st</sup> August, 2023).

### **Collaborative funding**

Moving away from Devolution Deals to discuss how other methods of funding influenced the barriers identified to deliver low carbon installations, an alternative method of funding for institutions and businesses interested was identified as the institutional research centre Innovate UK. This institution was set up by central government to disseminate funds to innovative projects at various stages of development, from conception to late commercialisation, one of the main funding programmes associated with this institution was that of the Net Zero Heat Programme. Originally conceived in 2004 as an advisory body under the New Labour government, Innovate UK was perhaps a good example of what could be achieved via a national and regional co-operative bargaining arrangement to enhance technological innovation strands. National policy such as The Heat and Buildings Strategy and climate change objectives were a main part of sub-national institutional funding arrangements for low carbon buildings. In 2006/2007 the institution was set up as a QUANGO, or non-departmental public body and continued to operate at an arm's length from central government. In a constitutional sense, in terms of separation from central government, Innovate UK was considered 'on a par' with that

of LEPs as there was a hybrid mix of public and private sector but, in a spatial sense it differed, in that the spatial scale of the institution had national coverage. Moreover, given the influence of the private sector at board level within the institution, it had similar freedoms to decide spending within the institutional framework constraints, as did LEPs; notably, both contained 'elites' as part of the Board with decision making powers delegated to actors that were not democratically elected. Returning to Dooley's casual characteristics in Table 6, LEPs and Innovate UK could be said to operating independently with many variables with no interdependency on others ( as they made their own rules essentially). Therefore, this would lead to a 'white noise; characteristic with resulting lack of path dependency or put another way, more innovative input was required.

Innovate UK contained a variety of grants, loans for businesses, hybrid applications for universities. Participant's views on institutional access to funding were mixed; some thought the process of obtaining funding was too strict in terms of application criteria due to the regulated way that the application process was set up and difficult to navigate. The short term timescales of funding announcements were also highlighted by some as a way of making access to funding more difficult, this point reinforced disadvantages of decentralised funding regimes at a sub-national governance level in England, as they were heavily controlled by central government. Innovate UK funding was found to be by enlarge out of control of mayors leading to a weaker type of leadership from mayors, presenting problems when trying to implement low carbon installations through place-based governance.

Alternative sub-national funding institutions that had potential to offer funding streams sub-nationally were institutions such as Salix and the UK Infrastructure Bank (UKIB). Although these were more of an intermediary towards an end goal of decisions by mayors who had more influence in this type of funding than the previous examples. Whilst these two institutions primarily serviced larger SMEs and had a focus on infrastructure projects, they were considered two financial institutions that had specific mandates to assist climate change and national policy implementation such as The Heat and Buildings Strategy. Whilst MCA Devolution Deals, discussed previously, were found to be predominantly negotiated by MCAs and contained an

element of democratic accountability, sub-national finance institutions such as Salix and UKIB were found to be in some respects ‘outside the realms of accountability’. Both institutions, set up as Limited Company’s by Guarantee, were found to have the power to set a framework for investment independently using taxpayers’ money and were only guided by actors of central government who was the only shareholder. This presented an alternative type of funding for low carbon installations when contrasted with Devolution Deal funding and highlighted the intrinsic nature of alternative funding arrangements. Innovate UK funding was considered a more collaborative type of funding with strict criterion to access funds which always ensured collaboration between applicants sub-nationally this demonstrated a more complex and restructured funding mechanism that was more collaborative. In contrast, Salix, which took applications from public sector bodies, provided a specific avenue for the public sector to borrow money for large infrastructure projects, this contrasted with both Devolution Deals and Innovate UK application criteria. In contrast to Salix, UKIB funding was demonstrated to have a low level of control by mayors as most of the funding was decided by Treasury owned institutions with its own broad set of funding objectives. Reconsidering the argument of institutional openness, due to the lack of accountability, it was not considered that these institutions were open, bringing into question the limited democratic involvement within them when disseminating financial funds. This was contrary to the theoretical model in Figure 6 as a lack of openness effected communication and information flows as discussed earlier.

The funding arrangements discussed thus far have included Devolution Deals, Innovate UK and more sub-nationally based Salix and UKIB. Some were more flexible and accessible than others and some were considered quite an ad-hoc method of funding in themselves and indicated a movement towards a more neoliberal political agenda, this followed the replacement of the New Labour government, and was emphasised by one participant:

‘the way I think of climate change money stuff is funded is a bit evolutionary’  
(CA2)



The funding streams discussed demonstrated that the evolutionary trajectory of funding streams for low carbon installations in the longer term did not support movement towards greater sub-national governance control via institutions, such as MCA and LEPs. This was due to the finding that some of the funds lacked monetary control at a sub-national level, control was being mainly kept at a central level and disseminated through private mediums such as Salix and UKIB with central institutional control from the HM Treasury. Therefore, there were again issues with the structural set up of sub-national governance institutions which contradicted first order systems dynamics, more specifically cybernetics, as some institutions could not be said to be fully self-organised or self-regulated. In terms of timescales and dissemination of funds each institution had their own separate timing for opening applications for funding streams, this always depended on central government instruction and the design of the application criterion at any particular time relied on announcement of new central policy. This left sub-national institutions making decision without knowing what money would be available to meet policy expectations or vice versa.

This was expressed by the same participant:

‘the difficulty lies when you are trying to co-ordinate multiple projects with differing funding streams, it can get a bit confusing’ (CA2)

The assertion that funding streams were ineffective because of funding institutions developed over different timescales and were highly dependent on different constitutional members led to a complex scenario and only increased fragmentation of a very complex application of systems dynamics. There also appeared a lack of trust that became apparent between local actors sub-nationally with funding providers, an example of this was that some participants expressed that Innovate UK was the right sort of institution but led by the ‘wrong people in the wrong place’ (meaning elites), this perhaps reinforced some principles of ‘population ecology’ from Dooley’s paradigms, in that, oversight of institutions was needed to implement any economic growth scenario, without this; first order thinking could not take place (because of absence of adequate structure).

It was thought that funding schemes were merely an ‘election winner’, most participants were from the public sector, so from a local authority perspective these views were generally in a positive context about the low carbon growth agenda, but some doubted their own ability to do this at the geographic scale identified. One Councillor reinforced the overarching finding of the research concerning spatial scale:

‘... in the times of austerity, why should regions, bigger areas make the decisions, from my perspective, it would be better to be led by a leader with a larger area than here’ (C1)

### **How can sub-national governance institutions facilitate endogenous economic development and deliver low carbon installations?**

The next three sections answer the second research question and continue along the line of discussion of governance and finance but incorporates another main thematic area to the question, that of skills development.

#### **Enhance skills and education**

There was little research that had examined the content of successive Devolution Deals in terms of outcomes for skills policy and delivery in the literature as Devolution Deals themselves were relatively new. This section emphasises the key findings and major contribution to the understanding of emergent policy on skills in relation to low carbon installations and further answers the question of the potential of contemporary MCAs to develop endogenous economic development in relation to people development. The section reflects on the findings of broader social inclusion through skills training and the importance of knowledge and learning within the data collected.

There was an entrenched ‘skills problem’ since 2010 which included major changes to the educational system associated with the Coalition government, this included the scope to enhance educational research opportunities, and hence, employment via a place-based rather than space blind approaches to publicly funded research and development as well as central changes to the national education system. This

approach was consistent with some existing literature (Marlow & Richardson, 2016) (Flanagan & Wilsdon, 2018). In terms of a greater commitment to broader social policies explicit in place-based governance, a notion of 'inclusive growth' had risen through the sub-national agenda (Inclusive Growth Commission, 2018), even though from some perspectives the concept was problematic (Lee, 2018). There was an attempt to map out a role for sub-national governance in social and educational policy where it made sense to work at that governance level, this perspective was not without merit, particularly against that of economic growth which had previously dominated debates. The evidence from this research demonstrated that the rhetorical and vague commitments regarding inclusive growth found in sub-national policy ignored rather than linked economic growth, inclusion was discussed in a nuanced way and tended to be a reaffirmation of local sub-national politicians' commitment to social inclusion policies. This was relevant to the study as low carbon installations had the potential to influence employment in city regions and incorporated manufacturing elements of low carbon installation agenda, which had the potential to increase socially inclusive outcome measures through an increase in 'working class jobs'.

The findings chapter examined several barriers that were crucial elements to overcome to achieve effective low carbon installation skills training and place-based thinking, the evidence demonstrated that there was an entrenched spatially blind approach among some central government actors to skills, in addition, the research uncovered a degree of scepticism surrounding the value of city regional skills policy, more pointedly, the fact that some participants supported views that success was likely if city regions were merged into a 'one region'. The constitution of LEP's was found to have created a form of 'elitism' which negated place-based governance and skills training due to overriding control of the institution of the private sector, this finding was also apparent with regard other funding institutions like Salix and UKIB with regards finance and funding. The space blind approach casted doubt on the implementation ability of MCAs regarding their own policies, and indeed, the implementation of The Heat and Buildings Strategy in a space neutral way was required, as was the associated skills training; particularly as it was the private sector that was responsible for development of staff in the low carbon installation sector.

Public investment in innovation focussed on excellence and this was bias towards the 'golden triangle', notwithstanding some top-down political interventions, such as QUANGOS like Innovate UK. This finance stream for research activity was also affected by institutionalised space blind planning within central government that contributed towards an uneven path of policy decision making that concerned funding and research and innovation projects associated with low carbon installations.

The evidence thus far has exhibited evidence of spatial blindness in relation to low carbon installation funding, particularly innovation development and skills concurred with other literature (Hildreth & Bailey, 2013). The broader analysis also included intrinsic institutional working, leadership quality and powers, spatial geography, and decentralisation. The evidence concluded that sub-national governance institutions were not currently 'set up' to deliver the skills, or roles, such as heat pump installations that were required on mass; subsequently, this influenced endogenous capabilities within the two city regions. Additionally, sub-national governance institutions in their current format could not deliver a place-based governance approach to city regional governance given the limitations imposed from central government. Evidence revealed a 'cross boundary' approach to skills policy and whilst attempts were made to engage SMEs, due to financial impacts on business, this failed as financial funding was strictly limited to geographic boundaries. It was acknowledged that this approach was in accordance with the place-based governance approach and there was evidence of local colleges acting independently of MCAs in developing courses, Leeds Building College for example had a plethora of courses in the low carbon area, this highlighted a positive for MCA funding and skills training in MCR city regions but also brought up the possibility of social exclusivity through 'selective funding', this was because some courses were paid for but only if you lived in a certain area. From a governance perspective, this only reinforced the argument that, whilst MCAs broadly wrote and negotiated Devolution Deals that included Adult Education Budgets these did not necessarily assist with development of innovative courses, but these were highlighted as having inclusion issues. Similarly, problems were encountered centrally historically with the National Health Service and a 'postcode lottery' funding for prescriptions. Whilst it was accepted that

mayors were involved with more traditional practical courses, such as plastering for house building, their involvement in low carbon installations predominately provided only limited finance towards skills enhancement. Whilst mayors had the policy making capability to adjust adult training in these areas because of the timing of Devolution Deals, low carbon installations were not given priority. In terms of funding decisions with regard low carbon installations mayors were largely reliant on funding mechanisms outside their control, this lack of control was not in accordance with the 'control mechanism' of Dooley's paradigms which required an overarching control mechanism to be in place, the current approach also leaned towards a more global rather than local way of governing. Alternating variables and interdependency factors were characteristic of the possibility of changing dimensionalities contained in Table 6 and could potentially lead to chaotic system; all these points supported the argument for a larger regional scale of governance with 'one leader' and pointed towards inadequacy in contemporary sub-national institutions in their current format. Regarding the provision of endogenous development for low carbon installations, from a systems perspective, the main controlling financial institution, the LEPs, took various forms and were found to be loose and flexible partnerships with predominantly private sector led institutions (Newman & Gilbert, 2022). Notably, LEPs had not written skills policy and tended to be an adjunct to the MCAs in this area, interestingly, they were listed among possible designated representative body alongside LAs, but this only demonstrated more confusion over geographic scale and policy Implementation. LEP's and were found to work more closely with both MCA and LAs within their geographical territory in relation to skills, LEPs were mainly tasked with promoting and enhancing economic growth through policymaking with control of financial distribution. This, in part, explained why MCAs had more formal arrangements, with several LAs joining together in a collaborative action on a voluntary basis but under a formal mechanism in statue to make policy. This collaboration provided the potential to handle larger 'wicked issues' such as transport, spatial planning, climate change and indeed skills training.

Different approaches to building new sub-national institutions were identified, mayoral and non-mayoral, both of which provided collaborative efforts through the combined authority mechanism. LCR was a NMCA until recently and this was shown

to have influenced skills training development. Approaches to skills were notably different and this was found to have impacted on the development of other sub-national institutions, examples included Sustainability Institutes and specific technical colleges, interestingly, whilst LCR was behind in developing a Devolution Deal, the city region was way ahead in developing their Sustainability Institute which was created in 2015. The evidence provided that the mayoral governance structure was not the only factor nor the ‘be all and end all’ of sub-national city regional institute development which was becoming a recurrent theme in the findings., moreover, in LCR local colleges were found to be ‘leading the way’ in relation to skills production for low carbon installations such as Leeds Building College, independently of a mayor.

Both LCR and SCR were found to have set up climate specific institutions such as the Sustainability Institutes alluded to earlier, however, the findings of this study suggested that SCR had more advanced skills training in relation to low carbon installations and associated skills contained within the SYSB. Some interviewees suggested that this was a leading exemplar for skills training and it was felt an innovative way of thinking ,due to the ‘employer led’ nature of institutions, and SMEs in the form of employers not telling employers what they needed but allowing employers to design and run to some extent the training on offer to suit business needs. A similar sort of arrangement was found in the Manchester City Region which was currently attempting to get more powers to act over educational matters (Timan, 2023). Interestingly, the SYSB ran by Calderdale College was based outside of SCR and technically part of the LCR in terms of geography, the SYSB was therefore oddly situated and only reinforced the fragmented governance theme found in England generally and in relation to LEP boundaries, again there was no direct evidence that the mayor had any major impact in developing this service. In contrast, LCR had developed a similar skills institution, like the SYSB but with some differences, SCR tended to concentrate on older age groups post-school and worked with employers surrounding apprenticeships and further education developments in relation to low carbon installation skills, whereas, LCR had comparable projects which concentrated on all ages and provided what seemed to be more of a ‘careers service’ to the general population. Neither exclusively focused on low carbon installations.

LCR had only recently adopted a mayoral model and there was an emphasis on building on sub-national institutional capacity, taking active steps to include the LEPs, but delaying on agreeing a Devolution Deal compared with SCR. In SCR development was much faster in terms of institutions and sustainability objectives, with an overarching interest in skills training such as the SYSB. This collaborative way of working between institutions was consistent with the theoretical model introduced in earlier chapters and ‘fitted’ with the general open system approach of sharing information of resources.

### **Clarity and formality in constitution needed**

From a constitutional perspective a seemingly crucial factor to the MCA was that of the mayor, whilst it was possible to have a NMCA and exist without a mayor, central government’s preference had always been a mayoral model. The two city regions under investigation both had mayors (LCR elected a mayor during the study), which theoretically provided a single point of accountability and a form of hierarchical governance structure within a city region. However, the mayoral governance structure was posited to have been pushed on sub-national governance institutions, in that, without one, Devolution Deals were less likely. Mayors had few substantive powers to use completely independently from central government, they were therefore dependent on conditional deals for financial capacity but had the ability to act strategically through the authority to produce Strategic Economic Plans (SEPs). Consequently, to some extent, they were lacking control mechanisms needed in Dooley’s paradigms in terms of finance but not policy in relation to skills development. The adoption of mayors in SCR and LCR had occurred at different paces with SYCA being adopted at a much faster pace than WYCA who only adopted a mayor after the failure of the ‘One Yorkshire’ approach. Crucially, by the 2016 Devolution negotiations, the LEP and NMCA senior executives were in the process of creating a collaborative and joint working arrangement with the respective LEP in LCR that acted as a formal advisor to the CA, SYCA had similar problems but progressed earlier in terms of timescales with a more cohesive approach to the geographic boundaries of city regional governance structures than that of WYCA.

In comparison, both WYCA and SYCA had close relationships with the corresponding LEP in the city region, in terms of finance within the Devolution Deal process, WYCA committed funds of £101 million solely for climate change projects, although not low carbon installations specifically; whereas, SYCA, due to the Devolution Deal was negotiated much earlier but missed the opportunity to include specific climate change financial commitments because this was not a commitment or priority of central government at the time. WYCA moved very early on in the Devolution Deal process and had an MCA office in the heart of the City of Leeds, adjacent to the train station near the LEP office, similarly, SCR had close networking between the two institutions. SCR was demonstrated to be relatively underfunded compared with historical funding precedents (Lucas & Tait, 2021), but bureaucratic accountability in a legal sense for both WYCA and SYCA was found to be broadly similar in relation to low carbon technologies and associated sectors of responsibility such as housing and transport. However, there were some place specific arrangements in place, both WYCA and SYCA, had a structural fix in place in terms of the combination of several local authorities to input into place-based thinking. Both MCAs had commitments to climate change initiatives, partnership committees existed to ensure LA partners thoughts were heard but specific climate change committees oversaw the implementation of climate change policy and were found to be left by enlarge to be dealt with at the LA level. Due to this abnormality, in relation to climate change policy implementation the specific committees had been indirectly set up with the principle of subsidiarity at the forefront. Collectively, many actors were at work in this complex governance scenario and the key to a solution in accordance with systems theory dynamics was to achieve a high dimensional system where non-linear ways of working could ensure that constraints could be ‘solved’ by feedback loops as illustrated in Table 6 and with arrows in Figure 6.

One interviewee described the setup of low carbon installation projects at a sub-national governance level as ‘the worst thing ever’ and thought the way government had published The Heat and Buildings Strategy was with only temporary implementation in mind to reinforce their chances at the next general election, such short term thinking at the sub-national governance level did not act as an advantage towards enhancing endogenous potential. Political sensitives were brought up on



several occasions in relation to both city regions as examples of governance difficulties in relation to low carbon installation roll out, for example, now that the WYCA Devolution Deal had progressed, a main confounding factor over the years was deemed to be the merging collaboration of different tiers of Councils, most poignantly expressed by the requirement for North Yorkshire County Council to secede in a new mayoralty, now North Yorkshire Council, a combination of eight local authorities in its own right. Similar problems of constitutional formation were apparent in the SCR when Derbyshire District Council objected to joining the city region and started legal proceedings to avoid being involved. This problem caused a lack of consistency, reluctance, but was also found in other city regions with regard spatial plans in Manchester, when Stockport Council decided to withdraw from its involvement in the city regional spatial plan production. Indeed, research surrounding the consultation element of low carbon installations and The Heat and Buildings Strategy roll out under the Cities and Local Government Act 2016 remained scant, the extent to which central policy makers approved the new governance geographies and partook in the corresponding public consultation was found to be unknown.

The relatively informal way Devolution Deals were completed was also a factor that caused uncertainty, WYCA lagged behind SYCA in terms of agreeing a Devolution Deal and this presented a complicated institutional landscape at a sub-national level to implement low carbon installation roll out and compare geographies. Applying systems dynamics second order theory the need to adapt to uncertainty was needed for institutions to 'get ahead' and be able to flexibly deal with uncertainties over a prolonged time scale and improve endogenous potential. Because certainty was lacking, this had presented an uneven geography for low carbon installations issues across England. The hard versus soft governance structure, entwined around the complicated geography of MCA and LEPs was hindered, if the actual geography was revised to a different scale this may assist more local endogenous development. One participant emphasised this fact:

‘ .....it makes it all very difficult to plan for when things are being announced at different levels with very short deadline timescales’ (CA3)

In summary, whilst both LCR and SCR were found on initial impressions to have place-based abilities surrounding local relationships, neither place was able to move forward with The Heat and Buildings Strategy agenda in its entirety independently of central government. Both city regions approach to incorporating climate change financial needs into Devolution Deals were inherently different due to timescales of the final Devolution Deal agreement. This was found to have a consequential effect on SME activity, due to reliance on other methods of funding which were delivered on a shorter term and ad hoc basis. That finding, considered that both city regions had progressed sub-national institutional development to aid the roll out through recently developed institutions to compensate for this fact. These included institutions such as The South Yorkshire Sustainability Centre at the University of Sheffield (South Yorkshire Sustainability Centre) Leeds Sustainability Institute (Leeds Sustainability Institute).

Furthermore, to reflect on findings surrounding the relationships between institutions and flexibility of governance, the research found that sub-national governance institutions that were responsible for low carbon installations and the delivery of The Heat and Buildings Strategy were increasingly becoming more formal and slowly moving away from the 'soft spaces' of governance discussed by Allmendinger and Houghton (2009). These harder governance boundaries could co-exist with open systems more effectively as they provided the movement of boundaries which coincided and corresponded with processes of dynamic states, this depended on how effective communication and information flow streams were to initiate second order thinking in a systems dynamic sense. The point of openness was expressed by central government in two ways, firstly, the focus on delivery of climate change initiatives via sub-national institutions collectively was arguably more democratically accountable than solely LEPs, secondly, finance and monetary ability had been moved to some extent from the LEP to other newly conceived institutions, such as UKIB and Innovate UK. These two points supported the disadvantages found in terms inadequate fiscal powers and control associated with central government's approach to low carbon installations through MCAs.

The shift of responsibility for delivery of national strategy had been moved into statutorily accountable bodies through MCAs which was significant as LEPs were often predominately private sector led but relied on resources from the public sector to operate and were dominant in larger core cities and conurbations. A certain amount of permeability was therefore required, this was seen to influence The Heat and Buildings Strategy rollout; the case being expressed by one interviewee as:

‘the bigger the LEP, the more power there is for investment it all depends on the deal’ (CA2)

It was notable that point of fragmented governance, not just between urban and rural, but throughout England was due to several factors; different paces of MCA and LEP conception, differences in MCA size, differences in investment potential, all these factors gelled to form a much broader barrier to The Heat and Buildings Strategy roll out. The fact that England was ‘split up’ into different institutional organisations at different stages of evolution did not assist a generic or combined approach to low carbon institutional activity. This was referred to by two participants from an LA who seemed to emphasise difficulties in understanding when it came to applying for funding bids:

‘... having different organisations to deal with is sometimes difficult, the local enterprise partnership and [mayoral] combined authority almost seem that they should be merged together’ (LA 2)

and;

‘it is very clear about who the LEP and MCA/NMCA are but the way they relate to each other can sometimes be confusing and ambiguous’ (LA 1)

These views could have had a historical explanation, in some respects linking to path dependency and ongoing tension issues, notably, independence and interdependency were crucial factors here, inherent within systems theory dynamics and part of casual characteristics, as MCAs and LEPs were effectively being forced to work together; although, it would have been more effective and efficient if they were combined into one. Theoretically, the absence of the competitive element between

two institutions would cause less tension and consequently potentially progress the roll out of low carbon installation programmes more rapidly. In contrast to this perspective, within the SCR; the more longstanding MCA, there was evidence of an ambition to bring together both sub-national institutions, the MCA and LEP, this was deemed to have influenced the development of other institutions and consequently had a role in developing the low carbon roll out agenda in the area:

‘some areas have a ‘LEP supremacy’ way of looking at things, here [in the Sheffield City Region] we tend to try and split the work and work jointly, it’s a lot more effective that way’ (CA 3)

Initially, MCAs and LEPs started out as flexible working relationships, not statutory governance partnerships, discussed here as being a more effective as part of an open system but with central government increasingly keen to shore up the position and authority of MCAs. This had a ‘knock on’ effect on policy implementation through the differential preferences of more local low carbon support institutions, following Mogren’s theory of self-interest (Mogren, 2014), and indeed, the self-influencing principle of some systems theory dynamics these working arrangements indicated that these institutions may well look after their own interests.

Many of the institutions identified had risen to implement The Heat and Buildings Strategy in the two city regions identified, some were voluntary on a smaller scale to that of a MCA or LEP or solidified local governance institutions from the inception of The Heat and Buildings Strategy. Central government had always put forward the premise that MCAs would become more in number with increased powers but seemed to have forgotten about the powerful influence of smaller agentic agents in city regions, additionally, central government mooted the point that places should be able to choose their own institutional structures which consequently impacted on low carbon installation delivery as local people had their own agenda and local barriers, particularly in relation to housing projects, given the government’s recent abandonment of the 300,000 a year new homes target.

The Leeds City Region Growth Deal stated:

‘ ..... invest in a skilled and flexible workforce, support the growth of businesses and build a resource-efficient City Region.’  
(Leeds LEP)

This perhaps reiterated some of Dooley’s paradigms perspectives, emphasising resource efficiency as a primary driver of city regional growth with power that a strong workplace brought to the economy. Negotiated nearly a decade after the HM Treasury and the then Chancellor George Osborne’s interest in local growth, the idea that a harder more formal devolved governance assembly arrangement moved even more to the forefront through the introduction of MCAs. The decision was intended to theoretically boost democratic accountability but apparently may have caused a difficult and divisive move for sub-national policy makers. Without doubt, the move towards locality success sub-nationally depended upon the strength of leadership which had a significant impact on sub-national institution’s adaptive ability to influence endogenous growth in relation to low carbon installations.

### **Ensure adaptive and inclusive institutions**

Endogenous development required more locally orientated institutional leadership to guide and implement policymaking at a city regional scale rather than a purely national centralised way of working. For the purposes of this research, the Darwinian landscape and application of feedback loops through the competitive environment and ‘survival of the fittest’ approach was highly relevant. When city regions fall behind in areas such as skills training, and consequently lack resources, it was acknowledged that the city region will fail faster. The resulting need for a focus on making a future where the benefits and risks are directly applicable to those making the decisions were an inherent part of place-based governance. This was found not to be the case in this research due to lack of involvement of the citizenry, however, this could be improved upon by ensuring training opportunities were present for the population of the city region on an equal footing.

The argument for more local fiscal and financial responsibility to enhance skills introduced in earlier chapters could only be achieved with a strong leadership typology, the two city regions under investigation both had a mayoral model (WYCA elected mayor during the study), but what constituted a strong and effective

leadership model needed to implement The Heat and Buildings Strategy was an area of debate. Federal systems of governance such as those in the US or Germany, as alluded to, experience increasingly strong methods of leadership given the powers and authority that institutional leaders possess, there was evidence in the literature that this directly influenced the implementation of strategies such as “scaling up’ and ‘policy diffusion’ (Eckersley et al, 2023; Kern et al, 2023) and this was a crucial point when attempting to utilise an adaptive form of leadership at a city regional level. This added to the problem of how to incorporate endogenous development into city regions, issues of engagement and ability to ‘mobilise ‘the population with mayors taking responsibility required a particular typology of leadership and was a point considered by one participant:

‘the very fact that mayors have the ability to change things strategically is essential to their very existence but things at the minute don’t go far enough in the north’ (C1)

This participant identified differences between mayors, not only internationally, but within England itself. This was identified in the literature review to refer to the quality of leadership (Smyth, 2021), but also what powers leaders had (Bentley et al, 2017) and were highly appropriate when considering endogenous development and an effective framework for effective leadership.

Expanding on this, it was useful to consider this in the context of powers of different mayors, in this case, LCR and SCR mayoral powers, with that of the Mayor of London. The Mayor of London had clear budgetary responsibilities and more formal budget raising powers, this in turn led to enhanced economic leadership powers and was found to reflect a more coherent and determined finance strategy in the low carbon installation sector. The Green Finance fund for London (Mayor of London, 2023), announced by the Mayor of London, was a typical example whereby the mayor could provide investment for infrastructure to meet low carbon targets and charge interest on the amount, a significant difference to other mayors; this included additional initiatives such as the ULEZ project (Transport for London, n.d), whereby charges were taxed for non-compliance. These examples clearly provided a better fiscal alternative to lead in a city region than anywhere else in England. The Mayor of London did not

share responsibilities with the London Assembly, whereas LCR and SCR had to share responsibilities between local authority partners, West and South Yorkshire MCAs needed to predominantly exercise legislative powers concurrently with other local authorities in the city region, not instead of, nor replace local authorities. WYCA and SYCA were required to form cabinets which were constituted from councils who had voluntarily joined the MCA with specific select committees, fewer powers were also reserved for MCA members as opposed to jointly with local authority leaders. All these points clearly pointed to a 'harder' governance type in London, than that outside of London whose element of voluntary association could be considered a 'softer' type of governance, this then impacted on the governance structural ability to influence endogenous development. The London mayoral model provided the flexibility, adaptability and accountability through one leader and the extent to which mayors employed a strong or weak leadership type was therefore influenced by the dynamics and principles of place-based governance by controlling more sub-national 'functions' illustrated in Figure 6. It was also notable in terms of systems dynamics, the elements of independence and interdependence were, in the case of the Mayor of London, much more biased towards the former than the latter.

The difference in powers of the Mayor of London and metro mayors in places like LCR and SCR demonstrated an argument to increase powers for mayors outside London, to better the goal of low carbon installations, increase the ability to work with business, and have more control fiscal city region economics. Mayors outside London could be seen to be more facilitative than authoritative role and therefore the taxonomy of strength of leadership and sub-national governance systems put forward by Bentley et al (2017), was highly relevant as MCA mayors moved either towards stronger or weaker leadership models. The literature review included a typology of strong versus weak leadership in the model illustrated in Figure 11.

**Figure 11 – Strong and Weak Leadership Model by Governance System**

Strength of Sub-national Leadership	Strong	New Centralism: Controls (a targetry regime) which provides the sub-national level with a framework for decisions on strategy and action in relation to local development.	Devolution: (Localism) All powers and resources devolved to the local level; Sub-national level can make decisions on strategy and action in relation to local development
	Weak	Centralism: Sub-national level to administer and discharge nationally devised policy programmes and political projects. Cannot make own decisions on strategy and action in relation to local development.	Decentralization: (Conditional localism) Some powers and resources given to the local level; Sub-national level can make some of the decisions on strategy and action that it wants to take on sub-national development but this is conditional on delivering outcomes centre requires.
		Centralist	Localist
		System of Governance	

**Taken from Bentley et al (2017)**

The concept of adaptivity in relation to the leadership of sub-national institutions was a key point found in the federal system of governance, and it was theorised from the findings of the study that increased adaptivity in leadership of sub-national governance institutions led to a more enabling dynamic, in accordance with some systems theory dynamics. To aid policy diffusion and policy making through the process of second order thinking, a more strategic change management approach was needed, place-based thinking was needed as a background to open institutions together with multiple actors in the policy making process. This had the potential to produce ‘good quality policy’ or ‘implementable policy’ to deliver low carbon installation production. The characteristics and adaptive functions of sub-national governance were found to be crucial in deliverance of this goal, a full review of leadership styles was available in the literature (Northouse, 2015), although the main theme of adaptive leadership, and in turn adaptive institutions, was the focal point of working towards policy delivery and addressing supply side issues. The adaptivity theme linked with the concept of Darwinian thinking through smaller adaptations causing new variations.



Endogenous development relied on openness of sub-national governance institutions and multiple actors' views which were a highly pertinent angle to the concept of adaptive leadership, the Darwinian requirement for variation and heterogeneity to progress in this respect meant LEP and MCAs met this criterion due to the mix of public and private sector institutional leadership. This type of leadership had worked within a specific locally orientated context, with followers doing the work (agentic activity), and leaders ensuring that citizenry contributed towards the end goal. This was identified as particularly relevant when dealing with wicked issues such as climate change, and hence, influenced behaviour change both institutional and citizenry. Interestingly, this relied on SMEs that required competent staff and competition which encompassed the Darwinian way of thinking to succeed. Referring to Figure 6 in earlier chapters smaller agentic agents were reliant on adaptivity to change ways of working in a quick fashion to respond to central government changes. Both the issues of leadership type and institutional constitution were crucial to economic growth, the openness of institutions to the public and implementation of institutional decision making directly influenced implementation including the proposed 'functions' put forward in Figure 6, this included the financial or fiscal (UKIB), democratic or admin (CA) (LEP), and leadership or political (elected members). The need to have engagement with 'followers' was central to the imposition of adaptivity, particularly with regard 'wicked issues' when there was a need to have a consensus among citizenry and behaviour change through a 'bottom-up' process which meant a need for inclusivity (King & Wilson, 2023).

The formalisation of institutional constitutions and leadership introduced earlier began by examining the openness and inclusivity of policy making sub-nationally in relation to low carbon installations. The interviews and case studies found experiences in this aspect of local growth were similar in both MCAs and the two city regions in question, however, interviewees in LCR were found to be more excluded from the process than in SCR. This aspect of deportation from active involvement with external bodies was also reinforced with difficulties accessing staff to participate in the study (PC1, 25th March 2022). This provided an example of a closed institution with inadequate communication lines with the external environment (in

this case the researcher). Information regarding SME funding schemes and £10 million pounds funding schemes were a further example of information which was unavailable without a statutory freedom of information request, this reinforced a non-inclusive environment (Neville, 2023). This was found to be match funding which required SMEs to put in an equal amount, this contradicted the initial public announcement which seemed to suggest a purely grant funded approach. Against the backdrop of Brexit and COVID, this amount did not seem particularly attractive for SMEs trying to stay afloat and break into new markets such as low carbon installations. Similar closed institutions attitudes were found in SCR when attempting to access Committees (PC4, 18th March 2022). This perhaps demonstrated some of the barriers discussed in Chapter 4, more specifically, that of information barriers and a lack of information processing due to tension between democratically elected institutions, the public, and researchers, it also called into question the legitimacy of claims that MCAs were truly open or democratic. In terms of skills policy, the data collected suggested that this was being written not open to debate or scrutiny, and this hindered policy delivery, this per se, raised the question of whether involvement of SMEs was adequate as most of skills policy was written without the involvement of employers.

In the context of central government's desire to adopt a more formal governance process sub-nationally in the form of MCAs, a recurrent theme amongst business participants was a disinterest in the process of Devolution Deals, due to the lack of influence they had over the process. To be truly place-based governance a fulfilment of the 'functions' put forward in Figure 6 was required as this could influence the adaptive leadership capability of mayors within MCAs such as LCR and SCR. Interviewees expressed a wish to find ways of engaging with sub-national governance institutions and leadership in developing low carbonisation policy and objectives, particularly in the already sensitive area of housing standards. Some interviewees expressed the view that the secretive nature of Devolution Deals and indeed the confidential nature of bids for funding through other funding streams reviewed, led to a hazy and opaque process, this was expressed by one participant:

‘why are [Innovate] bids and deals secret? Why are elevated member and business always kept in the dark? There are only a small number of people involved’ (C1)

The other local institutions involved had similar views, some participants thought that Sustainability Institutes were left to themselves to act rather than developed in a collaborative manner, for example, some of the funding for Sustainability Institutes came from the Research Excellence Framework and Innovate UK, and interviewees asserted that other subsidiary institutions got ‘money for nothing’. LSIPs, referred to earlier, were written at both LA and MCA levels but when asked about collaboration in this area it became apparent that the two institutions were working in isolation rather than in collaboration. All these governance issues and ‘hybrid’ ways of working were found relevant to the implementation of low carbon installations.

### **How can sub-national governance institutions influence appropriately resourced city regional policy to improve delivery of The Heat and Buildings Strategy?**

The next three sections answer the third research question and build on the previous discussion, it continues along the central theme of governance but incorporates the concepts of both endogenous innovation and economic development. It does this by consideration of skills development and economic policy sub-national. It develops the discussion around spatial considerations previously alluded to by discussing ‘scalar dumping’ which was identified in the literature (Peck, 2012, Waite & O’Sullivan, 2013).

### **Increase and implement skills capacity**

The perceived barriers identified and associated issues revealed a problematic goal for sub-national governance institutions with regards promotion of endogenous growth and was collectively restricted by an absence of soft infrastructure, more specifically, the tendency to favour some areas and promote geographically uneven outcomes driven by central government. This reinforced some of Harvey’s theories regarding capital accumulation and findings of other literature (Pugalis & Townsend, 2012). It reiterated the importance of relational thinking in place-based governance

with regard the identification of issues for well-resourced policy in relation to skills training.

A lack of capacity and lack of funding were a recurrent theme that hindered sub-national governance institution's ability to roll out low carbon installations, indeed, these were part of the conclusion to the first two research questions. The 'new' sub-national governance institutions in the form of MCAs and LEPs had both positive and negative points; on the positive side, long-term working relationships were beneficial and many local actors in LCR spoke about this. LCR had preliminary multi area agreements from the modern era when WYCA was a metropolitan county, in contrast, on the negative side, issues of path dependency were seen to cause negative and dysfunctional working relationships that became embedded in local areas; even when they manifested purely as apparently personal and political differences of the LA members of the MCA, these differences influenced policy implementation and decision-making regarding policy content. The indecision identified was compounded by mayors who needed support from the constituent LAs who's representations and associations were voluntary. Whilst there was a tendency for peripheral city regions with weak governance institutions to trail economically, it was noted previously that some sub-national institutions associated with low carbon installations were 'ahead' without the involvement of a mayor. This point called into question the ability of mayors to influence resources within a city region and was a highly significant finding that was somewhat supported by the recent experience of Devolution Deals. However, there was a suggestion that this was a variable dependant on the city region in question, as the mayor's role involved skilled negotiation to get the best Devolution Deal possible. The variability of adequate resources was dealt with in the theoretical model for the research and Dooley's paradigms in Table 6. As part of Dooley's paradigms within 'population ecology' presented in Table 4, there was a need to establish variations, heterogeneity, oversight for institutional controls, with an additional need for exogenous input to produce transmission of knowledge and innovation to produce emergence.

The lack of capacity found made it difficult for national and sub-national institutions to work together to facilitate policy that considered the particularities of a place,

more specifically, decentralised place-based specific skills policy was found to require effective multi-level governance, rather than the sub-national institutions at the time working separately from each other. To some extent a hierarchical structure was needed, particularly in relation to skills, due to the standardised way of negotiating Devolution Deals which contributed to the push for more regulation of sub-national institutions. The historical issues of lack of capacity were a significant problem for sub-national institutions 'locally', in the case of LCR skills training, the issue was mainly inherent in policy without any real leadership skills agenda discussed earlier. Whilst the SCR had set up the SYSB it was generally admitted that this was under capacity and 'not a patch' on the previous RDA institutions that undertook skills planning work. Described at a Westminster event as 'a disjointed approach to skills and training' (Westminster Business Forum, 5<sup>th</sup> July 2023, p23). The research mooted that MCAs would be more efficient with more adaptive city regional leadership and powers to influence this area. Prior to the UK's decision to leave the European Union, European Structural Funds had a part to play in economic investment and skills training programmes, these had been replaced by a much-reduced Shared prosperity Fund described by some as 'out-of-date' (Phillips, & Zaranko, 2023). It appeared that a lack of funding centrally and lack of capacity locally at city regional level was causing major issues with the implementation of The Heat and Buildings Strategy resources.

The development of skills policy changed with the advent of the Coalition government election win in 2010 which altered the landscape of skills policy significantly towards MCAs, consequently, the spatial landscape of skills policy became different compared with that of the previous Regional Development Agencies that were based on administrative geographies, not FEAs as MCAs are. Moreover, RDAs had a central role in drawing up a skills agenda for the region that they served, and this included a remit where the institution would survey the labour supply on offer at a regional level and plan accordingly. Recently, central government also recently mooted the possibility of a similar regional body in relation to pay but this was abandoned when the Truss administration abruptly came to an end (Elgot & Stewart, 2022). The effective dismantling of regional skills production and economic planning at a regional level was found to have also contributed towards fragmented and

uncoordinated multiple institutional development. It was difficult to see how sub-national governance institutions could make significant headway or support this without some element of fiscal control. As discussed in the literature review, the contemporary landscape was full of ‘contested spaces’ (Shutt & Liddle, 2020) and lacked the infrastructure accumulation and inward investment that was needed described by Harvey.

Another central criticism from some participants regarding resources for skills policy in its current format was the requirement to have two sets of skills policy at both LA and MCA level. Whilst the respective Devolution Deals contained monies for Adult Education Budgets (AEB) there was little detail in how this was going to be spent in relation to low carbon installations (Department of Education, 2021). Another anomaly found was the funding amounts given to each city region did not seem to correspond with the activity found in relation to skills training available, for example the SCR had the prestigious SYSB in situ but had been granted significantly less than LCR in terms of devolved AEB training budget. In 2021/22 SCR was granted £24,623,098 whilst LCR was granted £40,979,494, a 60% advantage (Department of Education, 2021). There was no apparent explanation for this anomaly except sub-national institutions, in the form of colleges, education providers, without statutory authority had collaborated to produce change outside of Devolution Deal process.

Taking the broader view of systems theory dynamics and the resources available to sub-national institutions there was a potential to develop resources by applying the theoretical model by increasing the ‘functions’ available to sub-national institutions to aid development of these factors; rather than purely relying on financial investment from external private sector bodies and organisations. To expand on this point, Devolution Deals did not directly influence low carbon installations, this was due to the substantive elements within them, as discussed, the constitution to agree a Devolution Deal was made up from various elements. The exogenous input to the city region in ‘deal making’ was the public sector and private sector, with central government, who had some control over the process. This produced knowledge, innovation, or, in the language of the theoretical model, emergence from various sources. What was required was well written policy to ensure a functional outcome of

the Devolution Deal process in terms of resources by the interaction of those concerned with skills development policy and ensure this worked along the lines of collaboration not independence. Looking at the skills development policy process in this context some of Dooleys' paradigms were apparent, however, the cognitive and adaptivity required was slow and therefore some Devolution Deals were slower to progress than others. The cognitive and adaptivity components were enhanced with the presence of a mayor, as discussed in answering Research Question 1, from an economic perspective, LCR was found to be an economically prosperous city region with the intention to attract private sector investment at the heart of the city regional economic plans, this had been developed over a timeframe without a mayor and lacked skills development provision. The approach in LCR was underdeveloped and suffered from a lack of local capacity and the approach was therefore not considered place-based, this was partly due to investment and resources being from outside the city region. This produced somewhat of a quandary as LCR was successful in obtaining new institutions like Channel 4 in 2018 but did not necessarily produce a 'new' long standing workforce as skilled employees were brought with it, not developed within LCR. The goal of sub-national city regional skills policy was to address weaker institutional governance by working with partner organisations within a multi-level governance framework. Theoretically speaking, this concurred with the inner workings of systems theory dynamics by adding more cohesion to sub-national governance levels within England. However, considering the other evidence found such as timing of Devolution Deals and central government influences, skills policy was relatively ineffective. In relation to the two city regions investigated it was difficult to see, with the resources available, whether either city region would meet central government's target of 2050, even though each city region as a governance structure had developed over different time scales. This concurred with the literature discussed on the rescaling of the State alluded to in Chapter 2 (Jessop, 1998) and Giddens (1998, 2011).

### **Reconsider scale and powers for skills**

Existing theory and research had also highlighted problems of the issue of 'scalar dumping' with regard city regional policy and fiscal responsibilities (Peck, 2012) (Waite & O'Sullivan, 2013). Indeed, the lack of spatial scale was one of the main

problems identified with the theoretical model developed, the idea of places taking responsibility for outcomes within their territorial boundary was problematic, in that, sub-national governance institutions had a perception to what was a normative spatial scale and how this 'fit' with place-based governance and associated with SMEs. The influence of capitalist economies was also compounded by the typical characteristic of uneven spatial development, put simply, some city regions were wealthier because of the involvement of economies that had developed historically, which linked to path dependence. For example, Manchester City Region was economically prosperous partly due to its historical relationship with the legal sector and due to association with several sectoral economies more so than others, although LCR had similarities here with a large legal and financial sectoral element, whereas SCR did not. These factors effected how skills policy was written and developed.

The exogenous input required over time formed part of Dooley's principle of population ecology, which influenced economic development, as a result, a key factor and influence of a space-blind or people-based analysis was to emphasise the fact that places always contained people. This was a point at the heart of second order systems theory when discussing the population ecology principle of Dooley's paradigms, in this sense, there was an overarching focus on the Devolution Deal that had the responsibility for developing people within a place. In this instance, a regressive policy approach was politically unfavourable but orientated in a way that favoured infrastructure rather than the people, this was apparent in the lack of publicly funded skills training for low carbon installations. Contrary to the characteristics of place-based governance and Dooley's paradigms; 'people management' influenced how city regions could be developed and how SMEs responded to skills development. Indeed, this may have explained why skills policy identified in the two city regions were 'wish lists' rather than actionable documents, moreover, the territorial cohesion needed to devolve responsibility and problem solve the implementation of The Heat and Buildings Strategy was lacking. Cohesion was required to generate revenue to address policy aims and objectives and to answer questions of scalar and fiscal dynamics required for actionable policy making. Scalar fixes were identified to enhance current city regional approaches through



development of actionable policy on a different geographic scale. Accountability, legislative powers, and communication with citizenry involvement were all areas that need to be addressed through a more singular and cohesive policy approach to better agent activity as depicted in Figure 6. These suggestions may have proved more effective in the implementation of skills training if sub-national governance institutions were merged as they were currently unable to act in this manner or act independently to resolve the barriers identified in the research.

Investment in skills training for low carbon installations was highlighted by businesses in the form of SMEs that had a cost perspective on the issue, one SME figure highlighted:

‘you don’t invest an enormous amount in training until you know that it going to work figures wise’ (SME1)

SMEs and other participants were generally nervous about making investment directly into skills training, this was because central government historically changed policy and funding amounts at short notice which added to uncertainty. There was an amount of nervousness surrounding how skills policy was developed at a city regional level as both the LA and MCA produced skills policy, it was questionable who was leading on skills development so difficult for business to judge and know who to work with. Linked to skills training, SMEs expressed a perception that reduced capacity in sub-national institutions were partly attributed to the austerity measures discussed in earlier chapters. There were, however, signs that the SCR was ‘in front’ or had better capacity in the skills arena, reasons for this may have been a more longstanding mayor compared to LCR, but this was not conclusive, other institutional developments in the city region could not wholly be attributed to having a mayor. A major positive aspect of The Heat and Buildings Strategy was seen as its abilities to encourage skills training and job prospects for a city regional population. As discussed in Chapter 2, there were specific place-based differences in ability and capacity during implementation, because of local choice, decisions whether to invest or develop local city regional institutions impacted on the output of low carbon installations projects in a sectoral sense.

Perhaps one of the most recent programmes found in relation to skills training and low carbon installations was that of Local Skills Improvement Programmes (LSIPs), alluded to earlier, was referred to by some participants. Expanding on these programmes, announced in August 2022, these plans sat alongside the SEPs developed by MCAs, although could be produced by other institutions such as LAs at a smaller geographic scale. LSIPs set out a process that had to be collaborative had to be led by multiple actors and had to be written in conjunction with a 'designated employer representative body (ERB)' (Department for Education, 2022).

Unfortunately, the 'guidance' released by central government was heavily caveated and more a form of statutory instruction, it was produced against the common background of struggling capacity and heavily weighted towards what central government wanted to see implemented, not left open to individual MCAs or LAs to decide how to produce these documents. The guidance on how to form an LSIP contained many of the reoccurring arguments cited in the literature in relation to problems with power dissemination and these continued to apply. Central government had essentially produced a document that outlined who should form the LSIP and what roles they should play, this called for six-weekly monitoring reports and was instructive rather than empowering on institutions. It was found that the LSIP programme was predominantly just 'out of touch' with the sub-national level, these mirrored similar problems reported with Innovate UK funding requiring quarterly reports if successful with a funding bid. Participants generally thought that this just added to more and more paperwork rather than getting to the point of how to implement the policy that was being written particularly considering some participants views when interviewed; none of the interviewees had started preparing a LSIP at the time of interview so any comments were prospective. Referring to Figure 6 again, rather than a seamless flow of information in and out of the city region it was more a multitude and over exaggeration of information crossing boundaries.

LAs, MCAs and businesses had struggled for skills capacity there were few locally skilled actors in, from one perspective or another, there was the view that central government was not serious about making local skills training work, this ranged from the provision of serious resources and powers to the design and implementation of

training courses. Additionally, there was the view that whilst central government's rhetoric provided the intention to deliver at the sub-national level there was simply not the capacity to act on their wishes, as the skilled knowledge was simply not available on masse to improve low carbon installations training opportunities and the technology was relatively new which influenced both supply and demand. This was demonstrated in fieldwork conducted the researcher by attending and EPC training event which was discussed in Chapter 5. Applying the theoretical model, the overarching theme of Darwinism to gain the skills to survive and compete with competition was therefore absent, knowledge transfer to innovate was not present, hence emergence could not take place, in this example skills development progress and associated policy could not be written. On a national level, the changes to teaching status required to teach at a secondary school level by central government when the coalition took over, had also had a consequential effect on the ability to set up appropriate low carbon installations, this emphasised the impact of centrally controlled decisions on sub-national governance as well as the budgetary constraints on those trying to set up appropriate training programmes:

‘ ... central government does not really have the appetite to make devolution succeed. The Department of Education are very controlling, there's been conversation about apprenticeship and such like for this [low carbon installations], but invariably it is an issue of transferring capacity from central government to local government’ (CV 1)

The lack of capacity found made it difficult for national and sub-national institutions to work together to facilitate policy that considered the particularities of a place, more specifically, decentralised place-based specific skills policy was found to require effective multi-level governance, and indicated a hierarchical typology was needed, rather than the sub-national institutions at the time working separately from each other and central government, particularly in relation to skills. It was suggested this was due to budgetary cuts within central government, the standardised way of negotiating Devolution Deals contributed to the push for more regulation of sub-national institutions and perhaps more convincingly, for a regional authority in relation to skills training the increase in number under the coalition of eight administrative RDAs to thirty-eight CAs meant that there would more skills plans rather the less.

### **A need for emergent and a new way of writing policy required**

The last part to answering the third research question was a broad examination of the policy and interventions that were found to be created from MCAs and LEPs in relation to low carbon installations. Much of the emergent sub-national institutional policy rested on recurrent themes such as physical regeneration and transport infrastructure projects, this had given way to far more funding of the latter in the Southeast than the North.

In Chapter 2 the pan regional governance approach was introduced in relation to transportation projects and asserted that a similar governance method would benefit low carbon building delivery, this approach, linked with Harvey's accumulation theory, advocated the use of transportation to reduce costs on businesses. In relation to resources, a multitude of action plans and strategies were available sub-nationally, both through MCAs and LAs, which demonstrated an investment of time in the production of documents followed by the governments' introduction of The Net Zero Strategy. This section assesses Strategic Economic Plans (SEPs), alongside the incoming IPs, to ascertain the ability of sub-national governance institutions to deliver on The Heat and Buildings Strategy. These were chosen as they were the main economic development documents available to MCAs to develop their respective city regional economies. From a multitude of perspectives, MCAs were required to demonstrate a link to low carbon issues, by developing policy and linking, in the case of IPs, to environmental issues. The two documents set out the city region's approach to economic and environmental issues from a variety of aspects rather using a 'tunnel vision' approach. Considering that central government demanded that new place-based institutions, such as MCAs and LEPs, had control for strategic planning in relation to their economies, much of the policy was found to have emerged from under the remit of these two sub-national governance institutions which had positive plans for economic growth. In practice, the main economic development tools were dominated by familiar areas of transport infrastructure, skills, and physical regeneration. The original SEPs were found to be largely concentrated on long-standing priorities without any firm grasp on low carbon installations in buildings. Despite sub-national governance institutions intention to produce policy that was tailored to places there was not always much discussion on the particulars of the two

city regions in question. The language of place-based governance was used when discussing physical regeneration and housing rather than themes related to low carbon installations. Whilst both had a specific objective surrounding clean energy and hence linked to low carbon installations, these were written very generically and not specific to the place or city region. Considering that central government formulated MCAs and postulated that new place-based governance mechanisms would be better equipped to formulate plans on a better understating of local knowledge, through historical factors, local challenges and barriers, it was found there was a strong degree of similarity across strategic plans and the Devolution Deal process. Both city regions under investigation prioritised transport, adult skills in 'green jobs' and business support to decarbonise, this reflected that both city regions understanding of what might be available via the various funding streams alluded to in Chapter 5 and the increasingly standardised way central government provided monies to sub-national governance institutions.

The concept of clean energy was found to be at the core of both LCR and SCR SEP plans, SCR had the advantage of being more recently produced and had a more concentrated focus on building decarbonisation as a priority, whereas, LCR tended to link the concept with business and how businesses could produce low carbon energy and reduce carbon emissions themselves, not necessarily discussing the same point in the same context. One possible reason for this was when the policies were written, SCR had recently updated their SEP in 2021, whereas, LCR dated back to 2016. The inclusion of clean energy into SEPs was seen to be at the core of sub-national institution's ability to influence The Heat and Buildings Strategy roll out and was seen in a positive sense. Interviews suggested that city regional actors considered 'clean energy' as an important development driven by a bottom-up process of governance, as the subject was popular with the general citizenry, although, one northern policy maker saw this as a policy vehicle limited to more of an advisory role to the centre:

'...government are pushing for clean energy and this is a good step forwards, but most of the ideas are coming from mayors, we seem to come up with proposals for clean energy projects and how to maximise investment but ideas are then championed by central government' (CA3)

In mitigation of the impact critiqued here, it was unsurprising that given the fragmented and non-linear way that MCAs had developed that there was a lack of specialised staff to write SEPs with a low carbon focus. It was also unsurprising that SEPs had imperfections and flaws, moreover, participants also revealed that central government preferred 'shovel ready' projects in the construction sector which encouraged a focus on longstanding 'off the shelf' solutions, such as low carbon installations, solar, and heat pumps. Crucially, linking this to the literature uncovered, these projects would require policy that supported Harvey's three presumptions for the progress of capital accumulation, a surplus of labour, a means of production, and an existence of means to absorb the product (Harvey, 1975). The focus on hard infrastructure investment over soft infrastructure such as skills training was also prevalent and the preference of shovel ready projects over skills training explained the lack of sufficient funds from central government for skills training which some participants identified, the overarching view from central government was found to be one of that public funding should demonstrate 'excellence'. This was in the form of research and development funding, rather than funding to improve places via education funding for specific places or city regions, as arguably, this was an unguided way to implement a place-based governance approach.

In common with most SEPs, LCR and SCR SEPs accentuated a positive perspective of cleaner energy in their economic outlook and presented multiple ways that SMEs could be stimulated whilst articulating comparatively few barriers to growth. However, as SEPs and other associated MCAs and LEPs policies progressed in accordance with the policy development process, there was a need to place a greater emphasis on social and environmental policy, alongside a concentrated effort to develop policies to increase innovation amongst SMEs. To coincide with this, central government recommended that all LEPs emphasised innovation policy but at the same time, ensured adherence to the same 'excellence not territory' approach when disseminating funds. The main priorities in progressive versions of SEPs were found to be similar for LCR and SCR, this made sense given the ongoing changes to SEPs in relation to low carbon installations which were reliant on central government changes. Earlier versions of SEPs struggled to identify priorities and specialisms to be place centred, which then progressed to focus on innovation and social policy.

Moreover, the requirement for ‘Lead Authorities’ (which could either be combined authorities, unitary, or local authorities), to produce Investment Plans that were linked to the Governments’ Net Zero goals added a level of complexity to funding discussed in earlier chapters and to the implementation of both SEPs and The Heat and Buildings Strategy.

IPs were a new form of policy introduced by central government whilst the research was conducted, and IPs specifically targeted MCAs to produce economic policy in the form of how they intended to invest money to obtain funding, a conditionality was there had to be a link and connection with environmental issues. IPs were the first sub-national policy document which forced MCAs to have to demonstrable link to environmental issues. Views and perceptions of emergent policy in relation to SEPs and newly formed IPs and the extent to which this would assist low carbon installation roll out were mixed. Centralised governance policy areas were a cross-cutting theme throughout the research and used local and national understanding of decentralisation. The purpose, potential, and impacts of power sharing in a fiscal sense left some with concerns and this was expressed by some interviewees. This concern focused more on the perception of decentralisation as this was one of the key themes discussed in earlier chapters. One of the most controversial topics in relation to sub-national governance in England which emerged from the research process was the misunderstanding of decentralisation versus ‘Devolution’. Local actors were found to be simultaneously positive about strengthened powers for new institutions such as MCAs and LEPs, most poignantly, the topic of fiscal decentralisation to produce low carbon buildings and the broad topic of climate change was found to be very much supported. The local business population saw the opportunity of low carbon installations as a good thing for the north:

‘.. having the ability to make policies specific for the economic circumstances of the area would enhance any roll out’ (SM2)

Additionally, there was the clear opinion that local actors believed that the current conditional arrangements as part of contemporary decentralisation practice in the two city regions was not sufficient to make a significant resource difference:

‘ .... It doesn’t really have the ability to transform the area, powers would have to be properly devolved to finance the net zero agenda’ (CA2)

In this sense, local policy makers, SMEs and MCAs had advised a more radical approach to decentralisation because they perceived a potential longer-term benefit through IPs. This was in a move away from a conditional finance arrangement in the form of Devolution Deals and the stringent criteria set out in competitive funding competitions, the external influences, or ‘exogenous’ influences in a funding sense was apparent as illustrated in Figure 6. From this perspective, a ‘moved’ policy approach from existing arrangements may have been the start of a move away from weaker systems of governance towards more fluid boundaries given the crossover of policy areas towards a fuller concept Devolution with fiscal powers. Generally, it was felt that for low carbon installations to be delivered effectively the barriers uncovered in Chapter 5 were to some extent dependant on the very concept of more devolved powers, particularly financial and fiscal control.

As a result, the current state of play saw a multitude of local institutions generated to aid the roll out of low carbon installations and SMEs sub-nationally. Local Net Zero Hubs were suggested and Regional Net Zero Hubs already created (Tees Valley Combined Authority, n.d), although the same point as previously alluded to on spatial scale crossover was apparent with the hubs. The spatial scales and governance arrangements of the ‘Regional Net Zero Hubs ‘referred to, did not correspond with contemporary MCA boundaries, the Northeast and Yorkshire regions had combined to produce a Regional Net Zero Hub which only added to the confusion over sub-national leadership and governance in relation to net zero issues. Some of the issues discussed in Chapter 5 were apparent concerning information flows in relation to funding opportunities. The Net Zero Hub simply referred the reader to the relevant subregional Growth Hub, this example brought to the fore the importance of the spatial element of governance as discussed in early chapters and this concurred with other literature (Pike et al, 2016, 2018) and the National Audit Office (2023). Central government had implemented decentralisation in England thus far in a piecemeal and ad hoc fashion and this only added to the confusion regarding low carbon buildings and national policy roll out. This linked back to the funding arrangements that were not always clear cut and were found presented as a root of funding that was



buried in expedience and not always systematic, nor informed or democratic. In relation to low carbon installation funding policy, more specifically heat pumps, some interviewees raised concerns about what they perceived as inadequate contributions from central government:

‘I don’t think central government have much of a finger on the pulse regarding consumers, the £5000 towards heat pump installation isn’t going to get people excited’ (TA 1)

This only added to concerns and barriers found previously. Similar comments were mooted in relation to skills programmes:

‘... when government comes up with an idea for something like this, it is very common not to really think of how to fund it all ..... at the minute skills development has been very much left to lower governance bodies like the combined authorities and local councils’ (Civil Servant 1)

The grounding for increased powers and fiscal tax rising abilities were therefore apparent in the data collected, to summarise, local policymakers, as were business, were keen to have more control and resources at their own disposal without interference from Whitehall, although this did not come without some reservations. The views of the participants expressed hybrid and mixed views on the issue of emergent policy in the form of IPs:

‘the idea [of investment plans] is good in theory but difficult in practice, the plans call for a collaboration between the authorities making the plan to develop big strategic issues, this sometimes leads to stakeholders fighting for the money’ (CA3)

Even prior to IPs some participants cited problems with the funding process:

‘Investment plans are just another minor evolution, they’re probably narrower than Devolution Deals and Growth Deals and Strategic Economic Plans, because their focus is on centrally set outcomes rather than taking a broader well-rounded approach’ (CA2)

Whilst this posited a more collective approach sub-nationally, the ‘policy overkill’ influenced the requirement for SMEs and the private sector to be involved in effective

public policy writing. One SME described this process as ‘time consuming’ and it was felt by the participant that the indirect manner of being involved in broader policy networking was not welcomed by SMEs. Linking this into other comments from Chapter 5, participants demonstrated that the only way to get finance for sub-national governance institutional initiatives was through the Devolution Deal process, so in this sense, IPs had advanced the ability of sub-national institutions to bid for and control finance for low carbon installations. Early SEP plans only had scant details on innovation policy and there was limited discussion by Barca (2009) of innovation and smart specialisation that would fit more succinctly with a place-based governance approach and the concept of low carbon installations. In some interviews there seemed a general sense that smart specialisation was purely about creating new jobs, which indicated that some LEPs and MCAs may not possess the relevant capacity or work experience to engage with complex ideas surrounding innovation. This assertion may have been explained by the methodology of the study as the city regions chosen were outside London and the ‘golden triangle’, the Universities of Oxford, Cambridge and London received research development funding, linking to points on regional disparities in England discussed in Chapter 2 remained a concern among participants interviewed.

More broadly, the argument of limited innovative thinking in IPs and SEPs found in this research supported research produced by the National Audit Office (National Audit Office, 2023) which demonstrated that central government funding policies, such as the UK Shared Prosperity Fund would not deliver the intended benefits of local economic stimulation. In this context, actors through their own networks could be aware of what works and what doesn’t, as a result Devolution Deals and IPs may have received a better reception. In this respect the first round of Growth Deals were more distinctive and linked to the actual places in both city regions with some degree of innovative thinking apparent but lacked the clarity as to clean energy commitments. Leeds Growth Deal emphasised a resource-efficient method of promoting businesses (the Growth Deal did not specify which type), with a main component for skills. There was a £3.8 million agreement for the Gainshare initiative, which targeted general skills and people development in SCR; the Gainshare programme provided central government infrastructure funding investment on the condition that it was

seen to generate and contribute to overall economic growth and tax revenue. Simply put, a panel of experts convened by central government provided periodic assessment of whether funding streams had an overall difference to national economic growth. In relation to low carbon installations, more recently, government had introduced the concept of Investment Zones which aimed to deliver on promises to increase employment and research development opportunities outside the Southeast for 'Green Industries'. This was one of the priority areas, although criteria applied as to how the funding was spent. Summarily, initiatives were found to be broad strokes and not specifically tailored to low carbon installations, nor specific places in the north, and therefore the two city regions lacked resources, and this approach could not be thought of as place-based governance.

### **To what extent can sub-national governance institutions support a place-based approach to The Heat and Buildings Strategy?**

#### **Outline**

This section answers the fourth overarching research question by extending on the previous thematic responses in the first three questions. It summaries whether this is possible in an effective and inclusive manner using specific elements of the theoretical model chosen and highlights potential flaws in the theory, whilst discussing the concept of place-based governance identified in earlier chapters in Figure 6. It builds on the perspectives discussed in previous sections and expands on the theoretical and governance arguments and discusses social inclusivity as part of place-based policy development as a backdrop to place-based governance. It evaluates the potential of place-based governance to work towards a more effective long term strategy for low carbon installations and clarifies the concept of place-based governance.

In terms of beginning to answer the overarching question, the importance of a relational and adequately scaled geography was considered essential throughout the research to be able to deliver low carbon installations via place-based governance. Also, a central theme of the research contribution was the awareness that spatial considerations were absent in the theoretical model chosen. Generally, relational

geography and understanding of a place contributed an essential element to place-based governance and were needed alongside an 'open system' to effectively develop The Heat and Buildings Strategy using. Sub-national governance institutions were concluded to be insufficiently sensitive to gain a relational understanding of place and failed to see the historical and path dependant orientation as a possible solution, they failed to measure realistic policy outcomes, both nationally and at a city regional level. Relational ideas were considered central to a progressive place-based governance approach, as was the principle of interdependency within systems dynamics. Whilst sub-national governance institutions tended to adopt a territorial understanding of place and used limitation boundaries as an important implication regarding delegated responsibility for current policy outcomes, this contrasted with elements of the theoretical model chosen, particularly that of boundary limitations, information flows and communication lines. At times, the governance boundaries themselves appeared confused, an example highlighted was the case of the SYSB that provided evidence to support the position that MCAs were willing to expand beyond their own territorial boundaries using procurement procedures and 'outsource' to other sectors. This supported the assertion of a need for a larger geographic governance scale, given that services, and associated finance were being placed 'out of the area', or in this case, city region. Whether this assertion would be considered place based governance would very much depends on who was in charge and whether the citizens were involved in decision making.

The principle of meta-governance discussed in Chapter 2, more specifically the concept of 'self-organising networks' as described by Gjalteam et al (2020), were not demonstrated to any great extent and hence, the principles of place-based governance could not be said to be engaged in this respect, similarly, the self-regulatory principle contained within systems dynamics as part of cybernetics, were not present. To ensure compliance with the first concept of meta-governance and to be considered place-based governance, there was a need to take more control of policy making, finance and fiscal control, alongside stronger political control as illustrated in Figure 6. The evidence showed that these points were main barriers to appropriate action sub-nationally.

Problems were compounded by an inadequate integration of meta-governance issues, as it was apparent the appointment of a mayor did not ‘speed up’ income streams and evidenced by the LCR Devolution Deal agreement which was delayed due to a local lack of adequate meta-governance. The evidence demonstrated that the issue of either having a mayor or not, was essential to place-based governance as mayors were ‘local leaders’. The implementation of The Heat and Buildings Strategy was impacted in three ways; firstly, there appeared a failure to recognise that other relationships outside of the narrow demarcation of the territorial city region could influence Devolution Deal processes, whereby party politics and ongoing disagreements were a factor in the Devolution Deal’s collapse, this contributed a large part to the making of conclusion 10 and was reflected in Figure 6 as ‘the political and regulatory’ function, it was also apparent that this element of meta-governance was not working effectively. Secondly, the offer of a narrow range of incentives through funding mechanisms and ‘deal making’ had perhaps indirectly created a competitive environment so that local and city regional actors and mayors were unable to work together in an effective manner. The state of play of sub-nationally was that they were insufficiently sensitive to longer term issues and the path dependant nature of rolling out The Heat and Buildings Strategy was particularly difficult in relation to skills training and finance needed for issues such as low carbon installations, this was the main source of evidence for conclusions 4 and 5. In a theoretical sense, the competitive environment was considered to increase tensions to a level that were counterproductive amongst small agentic agents depicted in Figure 6. The inadequacies concerned with path dependency influenced possible outcomes as presented in Table 6, and there was an acknowledgement that path dependency was needed to solve high dimensional issues. Path dependency and local solutions were crucial when dealing with many significant factors or variables, in this case the institutions, SMEs, citizenry, within the city region that clearly numbered more than 5 or 6. Thirdly, central government had potentially several conflicting roles in delivery of The Heat and Buildings Strategy, this varied depending on whether a mayor was in situ and what type of sub-national governance was available. These findings applied not only in relation to Devolution Deals but also in relation to longer-term policy measures such as skills training; central government tended to act as an advisor, sponsor and arbiter of funding mechanisms sub-

nationally. This led to confusion amongst sub-national institutions and private business, and this was the predominant factor leading to conclusions 1, 2 and 3. There was also a contrast with the third principle of place-based governance identified in the literature review of multi-level governance and the evidence from the research demonstrated there was potential for diagonal governance or interactive governance to be applied (Torfing et al, 2012), with potential negative results identified in earlier chapters. This was a variable which could alternate to meet place-based-governance because actors moved in and out of the geographical areas, but this depended on the intention of the actors concerned.

Collectively, from a theoretical governance perspective central government had failed to realise that different central government departments were intertwined around the issue of low carbon installation delivery and had tried to sift out tasks to multiple places, however, in the absence of a place-based approach, with adequate local leadership and capacity to do so, this was impossible task. Whilst The Department for Business Energy and Industrial Strategy (BEIS) was originally set up to coordinate The Heat and Buildings Strategy implementation, against a backdrop of The Net Zero Strategy, the consistent changes in central government position and introduction of new institutions at the top in Whitehall, such as the recently introduced Department of Net Zero and Energy Security only confounded matters. This further point only reinforced the earlier comment in the section regarding poor communication.

The introduction of MCAs and LEPs saw a push for the mayoral type of governance mode, since 2010 the Coalition and subsequent Conservative governments introduced new types of institutions that theoretically produced a single point of accountability sub-nationally, in a political sense this was through MCAs, in a funding sense, LEPs. Whilst both these types of institutions were found within the two city regions identified, there was no congruence of these institutions, either structurally or, from an agency or actor perspective to 'make it work' for low carbon installations. Whilst the institutions were under instruction to deliver national policy, the sub-national mayoral governance type was seen as a more formal and a 'harder' type of governance, in contrast, the LEP was a 'softer' type of governance, with different constitutions. Whilst voicing support for low carbon installation both were found not

to have made any real substantive commitment to implementation. The principles of 'hard' and 'soft' governance spaces, originally put forward by Allmendinger & Haughton (2009), were both aligned with the concept of place-based governance but the amount of flexibility applied to the boundaries of institutions, put forward in Figure 6, was a key limiting factor, as was the issue of information flows and agreed with other literature (Geng & Doberstein, 2008) (Murillo et al, 2011). The lack of information flows uncovered in the literature review in Chapter 2 was reliant on the constitution of institutions and in their political make up which was shown to have influenced the implementation ability of institutions, this left SMEs and the private sector 'in the driving seat'. Expanding on this, a lack of communication, both centrally and sub-nationally within the city region between institutions and SMEs, contributed towards a lack of agreement regarding finance which increased tensions during the Devolution Deal making process. Tensions were a necessary adjunct in any system dynamic but with the possibility of being disruptive if overly active, due to the problems with meta-governance highlighted above and a large amount of tension, the process was not considered place-based governance.

The two MCAs investigated had the ability to agree funding commitments by agreeing conditional funding arrangements through Devolution Deals, these tended to be negotiated on issues which were most prevalent at the time 'The Deal' was made, but not necessarily on specific issues such as low carbon installations. This type of funding left mayors no long term funding streams specifically for low carbon installations and had to 'invent' funding streams sub-nationally to try and promote SME schemes for low carbon institutional development. Consequently, this produced a precarious financial position and a lack of long term funding commitments, therefore, larger amounts were not allocated for this type of economic development. As a result, the main potential drivers in relation to low carbon installations were smaller agents within the city region, for example, smaller SMEs or sole traders were more likely to be eco-adopters by typology as discovered in the literature review and presented in Table 3. These had the basic initial skillset to roll out low carbon installations, but in collective terms they acted in a singular manner rather than a collaborative one. The research also found that obtaining funding for this group of business was difficult.

### **Incorporate endogenous innovation and social value into policy**

The main illustration from the evidence collected was that austerity had caused a prerequisite lack of governance capacity which was not considered a starting point for place-based governance as, the sub-national level of governance had essentially been hollowed out concurring with some literature (Jessop, 2002). A situation was needed whereby central government acted in a capacity other than that of a technocratic referee and sub-national governance institutions were able to take investment risks, this was the main reason for conclusion number 10 and the assertion that, a different kind of politics was needed, both centrally and sub-nationally to ensure a place-based approach made forward progress through additional capacity. Crucially, the relational element of place-based governance and historical perspectives posited the principle of path dependency in the literature, and this assumed that economically trailing places were more likely to have weaker governance institutions. Indeed, this was considered a main role of policy, to resolve conflict within any multi-level governance framework, however, as described multi-level governance was not in operation as described in the literature, there was found a mix and match of horizontal and diagonal governance which was operating behind the scenes during the intention to roll out of The Heat and Buildings Strategy.

In the simplest sense, national and city regional policy actors were working in partnership with each other to identify longer term solutions to problems, but skills, capabilities, capacity and powers, were lacking; to be able to use, design, and create implementable policy. The working partnerships uncovered had to be extended beyond the provision of opportunistic planning and had to influence a place's economy through capacity, capability and skills training, a place-based governance approach required a local person or leader to drive this. The research demonstrated that both mayoral or non-mayoral approaches discovered could not independently develop the endogenous growth in the sense of skills improvement and betterment of human capital in the current format, both within LCR and SCR, and did not comply with Dooley's paradigms nor second order systems theory. This was because the fundamental structural components were not present to do this because of an absence of first order thinking. The additional conclusion that strong entrepreneurial 'boosterism' within sub-national governance institutions existed in relation to The



Heat and Buildings Strategy which focussed on increased abilities of sub-national governance institutional policy making by over exaggerating their own abilities. This agreed with some of the literature review as Harvey (1989) promoted entrepreneurial policies to provide a business friendly urban milieu so mobile capital could remain where it was. The association with a 'boosterism' tone adopted by central government and sub-national policy makers lack of trust within multi-level governance relationships, pointed towards a tendency to talk up policy interventions associated with the key structuring role that austerity played in policy making (Pike et al, 2018). The overstating of funding available and the scale of relatively marginal policy interventions and possible policy impacts were apparent. Collectively, this influenced the ability to put into practice a place-based governance approach and was a primary cause of failure due to an absence of robust governance mechanisms at a sub-national level, in this sense, conclusions on critical theories of neoliberal development discussed in earlier chapters were relevant due to the coalition governments' introduction of privately led LEPs that influenced theoretical elements of the system theory in relation to place-based governance. The identification of austerity also underpinned a strong tone of territorial competition in the Devolution Deal process and the ability to obtain funding associated with low carbon installations was limited, due to only a partial influence over the substance of Devolution Deals and little other influences on funding sub-nationally. The role of mayors was particularly highlighted as variable across the two city regions and criticised for not being at the forefront of low carbon installation funding in both city regions. This was built on the argument and conclusion in this research that whilst mayors were important for securing funding sub-nationally through the Devolution Deal process, they had little 'freedom' as to what to put into the Devolution Deal, hence, the mayoral system was not a place-based governance approach system.

When The Levelling Up Strategy was published the idea of more mayoral led institutions (MCAs) and a mission orientated approach to national policy roll out was apparent, this needed a clear and realistic objective deliver finance, these were missing and could be more effectively designed and put into action sub-nationally with adequate power dynamics. The evidence also suggested that competitiveness was a potential mechanism for 'spatial winners', through the promotion of

agglomeration in economically lagging regions, some places struggled to move forward, not only through difficulties negotiating Devolution Deals but through a lack of qualified professionals and lack of skills training associated with low carbon installations. Sub-national governance institutions did not rectify this independently and struggled to act in a place-based governance way due to altering governance boundaries. Jobs and employment were key points put forward throughout by participants, as was an agreement that low carbon installations had the potential to impact on jobs and employment in their respective city regions. The analysis conducted throughout the research suggested that central government, constrained by its own austerity measures and decision to roll out MCAs in the fashion they have, had led to a hypothetical interest in entrepreneurship at a sub-national level but with associated difficulties in getting 'out of the starting blocks' in the city regions. More specifically, the evidence suggested smaller institutions, and institutions not under the direct control of mayors, had taken the lead in developing implementable projects through institutions such as sub-national SYSB, Regional Net Zero Hubs, and locally implementable programmes at the LA governance level.

Collectively, these conclusions were not supported by theoretical propositions from systems dynamics, in relation to Figure 6, the emergence, in the form of policy development referred to within the city region between the smaller agentic agents and sub-national institutions was simply not happening due to lack of information flows. The research started by identifying, amongst other qualities of systems dynamics, Dooley's theory of second order system thinking and identified the three paradigms of effective working through Complex Adaptive Systems (CAS), these were integrated into the research throughout the analysis and the conclusions of the study suggested possible solutions to the barriers identified using this theory, all had a link in some respect to a social perspective. Early emergent policy in the form of SEPs was light on social policy, this was established as a crucial element in Dooley's paradigms for effective working that needed common established goals, common goals related to low carbon installations were developed following the introduction of IPs. These documents followed SEPs and built on the requirement to 'link in' environmental issues whilst concurrently maintaining a skills and employability theme. There was also a need for SEPs and IPs to be involved with business and IPs document were

demonstrative of the role of SEPs original involvement with European Structural Investment Funds. Notwithstanding this, the social policy involvement in LCR SEPs did not contain any substantial reference to issues such as health and wellbeing, which indicated that this was not as much of a priority as endogenous growth in the form of employment. There was felt a view that low carbon installations themselves contributed through skills and employment opportunities and by the assertion that everyone's health would improve because of implementation of the low carbon theme was also negated. In contrast, more recent publications and the current SEP document produced by SCR had embedded the concept of health and wellbeing into the SEP, while LCR most recent iterations had relied on supplementary documents. Clean energy commitments or financial funding was not promised as part of the SCR Devolution Deal (HM Treasury, 2015), and the more recently negotiated WYCA Devolution Deal contained reference to the matter of clean energy but with no specific official financial allocation. Therefore, both city regions had the intention to look at energy policy, but no further money allocated through Devolution Deals.

Many city regions, including LCR and SCR had attempted to seek more responsibility for labour market programmes within their SEPs, although the specifics of work programmes, skills training, and the policies surrounding these tended to be associated documents rather than in the SEP itself and written was in a very broad sense. The issues of training providers were consistently referred to by policymakers being predominantly within the hands of private providers, discussed in Chapter 5, participants generally felt that private training providers was a negative step, one commenting:

‘... we have seen this in the teaching profession, the private sector. taking control over training ..... its not always a good thing’ (CS1)

This view was perhaps consistent with other views more centrally when in relation to the apprenticeship levy and influence of MCAs regarding skills training and ‘green jobs’. The introduction of MCAs had led to an emergence of more politically led institutions which had introduced more focus on social policy at a sub-national level, with an association to inclusive growth due to the regional inequalities discussed in

Chapter 2. Low carbon installations were described by one combined authority officer as ‘positive growth’, although this was not emphasised in published SEPs.

The issues of innovation policy and smart specialisation in relation to low carbon installations were crucial to both The Heat and Buildings Strategy delivery and that of place-based governance and systems dynamics as this was the result of the ‘system in process’, the emergence depicted in Figure 6 and in this case described as the smart specialisation and innovative practice. During the analysis of findings city regional growth had showed that sub-national policymakers apparently thought more about place making when making policy; this was in accordance with a place-based governance approach, but with central government actors remaining ‘space blind’ in their approach to funding streams low carbon installation innovation was delayed. An ‘excellence’ approach to development of research and development funding was being taken in relation to low carbon installations which was another way MCAs were trying to influence a more place-based governance approach. This research found that innovation could be a hazy but necessary concept to deliver The Heat and Buildings Strategy, beyond the obvious policy interventions of providing public funding for infrastructure research activity and usually within educational institutions such as universities. Indeed, the sustainability institutions referred to in Chapter 5 and higher education institutions were a crucial factor in the roll out of low carbon installations, given that new technology required development and were vital in both the LCR and SCR to develop economic manufacturing objectives.

The initial versions of both city region SEPs were found to have a typical trend in identifying innovation and research development as key themes but with limited discussion of what, and how, this would occur in practice. The increasing political interest in climate change nationally had the consequence that SEPs needed to be revised. Different approaches were taken to this, SCR brought forward a new SEP, LCR simply produced an associated document in the form of a Strategic Economic Framework (SEF) which supplemented the SEP. However, by the time Devolution Deal discussions and revised versions of the SEP in each respective city region came around, the governance mechanisms in each of the city regions had found time to provide more detail on the ideas and intentions around innovation policy.

Simultaneously, it was found that while there was a move to place more emphasis on innovation and endogenous development through a push for more local input, it was not always clear what role local institutions would play in The Heat and Buildings Strategy roll out, similar to other findings.

In the interviews, participants did not spontaneously start to talk about smart specialisation and innovation and it was found that this was due to increasing confusion regarding central government's strategy and ad hoc changes to policy, particularly with the constant changes in political leadership during 2022; additionally, there was a reluctance to think about social policy themes in the long term because of the short-term funding methods discussed in Chapter 5 and the ongoing nature of Devolution Deals. LCR SEP, written in 2014, incorporated a spatial call around innovation budgets and innovation was returned as a priority in the proposed 2016 Devolution Deal, eventually agreed in 2020. This was with a revised Strategic Economic Framework to accompany the SEP and work alongside the IP which was linked to the reduction in climate change central government objectives. One of the priorities was 'Skilled people, Better Jobs'. Sheffield's most recent SEP had a major focus on skills training, concentrating on supply and demand of skills needed by employers, considered more place-based in orientation. This heavy concentration on the skills theme may have been associated with the advent of the SYSB, interestingly, the concept of social value was incorporated in the most recent SCR SEP but in contrast, LCR took the tactic that was more funding focussed within the revised SEF to entice private sector investment. As these documents were constantly being developed, at the same time, top-down regional innovation investments were being delivered under the guise of local growth and pan regional growth in the form of the Northern Powerhouse through 'supplementary institutions', for example, educational institutions such as Leeds and Sheffield Sustainability Institutes. The Sheffield SEP concentrated on SMEs, but it was notable that there were 52,000 jobs in the city region area which specifically related to building and construction jobs. The documentation referred to low carbon buildings which specifically concentrate on residential building decarbonisation this specific focus may have been indicative of the Sheffield Skills Bank working with employers and developing their capacity

through employer led methods. In contrast, the LCR original SEP had a priority for skills and training, as one participant pointed out:

‘ ....it’s not all about the universities, putting innovation into skills policy is a bit more difficult because of the lack of control over education, skills, this has changed with the deals but skills still a difficult area to navigate’ (CA2)

SYCA and WYCA SEP documents were similar in terms of their focus on skills and transport infrastructure, the latter negotiated through the WYCA Devolution Deal had specific commitments for low carbon buildings. The updated Sheffield SEP, alongside LCR both had commitments to use ‘citizens juries’ to guide the policy making process in relation to climate change issues. It included ambitions for low carbon energy and ways to ‘transform the intelligence, resilience and resource efficiency of commercial and residential buildings’. Summarily, it was apparent through the analysis of policy that a relational stance to policy making was being used not only through established institutions but community sources also to and appearance of a place-based governance approach but this was preliminary work and not yet ‘active’ operationally.

### **Flexible governance for flexible economies**

As previously alluded to funding for innovation research and development was focused on ‘excellence’, this approach had dominated government thinking for several years with no real change to this approach. The recent announcement from central government in July 2023 that Cambridge, again, would benefit from funding to scale technology of businesses associated with another new centrally located departmental office. The ‘Office for Place’ influenced housing design and was yet another example of Departmental Ministers taking a strictly space neutral approach to sub-national economics, funding dissemination was demonstrated to have a reluctance to decentralised innovation outside of specific areas and central government were not willing to provide resources for city regional policy development, this was consistent with a lack of funding for innovation at different geographic scales was problematic. As a starting position this negated a place-based governance approach.

In contrast, it was found that local policymakers considered new announcements and repetition in government ‘new policy’ and ‘new funding’ only reinforced spatial disparities and reduced other likelihoods of a successful and timely Heat and Buildings Strategy roll out. This was illustrated by participants:

‘.... we support SMEs as best we can by encouraging innovation, although. we can only fund so much depending on how our deal looks like, there has to be interest from both sides’ (CA1)

and;

‘The role of Innovate UK is a bit of a mystery to me, is it the rebalance everything or to just create ore innovation where there already is innovation?’ (CA2)

In the perception of the participants identified above, some participants within MCAs were seen to question the method of funding dissemination for research and development, the way funding was being agreed was questioned and it was left open as to whether this could be done in a more efficient way. It was posited that MCAs, with continuing Devolution Deals were in an ideal place to disseminate the funds as policy, including skills policy previously discussed (LSIP), as this would take a consistent approach to innovation policy in any given city region. The same point was also discussed in the context of IPs, there seemed some negativity towards the introduction for this type of plan due to capacity issues and there appeared resentment following the advent of Devolution Deals as a central government measure to push low carbon expenditure:

‘.... It seems to me that these [investment plans] can just confuse matters, we have already had to write strategic economic plans which was a long haul and it seems to me that a bit confusing as to what these [investment plans] are needed when central policy changes all the time’ (CA1) Sheffield

This sort of opinion was set against a backdrop of sub-national MCA policy such as the London mayors’ Ultra Low Emission Zone (ULEZ) (Transport for London, n.d) for car transport which had seen some resistance due to central political differences and possible repudiation of the concept of change. In the perception of some of the participants, which partly came from sub-national institutional staff, the constant

reintroduction of different policy documents as excessive and expressed they would prefer a 'one document' approach. The attempted compromise between a place-based governance approach via a recurrent set of Devolution Deals were in essence a form of compromise from a department facing increased calls from sub-national policymakers alongside some within central government, for greater widespread dissemination of funding to increase city regional growth. This was reflected in the views of one civil servant in the skills arena in the form of a QUANGO:

'Civil servants responsible for skills innovation have started thinking about ways to do things that they would have done years ago ..... to consider a more place-based influence in policy making, it's not just about local skills but also about local growth' (CS1)

Similarly, the compromise around territory of place in the formation of city regions and 'excellence' in the form of innovation, only reaffirmed that The Heat and Buildings Strategy required a focus on sub-national development policy. IPs demonstrated a central government intention to ensure a 'green friendly' approach and robustness for national policy implementation. It was not clear whether this type of mandatory policy delivery would resolve tensions between central and local government when considered The Heat and Buildings Strategy, nor resolve the ongoing problems of a space-neutral approach to city regional economic growth but was considered that it would begin to form a more place-based way of working.

In other interviews, there appeared a broader sense of tension and apprehension regarding place-based governance and the implementation of innovation policy, possibly due to the long-standing disagreement within some Whitehall departments as to the appropriateness of space neutral approaches to economic development generally. This was also mirrored by some of the SMEs interviewed. The apprehensions received when a link to public investment was articulated in research and development for low carbon installations, it involved a trade-off between efficiency and equity, the answer was:

' ... there's never been a satisfactory resolution to smart specialisation of the skills training needed to bring forward the agenda [Heat and Buildings Strategy] and growing the innovation that will best



suit the area to put its mark on the map' (U1)

In the context of the perceived trade off, it was notable that an element of regionally focussed but now defunct European Structural Funds was aimed at boosting innovation and indeed skills in this area; with expectations among some central government actors that national expectations were not necessarily high. Moreover, discourse at times retained a distinct note of Keynesian spatial economics in that participants thought that some central government staff had limited expectations of sub-national development policy. One interviewee mooted that the principal purpose of EU structural funds was to invest public money in poorer places, this was also thought to be a central issue of place-based governance, with long-term results in terms of innovation as a secondary matter, this linked with the issues of funding:

' ... the European Regional Development Fund was about investing locally to grow economic potential and skills, this is now missing and replaced with a lot less ... we've still got Innovate though for innovation but skills training for the SMEs involved is a problem ' (U2)

On the further issue when pushed for where SMEs applied for innovation capital to get their money, one interviewee stated that French SMEs relied mainly on its larger corporate affiliates from France, not any money issued from the UK government or indeed UK firms. This raised the possibility that foreign investment was also affected by the slow progression of low carbon installations in England raising external influence as depicted on Figure 6.

To summarise, local actors were found to be increasingly likely to think on a serious level about ideas such as innovation and smart specialisation for low carbon installations and to seek aspirational innovation policy in their territory, however, central government was found to actively encourage places to develop thinking surrounding innovation and endogenous growth. Whitehall departments were somewhat cautious of decentralisation or full devolved powers and there was found to be a reluctance to 'let go' of funding streams for innovation policy and the implementation of low carbon installations which did not indicate what was considered in the literature to be place-based governance. There was also difficulty

creating a flexible economy for low carbon installations and accumulating capital due to a lack of consumer interest.

### **Non transparent finance with realistic sub-national policy**

This research found that criteria used for the allocation of funding through sub-national governance institutions for low carbon installations were opaque and relatively marginal, funding was also shaped by national fiscal austerity measures, in this context, different places had different experiences, LCR and SCR were very similar and reflected the national approach taken by central government. The fuzziness of funding criteria was visible in early analysis of the Devolution Deal process introduced in Chapter 5 and was dependant on when the MCA was formed, this impacted on whether sums of money for climate change issues were included, similarly, SEPs were assessed as they notionally provided funding streams were assessed and found to have been written very quickly and largely on an ad hoc basis, similarly, problems were found with the newly conceived IPs.

Central government's approach to funding of low carbon installation initiatives was found to have prompted confusion over the allocation of financing through various sub-national Deals, for example City and Growth Deals also. Some participants reported that they felt confused because of the numerous announcements of different funding streams, moreover, IPs required a 'lead authority' that could be either an MCA or LA, like LSIPs. LAs were found to be with sceptical as the guidance for IPs mandated that existing Adult Education Budgets and remaining European Social Fund monies be considered but that they themselves (the LA) did not have access to these funds directly without mayoral involvement. Nevertheless, the scepticism revealed during the fieldwork was also compounded by the fact that LAs and MCAs had to produce 'climate change strategies' and/or 'green strategies' to bid for money. In the background of austerity 'additional money' for low carbon installation programmes was difficult to identify or differentiate from investment that may have happened anyway. In terms of low carbon installation monies, it was found that this was easier to identify as it was specifically referred to in paperwork such as SME match funding in LCR or Innovate UK funding. This overarching confusion regarding funding streams disseminated down from central government was a

historical theme considering the large sums of money that were required to achieve low carbon installations for buildings in both the city regions identified. The Devolution Deal amounts were relatively low, and central government showed a tendency to announce multiple funding streams and attach these to existing funding already provided. Centrally however, the opacity of funding remained a dominant theme, and this was found to be an overarching broader problem with funding streams in England. These points supported the suggestion of a central body with responsibilities and powers for information flows and finance to be introduced a city regional level specifically to deal with low carbon installation issues.

The following examples provided useful background as to the complexity of the funding process when dealing with central government and the negotiation of funding streams, this was a recurrent theme found in funding for low carbon installations. The government had previously accepted Lord Heseltine's recommendation to draw together centralised funding and create one fund that could be decentralised to LEPs (Heseltine, 2012), the amount of £49 billion was suggested by Heseltine but this figure was watered down to £2 billion over 5 years by central government who considered the figure of £49 billion unrealistic. Moreover, there was historic evidence that the content of Devolution Deals negotiated with central government to sub-national governance institutions, had in the past, left multiple actors disappointed. Further examples of inadequately funding were the controversial New Home bonus which was worth around £400 million and the Green Homes Grant. The former was replaced after concern from actors that the funding created used a top slice of money already allocated in council budgets, this effectively meant a cut of the existing budget, the latter failed due to logistical problems with lack of SME compliance. Consequently, LAs in more deprived areas lost more revenue as part of new funding streams, furthermore, half of the funds consisted of transport funding which was already in local control and transferred to LEPs. It was unclear whether similar problems existed with funding commitments attached to Devolution Deals. Collectively these issues supported the assertions leader posited to have fiscal independence for city regions, if not total independence for the area, certainly in relation to specific projects that government policy was pushing for. In its current

format the lack of fiscal independence did not fully comply with the second principle covered in the literature review, decentralisation, to be place-based.

Importantly, funding arrangements via place-based deals and other funding mechanisms were always conditional via a competitive process, in this sense, the allocation of funding could be seen to only reinforce the regional inequalities in England. This competitive process was found to be like previous funding occurring in the 1980's between central and local government through the 'City Challenge' programme (Davoudi & Healey, 1995). This type of funding was like the current funding situation and was commented on by one interviewee:

'... the way government works with combined authorities is that it puts forward a pot of money and then ask the combined authority to bid for the money. This is how the deals work, but it's not really devolution because the government is still in charge, they are telling you how to spend it. It's all short term as well so it's difficult to get long term funding ..'  
(CA1)

Whether an element of competition in funding could have been said to go against place-based governance was one of debate and conjecture, on one hand a competitive element hindered sub-national institutions that did not have skills to bid for money, on the other, competition was a main factor in SME productivity and needed to develop a market for technologies associated with low carbon installation, this was also true of funding schemes like Salix and UKIB. Whilst this was not covered directly in systems theory dynamics, other theory such as Porter Diamond included the element of competition as a key factor for success in business (Porter, 1998). From this perspective, given the difference in timescales for agreeing a Devolution Deal in the two city regions, it was perceived that LCR had been rewarded from a climate change perspective by the delay in agreement of a Devolution Deal. Therefore, depending on which area of Devolution, housing, transport, climate change was a priority was dependant on the particular interest in the consistency of the Devolution Deal process. As a result, the current system of funding did not bode well to equalise the regional inequalities in England, there seemed a collective agreement sub-nationally that money from central government should be new money that had not already been allocated within pre-existing announcements. This would

incentivise city regional leaders to explore efforts to ensure that money went towards their respective city region.

Findings in relation to both city regions and policy documents analysed uncovered a tendency for MCAs to hype up their own city region to obtain funding, given the competitive mechanisms alluded to earlier. The Leeds PIPES project, discussed in Chapter 4, typically reflected some of the traits discussed of ‘entrepreneurial governance’ discussed by Harvey (1989), although, one of the key points of Devolution Deals, was to have a mayor in situ. This point was highlighted by some authors arguing that mayoral powers in England were weak as they stand:

‘place-based forms of economic development require strengthened institutional frameworks. Tackling entrenched problems of ‘left behind’ places will require more imaginative and flexible geographies than the centrally imposed approach to devolution’ (Tomaney and Pike, 2018, p33)

Therefore, the apparent presentation of sub-national or city regional policy may well have been overstated over time, some interviewees acknowledged that entrepreneurial traits associated with low carbon installations presented more aspirational targets than evidentially based ones. Achievements were made to seem more than they were, for example, LCR cycle route for sustainable transport initial phases were never finished but are now included in the most recent Devolution Deal for £830 million City Regional Transport Settlement, moreover, in the context of the competitive bidding process previously discussed the principal mechanism to obtain funding was perhaps exaggerated on projects achievements to obtain funding. Returning to the PIPES example, the heat network only originally connected 1,983 homes in the whole of the Leeds City Region so did not completely serve the community. Similarly, issues in terms of infrastructure were discussed in relation to hydrogen boilers in buildings, an interviewee, an expert in hydrogen projects expressed concern in terms of the timescales needed and unrealistic government targets in replacing the piping infrastructure to accommodate hydrogen as a unit of energy production, whilst sub-national government seemed to ‘gloss over’ that the objectives were not achievable, the Leeds City Region SEP asserted:

‘Northern Gas Network’s pioneering hydrogen conversion project in Leeds

will enable large scale decarbonisation of the gas network, creating an at-source hydrogen supply and a natural home for new hydrogen-based tech' (West Yorkshire Combined Authority / Leeds City Region Enterprise partnership, 2016, p72)

According to the expert testimony collected in this research this was not possible in the timescales stipulated, both SCR and LCR SEPs cited this as a major problem and hurdle to overcome as was the widening gap between their own national labour productivity identified as a key challenge. This was reflected in most sub-national areas as discussed in Chapter 2 and was a national priority when SEPs were being written. Furthermore, the introduction of IPs linked to climate change objectives and climate change strategies sub-nationally, pointed towards sub-national governance institutions efforts to win over more monetary involvement via the Devolution Deal process to support SMEs with implementation of low carbon buildings. This also reflected the tendency for sub-national policy to be written and include content to reflect contemporary national policy instructions rather than sub-national priorities and was therefore not considered place-based. Initial versions of SEPs with heavy involvement of advanced manufacturing and views of the then Chancellor George Osborne were more to create an appearance that 'things are being done'.

It was found that entrepreneurial language was embedded into sub-national governance institutions policy documents, the hydrogen conversion project referred to above on energy efficiency was clearly within the strategic objectives in LCR, elsewhere, SCR was actively pursuing a lower EPC rating and energy fuel efficiency for low carbon heating systems. SCR, again, benefited from a newly formed SEP published in 2021 alongside a Renewal Action Plan in 2020, whereas LCR was deemed to be behind only having published a Strategic Economic Framework (SEF) to support the existing SEP. Whilst the SEF addressed skills, it by no means addressed skills in relation to low carbon installations nor 'green jobs'. This may have indicated that the more longer standing MCA, South Yorkshire, had the ability to be more co-ordinated, reactive and adaptive to central government changes as they were able to provide policy in accordance with central government changes more quickly, hence, it was mooted that mayors may enhance policy making and create more adaptive institutions. This way of working was in accordance with the chosen theoretical

framework and principles of systems dynamics and the need for leaders to make decision in a logical governance framework.

Additional disadvantages of the SEPs for skills production in relation to low carbon installations was the fact that several of the statistical claim were difficult to quantify, for example, LCR SEP claimed that 35,700 jobs would be created via public and private enterprises following the previously agreed Growth Deal, although this created to 3.7 billion pounds in economic output, there was no justification for this within the plan. Similar problems were surely going to be apparent in relation directly to jobs associated with low carbon installations in LSIPs. Indeed, the West Yorkshire LSIP, produced by the Local Chambers of Commerce, stated that low carbon skilled jobs in relation the green transition were only required by 27% of employers. Two reasons were posited for this, firstly, the employers had no incentive to develop their business that way, secondly, there were not enough SMEs specialising in low carbon technologies and this created an incongruous ‘fit’ of sub-national policy surrounding the same matter. In summary and taking each of the points and principles of the place-based governance approach described in Chapter 3, a place-based roll out of The Heat and Buildings Strategy was unlikely. Meta-governance was present in the form of elected members in MCAs and LAs, although this was hindered by too much tension and lack of communication for an effective open system and systems dynamics to operate effectively. Similarly, multi-level governance was apparent in the form of diagonal governance which had previously been shown to be destructive.

For sub-national institutions in their present format to be considered place-based governance a more democratic and stable constitution was required to aid these elements, inadequate information flows added to increased tension, general systems theory and CAS principles of tension were mooted to be necessary principles for low carbon installations to be implemented but, for sub-national governance institutions be able to operate effectively in city regions, it had to be at the right amount. Too much tension and a place-based governance was hindered. Uncovered as part of this research was the tension between actors within city regions, there was an amount of tension that could be considered detrimental, particularly when considering central and local through Devolution Deal making for low carbon installations, this tension

could be reduced by increasing skills and finance, generating capability within sub-national institutions, the same functions that were associated with place-based governance. Another part of the ongoing tensions sub-nationally that was uncovered was the distinct lack of democratic involvement and slow-moving process of financial matters. From a business perspective, obtaining finance was ‘overly complicated’ or ‘unjust’ towards SME businesses and subsequently caused a lack of interest from SMEs. Generally, SMEs were not substantively involved in policy formation or implementation sub-nationally, contrary to open systems theory, due to a lack of automated control mechanisms.

In addition, mayors struggled to obtain ‘true’ Devolution which was required in the form of legislative power (building control), admin and fiscal control. Communication streams via inadequate information flows hindered the necessary interaction. Evidence pointed towards the powers of mayors being too weak, leading to a weak typology of leadership and consequently non adaptive institutions. Place-based governance as a concept required decentralisation and interaction, the necessary element of interaction of the CAS dynamic was concluded to be present at a sub-national governance level but lacked the necessary quantity and frequency to be effective to deliver national policy. This was due to a rhetorical emphasis on Devolution which was present sub-nationally in city regions but with inadequate timing to progress innovation and associated economic strategy.

The exact economic growth strategy and ability to roll out national policy varied, policy was paramount to mayoral strengths but un-coordinated and depended on the historical background of a place or the city region’s economic strategy; some city regions had inhabitants that ‘interacted’ more spontaneously than others. The principle of subsidiarity was present but on an informal basis only, the civic and ‘third sector’ were working through an independent informal governance system sub-nationally to successfully achieve implementation of The Heat and Buildings Strategy. Whilst a simplistic multi-level governance approach existed in England including MCAs, the multi-level governance component and that of interdependency persisted in a conditional led system, by which Devolution Deals, and finance were available to sub-national governance institutions and businesses through the principle of



dependency, however, it was uncovered that as part of the low carbon installation roll out, lower levels of institutional action (lower than city regional) level, were actioning agentic activity to implement policy at times independently of the MCA. This concurred with a perspective of complex adaptive systems regarding leadership, putting forward the argument that leadership in relation to low carbon installations was situated in a more 'bottom-up' governance fashion but this was not the original intention of central government when setting up MCAs, the principle of subsidiarity seemed to be operating but without formal control.

Institutional support, knowledge emergence and learning principles were present but were concluded to have limited involvement in policy making outside that of formal institutions, put another way, local citizenry and businesses were not incorporated into sub-national policy making in relation to low carbon installations, hence, the opportunities for emergence and learning to occur were less available and place-based governance was not present. Big gaps were apparent surrounding the achievability of economic policy in relation to low carbon installations, whilst institutional support sub-nationally was apparent, the principle of subsidiarity appeared to be more influential than originally envisaged at the outset of the research. Outside the narrow focus of low carbon installations, sub-national policy had incorporated social policy in accordance with the population ecology principle of Dooley's paradigms, but this was not necessarily widely accepted by the private sector. Smaller institutions than MCAs were contributing to the roll out and this had the effect of incorporating learning and forming innovative ideas at a lower governance level, a lack of integration of institutions consequently caused a lack of effective working and operational integrity.

The following are takeaways from the discussion that were used to develop the conclusions and show that a place-based governance approach is negated:

1. MCAs were found to be favoured by central government as a method of city regional governance in England but had an absence of 'true' democracy, citizenry involvement, and poor information flows, which negated place-based governance.

2. Barriers identified low carbon installation delivery as directly influenced by the 'fuzzy' boundaries and geographic political sensitivities within and surrounding city regions. The flexibility element of governance aligned with some of the governance literature in the format of Type 3 and diagonal or interactive governance. The interdependency element of systems dynamics was present, however, there were 'many parts' working independently within both city regions. A lack of interdependency could potentially negate place-based governance.
3. Adaptive institutions were found to be resource dependent and if resources were lacking an open system could not perform effectively due to structural governance issues and difficulty processing first order thinking in systems dynamics in city regions. A lack of structure meant a lower level of agency in the city region which negated place-based governance.
4. In the current climate of austerity, adaptive institutions were necessary, but a strong typology of leadership was required to have effective performance. Leaders needed powers to implement their ideas which in relation to low carbon installations, mayors did not have these powers.
5. MCAs and LEPs constitutional make up were inherently different, one public sector led to other private sector led, this was found to have caused increased tensions in accordance with systems dynamics and caused a limitation on sub-national governance institutional impact on endogenous growth and skills training.
6. Capacity issues both private and public sectors in the LCR, SCR and associated LEPs were found to be inadequate to effectively support SMEs to roll out The Heat and Buildings Strategy, this hindered sub-national governance institutional responses.

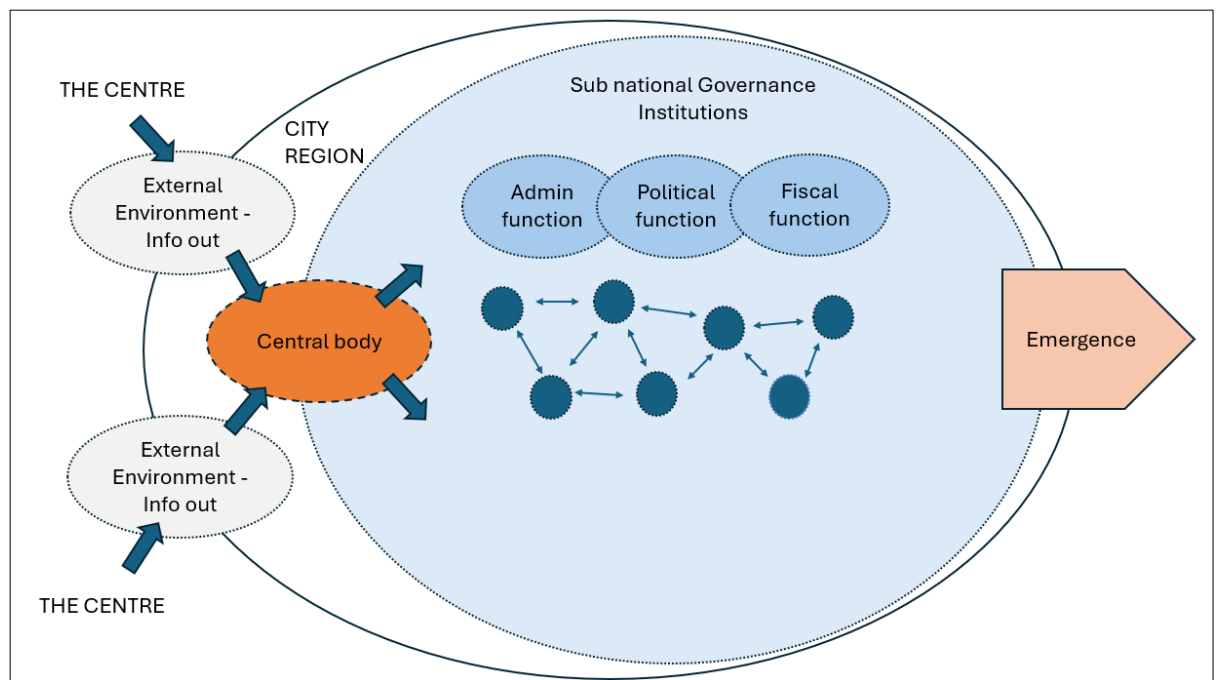
### **The theoretical framework reviewed**

Upon completion of the literature review, an additional principle of integrative adaptation was incorporated into place-based governance, thereby establishing the theoretical framework for the study. Integration and adaptivity associated with dynamism were considered important to explain place-based governance and systems dynamics. Applying the principle in Figure 6, Tables 4, and 6, throughout the

research it was clear the multiplicity of sub-national governance institutions, in the form of MCAs and LEPs, were working ‘very much apart’ from each other and other institutions.

Policy and funding mechanisms were implemented and devised by different institutions with varying agendas and objectives, but there was a lack of cohesion in the process. Goals and objectives related to low-carbon installations needed to be location-specific to address the unique barriers and issues of each area effectively. The concept of path dependency was of paramount importance within systems theory dynamics and MCA development plans were dependent on the principle of path dependency and historical forms of economic growth; but required the overriding need for integration and adaptivity, to take advantage of the benefit of an open system of governance and systems dynamics. However, place-based thinking was integrated into broader social inclusion policies and this approach involved sub-national institutions collaborating to combine local knowledge in order to formulate place-specific policies, promote innovation, and support endogenous development. Despite a rhetorical emphasis on place specific histories, strengths, weaknesses, and most of the emergent policy relating to low carbon installations being very similar across different places.

To summarise the issues found and the current state of play within city regions, institutional processes did not align with the theoretical model, as presented in Figure 6, nor was it considered efficient way of working. The barriers identified prevented the delivery of national policy could not be overcome sub-nationally due to the issues raised in the discussion, therefore, the theoretical model could not operate in its current format. Generally, the discussion of the research questions suggested that the theoretical model needed to take account of the findings in terms of five key barriers identified, as a result of applying the theoretical model and discussing the findings of the research it was decided to review the theoretical model to propose a more efficient way of working within city regions, the theoretical model in Figure 6 was reviewed and is presented in Figure 12.

**Figure 12 – A revised theoretical model for sub-national governance**

**Source: Authors own**

To explain the revised model, three functions were originally identified in Figure 6 that of the administrative, fiscal, and political and regulatory control. It was thought that these three functions were needed in a city regional environment to adequately control low carbon installation delivery. The barriers identified in the findings chapter pointed towards a catalogue of problems with communication and information flows which, in turn, influenced SME behaviours and had a consequential effect on skills training. To combat this, a larger spatial orientation for sub-national governance was suggested, depicted by the larger light blue circle. The agentic activity that did occur sub-nationally was constrained by communication issues with the institutions in the city region, subsequently this impacted on economic development activity (or as per the theoretical model - a form of emergence). Hence, the small blue circles, the agentic activity have been moved closer to the three functions of sub-national institutions, the box containing emergence within the city regions envelope between the agentic activity and sub-national institutions was removed and, in theory, this provided a closer working relationship between the two. The lightly coloured arrows were removed as these represented a method of communication that was ineffective, they represented a longer communication route then was necessary and acted as a

potential source of 'tension'. The model in Figure 12 was deemed to be more place-based, given the fact that the SMEs were working in closer proximity to partners within the city region. Additionally, the spheres of external environment activity, originally numbered four were reduced to two. This represented information flowing from central government, the recipient of the information was made more concise and went straight to a 'Central body' sub-nationally rather than into the city region geography generally. The main responsibility of this 'Central body' is to disseminate information, and potentially funding, thorough one medium directly to the city regional drivers whether it be the public or private sector. The boundaries, identified by the lines, were replaced with dots, rather than dashes, to indicate a need for a more fluid boundary between information that came from outside the city region. The three functions were also merged to crossover to indicate a more coherent, logical, and collaborative way of working. These changes were required, particularly when accorded with the principles of an 'open' system discussed in earlier chapters.

### **Summary**

The approaches to development of new institutions such as MCAs and LEPs differed in the two city regions and undoubtedly influenced the ability of MCAs and LEPs to deliver low carbon installations when considering the answers to the first three research questions posed. The central institutions, MCAs and LEPs, were not necessarily beneficial to the implementation of The Heat and Buildings Strategy, as the production of endogenous growth in terms of skills was found to be different in the two city regions and heavily reliant on central government 'guidance'. This research has examined decentralisation of sub-national institutions looking specifically at perceived opportunities and risks, most notably, Chapter 5 identified five key barriers. There were three major functions identified sub-nationally and the theoretical model was restructured based on the findings, one of the most important findings of the research was that; whilst mayors were found to be given the ability to make strategic planning documents and skills documents alike, this was not enough to make SMEs, or the multiple participants interviewed, believe that a mayor could have a more effective influence. The functions as depicted in original theoretical model were revised because of the research.

In summary, the evidence presented here shows that much emergent policy under control of sub-national governance institutions in city regions exaggerated the potential impact of often relatively marginal interventions through contemporary projects involving low carbon installations. The funding available was a multiplicity of funding streams which often hid overly strict funding conditions, which increasingly difficulty to broaden sub-national policy and innovate endogenous development. As a result of the discussion of findings, incorporation of the ‘takeaways’ identified in this chapter suggested solutions were created that link the barriers found to the conclusions for this research, these are presented in Table 17.

**Table 17 – Suggested solutions to the barriers of successful implementation of low carbon installations via a place-based governance approach**

Barrier	Relevant conclusion
Absence of an authoritative body in relation to low carbon installations and a lack of leadership at a sub-national level, more specifically, a lack of adaptive leadership	1 & 2
Little integration of sub-national governance contemporary power structures, abilities and responsibilities, combined by the fact that intrinsic actors within sub-national governance institutions and politically opaque governance processes	2, 9, & 10
No statutory provision in England for sub-national governance institutions to comply with a firm set target, targets are set locally but lack little by way of reasoned justification for the target set, i.e. different sub-national governance institutions will have different target dates to complete their low carbon installation ambitions	4, 6 & 7
Limited resources, including human capital, finance and skills training capabilities	3, 4 & 7
Lack of transparent funding and monetary delegation processing at LEP level	4 & 5
Spatial limitations including a lack of acknowledgement from central government a to different spatial economic areas in which to implement national policy including The Heat and Buildings Strategy	2
Capacity issues among sub-national governance institutions but also SMEs in the respective geographical city regions	1, 2 & 7
No achievable well thought out, place specific targets	2, 3 & 4
A sub-national governance system in England that is fragmented and disorganised	1, 2, 9 & 10

**Source: Authors own**

## Chapter 7 – Conclusion

### Outline

This chapter provides a conclusion for the research and brings together the analysis and discussion into a concluding chapter. It identifies the analytical findings of the research in the context of the existing situation sub-nationally and puts into practice the principal elements of place-based governance outlined in the literature review. Place-based governance was shown to need to incorporate the principles of systems theory to work effectively and this research has integrated the principles of adaptive integration by underpinning and extending on place-based governance principles, as well as identifying gaps in the system dynamic itself. This was achieved through the application of a conscious normative perspective of place-based governance, in that, the approach was dealt with as being implicitly progressive which attempted to reconcile city regional growth, reduce inequalities, and demonstrate the ability to incorporate academic theoretical models into sub-national governance and its institutions in England. Strengths and weaknesses were identified in the contemporary sub-national governance ways of working in relation to implementation of The Heat and Buildings Strategy. This chapter extends on the discussion, make conclusions on the key conceptual themes and findings, and provides the research's main contributions to knowledge.

### Overview

The literature and contemporary research reviewed suggested that there were barriers for sub-national institutions to implement The Heat and Buildings Strategy and a lack of support for SMEs in the two city regions identified. The findings of this research accorded with existing literature, but at the same time, it made an important and original contribution to knowledge by providing an empirical investigation of an emerging system of governance in the context of The Heat and Buildings Strategy. Several findings of the study were unanticipated, this included a crucial central role for private sector actors in low carbon installations, who had a heavy reliance on a competitive funding process contained within a demonstrable process of territorial competitiveness to obtain capital finance. Austerity budgets and changes to funding mechanisms through Devolution Deals were found to be more likely to increase

competition rather than promote collaboration and this was associated with another important finding of the slow-moving negotiatory process of deal making; with short term and often complicated mechanisms involved within this funding stream. These points also applied to the other funding streams on offer such as Salix and Innovate UK. The evidence collected regarding the role and opinions of the private sector in the form of SMEs were influential, the evidence suggested that the slow progress in delivering low carbon installations was due to finance issues, communication and information flow problems, this consequently reduced capacity for development in terms of skills training and human capital. A fundamental problem with finance for the private sector was linked to the complicated and arduous process of how to obtain funding, from both central governments to sub regional governance institutions through Devolution Deals and sub-national governance institutions to SMEs. Financial assistance was publicised for marketing purposes but often with ill thought out schemes that made participation an unviable and unattractive option for the SME, as highlighted by the Green Homes Fund and LCR SME fund in previous years. The distinct lack of implementable skills policy and lack of skills necessary to implement The Heat and Buildings Strategy was a key finding, as was the difference in the provision of skills in institutions when LCR and SCR were compared. The conclusion that, whilst mayors certainly had a part to play in securing funding, they were not fully in control of other institutions that contributed towards low carbon installation roll out, the mayor played only a minor role in the provision of skills training and planning and innovative policy delivery. The evidence demonstrated that this was, in part, due to the limitations and set of restrictions from central government.

This final chapter concludes that there has been a shared failure to adapt and implement low carbon installations and The Heat and Buildings Strategy, both centrally and sub-nationally. Despite contrasting approaches to policy delivery in both city regions identified, the absence of, or failure of, effective meta-governance in its current format was compounded by the inadequacy of current, spatially fragmented, sub-national governance institutions. This differed depending on the city region, for example, SCR was more advanced with skills training and had developed a wholly new Strategic Economic Plan, whereas LCR had merely extended its SEP



through a review process. It was concluded that this difference had encouraged and contributed development of specific skills training institutions such as SYSB, but notably by using outside institutions that were beyond the MCAs geographic boundaries. In comparison LCR skills policy making was led primarily by an update of the Strategic Economic Plan but had more recently negotiated a Devolution Deal that was considered more appropriate for environmental issues and incorporated more environmentally specific finance arrangements due to timing of negotiations. Notably, low carbon installations were still not specifically referred to in the Devolution Deals, at the time the research was conducted no central body was in control of the low carbon installation roll out which was needed to ensure that adequate funding, resources, and capacity were available at the sub-national governance level and centrally to be able to deliver. Whilst BEIS, the central government department had been tasked with this, it was concluded that they were distinctly out of touch with what was happening on the ground at city regional level. This was compounded by insufficient relational geographical factors between the importance of history path dependency and government's apparent rejection that these factors were important to consider when implementing The Heat and Buildings Strategy.

### **Caveats / Limitations/ Ethics**

Any research study has limitations. This study's limitations were in two forms, firstly, the qualitative methodology chosen had general perceived limitations discussed in the methodology chapter, secondly, more specific problems were unique to the study, in this case recruitment of participants. Because experience was key to the qualitative methodology, the researcher's observations must have been able to account for varying kinds of experiences in a way that is idiographic rather than generalised. Experiences are always changing and fluid, perspectives of the same event change from person to person and in some respects, observations are needed for a 'true' natural event. Interviews are a way of changing or manipulating the environment to obtain data, this was combated by ensuring interviews were open ended and narrative. From a case study perspective, there was never a definitive test of a theory or framework (Vaughan, 1992), however, case studies provided a certain amount and type of data for analytical generalisation (Yin, 2018). Difficulties were

encountered during the data collection phase that were not envisaged, for example, initially when approaching participants, some refused, some accepted and then did not turn up, some turned up for interview and promised extra information following the interview and did not fulfil their promises despite follow up. The ontological perspective used related to the epistemological view of knowledge; in terms of the positionality this was reliant on the researcher's perceptions of implementation. The research design also considered ethical dimensions and gained ethical approval from the University of Northumbria ethics department. The ethical guidelines of Northumbria University were implemented throughout the research. It was made clear at the outset that no participants were under any obligation to take part and were free not to accept the invitation to the interview.

### **Original Contribution to Knowledge**

The research provided an original contribution by informing national and local government, the private sector, and other stakeholders on how to make sub-national governance processes more effective to businesses and deliver low carbon buildings. It also provided recommendations to improve sub-national policy making and governance processes. It presented an original contribution by investigating the contemporary situation regarding the implementation of The Heat and Buildings Strategy in the form of two city regions at a sub-national governance level in England and investigated, extended, and clarified some principles of systems theory dynamics and Dooley's CAS dynamic in relation to sub-national governance institutions in England.

It explored the normative position of a place-based governance system and integrated them through system dynamics to consciously impose a fifth principle to the place-based governance model. The fifth principle was described here by the author as the integrative adaptivity principle and expanded on the progressive and implicit nature of place-based governance using system dynamics, then presented policy recommendations based on the barriers identified concerning difficulties in implementing national policy. It highlighted challenges within the contemporary sub-national governance structure in England and the importance of spatial

considerations within any geographic area. An original contribution to knowledge was demonstrated in several ways, the research:

1. Presented a theoretical unpacking and extending the place-based governance approach.
2. Incorporated the importance of the system theory dynamics and CAS dynamics to places and city regions.
3. Provided justification for relational thinking and geography surrounding place-based governance.
4. Produced potential solutions to more effective short and long-term implementation of The Heat and Buildings Strategy national policy through place-based governance acting as a conduit.

Gaps were present in the research as with any research project, these gaps are now briefly outlined and potential avenues of enquiry suggested for the future. In a broad sense, the analysis presented in this thesis concentrated on structural and relational factors of the place-based governance approach. In addition, a retained focus on the core elements of the place-based approach and that of systems dynamics was used. A different research approach would have provided for a different direction and may also have shifted the focus of the research questions onto the other institutions within the case study sites themselves, such as Sustainability Institutes and the 'civic sector' to extend on the results of this research. Such an approach might employ a different understanding of local political relationships and motivation of the civic sector to perhaps provide more relevant data on the motivations of the civic sector's involvement in the implementation of The Heat and Buildings Strategy. A different philosophical stance could be used to interpret the data and this would also provide new understanding and knowledge, for example, social constructionism could provide a more subjective perspective and interpretation of the units of analysis through more subjective means.

## Conclusions and Recommendations

The research conclusions are as follows:

First, a central overarching body is required to disseminate innovation information, coordinate funding, and implement The Heat and Buildings Strategy (at the time of data collection The Department of Energy Security and Net Zero did not exist).

Evidence from findings/analysis chapters – The main evidence relied on for this conclusion was the overall lack of co-ordination and general separatist ways of implementing solutions to some of the barriers identified. For example, skills training had begun in earnest in the two city regions investigated, but this was being rolled out in multiple different ways by multiple different actors. Similarly, funding streams to influence skills training was controlled by multiple different actors away from the sub-national governance institutions, this negated a place-based governance approach to rolling out The Heat and Buildings Strategy given the lack of accountability. The evidence demonstrated that the fragmentation of not only strategic policy making, but also the influence of finance needed to generate funding for SMEs to implement The Heat and Buildings Strategy was inadequate. There were consistent difficulties accessing information in relation to a host of areas for low carbon installations, including information on how to decarbonise and set up training schemes to develop low carbon installation skills, training was more established in SCR rather than LCR. Funding streams were reported to be fragmented and time consuming to access rather than having one point of contact, this made it more difficult for businesses to develop. Drawing on earlier chapters the ‘harder’ governance spaces that seemed to be developing in the form of MCAs seemed to rely on ‘soft’ governance spaces in relation to finance. This had obvious implications for governance sub-nationally. ‘Soft’ governance took different forms, with nationally setup institutions such as LEPs and an infiltration of the private sector in relation to sub-national funding streams in the form of companies like Salix and Innovate UK which had their own amount of independence in decision making. This lack of direct State funding and co-ordination activity was concluded to have produced a new ‘type’ of governance space sub-nationally which concurred with the literature (Harrison, 2014) (Harrison & Hoyler, 2022). The argument that the private sector effectively ‘filled

a gap of governance’, partly supported the need for an overarching body that would complement these developments and ensure that more State influence and capacity was available at a national level was confirmed.

Second, MCAs and LEPs should merge to become one accountable entity for city regions, (herein known as Mayoral Combined Authority Partnerships MCAP), therefore making a sub-national body that is more democratic with statutory authority and responsibility, this would present the opportunity to nurture good working relationships without anti-collaborative tensions and more organised contact with central government (this was starting to occur at the time of writing).

Evidence from findings/analysis chapters – This conclusion was largely being implemented at the time of writing of this PhD, LEPs were being absorbed into the MCAs and a lack of information processing and sharing of information reported in both the public and business environment was one reason for this conclusion. Additionally, the combined capabilities of these two institutions would provide mayors with more powers in terms of control of finances, but the merging of the two institutions may well negate private sector finance control sub-nationally. The difficulties encountered during the research to access information, even information which had been announced by the public sector already in the public domain was not sufficient, the case of the announcement of SME funding in LCR referred to in the discussion was one example. The principle of information processing, apparent in systems theory, was most prominent in forming this recommendation. SMEs reported to be confused and disinterested in some of the processes involved in creating the innovation needed for low carbon installations, this was one of the reasons there was a lack of interest. Lack of information flows led to sub-national governance institutions were poor at conveying information and generating adequate financial incentives, although, it was acknowledged that one of the flaws of the research was the inability to access more SMEs with different typologies. The finding of a non-democratic element in sub-national governance and a lack of involvement of SMEs and citizenry in policy making contributed to this conclusion. If a ‘one entity’ approach was taken at city regional level, this had scope increase involvement and interest of business.

Third, central government should seek to incentivise MCAPs to work more collaboratively with each other in a cross-border capacity with neighbouring LAs and compel them to comply with MCAs to build low carbon buildings through the strategic planning process and involve SMEs.

Evidence from findings/analysis chapters – Whilst MCAs and LAs had some element of collaboration this was concluded to be a purely voluntary arrangement with no statutory requirement in existence to ensure collaboration in relation to implementation of The Heat and Buildings Strategy within a city region. Whilst there was a statutory duty for LAs to work with each other in relation to developing statutory development plans, no such provision was available to influence the constitution of city regions to do the same. In this sense, the local authority councils only had a voluntary obligation to comply with MCAs requests, this left a ‘gaping hole’ in terms of the authority of mayors for LAs that did not wish to comply with general strategic direction. For example, the evidence pointed towards a dependency on cashflow and financial situations, which left some LAs more inclined to follow general strategic direction than others. Some had more to gain from compliance. This had a knock-on effect and a lack of encouragement for stakeholders within city regions (local authorities, civic sector), to comply with requests from MCAs to roll out national policy. A similar voluntary arrangement was present on the part of the SMEs, the private sector needed motivation to comply with requests to change business habits, although, it was notable that compliance from SMEs would always have to be voluntary, this conclusion was consistent with findings from the literature review (Heseltine, 2012). The evidence pointed towards part of the problem being multiple institutions acting independently at the sub-national level leading to fragmentation and lack of co-ordination. This made the need to provide incentives more important as, due to multiple competition, there would be no compliance without a benefit (for business). The social value objective uncovered as part of the research was deemed of lesser value to small SMEs over economic factors of running a business. MCAs also bordered other non-city regions that were purely governed by local authorities, and consideration was not given to these as the issue under investigation was a ‘wicked issue’. How MCAs interacted with bordering LAs that were not part of the MCA needed to be addressed to enhance co-operation, this would be made easier

with less institutions not more, which supported more regional orientated institutions.

Fourth, in addition to competitive funding bids, there should be one central source of long-term funding to put in the hands of a democratically elected body i.e., the MCAPs to specifically support SMEs build or retrofit buildings to low carbon.

Evidence from findings/analysis chapters – The variety of funding streams presented in Chapter 5 were the main sources of evidence for this conclusion. It was clear that funding streams were controlled by central government, contrary to a place-based governance approach and a well-functioning systems dynamic at a sub-national governance level. Moreover, reliance on external factors and resources constrained competition, for low carbon installations to be successful during the Devolution Deal process there was a need to stop the reliance on central government and make fiscal arrangements around the sub-national governance institution's specific criteria for the place. The evidence pointed to SMEs losing out due to a failure by central government to understand their needs locally, in addition to a lack of funding, the short-term goals and objectives set by central government to provide finance were not adequate to meet the aspirations of MCAs policy requirements. Whilst MCAs at a sub-national level were trying to plan long term, this was contradicted by central government decision making, one example was the HS2 project, a major transportation project in England, and, at the time writing, the project had been recently cancelled by central government 'stating the facts had changed'. MCAs found themselves having spent time and money on producing policy documents to compliment a large infrastructure project that turned out not to exist. If situations like this were avoided, then massive amounts of money would be available to channel into projects for low carbon installations via properly constituted sub-national governance bodies. A MCAP make up would also have the benefit of being able to use information from all three-sub-national institutions towards a common goal, for example, MCAPs could include a more democratic element as the constitution of the institution would itself include MCAS, LEPs and LAs with all the associated powers they have.

Fifth, a mandatory requirement should be put on MCAPs to publish information in relation to low carbon installation funding streams, like that recently introduced for s106 agreements within the planning application process. This would develop more certainty for the private sector and citizenry in relation to what funding is available.

Evidence from findings/analysis chapters – The publication and availability of information found during the study was concluded to be unacceptable to support an effective roll out of The Heat and Buildings Strategy. That said, financial information was very difficult to follow and find, aside from announcements made by the institutions. Sub-nationally, schemes seemed to be being devised with the same ‘talk up’ intentions as some MCA produced policy, more specifically, SME funding set sub-nationally from mayoral budgets, was not adequately explained in information provided or available readily. The evidence showed that whilst MCAs were producing some schemes to assist the low carbon transition in buildings, it was not nearly enough to produce constructive behaviour change in SMEs and not delivered nor presented in a way that was attractive to SME business models. Poor information flows put more onus on SMEs to financially fund low carbon projects themselves and only confused the situation. Even if specific amounts for low carbon installations were negotiated into Devolution Deals it would be difficult to track the money in the current sub-national governance system, given the lack of any reliable tracking like in the Treasury. Furthermore, due to the poor provision of finance, various issues associated with long term funding over the past decade, lack of powers for mayors, lack of coherent strategy to improve the skills set at the city regional level in England, all collectively led to a distinct lack of soft infrastructure. This point of soft infrastructure reinforced some of the points found in the literature review and the available literature (Tomaney et al, 2023). The collective argument, that spatially orientated governance could affect the movement of actors between different governance levels was highly apparent when investigating the SYSB, when alternative spatial scales meant that actors were moving between governance boundaries. This example also revisited the argument for an absence of the State sub-nationally in education areas, despite funding being allocated in both the city regions Adult Education Budget; additionally, the use of private colleges, or alternatively, the tertiary educational centre fulfilled MCAs objectives and provided evidence that



actors had informally moved MCA governance boundaries. This recommendation would go some way to satisfying the requirements for necessary information flows from systems theory and CAS dynamics.

Sixth, MCAPs should be required to involve business and multiple stakeholders in policy making from their own local geographical area to generate local engagement, this would develop an element of 'dual accountability' both for sub-national governance institutions and the various sub-national stakeholders/other institutions involved in developing low carbon buildings.

Evidence from findings/analysis chapters – Expanding on other recurrent themes within the evidence collected was that of the apparent 'dissociation' of private sector actors from sub-national policymaking. This added to the study's conclusions, in that, the collaborative element necessary to achieve a place-based governance approach was missing. Issues of responsibility and accountability regarding implementation of low carbon installations were very nuanced. An example was The Heat and Buildings Strategy, which was supposed to be implemented sub-nationally, but no one at this level of governance was sure who was supposed to be leading the way, or which institution would play which role in delivery. This was one reason for the ultimate duplication of sub-national institutions and 'Hubs' at different levels of governance, who was ultimately accountable for The Heat and Buildings Strategy was questionable, the central government department set up to guide the process but BEIS seemed to be taking a more complementary role, rather than a leadership one, and the sub-national governance institutions didn't have the power to take up the reigns they desired which consequently effected SME engagement. The Heat and Buildings Strategy itself did not outline or highlight specific roles for sub-national governance institutions, the civic sector, or the private sector, the central government policy evidence contained vague references to involving the private sector, as had been done time and time again in relation to implementation of national strategy, However, no formal instructions were made, and this was left up to the LEPs and MCAs in their sub-national capacity to effectively control and guide the private sector. This tactic was flawed as the 'elites' in LEPs, exhibiting rent seeking behaviour, could assume control sub-nationally. Additionally, The Heat and Buildings Strategy

was published in 2021, when LEPs had been established for around a decade, this was significant as the study showed that even though private sector ‘elites’ had been in charge for a decade, there was no real sense of urgency or motivation, nor the governance infrastructure over that timeframe to act quickly to central government demands. Even though central government wanted to support private business, from the small amount of private sector actors interviewed, this was not the private sectors feeling, there was even the opinion that there was a push against low carbon installations in the house building sector which counteracted central government intentions.

Seventh, increased capacity is needed, not only in numbers of staff working at a sub-national governance level, but politically in the sense of number of Councillors would strengthen democratically elected place-based sub-national governance institutions.

Evidence from findings/analysis chapters – This was another area that was concluded to have affected by austerity, the lack of demonstrably elected officials within LEPs was a problem that chose strategic direction in line with their own priorities, not the politically elected leaders within MCAs. This point related, not only to working staff members, but the political capacity to make informed decisions and drive forward ideas to be more innovative. There was a need to increase the driving political force sub-nationally for low carbon installation roll out. An overriding issue, due to the age of austerity since 2010 were the issues with capacity within the public sector, similar issues were apparent in the private sector but it was also concluded that human capital and capacity was a major issue in the private sector, with the main barriers for this being a lack of clarity and certainty in policy at both national and sub-national levels to install low carbon installation technology. Additionally, the issues of who was organising the relevant skills training and funding to increase human capital were problematic, contrasting the two city regions, the capacity issue was being dealt with in two very different ways, as referred to in the analysis chapters, the evidence showed that there were different tactics that could be employed when trying to develop capacity and skills with both an organisation and city region. ‘Home grown’ talent required that the infrastructure for skills be present locally, the evidence of development for this was more prevalent in SCR. In contrast, in LCR the evidence

pointed towards skills preparation being present in the Strategic Economic Plan for the city region, but the evidence showed that this relied more on inward private investment and ‘bringing in business’ rather than developing it within the city region. Indeed, recent evidence from the National Audit Office (2023) demonstrated that between 50% and 85% of the ‘shovel ready’ projects referred to in earlier chapters was supposedly available through Towns Fund and Levelling Up Fund but were stalled due to lack of skills (National Audit Office, 2023). This highlighted the disadvantages of not having readily available soft infrastructure, previously alluded to, even if money and finance were made available immediately for soft infrastructure development. This was disappointing to see when considering city regional policy intentions, particularly with learning institutions such as The Leeds College of Building developing courses within the low carbon installation area. This point simply reinforced other conclusions made in surrounding the ‘multiplicity’ of sub-national institutions and the lack of co-ordination.

Eighth, a more robust method and framework for measuring progress should be developed at a sub-national governance level, rather than relying on centrally decided and centrally driven targets and outcomes.

Evidence from findings/analysis chapters – Realistically set and evidence-based outcomes to measure the progress with regard low carbon installations were non-existent. The evidence that policy outcomes were not robust nor concise enough to adequately measure progress; targets that were in place were simply driven by central government with no real justification for the target dates in question for local areas, contradicting a place-based approach. Indeed, sub-national governance institutional staff commented on the unrealistic expectations of central government being a limiting factor. Some sub-national governance institutions freely admitted to not really understanding why a particular date had been chosen. If a place-based governance approach was adopted each individual geographic area could calculate a realistic target date and measurement outcomes for low carbon installations in terms of quantity etc, using pre-existing sub-national governance institutional data, which would be more realistic. However, there was evidence that it was because of the approach taken by central government, by retaining control contrary to the place-

based approach, that timescales and outcome dates had led to difficulties in agreeing outcome measures. The outcome measures and centrally driven target regimes in England did not take account for local barriers and negated a smaller institutional approach to project delivery, this agreed with the literature (Bentley et al, 2016), the overcentralised approach in England was also contrary to the CAS dynamic as smaller agents were required to produce more agentic activity.

Nineth, in the longer term a move towards regional governance institutions in England that have the adaptive leadership capability with fiscal and legislative powers is needed.

Evidence from findings/analysis chapters – the evidence available generally supported a move towards a ‘one centre or area’ approach to The Heat and Buildings Strategy roll out. It was considered in some circles and by some participants that the potential of regional bodies, like those such as the defunct Regional Development Agencies (RDAs), would ensure a more co-ordinated approach and provided a revised geographic scale with more opportunity to implement the place-based governance approach. There were several arguments from different perspectives as to why this conclusion was made. From a fiscal perspective the evidence concluded that mayors had relatively few powers in relation to finance and generating fiscal incentives for SMEs to comply with their intentions. Evidence pointed towards the ability to control pension schemes in their own city region to divert funds to low carbon installations if they wanted to (although in practice this was channelled to climate change initiatives generally and in limited amounts), as evidenced in LCR. Mayoral powers in a fiscal sense were concluded to be poor compared to international counterparts, citing the Mayor of New York power’s to raise taxes independently; although on this point, it was highlighted that this may not really benefit poorer city regions that have a low tax base and economic output. From a policy perspective the evidence pointed towards policy being more implementable at a regional level, which would reduce the fragmentation uncovered as part of the research in relation to the governance mechanisms, like the Northern Powerhouse (more transport based), but also from international comparison like German Federal States. Some of the theory in the literature reviewed provided possible explanation for the advantages of the larger governance modes by

explanation through concepts such ‘scaling up’ and ‘policy diffusion’ (Kern et al, 2023). The legislative abilities of federal systems were shown to have advantages in relation to low carbon installations in areas such as building control with the advanced stages of low carbon installation roll out in Europe. Whilst direct evidence to support this conclusion was not available, the indirect assertion and opinion that, as part of a federal system of governance more local/regional leaders should have had legislative powers, was thought to make sense to implement The Heat and Buildings Strategy. Legislative controls would certainly be an option for regional place-based governance mechanisms in England for an area like Building Control, as the standards for low carbon installations and buildings were currently controlled centrally through legislation. In relation to low carbon installations, mayors could have legislative powers to control building regulations more specifically for their respective areas. Politically, thinking more along the lines of elected members, the opportunity to return to a regional governance system in England in the long term was fraught with problems perhaps not conducive to the timescales provided by central government for The Heat and Buildings Strategy. The evidence pointed towards some elements of ‘political infighting’ and the time and resources it would take to set up a regional governance system would not be able to take place in the timescales proposed for The Heat and Buildings Strategy.

Tenth, expanding on conclusion 9, the political system in England itself, not only at a sub-national but national level requires revision for long term improvement to national policy roll out in cases such as The Heat and Buildings Strategy in England.

Evidence from findings/analysis chapters – It is accepted that this conclusion would require a sea change within the political system of England but is mooted as a longer-term method of making a more efficient political system and beyond the timescales for central government targets for implementation of The Heat and Buildings Strategy. This conclusion was developed from an overarching application of systems theory to sub-national and central government working mechanisms that the centrally biased political make-up and indeed, political ways of working central government in England were obsolete. Historically, Parliament has elected MP’s using a ‘first past the post’ system, in which one MP is elected to represent a constituency. In Europe,

different political constitutions were used, for example, that of ‘proportional representation’, an election system whereby a percentage of votes makes up the final representatives in Parliament rather than having a winner and loser approach. Whilst this research concerned itself with sub-national governance at a sub-national level, the evidence demonstrated it to be impossible to improve sub-national governance sub-nationally without considering the centre. This conclusion would by no means impact the current target outcome of 2050 or 2030 Levelling Up Start missions but it was concluded that this point needed to be addressed for productive governance change in England. One reason behind the conclusion was the ‘stop’ ‘start’ management of projects linked to The Heat and Buildings Strategy and the stalling of finance arrangements found at every level of governance in England. The introduction of a proportionate party approach to politics in England (and the UK) would, theoretically at least, lead to ideas being taken forward rather than planning a strategy within one Parliamentary term only to be cancelled in the next. A more global consensus of political will centrally is needed, both centrally and sub-nationally, rather than one centrally orientated political incumbent.

The literature review in Chapter 1 identified systems theory and Dooley’s paradigms which had been used by various actors in assessing organisational effectiveness over the years, with different interpretations of the theory incorporated in different ways. A lack of any acknowledgement of a spatial element within systems theory dynamics was highlighted as the main flaw and criticism and this was one of the main points of the original contribution of integrative adaptivity of sub-national governance institutions. It was concluded to be necessary that a spatial orientated explanation was a main confounding variable in sub-national governance implementation. More broadly, this research uncovered major issues and problems with the contemporary orientation of governance boundaries from a spatial perspective and it was concluded that this may well have influenced the associated fragmentation and ‘starting up’ of other sub-national institutions on multiple scales in relation to low carbon installations. From a systems theory perspective of CAS dynamics, the overriding objective of collaboration was made more difficult due to the multiplicity of organisations heading towards the same goal. In terms of CAS dynamics issues with information flows, these were concluded to be a problem and for this reason the

competitive element between each agentic agent or institution was apparent.

Elsewhere as part of the dynamic, information flows, were concluded to be poor, this was mainly on the part of MCAs failing to filter their own intentions in terms of funding streams to the wider business community, and consequently, the same business community could not possibly follow the four steps of information processing required for learning within the CAS dynamic, that of knowledge acquisition, information distribution, information interpretation and organisational memory (action taking).

Summarily, too much centralised decision making, mayors with only control of policy making and no real implementation powers nor enough independence to act in accordance with the systems theory principles resulted in a hinderance of place-based ways of working, as did a lack of a true open governance system. All added to the failure of achieving the target of 'net zero' by 2050. These flaws had created a 'governance gap' sub-nationally in England which was being filled by multiple actors found sub-nationally but operating within informal institutions, this could be an advantage but not in isolation of the other elements alluded to previously from systems theory. The very nature of having multiple agents or organisational bodies working towards the same goal was needed to agree with systems theory dynamics, as was heterogeneity.

This research presented an investigation into the contemporary situation regarding the implementation of The Heat and Buildings Strategy in the form of two city regions. Sub-national institutions and SMEs at this level of governance brought together a broad constellation of actors in the policy making process and were all a key part of a place-based governance approach. Early research into the place-based concept saw a positive potential to work flexibly and incorporate the concept into emergent sub-national government institutions. However, at the same time there was a sense of a lack of democratic accountability sub-nationally and underlying resistance from central government to convey adequate powers and finance to the democratically elected sub-national governance institutions. The entire sub-national governance structure was confusing and opaque, and evidence suggested decentralisation and implementation of The Heat and Buildings Strategy would be more successful when

‘bottom-up’ and principles of subsidiarity were employed, in fact, the evidence pointed to these principles currently being utilised in an informal fashion in relation to The Heat and Buildings Strategy. In this context, centrally designed institutions without local mandate hampered the ability of new formal sub-national governance institutions, such as MCAs, and importantly, the evidence pointed towards a problem with multiplicity of informal and formal institutions sub-nationally and the over reliance to lead through informal or soft governance via LEPs. Further research could investigate the reasons for this lack of emergence within current governance formations and look at ways of working to improve this. It is acknowledged that further research may use differing philosophical approaches and methods and understand these phenomena. National policy rollout was confounded by lack of spatial scale, policy certainty, and several other barriers that prevented the private sector from having the confidence about future intentions of policy to invest in low carbon installations, both sub-nationally and centrally.



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**Appendix 1****INFORMATION SHEET: GUIDANCE****The UK Heat and Buildings Strategy: A sub-national governance place-based investigation drawing on two city regional case studies in England between 2019-2022****Participant Information Sheet**

You are invited to take part in this research study. Before you decide it is important for you to read this leaflet so you understand why the study is being carried out and what it will involve.

Reading this leaflet, discussing it with others or asking any questions you might have will help you decide whether or not you would like to take part.

**What is the Purpose of the Study**

The aim of the study is to evaluate the way that finance sector, private business in the form of Small to Medium Enterprises and local government are collaborating in the implementation of the governments new 'Heat and Buildings Strategy' in relation to low carbon building projects and skills policy. There are no right or wrong answers.

**Why have I been invited?**

The study is currently interviewing people who are associated finance investment and skills policy for low carbon projects for buildings. This can include subnational governance bodies, Small and Medium Enterprises for low carbon projects. You have been selected as you either work in the finance sector, local government or business associated with the new low carbon programme roll out in the Heat and Buildings Strategy and can comment on skills development.

**Do I have to take part?**

No. It is up to you whether you would like to take part in the study. You have the participant information sheet to help you make that decision. If you do decide to take part, remember that you can stop being involved in the study whenever you choose, without telling me why.

**What will happen if I take part?**

You will be asked to attend an interview on a date to be determined either face to face or via Microsoft Teams, guided by your preference. After signing a consent form you will be asked to engage in a series of questions around four themes, these will be: governance structure, Investment Finance, Employment / Business support and Skills. After the interview has concluded you will be provided with a debrief sheet explaining how you can get results of the research and how you can withdraw your data if you wish.

**What are the possible disadvantages of taking part?**

Taking part in the research would take up about 1 hour of your time.

**What are the possible benefits of taking part?**

By taking part in the study, you will be assisting in the understanding of how low carbon building projects are implemented via Small and Medium Enterprises through the Heat and Buildings Strategy.

**How will my data be stored, and how long will it be stored for?**

All paper data, including the questionnaires, the typed-up transcripts from your interview and your consent forms will be kept in locked storage. All electronic data: including the recordings from your interview, will be stored on the University U drive, which is password protected. All data will be stored in accordance with university guidelines and the Data Protection Act (2018). All written records will be coded and anonymized and your name and email address will be separated from transcriptions.

Data will be stored following the principles of 'data minimisation'. The University has retention schedules for different categories of data which will be followed. Your data, which include your name, email address and transcript of your interview will be kept for a period of 1 year following completion of the study.

**What categories of personal data will be collected and processed in this study?**

Your name and email will be collected to contact you.

**What is the legal basis for processing personal data?**

Article 6(1) (e).... “processing is necessary for the performance of a task carried out in the public interest”.

**Who are the recipients or categories of recipients of personal data, if any?**

The only person with access to any data will be the researcher.

**What will happen to the results of the study, and could personal data collected be used in future research?**

The general findings might be reported in a scientific journal or presented at a research conference, however the data will be anonymized and you the data you have provided will not be personally identifiable, unless we have asked for your specific consent for this beforehand. The findings may also be shared with other organizations/institutions that have been involved with the study. We can provide you with a summary of the findings from the study if you email the researcher at the address listed below.

**Who is Organising and Funding the Study?**

Northumbria University

**Who has reviewed this study?**

Before this study could begin, permissions were obtained from Staff and the ethics department of Northumbria University.

The research project, submission reference 28920 has been approved in Northumbria University's Ethics Online system. It has been reviewed to safeguard your interests and have granted approval to conduct the study.

**What are my rights as a participant in this study?**

You have following rights: a right of access to a copy of the information comprised in their personal data (to do so individuals should submit a [Subject Access Request](#)); a right in certain circumstances to have inaccurate personal data rectified; and a right to object to decisions being taken by automated means. Participants should also be informed that if they are dissatisfied with the University's processing of personal data, they have the right to complain to the Information Commissioner's Office. For more information see [the ICO website](#).

**Contact for further information:**

**Researcher email:** [matt2.kennedy@northumbria.ac.uk](mailto:matt2.kennedy@northumbria.ac.uk)

**Supervisor email:** [joyce.liddle@northumbria.ac.uk](mailto:joyce.liddle@northumbria.ac.uk)

**Name another person who can provide independent information or advice about the project.**

**Name and contact details of the Records and Information Officer at Northumbria University:** Duncan James ([dp.officer@northumbria.ac.uk](mailto:dp.officer@northumbria.ac.uk)).

**You can find out more about how we use your information at:**

**[www.northumbria.ac.uk/about-us/leadership-governance/vice-chancellors-office/legal-services-team/gdpr/gdpr---privacy-notices/](http://www.northumbria.ac.uk/about-us/leadership-governance/vice-chancellors-office/legal-services-team/gdpr/gdpr---privacy-notices/)**  
**or by contacting a member of the research team**

**CONSENT FORM****Project Title**

**The UK Heat and Buildings Strategy: A sub-national governance place-based investigation drawing on two city regional case studies in England between 2019-2022**

Principal Investigator: Matthew Kennedy

I have carefully read and understood the Participant Information Sheet  
I have had an opportunity to ask questions and discuss this study and I have received satisfactory answers.

I understand I am free to withdraw from the study at any time, without having to give a reason for withdrawing, and without prejudice.

I agree to take part in this study.

I also consent to the retention of this data under the condition that any subsequent use also be restricted to research projects that have gained ethical approval from Northumbria University.

I agree to the University of Northumbria at Newcastle recording and processing my name and email address and any transcriptions from my interview, which will subsequently be anonymised, and for it to be stored the duration of 1 year after completion of the study. I understand that this information will be used only for the purpose(s) set out in the information sheet supplied to me, and my consent is conditional upon the university complying with its duties and obligations under the Stat Protection Act 2018 which incorporates General Data Protection Regulations (GDPR). You can find about more about how we use your data here - [Privacy Notices](#)

Name/signature of Participant ..... Date .....



## Appendix 2 - Interview Guide – Prompt sheet

### Introduction

I am researching The Heat and Buildings Strategy and implementation of low carbon buildings although I am keen to explore economic growth issues and funding for this also.

The main consistency behind sub-national governance is the idea that policy set by Combined Authorities should be tailored to the specific place in question, local people, staff and business should be at the centre of any policymaking.

### Funding / Skills

What has been your experience of applying for funds for aiming for 'Net Zero' in relation to decarbonising buildings?

How have you done this and who has been involved?

I.e. which institutions? Public / private business

What is your experience of working in collaboration with combined authorities / local authorities / LEP and central government?

- Can you comment on relationships between them?
- How would you describe the process / barriers of applying for funds?
- In your experience have you any other challenges / problems with trying to achieve decarbonisation of buildings?
- Describe relationships between institutions – how are you aiming to achieve this?
- Communication / information

How have MCAS evolved:

- in terms of stakeholders
- process of decarbonising buildings – which private / public
- can you describe the process – is it formal / informal?
- who is accountable for decarbonisation of buildings in your area?
- How is this managed by institutions?

Do you think that institutions such as mayoral combined authorities need more powers to decarbonise buildings?

- Expand if needed.

What ways of funding are available to you to develop the decarbonisation of buildings?

- Have these changed over time?
- Good / bad points

- Prompt spatial / regional?

How is your organisation managing the implementation of decarbonisation of buildings through strategies / plans?

How does national policy fit with your city regional/local growth plans aspirations?

- Is the balance of powers right for building decarbonisation?
- Do you have the right skillset to implement The Heat and Buildings Strategy?
- What where your experience in negotiation for money for y our areas priorities?

How does current sub-national policy work across different geographical areas to deliver national policy?

### **Policy & Governance**

Have sub-national institutions, created any new partners or collaborations to develop The Heat and Buildings Strategy?

How have city regions tried to roll out the decarbonisation of buildings / specific projects? – Innovation?? Prompt

What is your understanding of the deal and other funding processes involved for building decarbonisation projects?

- How are application decided, deal approved, what's your view?

### **Spatial equality**

In your view what is the purpose and effect of sub-national policy in combined authorities?

Prompt, economic growth, jobs, skills, democratic involvement

- How do you think we can measure the outcomes of these policies
- ? prompt social, monetary

What type of growth is your city region intending on pursuing from the decarbonisation of building?

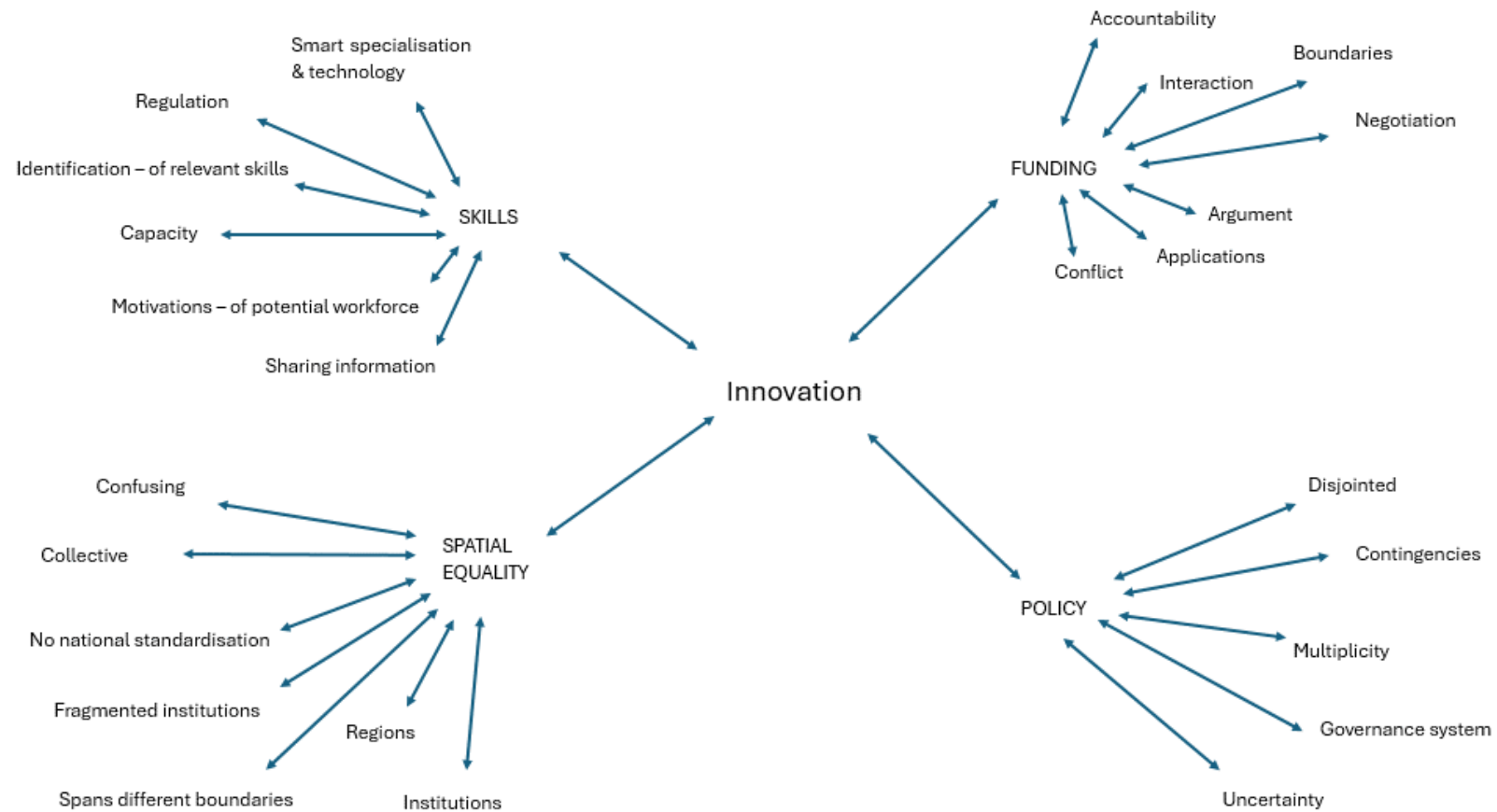
- GDP, private growth, employment?

Do you think approaches to economic growth and national policies such as the Heta and Buildings Strategy have changed since the 2010 Coalition government?

How?

### Appendix 3 – Coding and thematic development & example of thematic development during data collection with raw data

#### General mapping from all interviews in the process



# **Interview transcript – Raw data**

0:0:0.0 --> 0:0:0.390

TA1

Yes.

0:0:-1.-690 --> 0:0:7.630

matt.kennedy

You really want anything else, so I've switched that on now so it's recording me and you. So as I said, it's about decarbonization of buildings. And you were speaking.

0:0:8.250 --> 0:0:19.620

matt.kennedy

And about this process specific to rural, but what you were saying, I finally introduced so in terms of your, you're the director of a private gas company, is that right?

0:0:21.940 --> 0:0:23.750

matt.kennedy

Trade association like OK.

0:0:20.0 --> 0:0:29.70

TA1

So where the trade association, so there's a bit of a bit of a difference there. So yeah, we're the trade association for their LPG and bio LPG industry.

0:0:29.330 --> 0:0:34.10

matt.kennedy

Yeah, the LPG, that's that's sort of the higher higher octane gas is it?

0:0:34.830 --> 0:0:40.220

TA1

Yes, so it's it's essentially mains gas off off the gas grid essentially. Ohh yeah.

0:0:49.180 --> 0:0:49.760

TP1

No.

0:0:55.430 --> 0:0:55.750

TP1

Mm-hmm.

0:0:38.150 --> 0:0:58.980

matt.kennedy

Yeah. Yeah. Lovely. Yeah. OK. So during your talk and I didn't get, I didn't get a notes from it or a present. You know that a follow up from it at all. So if I'm being repetitive, I apologize. But as I say, I found it really interesting. You were highlighting problems of of retrofitting, basically. I'm researching combined authorities and low carbon buildings. Could you just take me through what what you see the problems are?

0:1:5.890 --> 0:1:8.450

TA1

Yes that's fine. Don't worry. Don't worry. Yeah.

0:1:25.70 --> 0:1:25.400

matt.kennedy

Yeah.

0:0:59.540 --> 0:1:30.870

TA1

Yeah, yeah, of course. So I think that, you know, I got apologies, this is gonna be rural focus, but there's stuff that you'll be able to take roll. So obviously there's a number of challenges with existing dwellings across the UK. I there are nuances also, obviously depending on whether it's England, Wales, Scotland, Northern Ireland as to some of their make up and maybe some of the more of the traditional buildings for example, and some of the older housing stock. But generally we are looking at old housing stock across.

0:1:46.260 --> 0:1:46.630

matt.kennedy

Yeah.

0:1:30.990 --> 0:2:0.680

TA1

The UK, particularly in rural areas, we see a, you know, a lot of older housing stock. We also see a lot of, you know solid wall insulated properties. We see them being built with traditional methods. They're generally harder to retrofit whether that's because of the fabric, whether it's because of kind of the character and the heritage of the building, you know, on a beautiful stone property, you not gonna wanna do external wall insulation on it, are you, you know it's.

0:2:0.240 --> 0:2:1.350

matt.kennedy

Yeah, yeah.

0:2:1.0 --> 0:2:32.720

TA1

I appreciate it would make it more energy efficient, but you're not gonna wanna do that to your house. Most. Most likely I and yeah. So, you know, other measures may become more difficult. Things like underfloor insulation, potentially as well as thinking about things like loft insulation or be at the loft insulation side of things. And some of those small, not smaller but easier measures and things that obviously we still wanna see uptake of in rural areas, but it's not necessarily our simple as we see perhaps for that urban counterparts. Finance is a big thing.

0:2:32.680 --> 0:2:33.90

matt.kennedy

Yes. Can you expand?

0:2:33.910 --> 0:2:43.80

TA1

You've also got more homes tied up, you know, in some stories, my cat more homes tied up in things story. The government are pretty tight when it comes to cash. It's all down to negotiation to get more money really. Smaller small medium enterprises don't always have the resources, it difficult of them to get money. Are you aware of the funds> I'll send them to you

0:2:43.540 --> 0:2:43.760

matt.kennedy

I.

0:2:44.570 --> 0:2:46.320

matt.kennedy

Are you referring to your friend you spoke about before?

0:2:46.750 --> 0:2:50.200

TA1

Yeah, he said. He wants to be the star of the show but short on finance. So very.

0:2:49.320 --> 0:2:52.10

matt.kennedy

Yeah, getting left out, left out.

0:2:53.860 --> 0:2:56.440

TA1

Ohh what was I saying? Yeah, I.

0:2:57.100 --> 0:2:57.810

TP1

It's.

0:3:2.270 --> 0:3:2.720

TA1

Yeah.

0:2:57.270 --> 0:3:3.960

matt.kennedy

So can you tell me more about money problems business are havin

0:3:4.180 --> 0:3:22.470

TA1

Yeah. So you know, it's generally more challenging. Also, you're gonna have a, you know, there's more restrictions in place from a **planning perspective** as well of having to replace you know like for like or you know to keep to a certain style. You've got all these kind of challenges that you can kind of acutely **see more in rural areas**. The interaction is more difficult in **rural areas don't have as much of a say**

0:3:22.990 --> 0:3:27.730

matt.kennedy

Yeah, OK. So you've picked up on a planning point there in terms of the planning permission that would?

0:3:28.540 --> 0:3:35.230

matt.kennedy

That you know that the planning issues that you would get, can you explain this for mw for rural areas?

0:3:35.970 --> 0:3:36.240

matt.kennedy

Ohh.

0:3:35.800 --> 0:3:37.550

TP1

Yeah, I think so. I think so.

0:3:37.100 --> 0:3:37.730

matt.kennedy

Yeah. Why?

0:3:37.640 --> 0:3:39.670

TP1

OK, I because.



0:3:39.110 --> 0:3:49.490

matt.kennedy

I mean, in your experience, the the people that give the permissions can you expand on this?

0:3:50.210 --> 0:4:19.340

TP1

Are are we very are be **mindful of answering** that because I don't think I'm just. I'm just reeling off personal perspective. If I'd rather than a really an informed view. But I mean antidote. At least speaking I think that you know it is more of a challenge in rural area and that antidote Italy you know talking to people who have **properties or large** you know numbers of properties in rural areas that you know **they have to go through many many hoops.**

0:4:19.430 --> 0:4:20.100

matt.kennedy

Yeah.

0:4:19.600 --> 0:4:30.230

TP1

To make you know, **just small changes when it comes to energy efficiency.** Now you know the answer to that regulation is a problem everything needs to be tighter everything, obviously, but there's a.

0:4:30.960 --> 0:4:33.340

TP1

That must be a meet in the middle place.

0:4:33.110 --> 0:4:39.80

matt.kennedy

Yeah. OK. So I'll put that onto, you've mentioned to make thing more strict? everything in terms of regulation, is that what you meant?

0:4:39.830 --> 0:4:46.940

TP1

Oh yes, yes. So I think that I think that you know the I don't think the answer would be to make thing more relaxed everything because. **We need a path to following in terms of training, standardisation**

0:4:46.520 --> 0:4:47.970

matt.kennedy

TP1, you don't. Wow. OK, Sir.

0:4:47.730 --> 0:4:57.440

TP1

I think there's too many risks in, you know, doing that from a from a, you know, a quality, a quality point of view, but so.

0:4:57.522 --> 0:5:1.440

matt.kennedy

Mmmm

0:4:58.410 --> 0:5:9.360

TP1

But nonetheless, I'm sure there's a sweet spot basically between, you know, highly regulated, not highly regulated, but highly, yeah, highly regulated versus, you know, relaxing that a little bit more for the planning boundary side of things.

0:5:8.390 --> 0:5:18.790

matt.kennedy

Yeah, yeah, yeah. It's in terms of you mentioned the expense there as a sort of a a topic really. I mean, just firstly in terms of the cost.

0:5:19.490 --> 0:5:30.940

TP1

Is it? Is it the rural areas, the materials because of the because of the makeup of the area, you know, as you said the, the, the, the view of it and it is more expensive to do it in rural areas and urban, thing is also more difficult and staff in rural

0:5:35.610 --> 0:5:35.940

matt.kennedy

Mmmm

0:5:39.230 --> 0:5:40.350

matt.kennedy

Uh. Bigger, yeah.

0:5:31.920 --> 0:6:2.230

TP1

I think I think it would be because we're generally looking also at a like for example larger properties. You've got a lot of larger tapped properties as well, I you know which you know that brings his own cuttlefish of of problems, but also access to the skills access to people to come to your home, to retrofit, to install heating systems, it's worth putting into context. Actually I live in an off grid that Edge I recently moved in

0:6:4.970 --> 0:6:5.140

matt.kennedy

Yeah.

0:6:8.670 --> 0:6:9.60

matt.kennedy

OK.

0:6:2.350 --> 0:6:23.490

TP1

Well, it's not a recent anymore. I say it keeps saying recent. I recently moved with my partner. He actually has a heat pump in his home and he retrofitted this property a number of years ago and it's been in the fortunate position to be able to do that and have this heating system. Now it's broken down twice and twice there is nobody within the area to fix it.

0:6:47.470 --> 0:6:47.980

matt.kennedy

Yeah.

0:6:24.780 --> 0:6:49.350

TP1

At least over, but I think it was like 80 miles away was the closest person and they couldn't come. I, you know, in the end my my uncle has, you know, some was

able to come and you know it wasn't really to do with heap was more like other bits around it. But that's not the solution for these kind of things that you can't have. If I was looking for a local oil engineer or Gas Safe registered engineer.

0:6:49.420 --> 0:6:49.860

matt.kennedy

Mmmm.

0:6:50.60 --> 0:6:52.590

TP1

You know, I'd be able to get one very close.

0:6:52.10 --> 0:6:57.820

matt.kennedy

Now that that's that, that's really interesting that I can. I can I ask about your partners experiences do you think he'd mind?

0:7:1.660 --> 0:7:1.950

TP1

And.

0:7:1.760 --> 0:7:8.500

matt.kennedy

Just just now, I mean you you said that you tried to get somebody and you couldn't get, you couldn't get the Labour to to fix it?

0:7:8.100 --> 0:7:25.680

TP1

Yeah. Yeah, basically. Yeah. So no, I think that's, that's fine, Sir. Fine to reference so. But so yeah, so it has been, you know, again where they work, you know, and they can work really well, you know, even as a a gas association, we don't quibble that it's all about being put in the right place.

0:7:33.140 --> 0:7:33.360

TP1

Umm.

0:7:42.530 --> 0:7:53.160

TP1

Yeah, definitely. I mean, I think there's there's 60,070 thousand Gas Safe registered engineers I can send you. I can send you a bit more information on this after after..

0:7:52.370 --> 0:7:54.800

matt.kennedy

If you don't mind, that would be great cause.

0:7:54.390 --> 0:8:2.180

TP1

Yeah, I we've done a number of reports and things that I can send you and I can send you some kind of antidotal information as well around.

0:8:1.800 --> 0:8:14.380

matt.kennedy

That, that, that if you if you got 10 minutes that would be great because there's that much information on it and search you through it or you you know you you tend to miss things like the if you've done something specific on it that would be great if you could send it to me, yeah.

0:8:13.240 --> 0:8:22.320

TP1

Yeah. Yeah. Cool. So, yeah, that's something like 60700 thousand. Gas, say engineers. I think that's I think it's it's under 5000 heat pump engineers.

0:8:23.990 --> 0:8:48.880

TP1

Yeah, it might even be lower than that. It might even be too. Two and a half thousand. I'll send you the starts. They're. They're all for this. So you can use them. But yeah, there's clearly not enough people. And also, you know, we've got aging workforce of installers generally. Generally speaking, we're talking about older men who've been in this for a, you know, they've done their entire lives.

0:8:49.250 --> 0:8:49.610

matt.kennedy

Thanks.

0:8:50.40 --> 0:8:53.450

TP1

Are they going to retrain to be heat pump engineers when they're close to?

0:8:53.790 --> 0:8:58.200

matt.kennedy

You're reading my mind. I think XX cause I guess.

0:9:10.350 --> 0:9:10.620

TP1

Umm.

0:8:59.100 --> 0:9:13.910

matt.kennedy

That's' great. I was gonna come on to talking about the skills required now, obviously, if there's a shortage, it seems like quite a niche area to me.

0:9:14.280 --> 0:9:14.510

TP1

Mm-hmm.

0:9:14.930 --> 0:9:18.660

matt.kennedy

You've just touched on what you were speaking on there. Do you have any views on skills or labour required for this?

0:9:19.840 --> 0:9:23.210

matt.kennedy

In terms of trade and a new workforce, do that type of work?

0:9:24.530 --> 0:9:25.770

matt.kennedy

Do you have any views on that?

0:9:26.340 --> 0:9:36.820

TP1

Yeah, I think that it's a really big challenge ahead for the future. I really, you know there aren't enough now and at the scale that government wanna roll out, he pardons.

0:9:36.490 --> 0:9:37.350

matt.kennedy

Yeah, yeah.

0:9:37.640 --> 0:9:46.670

TP1

There isn't going to be the skills available in, you know, 3-4 years time for some of the you know they wanna roll out 600,000 heat pumps a year by 2028.

0:9:47.40 --> 0:9:47.490

matt.kennedy

Yes.

0:9:52.740 --> 0:9:53.60

matt.kennedy

Yeah.

0:9:47.130 --> 0:9:53.700

TP1

You know it's there is not going to be the skills available to be able to deliver that in a couple of years time I.

0:10:2.500 --> 0:10:2.720

matt.kennedy

Yep.

0:10:12.180 --> 0:10:12.390

matt.kennedy

Yeah.

0:10:2.780 --> 0:10:15.30

TP1

Patients compared to perhaps traditional traditional plumbing qualifications and gas have regional qualifications. You've got kind of a mix of different skills that are coming in because it's not just the plumbing, it's also around kind of electrics.

0:10:15.370 --> 0:10:15.690

matt.kennedy

Yep.

0:10:15.480 --> 0:10:17.610

TP1

I I'm not in itself is.

0:10:25.360 --> 0:10:25.620

matt.kennedy

Hmm.

0:10:36.380 --> 0:10:37.610

matt.kennedy

Yeah, yeah.

0:10:18.390 --> 0:10:42.700

TP1

It's different. You know, I will caveat that with I'm not a huge expert on the the you know the the interims of the actual qualifications. But my general understanding is that I know in the past before kind of qualifications are trying to be developed around this, you would almost need a kind of electric qualification and a plumbing qualification to be able to do it. But I think they are trying to put that into one. But again it's two different skill sets basically.

0:10:42.970 --> 0:10:43.960

matt.kennedy

Yeah, yeah.



0:10:43.200 --> 0:10:44.470

TP1

The of the amount required.

0:10:44.680 --> 0:10:53.750

matt.kennedy

Yeah, yeah. King quite nice. So when you said when you said they've been trying to put that into, can you just clarify that? Who is it this dealing with it as far as you're aware?

0:10:53.430 --> 0:11:4.800

TP1

So I'm so government are obviously really trying to drive this. I'm MC S are the main body who do the heat pump qualifications.

0:11:5.270 --> 0:11:6.870

matt.kennedy

Who's that? Sorry and CS.

0:11:6.310 --> 0:11:8.310

TP1

And MCS so the.

0:11:12.410 --> 0:11:12.890

matt.kennedy

So that.

0:11:14.640 --> 0:11:16.200

matt.kennedy

Google it. Yeah, that's fine.

0:11:9.510 --> 0:11:23.440

TP1

Micro. I can't. What? It's for Microsoft. If you Google MCS they'll come up I they are the main training body delivery body for certification around heat pump qualifications.

0:11:24.80 --> 0:11:25.90

matt.kennedy

OK, right.

0:11:31.110 --> 0:11:32.630

TP1

Yes. Yeah.

0:11:27.70 --> 0:11:51.860

TP1

And that's that's what to deal with the standards of the people that are trained to do it. Do they? Ohh. OK, MCS didn't know that lovely and yeah, cause I I'm using the date. I'm sort of looking at it in terms of the time frame to 2030 and I think I think there's a hit the nail on the head there with the in terms of capacity because everybody's saying the same thing in terms of capacity to actually do the work and.

0:11:54.710 --> 0:11:55.400

matt.kennedy

Mmmm.

0:11:51.410 --> 0:12:4.990

TP1

Yeah, yeah. And it's also quality. So you Citizens Advice, for example, pulled up. And again, I'll copy and paste it from consultation responses. So I'll just copy and paste a couple of experts, experts for you.

0:12:5.170 --> 0:12:5.720

matt.kennedy

Thanks.

0:12:5.350 --> 0:12:32.850

TP1

I. But you know it's it's it is a device. For example, they've had lots of feedback around installations of heat pumps around quality because it's not just having people available to do it, they've gotta be competent at. It's gotta be done to a a, a good quality appropriately sized. All these other things. So you know again some other feedback for example which we give to to governments stakeholders it's you know it's.

0:12:38.840 --> 0:12:39.140

matt.kennedy

Mmmm.

0:12:33.520 --> 0:12:42.260

TP1

Yeah, you have your ambitions to roll out this many heat pumps, but it's not going to help you if you just roll out a ton of inappropriately sized not well installed heat pumps.

0:12:41.850 --> 0:12:43.220

matt.kennedy

Yeah, that doesn't do the job.

0:12:44.700 --> 0:12:48.910

matt.kennedy

So so did you mention this LCB of I don't a report on that there somewhere?

0:12:49.300 --> 0:13:6.760

TP1

And that with Citizens Advice. So they they've done a review ohh of low carbon heating systems and like feedback around it. I've got the reference somewhere in one of my consultation responses from recently, but you might find on Google if you Google Settings, Citizens Advice and heat pumps.

0:13:16.510 --> 0:13:16.880

TP1

Yeah.

0:13:6.950 --> 0:13:30.940

matt.kennedy

Yeah, well, I'll have a look for that case. I didn't know that either. I mean, that's quite interesting cause you getting a A customers customer perspective from that as well, aren't you there? And because another thing that's come out from people I support is in terms of, I know you're not a skills specialist, but in terms of the the certification for the things and in terms of the standard for the qualification is seems to be lacking.

0:13:31.560 --> 0:13:38.130

TP1

Yeah, I know there's been a lot of issue with is it past 30 past 2035.

0:13:38.580 --> 0:13:41.30

matt.kennedy

PAS. Is that? Yeah, yeah.

0:13:39.660 --> 0:13:48.750

TP1

Yeah, I I know that that's something that's been recently brought in and as far as I'm aware it's caused no end of issues.

0:13:48.880 --> 0:13:49.240

matt.kennedy

Yep.

0:13:49.610 --> 0:13:57.980

TP1

I I'm not close to it, but I just know from being in the heating sector and hearing these things aren't totally on our newsletters and stuff like that, that.

0:13:58.730 --> 0:14:3.160

TP1

It's caused no end of problems, and that's very much tied into our.

0:14:4.0 --> 0:14:8.240

TP1

Nothing. This the things that you're looking at sums of retrofit and and stuff.

0:14:7.940 --> 0:14:21.390

matt.kennedy

Yeah, it Joseph. Terms of fight in terms of improvements that could be made to what's happening then in your view in your perspective from everything that you know what, what could say central government do to improve things do you think?

0:14:27.460 --> 0:14:27.790

matt.kennedy

Mmmm.

0:14:22.30 --> 0:14:54.980

TP1

Well, from our perspective, we just don't want them to take her one size fits all heat pump only approach. We think that's gonna solve it for homes which aren't suitable for electrification. I'm you know, they're they're doing everything they can to roll out as many heat pumps as possible. Yes, the fundamentals, the, the, the ability to retrofit the skills, you know, the electricity infrastructure in rural areas to be able to, you know take not just increase demand from electric heating which on its own or probably be fine but evies.

0:15:6.100 --> 0:15:6.440

matt.kennedy

Ohh.

0:14:55.280 --> 0:15:9.10

TP1

You know other demands in the home. I mean, again, kind of antidote idly. Some of the cause government haven't shared very much information on this. But and today we've got feedback that they were looking at around 100 hours. Let's say that they thought 100 amps. This will require much better infrastructure to be effective.

0:15:9.390 --> 0:15:18.280

TP1

Our connections. We're gonna be made available to the free to homes via their DNO, which.

0:15:23.70 --> 0:15:23.330

matt.kennedy

Mmmm.

0:15:19.100 --> 0:15:33.570

TP1

I mean, I think that's just a perspective. I don't think that's a that's a given, but also by the time you actually couple up a heat pump I and an EV, you basically have no spare voltage to even like use basic electrical items in your home, so.

0:15:33.200 --> 0:15:33.970

matt.kennedy

Ok.

0:15:34.380 --> 0:16:6.70

TP1

Yeah, like you know, he's the cattle or something. And then you've got no more. So you know, we have kind of questions. Some of these underlying assumptions because you know, again a lot of announcements that come out and based on policy is that is almost, you know, the consumer almost just needs to worry about the upfront cost of the heat pump and maybe some retrofit, whereas an actual reality, we're looking at infrastructure costs, we're looking at very high upfront costs up to £18,000 with some of the heat pump costs that we've seen for rural homes because we're looking at.

0:16:8.320 --> 0:16:8.960

matt.kennedy

Mmmm.

0:16:6.190 --> 0:16:18.740

TP1

Have large air draft yeah. Properties. And then when you take into account retrofit you know up to 32 grand who was that cash line around you know it's no one has it so it's not all adding up basically.

0:16:18.780 --> 0:16:31.730

matt.kennedy

No, no. So I won't put words in, you know, in terms of the financial aspect, do you think the government could do more? I mean they're giving out £5000, aren't there? And you just mentioned 32. Do you think there's a?

0:16:33.130 --> 0:16:34.830

matt.kennedy

A gap between the finance.

0:16:35.670 --> 0:17:2.440

TP1

Well, you know, there should only things like from there shouldn't be a need for things like finance for these kind of situations. Because I think if they if they took a mixed approach and let other solutions play a role where they're probably more appropriate. So for us for example, you know some of these homes, it'd be much more cost effective for an oil user to switch on to LPG. Today, you're switch on to LPG, the upfront cost, you're looking at 1 1/2 grand for a boiler.

0:17:4.480 --> 0:17:4.810

matt.kennedy

Yeah.

0:17:2.560 --> 0:17:18.950

TP1

Roughly maybe 2 grand, maybe a little bit more. If it's a really large property, but generally we're looking at 1 1/2 grand. You know they have a transition, they reduce their carbon with LPG, they have their future transition to borrow LPG, which is renewable drop in. They don't need to change anything.

0:17:18.910 --> 0:17:19.390

matt.kennedy

Yeah.

0:17:19.650 --> 0:17:43.970

TP1

Yeah, that for a home. That's not good. Where you're going to. Otherwise, you'll spend 32 grand trying to reach fit input heat pump in as long as the solution is net 0 compatible, does it really matter what they use? And that's kind of how, you know, you know, yes, we could we could ask government to say well, actually you need to support homes with rural homes with 20 grand grants to help them. But actually, you know the most cost effective.

0:17:54.940 --> 0:17:55.190

matt.kennedy

Yeah.

0:17:44.770 --> 0:17:58.80

TP1

Yeah, approach is just to let homes that aren't going to be suitable for heat pumps have alternative solutions and where they do work well definitely. You know, he comes up a really key role to play, but it just comes back to this mixed approach.

0:17:58.130 --> 0:18:2.990

matt.kennedy

So so is that something you suggested? Do you? Do you liaise with government bodies or?

0:18:3.280 --> 0:18:14.860

TP1

Yeah. So, yeah, so you know we we yeah, we we look to share information and and and influence governments around these these kind of areas and share information in but.

0:18:14.300 --> 0:18:18.930

matt.kennedy

So that the the mixed approach that you mentioned, now what they've responded to that or?

0:18:20.160 --> 0:18:26.50

TP1

Well, they well that response is that they want to run, will our 600,000 heat bucks a year by 2028 so.

0:18:27.530 --> 0:18:28.350

matt.kennedy

OK.

0:18:27.530 --> 0:18:51.750

TP1



Alright, alright. Yeah. So so that that is, that's their kind of their kind of view on this now. Yeah, they do say again working in public affairs. I I understand what they're doing. You know they do say they offer a mixed approach because they say well, if you can't have a heat pump, you can have biomass off the gas grid, but a biomass upfront cost in some cases actually more than a heat pump and you know.

0:18:56.630 --> 0:18:56.890

matt.kennedy

Mmmm.

0:18:52.560 --> 0:19:1.330

TP1

Direct burning of biomass isn't necessarily the best solution for everyone else, so you know they can say they offer other solutions, but it's just that the other solutions are untenable.

0:19:1.650 --> 0:19:5.500

matt.kennedy

Policymakers focused on what they want sometimes don't they, they come out with policy.

0:19:6.50 --> 0:19:7.220

TP1

Yeah, definitely.

0:19:8.40 --> 0:19:11.520

TP1

You know well, they're gonna. They're trying to force the manufacturers to produce them.

0:19:11.960 --> 0:19:12.370

matt.kennedy

Yes.

0:19:12.840 --> 0:19:16.730

TP1

In the UK, through ladies, I know that.

0:19:16.410 --> 0:19:17.550

matt.kennedy

OK. Yeah. One.

0:19:18.100 --> 0:19:25.210

TP1

So you know, one of the proposals is a market mechanism and you'll be able to Google that and it'll come up on gov.uk.

0:19:25.440 --> 0:19:25.950

matt.kennedy

Yeah.

0:19:26.30 --> 0:19:27.320

TP1

I it was.

0:19:26.650 --> 0:19:28.80

matt.kennedy

What's it called? Market manager?

0:19:55.580 --> 0:19:55.830

matt.kennedy

Yeah.

0:19:28.170 --> 0:19:57.940

TP1

Market mechanisms, I think it's called market mechanism for low carbon heat, but essentially it's a levy or a kind of like an obligation onto the manufacturers to produce heat pumps to try and bring down the cost. But one to try and make obviously increase manufacturing of heat pumps in the UK, but also to reduce the cost because Ben is believe that by 20 is it by 2020 it will be online by some point in the mid twenty 20s.

0:19:58.140 --> 0:20:7.870

TP1

They say they can half between 25% and 50% reduce the cost of a heat pump and by 2030 they say that it can be cost comparable with a gas boiler.

0:20:8.660 --> 0:20:9.130

TP1

Which?

0:20:8.810 --> 0:20:9.500

matt.kennedy

OK.

0:20:12.500 --> 0:20:13.250

matt.kennedy

Yeah. So.

0:20:10.90 --> 0:20:13.760

TP1

Which is, you know, a stretch by any means.

0:20:14.410 --> 0:20:22.660

matt.kennedy

That's three useful things you give me in about 10 minutes.

0:20:23.0 --> 0:20:23.350

TP1

Yes.

0:20:23.740 --> 0:20:34.30

matt.kennedy

And the the the trying to sort of force and not not sort of push them artly there really by incurring a levy is different between occurring and suppose it is isn't it?

0:20:34.540 --> 0:20:55.200

TP1

Yeah. Yeah. So no, they're basically forcing them to do it. And I will. There's still proposals around that, but you'll be able to see and bit bored that in the responses I, but yeah, so they're they're trying to force manufacturers. They're forcing off grid, rural consumers through the off gas grid regulation proposals, which you probably seen.

0:20:55.400 --> 0:20:55.810

matt.kennedy

Yeah.

0:20:56.500 --> 0:21:4.700

TP1

I'm not basically saying that from 2026 when you're boiler your oil boiler, your LPG boiler breaks down, that you have to replace it essentially with a heap.

0:21:4.330 --> 0:21:5.630

matt.kennedy

With something that, yeah, yeah.

0:21:6.10 --> 0:21:7.440

TP1

So you know.

0:21:8.70 --> 0:21:11.930

TP1

That's that's worrying from all angles of the supply chain.

0:21:12.620 --> 0:21:18.570

TP1

Trying to encourage and develop the skills really very much focused around rolling out heat pumps.

0:21:20.190 --> 0:21:21.460

TP1

But the natural.

0:21:25.760 --> 0:21:26.830

TP1

Sorry equates.

0:21:21.890 --> 0:21:33.380

matt.kennedy

So this is in, I mean in terms well, in terms of what they could do that it's more telling people rather than giving people options from what I've seen.

0:21:45.530 --> 0:21:52.200

matt.kennedy

Do you have any experience with the working with the subnational bodies like the combined authorities and the lips on issues like this?

0:21:51.200 --> 0:21:59.400

TP1

Not in my current role. In my current role I did in previous roles, but I'm aware of the how they operate

0:21:59.330 --> 0:22:2.560

matt.kennedy

OK. So coming onto combined authorities

0:22:3.320 --> 0:22:10.730

matt.kennedy

Do you think they could have a a? A more? What do you think they could do to to assist the the the roll out?

0:22:13.10 --> 0:22:13.350

TP1

Yeah.

0:22:11.490 --> 0:22:17.220

TP1

Again, this is my personal perspective. I suppose all of this is my personal perspective anyways and it, rather than being attributed.

0:22:17.440 --> 0:22:18.930

matt.kennedy

Nobody. Nobody knows you anyway.

0:22:19.150 --> 0:22:23.240

TP1

Yeah. Yeah, that's that's true. I my my personal perspective is that.

0:22:26.530 --> 0:22:26.810

matt.kennedy

Mmmm.

0:22:24.170 --> 0:22:53.440

TP1

And having work, I used to work for a Chamber of Commerce and it was all you know, very much emphasis on local. However, now looking at things from my current perspective, I can see challenges when you have different labs taking different approaches or different local authorities combined authorities all doing something slightly different. **It's very, very difficult for industry to deliver.** You know, just as one example, I believe in the **recent consultation consultation on planning.**

0:22:54.640 --> 0:23:18.770

TP1

There was suggestions that essentially there would be like a baseline assumption of, let's say I don't know **energy efficiency of properties, but the local authorities would be able to take the decision to make them if they wanted to raise the standard, they could raise the standard and that,** for example was **really challenging because if you've got one and we're talking more about new build, then maybe but you know, for example, it makes it challenging because accountability is spread in different bodies**

0:23:43.900 --> 0:23:44.70

matt.kennedy

Mmmm.

0:23:21.150 --> 0:23:48.610

TP1

Worcestershire, for example, you could have one level, but in Gloucestershire, it's another. Whatever. You're gonna have companies operating between the two, so it doesn't make it particularly practical from an actual delivery perspective, albeit I do know again, having worked in that kind of organization previously, that it's always nice to have that local spin animation and there's a lot of benefit from it. But at the same time, maybe now in my current role, I see more of the challenges that come from that.

0:23:48.550 --> 0:24:7.580

TP1

Umm yeah, I was trying to talk to a guy yesterday and he was saying pretty much the similar thing really in terms of if you put it in the hands of the subnational, then you could, you know, skills, everything, every aspect of it you, you could get different levels. And from a if you're a national, a big national company, you're just causing problems, really, aren't you?

0:24:13.970 --> 0:24:14.250

matt.kennedy

Mmmm.

0:24:8.20 --> 0:24:35.790

TP1

And I think that there's, you know, there's a way to engage appropriately with local authorities and local bodies. Do I think that central government do that particularly well? Probably not, no. But that opportunity, I think is still there. So you know, I think council boundaries are still important aspects of local economies because if, for example, particularly on the rural side of things, it is different. You know, you obviously have a lot more oil technicians in rural areas than you do in.

0:24:36.500 --> 0:24:45.750

TP1

In urban areas and you know all those kind of nuances do need to be taken account of. But yeah, I agree as a central larger scale approach is generally better for things like skills or.

0:24:52.130 --> 0:25:1.450

matt.kennedy

Have you got any any perspective on what how it will be better for national government to do it to the to the subnational, from your experience and what you've done in the past?

0:25:12.730 --> 0:25:19.90

TP1

I mean, this is just my perspective. They come out with a policy and they don't really look at how they're going to implement it. So it's a bit difficult sometimes.

0:25:19.950 --> 0:25:21.300

TP1

Yeah, I mean.

0:25:20.420 --> 0:25:21.840

matt.kennedy

It's a back to front, isn't it?

0:25:22.310 --> 0:25:24.20

TP1

Yeah, I think this.

0:25:25.490 --> 0:25:47.860

TP1

You know, impact assessments or something that can be utilized potentially for that format. So for every consultation that comes out, you know an impact assessment should be released at the same time whether there's an opportunity for that, you know to to look at things in a little bit more detail on a practical basis rather than just necessarily a monetary basis, which is generally how it looks at it.



0:25:49.900 --> 0:25:55.650

matt.kennedy

You mentioned impact assessments?.

0:25:57.30 --> 0:25:57.

0:25:56.630 --> 0:26:20.270

TP1

Yeah. No, I think that there's opportunity. Well, there's always opportunity for better engagement from from government departments. So I think in the round, yes, there should be a, you know a more you know more engagement that takes place around these kind of things. I mean, I used to work for a body that did energy well. I was only there for a short period of time on skills in the energy sector. I what are the things again that.

0:26:27.540 --> 0:26:27.780

matt.kennedy

Mmmm.

0:26:23.640 --> 0:26:51.320

TP1

A lot of these like kind of engagements are don't have really high levels. You have these like for example T levels, you have these really great panels with all these great people on them who are really experienced. cce and you know I think that it's a similar thing to a certain extent you know as a national body that we kind of do to a certain extent as well because we.

0:26:54.90 --> 0:26:51.450

matt.kennedy

Yeah, yeah

0:26:51.410 --> 0:27:13.300

TP1

We come and say it from quite a high a high level, but there's always the benefit of engaging it all the levels, because otherwise you, you know, you don't get the reality for what things are on the ground and at the moment, I don't believe that heating policy does have a good view of actually appetite or engagement from people on the ground because everyone they thought to was early adopters.

0:27:30.70 --> 0:27:30.660

matt.kennedy

That's why.

0:27:31.420 --> 0:27:32.430

matt.kennedy

Yeah, yeah.

0:27:14.340 --> 0:27:41.690

TP1

Yeah, if you ask people like, do you wanna stop climate change? Of course. They're gonna say yes. Do you want to decarbonise your home? Of course they're gonna say. Yeah. Well, not everyone. Just surprisingly. But you know, of course they're gonna say yes, but it's kind of again, comes back to that engagement. The types of questions that we're asking and how we're looking people means that they're missing a layer of detail. And as someone who cares about the planet, I will, you know, in terms of my future, many hopefully, many, many, many, many, many, many years.

0:27:42.130 --> 0:27:44.80

TP1

Ohh, you know to go.

0:27:48.950 --> 0:27:49.850

matt.kennedy

Mmmm.

0:27:45.300 --> 0:27:53.610

TP1

I can just really see a really big risk by not doing this properly that it undermines all and we start all over again and that's the last thing that I wanna see is.

0:27:54.370 --> 0:28:2.100

TP1

It is doing it wrong and being back at square one and it takes another 20 years to get back to where we are now, kind of it's.

0:28:14.40 --> 0:28:14.520

TP1

Umm.

0:28:2.600 --> 0:28:23.830

matt.kennedy

Yeah. I'm finding really is is. Is. Is, is this is this general theme that everyone wants to engage. What's the practicalities of how they actually implement things?

0:28:29.410 --> 0:28:30.490

TP1

Yeah, that's alright, don't I?

0:28:29.620 --> 0:28:33.500

matt.kennedy

Yeah. And so you're the trade associate. Do you deal with SME's a lot?

0:28:34.100 --> 0:28:34.880

TP1

Yes. Yeah.

0:28:35.340 --> 0:28:46.710

matt.kennedy

OK. So it's mainly Marco SME that the builders, the plumbers, et cetera, that are eventually gonna be retrained, what's your understanding of this process?

0:28:47.190 --> 0:29:9.720

TP1

I will, yeah, definitely. On the supply chain, but not so that we obviously have SME gas supply members for example, and things like that. But you know thinking more around installers and the supply chain for this kind of thing, then yes, generally you are looking particularly around retrofit ismes because you're using local contractors and local local builders to do this work for you.

0:29:18.370 --> 0:29:19.150

TP1

Yeah, yeah.

0:29:10.50 --> 0:29:24.910

matt.kennedy

Lovely. So just just thinking around the in stores, I know you've got the other the the gas people, but just thinking about the in stores and the trades weren't really I think I'm thinking about really and they tend to be very small companies from what I've from, I've researched so far, so.

0:29:25.620 --> 0:29:31.620

matt.kennedy

Can you think of anything that the government has done positive at subnational at any level to develop retrofits?

0:29:45.580 --> 0:29:47.540

TP1

During porridge, more installations.

0:29:40.920 --> 0:29:48.950

matt.kennedy

What am I trying to say? Spirit. So the question to to, to, to, to, to sort of cooperate more, encourage miners. Yeah, and.

0:29:48.480 --> 0:29:52.670

TP1

Am I suppose at the end of the day it comes down to?

0:29:55.700 --> 0:29:56.90

matt.kennedy

Yes.

0:30:11.380 --> 0:30:11.710

matt.kennedy

Umm.

0:30:11.800 --> 0:30:41.820

TP1

Somehow radically overhauled how people think about heat pumps, but I don't think that that's they are gonna be a really key role in driving low carbon technologies because you know, you call up your local heating engineer. People like, for example, my uncle is a Gas Safe, registered engineer and plumber, and people were call him up. And of course, he's just gonna go over and replace, replace the boiler cause I've got no hot water and they want to change it. So it's, I do think they get a little bit of an unfair focus around that because.

0:30:41.900 --> 0:30:59.290

TP1

If you're heating system breaks down, which is the majority of the the main time, people will have the opportunity to change their heating system. They just want to get it back up and running so quickly. So are they gonna take up to seven days? Maybe to install a heat pump with no hot water or heating? Probably not.

0:31:14.320 --> 0:31:14.830

TP1

Yes.

0:30:58.690 --> 0:31:17.990

matt.kennedy

Yeah. And yeah. Yeah. So that comes back to your point, you made earlier about the repair and maintenance cause that's really useful.

0:31:18.640 --> 0:31:36.930

TP1

I think I think that there's in terms of again around the engagement piece. I know that there are various associations, CI PHE and the chart Institute of Plumbing and Heating who have quite big membership base. I know there's a couple of others, but the actual.

0:31:49.570 --> 0:31:49.900

matt.kennedy

Yeah.

0:31:37.670 --> 0:31:53.400

TP1

You know, for example we cover 98-99% of our market as an association. I think the on the installer side, it's very, very low percentages of of engagement. So it's quite hard to communicate with installers.

0:31:54.40 --> 0:31:54.220

matt.kennedy

Yeah.

0:31:54.970 --> 0:32:5.400

TP1

You know, we do a lot of media work, for example through things like **Installer magazine** and outlets, play heating and plumbing, monthly ventilation and plumbing monthly. All those kind of things.

0:32:11.220 --> 0:32:11.650

matt.kennedy

Yes.

0:32:6.890 --> 0:32:24.40

TP1

To you, try and you know get opportunities and messaging out there like that's obviously an opportunity, **but again you know they wanna deliver the best solution for homes and sometimes that's not a heat pump**, but that's not what I wanna hear. So it's a bit of a meeting you know, where do you meet?

0:32:24.0 --> 0:32:34.910

matt.kennedy

Yeah. Yeah. But I mean, I think I think what you just said there was was the question I was trying to form, I think in my head, but I I had a blank, you know, how do we engage, how how can government engage these small SME?

0:32:54.440 --> 0:32:54.630

TP1

Yeah.

0:32:44.600 --> 0:33:3.870

matt.kennedy

Positively, really in terms of engagement with it because as you said, if you're a business and you need to please the customer, they're gonna want it fixed and straight away. It's like your chap with this heat pump, people. I'm gonna wait around other. So it affect their business. So I was thinking really like sort of incentives and subsidies. Are you aware of government doing anything to try and?

0:33:4.630 --> 0:33:8.460

matt.kennedy

Incentivize that small group at present, because I haven't found anything.

0:33:9.590 --> 0:33:11.660

TP1

Not particularly, I don't think.

0:33:13.780 --> 0:33:14.70

matt.kennedy

Mmmm

0:33:13.660 --> 0:33:16.530

TP1

I'm not aware of any particular subsidies.

0:33:18.10 --> 0:33:18.300

matt.kennedy

Yeah.

0:33:18.750 --> 0:33:33.400

TP1

With the like for training or things like that, maybe that will come in the future, but then that's how MC are gonna make them on either not mean that it works both ways, so they still need to earn income from trading I guess. So I don't know where the sweet spot is brown at.

0:33:33.660 --> 0:33:33.970

matt.kennedy

Yeah.

0:33:33.620 --> 0:33:34.270

TP1

I.

0:33:34.670 --> 0:33:43.720

matt.kennedy

Because one thing I'm thinking is is turned a rolling out the skills on a on a on a big level as you said at the beginning in terms of the the time scale that government are going towards.

0:33:44.560 --> 0:33:45.130

TP1

But many.

0:33:44.380 --> 0:33:46.590

matt.kennedy

If they can't increase the gone, sorry.

0:33:49.440 --> 0:33:51.410

matt.kennedy

Yeah, yeah.

0:34:3.300 --> 0:34:3.640

matt.kennedy

What?

0:33:46.670 --> 0:34:17.120

TP1

Now I'm just going to say, well, **manufacturers are critical in that because from an installer perspective**, you know they sell the brand or that really trains them up. Generally speaking, I mean, it's not, I don't think that they legally have to, it's more just kind of, yeah for example, you get trained up by Worcester Bosch, you goes training center, your your training, you know your train and you learn about that projects and then you don't really sell their products. That's usually kind of how it goes. If you've worked really closely with the bar should not gonna necessarily.



0:34:17.340 --> 0:34:23.550

TP1

I don't know. It's still available if, for example I and I think that the manufacturers do play a really key role.

0:34:24.10 --> 0:34:25.230

matt.kennedy

Yes, in the training.

0:34:24.580 --> 0:34:53.60

TP1

Asked for this because they do. But you know again anti dentally speaking because I don't want to be speaking on behalf of of particular brand or anything. But you know a lot of the manufacturers **do have heat pump offerings and they do train up on heat pump offerings** and they're there. But again it's you know people go back to what they want and it's familiar they know well it's obviously broken down. So it's not working at that time but they know it works. They just wanna like for like replacement.

0:34:53.150 --> 0:34:55.440

matt.kennedy

Yes, yes, it's it's something.

0:34:54.710 --> 0:35:3.100

TP1

That kind of like how much more they could do to **change the consumer's mind without just doing direct consumer engagement** to raise its profile.

0:35:2.920 --> 0:35:6.840

matt.kennedy

Yes, yes, I said. Rather than the the people that install, I see what you mean.

0:35:7.310 --> 0:35:7.620

TP1

Yeah.

0:35:8.20 --> 0:35:19.460

matt.kennedy

Because at the end of their people like what they like and it anything new apart from your partner, obviously anything new people don't automatically take, so do the because of problems and things.

0:35:39.390 --> 0:35:39.690

matt.kennedy

Old.

0:35:39.760 --> 0:35:39.890

matt.kennedy

Yeah.

0:35:19.750 --> 0:35:50.700

TP1

Yeah, exactly. And so, you know, it is, I think it is more of a challenge, particularly in rural areas. We've got an older population, you've got less people who are, you know, you could make a general sweeping statement and say younger people are more likely to be open to new technologies compared to older people potentially. And I'm just thinking about people who live in my village, lots of elderly couples or people living alone as well. A lot of people who live alone, they're partners.

0:35:58.470 --> 0:36:0.510

matt.kennedy

Mmmm.

0:35:50.830 --> 0:36:0.650

TP1

You know, passed away and now can you really see them wanting to switch, you know, switch something up like that entirely and learn how to use a new system? Probably. Probably not.

0:36:5.170 --> 0:36:6.180

matt.kennedy

Yeah, exactly.

0:36:1.310 --> 0:36:18.790

TP1

Particularly if the the install that's to travel 50 miles to get there on the small roads in Rural England, you know that's great. I think I found that really useful. And you give me quite a few points there. Just just you you picked up on some reports you be able to send me is that OK?

0:36:21.500 --> 0:36:21.830

matt.kennedy

Mmmm.

0:36:17.370 --> 0:36:44.360

TP1

Yeah, I'll. I was. I will send you a some links I there's loads on our website, so I'll send you to where they all are and you can download them. There's archetypes on there where you can take different types of properties and you can see how much it would cost to transition them, how long it would take to install kind of you've got analysis on rough disposable income people have and how much they would be able to spend on this kind of stuff. So you feel free to use use all.

0:36:45.990 --> 0:36:47.460

TP1

Yeah, we'll talk if it's able.

0:36:48.980 --> 0:36:49.240

TP1

I.

0:36:51.170 --> 0:36:51.650

TP1

No, no.

0:36:43.940 --> 0:36:56.590

matt.kennedy

That is all publicly accessible. Can I get to all that alright? I mean, that's great. I mean I I don't. I don't need to do it all for me. But I mean that. That'd be great if you could do that, because that would be. Sounds like you got some really good, useful tools there

0:36:56.520 --> 0:37:20.230

TP1

Yeah, I'll send you the link to where they are. You can download them. I. The other thing I'll do is I know I've mentioned a couple of specific stats now. I don't know, they're not not public information, but they're just more things if we've we've put in consultation responses. So I'll have a little dig around and I'll see if there's any some of the things around, particularly skills and infrastructure that I've mentioned. I'll copy and paste it into the body of an email and send it over to you.

0:37:19.20 --> 0:37:28.570

matt.kennedy

Yeah, that that would be great. It was the numbers 60,005 thousand between heat pumps and normal boilers, I think, right?

0:37:27.590 --> 0:37:32.620

TP1

Yeah, yeah, I definitely got the right figure somewhere. So leave that with me.

0:37:42.410 --> 0:37:43.360

TP1

No, that's alright.

0:37:30.550 --> 0:37:44.450

matt.kennedy

Yeah, I mean that be great and the workforce, if they're all older and and if there's something around the ages of the workforce to install them. But I, yeah, that that it's very, very good of you to do that because I was, it's taking up your time.

0:37:47.840 --> 0:37:48.190

matt.kennedy

Great.

0:37:44.960 --> 0:37:51.830

TP1

That I'm I'm I'm happy to happy to support and have you spoken to energy and utility skills.

0:37:52.240 --> 0:37:57.290

matt.kennedy

No, I'm just start. I'm just starting out approaching people, really. So what was that energy?

0:37:57.650 --> 0:38:23.520

TP1

And utility skills there used to be a Sector Skills Council many years ago, and they're now they've turned into a bit more of a trade body. They do the they do the cards that heating engineers have to have to get on to particular sites and engineers have to have to particular particular sites. Are I worked for them for a bit and that's where the the stuff **around T levels came in and apprenticeships**, so could be worth approaching them.

0:38:32.40 --> 0:38:32.990

TP1

Yes. Yeah.

0:38:21.910 --> 0:38:36.520

matt.kennedy

Well, that that well that that's interesting because just from speak, the people I've spoken to a big thing that's coming up is a skills. So I'll definitely. So that's energy and utility skills, yeah, is that it? Yeah. Lovely. I'll contact them. Do you know anyone specific?

0:38:37.0 --> 0:38:41.210

TP1

I'm well. I don't know if you still there, but there's a guy called XX.

0:38:47.950 --> 0:38:48.460

matt.kennedy

Thanks.

0:38:42.630 --> 0:38:49.700

TP1

He was the policy manager when I was there so he could be a good person to to talk to, but there may be.

0:38:51.700 --> 0:38:52.50

TP1

Else.

0:38:50.30 --> 0:38:58.170

matt.kennedy

Yeah, there might be somebody else now. That's fine. I'll I'll look at that. That, though I'm sure I'll find that useful. That's great. So thanks for your time, Sophia.

0:38:58.40 --> 0:38:58.900

TP1

That's OK.

0:38:58.920 --> 0:39:4.190

matt.kennedy

And and if you could send me that stuff, that would be great. I'll, I'll keep your email in case I've got any queries. Is that alright?

0:39:4.610 --> 0:39:5.850

TP1

Yeah, that's fine.

0:39:4.900 --> 0:39:8.210

matt.kennedy

I won't bother you all the time, obviously, but just in case anything pops up.

0:39:8.770 --> 0:39:18.300

TP1

No, that's that's no problem. And and just in terms of, so obviously it's all anonymous. So, so, so, yeah, no, that's absolutely fine as long as it's all.

0:39:26.770 --> 0:39:27.300

TP1

OK.

0:39:17.900 --> 0:39:29.530

matt.kennedy

Yeah. I mean in fact, quote you, if I go through all this stuff here and I quote you, you'll be an independent expert, number six or seven or eight or you'll just be, you'll be referred to as an independent expert.

0:39:31.740 --> 0:39:32.530

matt.kennedy

Is that alright?

0:39:34.940 --> 0:39:35.250

matt.kennedy

Yeah.

0:39:42.890 --> 0:39:43.310

matt.kennedy

Yeah, yeah.

0:39:30.270 --> 0:39:50.520

TP1

Yeah. No, that's absolutely fine. Yeah, that's absolutely fine. Just on a practical note, I I will send you when I come back to you, I'll put my personal email address in there. Only that I'm actually leaving the association in in next month. So I I'll put my personal email in then if there's anything you wanna come back on in relation to.

0:39:50.960 --> 0:39:52.180

matt.kennedy

That would be great. Thanks.

0:39:51.530 --> 0:39:54.340

TP1

I take it up then you can contact me on there because I.

0:39:53.920 --> 0:39:55.50

matt.kennedy

If you got a promotion.

0:39:56.180 --> 0:40:6.150

TP1

Yeah, well, yeah, I'm. I'm going more into the renewable gas supply bit, so I'm actually relocating to XX. I. So it's yeah, it's all change.

0:40:5.800 --> 0:40:8.160

matt.kennedy

You said you said to me that doing very well.

0:40:10.550 --> 0:40:11.460

matt.kennedy

That's good to hear.

0:40:8.550 --> 0:40:12.180

TP1

Thank you. Yes. No, no, it's exciting. Exciting so.

0:40:29.250 --> 0:40:30.770

matt.kennedy

Yeah. Yeah. Well.

0:40:13.970 --> 0:40:31.970

TP1

Thank you. Yes, I and they likewise hope. Hope you're engagement process goes well. I yeah, more than that. I I know from doing my own thesis albeit was a master's not a pH. D It's really good to get industry engagement so I know it can be challenging sometimes so I'm happy to support.



0:40:52.50 --> 0:40:57.500

TP1

Now definitely, definitely do you wanna go into the heating sect? Are you looking to move into that sector?

0:40:59.420 --> 0:41:2.110

matt.kennedy

But to be honest, I'm a planner by trade.

0:41:2.700 --> 0:41:3.960

TP1

OK, right.

0:41:24.340 --> 0:41:24.790

TP1

Of them all.

0:41:3.400 --> 0:41:26.90

matt.kennedy

Just finally, I knw you are a national body but can you comment on any regional variations you are aware of for skills, finance in relation to the Heat and Buildings Strategy?

0:41:39.140 --> 0:41:39.530

TP1

Yeah.

0:41:27.230 --> 0:41:44.210

TP1

I'm find that really interesting. I never realized there's so many technical issues regarding, you know, private dwellings and their energy consumption. You know, you don't realize how many issues there are when you start digging into it, you know.

0:41:45.510 --> 0:41:46.0

matt.kennedy

Mmmm.

0:41:44.590 --> 0:41:51.660

TP1

Yeah, definitely though. Ohh, its just just another one for your list HIC, the heating and hot Water Industry Council.

0:41:51.750 --> 0:41:52.140

matt.kennedy

Thanks.

0:41:53.40 --> 0:41:54.490

TP1

Mainly there's difference all over the country, businesses in one area have access to different things than others. It's a bit of a mess really. You know, different opportunities for different areas.

0:41:54.660 --> 0:41:54.940

matt.kennedy

Mmmm.

0:42:2.750 --> 0:42:3.150

TP1

Yeah. So it presents differently. Some places provide more financial support than others, some depends on whether there is a mayor around. Devolutions Deals haven't relay affected the process I don't think as

0:41:55.720 --> 0:42:5.760

matt.kennedy

Ok

0:42:6.330 --> 0:42:14.660

TP1

Yeah, there are definitely, definitely lost chances. So there's lots of stuff to get your teeth stuck in too, so I know I'd thoroughly recommend it. Well, all the best.

0:42:15.890 --> 0:42:16.410

TP1

And I'll.

0:42:14.650 --> 0:42:17.900

matt.kennedy

Yes, sent to you and hope you enjoy your time in XX.

0:42:18.300 --> 0:42:31.440

TP1

Thank you. I will do. I'm. I'll drop you an email today because I'm off on leave for two and a bit weeks tomorrow, so I'll drop you an email today with the links **and some of the experts**, experts and yeah, any questions, just let me know.

0:42:31.630 --> 0:42:33.600

matt.kennedy

Right. Alright. Thanks for your time, Sophia.

0:42:33.830 --> 0:42:36.110

TP1

Alright, no problem. Take care. Cheers bye.

0:42:34.600 --> 0:42:36.810

matt.kennedy

Here's what bye bye.

### Coding example

oding Exempl	Code	Main Theme	Sub theme 1	Sub theme 2	Sub theme 3	Sub theme 4	Possible Quote	Context / interpretation
<b>Interview 1</b>	<b>TA1</b>	Challenges						
		Finance					Finance is a big thing.	Need finance hard to get
			Traditional / old buildings				The interaction is more difficult in rural areas don't have as much of a say	Rural areas more difficult to implement
				Buildings, planning			more restrictions in place from a planning perspective  challenges that you can kind of acutely see more in rural areas.	Planning permission retrofit
					energy		they have to go through many many hoops.	Long winded process
		Regulation						accessible but not ideal, example of step to negotiate narrow passageway

			Stricter tighter control				We need a path to following in terms of training, standardisation	Regulation for course not enough etc
				Planning boundaries, skills mixing			ou've got kind of a mix of different skills that are coming in because it's not just the plumbing, it's also around kind of electrics.	Needs better organisation
					Costs of training			
						Materials used		cost
		Skills access					Now it's broken down twice and twice there is nobody within the area to fix it.	Not enough staff, trained people
			standard of skills				some other feedback for example which we give to governments stakeholders it's you know it's.	certification for the things and in terms of the standard for the qualification seems to be lacking.
				lack of skills			I think there's 60,700 thousand Gas Safe registered engineers	capacity of skills, older staff are retiring

					delivery		it's there is not going to be the skills available to be able to deliver that	skills to deliver
		Involvement of third sector					Citizens Advice .... they've done a review of low carbon heating systems and like feedback around it	consumer feedback
		Assumptions of costs					<p>underlying assumptions ... that come out and based on policy ... that is almost, you know, the consumer almost just needs to worry about the upfront cost of the heat pump and maybe some retrofit, whereas an actual reality, we're looking at infrastructure costs, we're looking at very high upfront costs up to £18,000 with some of the heat pump costs</p> <p>They say they can half between 25% and 50% reduce the cost of a heat pump and by 2030 they say that it can be cost comparable with a gas boiler.</p>	costs of heat pumps, conflict in perceptions central/local/c onsumer

			businesses operations				You're gonna have companies operating between the two, so it doesn't make it particularly practical from an actual delivery perspective	in the context of governance boundaries of combined authorities
				associations of business			manufacturers are critical in that because from an installer perspective	manufacturers of physical infrastructure - training issues
					lack of finance for business		I'm not aware of any particular subsidies.	
			appropriate approach				<p>Otherwise, you'll spend 32 grand trying to reach fit input heat pump in as long as the solution is net 0 compatible, does it really matter what they use</p> <p>Direct burning of biomass isn't necessarily the best solution for everyone else, so you know they can say they offer other solutions, but it's just that the other solutions are untenable.</p>	

						infrastructure	This will require much better infrastructure to be effective.	
		Government-overall strategy						
			Mixed approach				if they took a mixed approach and let other solutions play a role	comment general strategic strategy
				business conflict with central government policy			but again, you know they wanna deliver the best solution for homes and sometimes that's not a heat pump,	
		Costs to business / levies					it's a levy or a kind of like an obligation	
		Governance					It's very, very difficult for industry to deliver.	
			accountability				energy efficiency of properties, but the local authorities would be able to take the decision ... to raise the standard ...was really challenging because if you've got one and we're talking more about new build, then ... it	governance processes



							makes it challenging because accountability is spread in different bodies	
				Engagement			<p>engage appropriately with local authorities and local bodies. Do I think that central government do that particularly well? Probably not, no. But that opportunity, I think is still there ... I think council boundaries are still important aspects of local economies ... I agree as a central larger scale approach is generally better for things like skills</p> <p>there's always opportunity for better engagement from from government departments</p> <p>I don't believe that heating policy does have a good view of actually appetite or engagement from people on the ground</p>	business engagement with governance
		Broader issues					I can just really see a really big risk by not doing this properly	

							that it undermines all and we start all over again	
		SME typology					generally, you are looking particularly around retrofit because you're using local contractors and local builders to do this work for you.	
		Associations						talked generally about associations and there are a lot of them
		Consumer behaviour					change the consumer's mind without just doing direct consumer engagement	

**Appendix 4 – List of conference events attended**

<b>Title of event and date</b>	<b>Type of event</b>
Westminster Event - Next steps for achieving green economic growth and supporting green industries in the UK 05.07.2323	Virtual event
Westminster Event - WBF - Funding the net zero transition – next steps for UK green finance – 11.10.23	Virtual event
Westminster Event - WEEdF - Next steps for green and climate change education in England – 12.07.2023	Virtual event
Westminster Event - WEEdF - Next steps for T Levels – 20.09.2023	Virtual event
Westminster Event - WEET - Priorities for climate adaptation and resilience in the UK – 28.09.23	Virtual event
Westminster Event - WEET - Next steps for the Contracts for Difference scheme - 06.07.23	Virtual event
Westminster Event - Priorities for UK climate policy following COP28 31st January 2024	Virtual event
Westminster Event - WEET – Next steps for the digitalisation of the UK energy system	Virtual event
Westminster Event - WEET - Next steps for planning and the natural environment in England-15.06.2023	Virtual event
Westminster Event - WEMF - The future for tackling shortages in the UK Labour market- 22.06.23	Virtual event
Westminster Event - Next steps for local skills improvement plans and regional skills in England - 23.01.2	Virtual event
Westminster Event - Installer NEC Birmingham 2023	In person - Birmingham
Westminster Event - APSE Energy: Big Energy Summit 8 & 9 March 2022	In person - Kenilworth