C40 CITIES ARUP

Powering Climate Action: Cities as Global Changemakers

V1.0. June 2015

Addis Ababa
Amsterdam
Athens
Austin
Bangkok
Barcelona
Basel
Beijing
Berlin
Bogotá
Boston
Buenos Aires
Cape Town
Caracas
Changwon
Chicago
Copenhagen
Curitiba
Dar es Salaam
Delhi
Dhaka North
Dhaka South
Hanoi
Ho Chi Minh City
Hong Kong
Houston
Istanbul
Jakarta
Johannesburg
Karachi
Lagos
Lima
London
Los Angeles
Madrid
Melbourne
Mexico City
Milan
Moscow
Mumbai
Nairobi
New Orleans
New York City
Oslo
Paris
Philadelphia
Portland
Rio de Janeiro
Rome
Rotterdam
San Francisco
Santiago
São Paulo
Seattle
Seoul
Shanghai
Singapore
Stockholm
Sydney
Tokyo
Toronto
Vancouver
Venice
Warsaw
Washington, D.C.
Yokohama

The self-reported data from these 66 cities has been used in this report. Any cities joining C40 after the data collection period are not on this list.

Contents

Powering Climate Action: Cities as Global Changemakers

Foreword

Executive Summary

1 **Introduction**
- 1.1 Cities as Changemakers
- 1.2 Background and Previous C40 Work

2 **Power in C40 Cities: Mayors Have Similar Power Profiles**
- 2.1 The Types of Power Exercised by C40 Mayors
- 2.2 Mayoral Power by Sector
- 2.3 Common Power Signatures of Cities

3 **The Relationship between Power and Action: Limited Power Does Not Mean Limited Action**

4 **A More Comprehensive Framework: Understanding the role of government structures and government policies**
- 4.1 The Role of Government Leadership and Structure
- 4.2 City Governance
- 4.3 Exploring Governance Types
- 4.4 Using Governance to Understand Action

5 **Conclusion**
- 5.1 Key Takeaways
- 5.2 Call to Action

A1 **Appendix 1: Regional snapshots of Power and Action**

A2 **Appendix 2: Analysing mayoral powers: The C40 approach**

A3 **Appendix 3: Who plays a part in city governance?**

Foreword

Gregory Hodkinson & Mark Watts

The *Powering Climate Action* report is the first of its kind; a comprehensive survey of the powers and governance approaches used by cities to deliver climate action. It spans all global regions, all urban sectors, and unlike any other study, is built on 123,078 data points reported directly by 66 C40 cities.

The report's publication is very timely. The urgent need for meaningful international cooperation to reduce emissions is reaching fever pitch. As the leadership needed from nations continues slowly to take shape, it is action by cities that will help close the emissions gap and keep alive the possibility of a climate safe world. Cities, and other non-state actors such as regional government, the private sector, civil society and investors are ultimately responsible for delivering GHG reductions on the ground.

The data surveyed in this study tells a very clear message: cities have the tools to play their part. Cities have power across a huge range of assets and functions, enabling them to take meaningful action. To accelerate and expand urban climate action we need a better understanding of the conditions that help or hinder progress.

The New Climate Economy Global Commission has made a powerful case for why low-carbon leadership in cities is essential and the economic case for urban climate action. The Global Commission also strongly emphasises the importance of international cooperation in delivering this. Cooperation raises ambition, and allows sharing of expertise and learning, collective development of new standards and approaches and the pooling of resources.

Powering Climate Action firmly demonstrates that collaboration works. Cities that govern collaboratively deliver vastly more transformative action than those who rely on direct implementation. The report also establishes the basis for that cooperation. The data shows that C40 mayors have remarkably similar power profiles across regions and sectors, giving cities a strong foundation from which to share, collaborate and facilitate.

Finally, the report offers a firm message of empowerment for all C40 cities, and cities worldwide. The evidence shows that in specific areas, having direct power enables more action. However, in most areas, cities are able to deliver transformative action even where they have limited power, by collaborating with other cities and non-state actors. Limited power needn't mean limited action.

Delivered as the first product of a three-year global research partnership between Arup and C40 Cities Climate Leadership Group (C40), we hope cities, their partners and the wider community will receive this report as a firm call to action, to collaborate and move forward together to deliver the kind of transformative climate action that is needed so urgently.

Gregory Hodkinson
Chairman
ARUP

Mark Watts
Executive Director
C40

Executive Summary

Introduction

Powering Climate Action: Cities as Global Changemakers explores the complex interplay between the powers that city governments hold, the governance and decision making structures in which they operate, and the actions they are able to take to address climate change. The report identifies the characteristics of power and government that are conducive to climate action.

The research analyses data about city 'powers' collected from cities in the C40[1] network, supplemented by data about city climate actions (from C40's Climate Action in Megacities 2.0) and urban governance characteristics (from the City Leadership Initiative at University College London). The findings are grounded in background research focusing on the existing understanding of city climate governance.

The study highlights the characteristics of urban climate governance that prevail in C40 cities, as well as the breadth and depth of powers cities hold over assets and functions. Together these dimensions of power combine to form power signatures, which describe the profile of power a city has over an asset or function, or even a whole sector such as transport. These can then be used to compare and contrast cities and to understand how they deliver action.

By assembling the critical components of a city's governance and delivery infrastructure, the report presents a pathway to climate action that highlights the important aspects of cities' climate governance including political context and government structures, as well as potential delivery routes and partners who may be involved in the delivery of action.

Through the development of six urban governance typologies (Table 1), the study also examines the typical models of governance adopted by cities and demonstrates how governance – rather than just power – impacts a city's capacity to take action. This link is further illustrated through regional snapshots of climate action, which illustrate how power profiles and delivery capacity compare across regions.

Table 1:
City governance typologies

Commanding cities Typically use regulation and enforcement to deliver action. The role of private and other actors is often small.	**Implementing cities** Commonly take action through the delivery of projects and programmes, often without the input of private and other actors.	**Providing cities** Are characterised by a high level of control over service delivery, and are able to take action through this influence.
Legislating cities Achieve progress on climate change by setting policy and legislation that requires others to act.	**Collaborating cities** Commonly act in partnership with other actors to leverage their respective powers.	**Facilitating cities** Have limited power to take action directly, instead focusing on creating an attractive environment for others to act.

1 "C40 Cities Climate Leadership Group (C40)"

Table 2: Key Terms

Power The degree of control or influence mayors exert over assets (such as buses) and functions (such as economic development) across all city sectors.[1]	**Government** A set of formal administrative structures led by an elected or appointed leader with a mandate to govern a city or state.	**Governance** The system of governing through which a range of public and private actors deliver core services.

The study investigates the types of power that cities typically hold over their assets and functions; powers range from ownership and operation of assets and development of policy and legislation, to budgetary control and vision setting. The analysis shows that cities have a varying profile of different powers, depending on the particular assets or functions in question.

On the other hand, the individual characteristics of city governments have a clear influence on a city's capacity to deliver climate action. For example, the findings of the analysis suggest that cities with shorter mayoral terms and directly elected mayors, and those which operate under non-hierarchical government structures, tend to deliver more action than those with alternative profiles.

While these individual characteristics may help to describe broadly the optimal conditions for delivering action in terms of government structures, it is the interrelationships between these and other factors that truly demonstrate how a city operates. Analysis of the city governance typologies reveals that cities that work in collaboration with other partners – including actors from the private sector, community groups and networks – deliver more actions across all sectors and regions of the C40 network.

2 It is important to note that the C40 definition of 'power' differs from wider conceptualisations found in political and social science literature. For the purposes of this study, the C40 understanding of the concept is used.

Takeaways

Cities share remarkably similar profiles of power across regions and sectors, creating an excellent platform for mutual learning and cooperation.

It is sometimes the perception that cities are each of a different type; that working with each city will be a new learning process, and that there is always some need to re-invent the wheel when transferring solutions between them. This analysis shows, however, that while cities use a variety of types of power to achieve action, many cities employ the same profile, or combination, of power types across their various assets and functions. The existence of such clusters, or power signatures, demonstrates that groups of cities use similar approaches to deliver action. These commonalities provide a strong platform through which cities can collaborate, much like they do through the C40 network, sharing their knowledge and experiences in exercising power to deliver climate action.

When it comes to delivering action, the way cities use their powers is more important than the dimensions of power they have.

The research emphasises that having less power to own and operate assets and functions – the powers traditionally associated with achieving more action – does not necessarily lead to cities delivering less action in practice. Instead, cities with powers that are typically considered 'weaker' – such as vision setting – are in fact taking action at a significant scale. Cities are using innovative approaches to overcome an absence of 'stronger' powers by implementing softer policy tools – in combination with harder options – to achieve their goals (e.g., the power to set and enforce policies that require others to act). An overview of types of city governance provides a better understanding of the potential delivery routes and actors involved in guiding and influencing climate action.

Cites are in a unique position to catalyse wider climate action.

This work demonstrates that many cities are ensuring comprehensive action is taken through collaboration. With their broad range of capabilities – to operate services, fund investments, and promote targets and goals – at multiple levels of city administration, cities are uniquely positioned to tackle the myriad challenges associated with climate change. In this report, the development of typologies enabled a more accurate picture of how cities use their powers to emerge as climate leaders. The typology analysis reveals that city governments are often more successful in delivering climate action when they cooperate with other actors from the private sector and civil society. Nurturing partnerships with actors from both state and non-state sectors may afford cities the opportunity to employ their powers most effectively and ultimately catalyse climate action.

Call to action

As urban populations continue to grow, so does the prominence of city-led action in tackling global challenges like climate change. The findings of this research confirm that cities are in a strong position to catalyse climate action. Indeed, many cities are already leading the way in taking strong and meaningful actions to reduce greenhouse gas emissions and increase urban resilience. In December 2015 the United Nations hosts a forum for cities at the international climate change negotiations (COP 21) in Paris. Here, under the Compact of Mayors cities will be making commitments on emission reductions that are analogous to the Independent Nationally Determined Commitments of nation states.

Based on the evidence, this study presents four main recommendations:

- **Cities should recognise that limited power need not necessarily mean limited action**
  Cities have enormous potential to deliver action through a broader approach to governance. Through partnerships with other cities, government, private businesses, investors and civil society, cities are taking extensive action even where they don't have strong power. For example cities have taken 1,027 actions where they have limited power over assets (around 13% of all action).

- **Cities should reach out to partners to collaborate in delivering action.**
  As this report shows, cities that collaborate deliver more action. In fact, on average, those cities that take a collaborative approach to governance deliver twice as many actions as those that implement through a less partnership-based approach. As such, cities should reach out to the private sector and civil society, as well as other cities, to deliver more action, and get the most out of the actions they take.

- **The private sector should actively seek to partner with cities to capture unique economic opportunities.**
  Because cities share strong similarities in the types of power they hold, there is no need to reinvent the wheel when working with different cities. There are strong regional similarities in governance, for instance. The mix of governance approaches used by European and North American cities are on average almost exactly the same, with collaboration with partners being the most common governance approach for these cities. For instance, C40 cities have full direct control or ownership over 60% of all assets in the transport and buildings sectors.

- **The wider international community must empower cities to deliver climate action.**
  Although in the broad sense cities are taking extensive action where they have low power, in some areas lacking power may inhibit action. *Powering Climate Action* propagates a call to action for governments and other actors at all levels to help cities leverage the powers and resources they need to expand the scale and scope of climate actions. For example, in the buildings sector, where cities have strong power they deliver almost three times as much action per city as those with limited power. In addition, cities with strong power are taking 37 actions to deliver Building Energy Management Systems, and 20 actions to deliver Energy Performance Contracting.

1

Introduction

1 Introduction

1.1 Cities as Changemakers

In every region of the world, cities are centres of economic power, knowledge and innovation. Nations often look to cities to drive prosperity and demonstrate leadership at the regional and local levels. As urban populations continue to grow, so does the prominence of city-led action in tackling global challenges like climate change. Cities are gaining ever more influence on the international stage on the road to the United Nations international climate change negotiations (COP 21) in Paris and beyond. Under the Compact of Mayors[3] cities will be making commitments on emission reductions and adaptation in advance of COP21 that are analogous to the Independent Nationally Determined Commitments of nation states.

Positioned more closely to daily urban life and more nimble than higher-level governments, cities often benefit from a greater understanding of local challenges and greater agility to adapt to changing conditions. As a result, city governments are often better placed to deliver action on the ground than their counterparts at the national and international levels. However, little research has yet been completed to explore how cities deliver action, and what may be the critical factors that determine their success. This is a crucial field of enquiry to unlock cities' potential, enable them to do more and provide insight into how other actors can interact with cities more effectively.

This report, *Powering Climate Action*, is the product of comprehensive research by C40 Cities Climate Leadership Group (C40) and Arup, in partnership with the City Leadership Initiative at University College London (UCL). Building on an established understanding that cities globally are taking action on climate change but that the scale and type of this action vary significantly, the research explores the role of power and governance in influencing action, with the objective of understanding the conditions that can drive further progress.

The report demonstrates a remarkable commonality in the types of power that city governments exercise in each sector, which may provide a strong basis for cooperation between cities. By leveraging the powers they have available to them, even cities with power limitations can take action. However, how cities govern, their wider political context and their ability to deliver through partnerships, are shown to be a more informative lens through which to consider action. In particular, the work highlights the extent to which cities work with their partners to deliver and enable action.

The report confirms that cities are in a strong position to catalyse climate action thanks to their capacity to deploy their powers in innovative ways and to collaborate with other actors. The findings propagate a call to action for governments and other actors at all levels to help cities leverage the powers and resources needed to expand the scale and scope of climate actions.

3 The Compact of Mayors is the world's largest cooperative effort among mayors and city officials to reduce greenhouse gas emissions, track progress, and prepare for the impacts of climate change.

Cities generate around **80% of global wealth** (GDP)

Cities consume over **2/3 of global energy**

Cities emit more than **70% of global total greenhouse gases.**[4]

Power
The degree of control or influence mayors exert over assets (such as buses and cycle lanes) and functions (such as economic development) across all city sectors.[5]

Government
A set of formal administrative structures led by an elected or appointed leader with a mandate to govern a city or state.[6]

Governance
The collaboration between government, private and civil actors when setting a city's strategic priorities, and when delivering and managing the city's core services.[7]

1.2 Background and Previous C40 Work

In 2014, C40 and Arup published *Climate Action in Megacities Version 2.0* (CAM 2.0), a landmark research report that analysed mayoral powers and identified major trends across sectors and geographies, demonstrating that cities have the power, the expertise, the political will and the resourcefulness to take meaningful climate action. Furthermore, the report demonstrated genuine expansion of city level action, compared with earlier analysis led by C40 in 2011.[8]

CAM 2.0 also showed that cities have significant potential to help with narrowing the global emissions gap.[9] In support of this, a recent study by C40 and the Stockholm Environment Institute (SEI) concluded that 80% of the emissions reductions that cities can achieve are not currently captured by national government emissions reduction efforts; this is due to cities' capacity to directly influence core sectors such as buildings and transport.[10]

Powering Climate Action builds on this previous research, drawing deeper insights into how the powers that mayors hold and the governance structures cities adopt can influence the number and type of climate actions they are able to take.

4 OECD (2010), Cities and Climate Change, OECD Publishing, Paris.
5 It is important to note that the C40 definition of 'power' differs from wider conceptualisations found in political and social science literature. For the purposes of this study, the C40 understanding of the concept is used.
6 Bulkeley, H. & Kern, L. Local government and climate change governance in the UK and Germany. Urban Studies. 2006;43:2237-2259
7 Bulkeley, H. & Kern, L. Local government and climate change governance in the UK and Germany. Urban Studies. 2006;43:2237-2259
8 Climate Action in Megacities 1.0, C40, 2011
9 The gap between what is needed to limit global warming to 2° C and what is realistic as a result of the commitments nations have made.
10 Stockholm Environment Institute (SEI) in partnership with the C40 Cities Climate Leadership Group (2014). Advancing climate ambition: cities as partners in global climate action. A report to the UN Secretary-General.

2

Power in C40 Cities

Mayors Have Similar Power Profiles

2 Power in C40 Cities: Mayors Have Similar Power Profiles

2.1 Types of Power Exercised by C40 Mayors

The ability of city governments to exercise control and influence over assets and functions is an important component of how climate action is achieved in cities. C40 has developed a world-leading dataset to better understand the types of power C40 mayors have to deliver action, and how that power is used in practice.[11]

The data behind *Powering Climate Action*, known throughout the report as C40 Powers data (see Appendix 2A for more detail) provide an opportunity to explore climate action delivery routes in detail. While the powers data describes the types of power that cities hold over different sectors of city operations, CAM 2.0 gathered information on more than 8,000 climate actions taken in cities, including insights about how they are delivered. C40 categorises mayoral powers over a city's climate-related assets and functions[12] according to four *power dimensions*:

- **Own or operate**
- **Set or enforce policy/regulations**
- **Control budget**
- **Set vision**

By looking at how climate action is delivered in relation to each asset or function – which dimensions are employed and the degree of control a city has in relation to each dimension (or, the *power score*) – it is possible to identify combinations of powers and to amalgamate the findings at the sector level. This report describes these combinations as *power signatures*; these provide a framework to identify commonalities among cities, as well as opportunities to drive climate action through collaboration and knowledge sharing.

Figure 1:
C40 cities' power over all assets and functions across the four power dimensions, based on responses from 66 cities

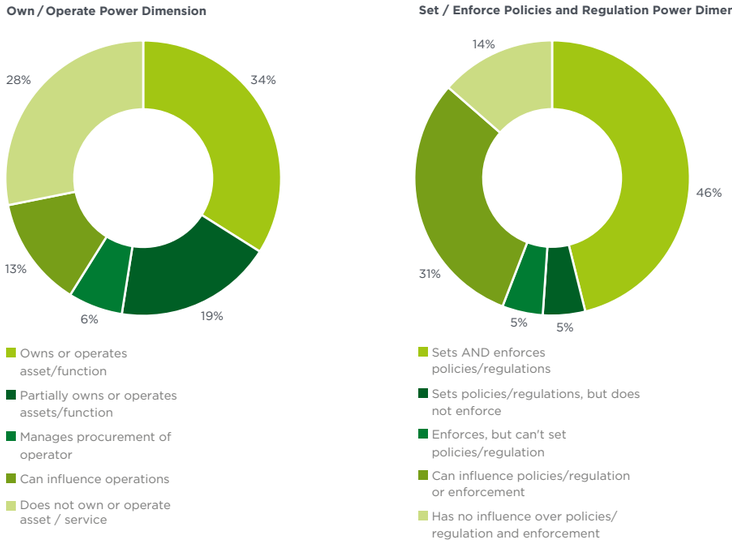
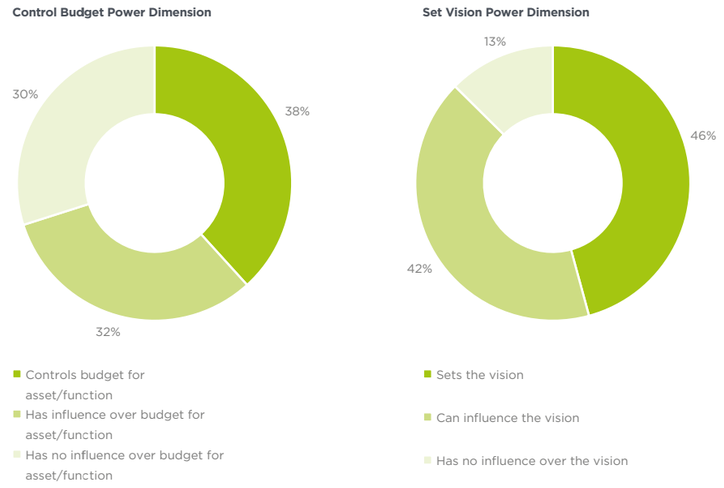


Figure 1 continued:



See Appendix 2A for definition of power score, dimension and signature

There are observable differences between cities' *power dimensions*. For example, within the dimension of 'own or operate', there are almost as many cities that *own and operate* their assets as there are cities that *do not own or operate* them. Likewise, within 'set or enforce policies and regulations' there is a significant difference between the number of cities with capacity to set *and* enforce, compared with those that can set but not enforce policy. Figure 1 illustrates the differences between the powers that cities hold over assets and functions across all sectors.

A third of assets or functions across all cities are owned and operated by the cities themselves. Ownership and operation offer the best conditions for taking action at a local level. Cities that hold this dimension of power can directly control the operation of assets and determine the scale of investments related to climate actions.

On the contrary, for a third of assets, cities have no influence over budgets. It is possible that this trend is driven by the privatisation of services and increasing budget constraints faced by city governments. Cities may seek alternative ways to deliver action when the ability to control budgets is not available. Mexico City, for example, is incorporating sustainability criteria into city building regulations, which puts the onus on developers to achieve the carbon savings that the city wishes to achieve.

Approximately 45% of cities are able to set *and* enforce their own policy, while many other cities are, at least, able to influence policy. This, especially coupled with ownership of assets, puts cities in a good position to take effective climate action. Copenhagen, for example, owns and operates the city-wide district heating network and so was able to set a policy mandating households to connect to it. As a result, take up rates have increased to almost 100%.

Approximately 80% of cities report that they have the ability to set their vision for effective climate action. Although vision-setting is deemed to be a less strong dimension of power than the others, vision statements are an important way for cities to set goals and acquire commitment from other parties. They also provide a key framework within which to work and plan for the future, without which focused climate targets may not be articulated or carried out. Cities with clear goals and targets take around three times as many climate actions as those without, which highlights the importance of vision setting and leadership.

11 Please see Appendix II for further detail on how city power is characterised, measured and quantified by C40.
12 Examples of assets include: city buses or street lighting. Examples of functions are: waste management or land use planning.

Takeaways

34% of assets and functions are directly owned or operated by mayors.

This demonstrates the high level of power enjoyed, and broad basis for direct, unilateral action in these areas.

The power of cities to set and enforce climate policies and regulations has the potential to drive the delivery of action significantly.

Cities that possess this capability, especially combined with the capacity to control budgets, have opportunities to deliver effective climate action. For example, **Toronto's** Green Roof Bylaw requires the construction of green roofs on all new development sites. The Bylaw comes under Section 108 of the City of Toronto Act and applies to new building permit applications for residential, commercial and institutional development made after January 31, 2010.

Setting vision is a powerful means of securing commitment for climate action.

Climate goals set out in this way may also become part of wider city plans and thus more deeply entrenched in long-term delivery targets. A strong vision for climate action shows leadership and commitment, even where there are restrictions on the city's power. The Walkable City **Stockholm** City Plan is a comprehensive water and land use plan led by the city — it is the first step in the pursuit of the city's future vision.

Cities with lack of budgetary control or ownership or operation of assets can still deliver ambitious climate action

Partnering with actors, such as state or national governments, who possess needed resources can help cities to overcome disadvantages in certain areas, allow them to focus their resources and build upon existing strengths. For example, **Melbourne** is working with the Australian government to provide excellent quality pedestrian access to all public transport stops, stations and interchanges. Though the city initiated the plan to improve pedestrian access, the state government takes on the responsibility to fund and implement it.

2.2 Mayoral Power by Sector

This report maps the dimensions of power that cities hold in each sector to illustrate the powers they commonly have over their assets and functions across different sectors. Later the report compares these power dimensions to the actual number o f actions cities manage to deliver.

The diagrams demonstrate the dimensions of power that exist across all C40 cities in three core sectors: Transport; Energy; and Water. A composite power score represents a combination of the individual power scores for each asset or function within the sectors; the size of the diamonds reflects the composite score, where a score of 3 denotes strong power in that dimension, while 0 represents no power.[10]

The graphs show that in the Transport sector cities have a higher power score in all four power dimensions for city roads, municipally-owned fleets, on-street car parking, and pavements and sidewalks, than for any other assets. A high power score in all four power dimensions implies a high level of city control over the asset or function.

The observations in this section reflect the way C40 cities, on average, operate their assets and functions. For example, in the Transport sector, it is very common for C40 cities to have – and to exercise – all dimensions of power over city roads, while it appears to be more common for other actors to operate ports.

For other assets – such as private vehicles – cities exhibit power in relation to only certain dimensions. In the case of private vehicles, cities have no power of ownership and operation.

Figure 2: Sector power signatures – transport assets and functions

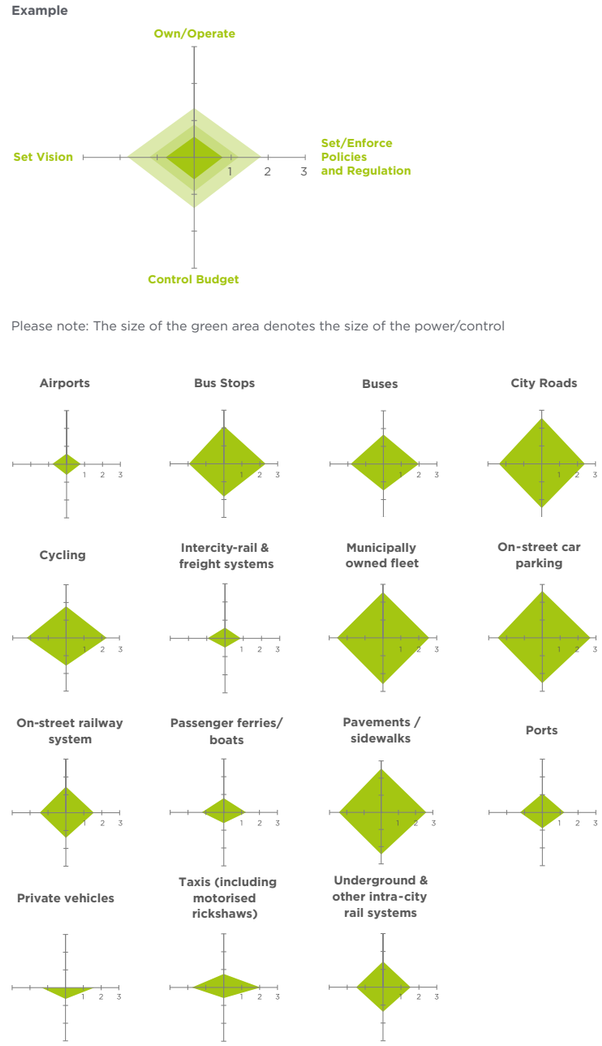
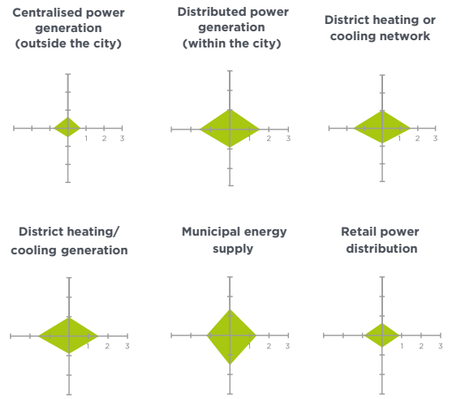


Figure 3: Sector power signatures – energy supply assets and functions



10 See Appendix II for more information about how these diagrams were prepared.

In the Energy sector, cities have a higher power score in relation to setting or enforcing policies and setting vision, than they do to own and operate, or to control budgets. The exception to this is municipal energy supply, for which ownership and operation and budgetary control have higher composite power scores.

Notably, cities indicate having the power to set/enforce policies and set the vision for distributed energy solutions, which has the potential to translate into effective climate actions when combined with low-carbon energy supply options.

In the Water sector, cities have the capacity to use all four dimensions of power. The power score for budgetary control is lower than for the other dimensions in all three asset groups. The powers to set and enforce policy and to set vision are the higher scoring dimensions across all assets in the water sector.

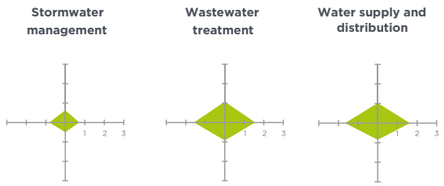


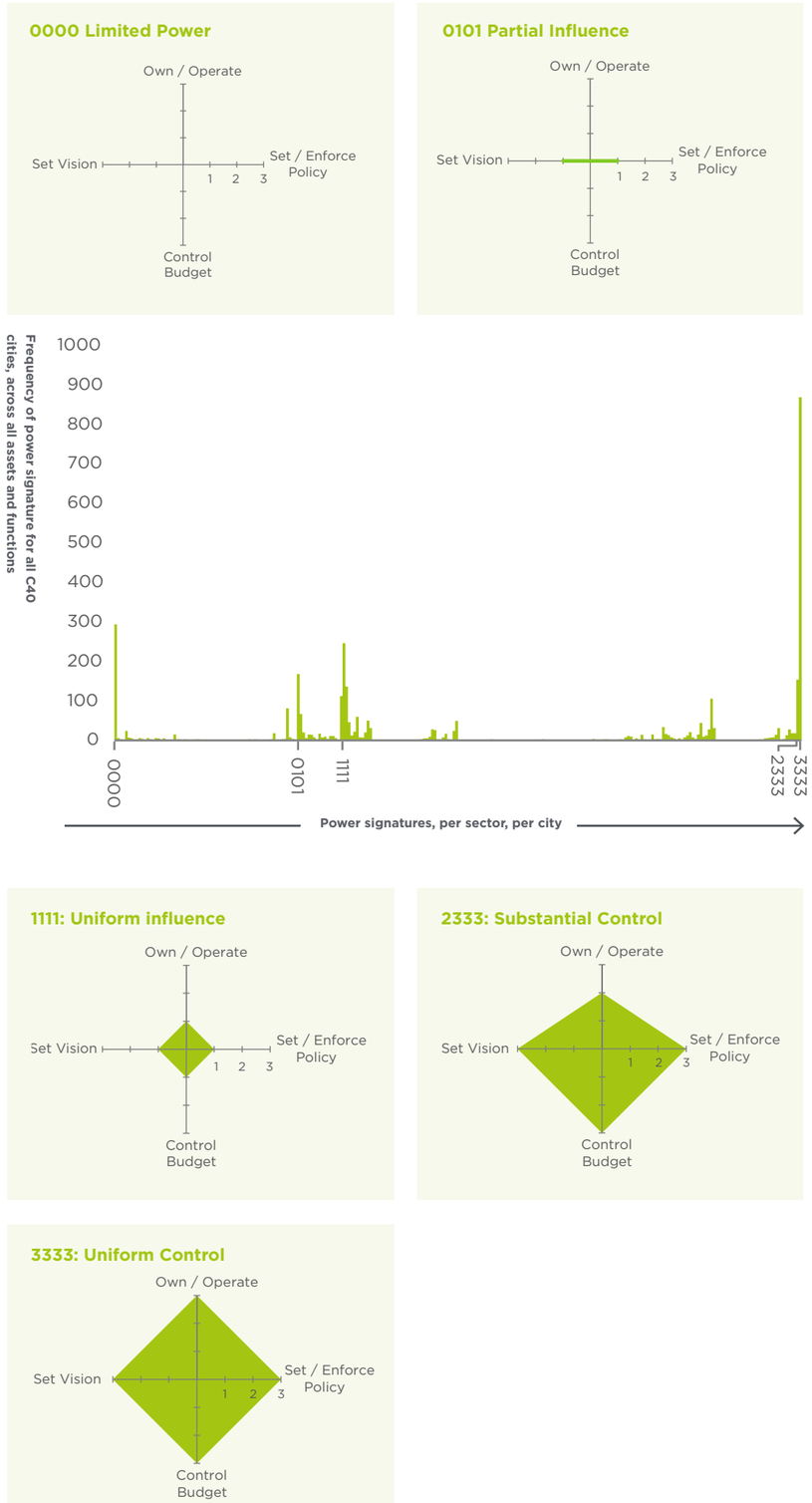
Figure 4: Sector Power Signatures – Water Assets and Functions.

2.3 **Common Power Signatures of Cities**

The following sections examine how powers translate into city climate action, and identify the dimensions of power that appear to drive delivery of actions. Each city has four different scores (one for each dimension) per sector and per asset or function within each sector. This combined score illustrates the dimensions of power that each city has within each sector – known as their *power signature*. The power signature illustrates the direct powers cities have to implement and govern climate action. A power signature can be for an asset or function, or aggregated together for a whole sector. For instance if a city has high power over each of the four power dimensions for a particular asset, it will have a power signature of 3333. If it has high power over all dimensions except for moderate "own/operate", it will have a power signature of 2333. If it has no power except for low power to set policy and set vision, then a city has a signature of 0101 for that asset or sector. There are 256 possible combinations of power, and so 256 possible power signatures. See Appendix A2 for further explanation.

Cities display similar power signatures as each other across sectors, and may therefore be able to learn from each other about the practicalities of delivering actions through a particular power signature, or mix of powers. Figure 5 demonstrates that cities cluster around common power signatures.

Figure 5: Exploring cities' Power Signatures: All 66 cities, all 12 sectors. This graph displays how many assets and functions in C40 cities have each power signature. For instance, there are more than 800 assets and functions across C40 cities over which cities have full power, or a signature of 3333.



Top 5 signatures:

3333: “Uniform Control”: Uniformly very high control over asset or function. C40 mayors have this uniform high power, across all four power dimensions, for 27% of all assets and functions. In these cases mayors have the capability to deliver climate action independently.

2333: “Substantial Control”: High control over asset or function, with close to uniform control. There is a large number of very similar signatures - 5% of power signatures are nearly identical, for example - but with only partial ownership or operation responsibilities.

1111: “Uniform Influence”: These cities have influence over assets in all four powers dimensions, which they can use to shape intelligent action, but do not exercise strong control in any. 8% of total C40 city assets share this component.

0101: “Partial Influence”: Limited direct control, with moderate ability to set policy and vision for asset or function. In 5% of cases, cities possess no control over their assets’ budgets, and are not the owners or operators. They must use their influence over vision and policy to implement the action they desire, while placing reliance on their third party partners and other city stakeholders.

0000: “Limited Power”: 9% of assets or functions from amongst C40 cities show uniformly limited power, indicating the proportion of assets and functions outside of direct mayoral control or influence. For these cities to deliver their climate agendas in these sectors, they must look to bring on board alternative stakeholders and leverage the strength of their networks.

Takeaways

Despite a range of possible power combinations, there are many cities with identical signatures.

This is critical for the way that C40 is able to support the replication of best practice across its global network. Cities with the same power signature but different actions could learn from one another about how best to leverage the powers they hold. Such commonality indicates a strong role for C40’s networks to facilitate knowledge sharing and capacity building based on the shared characteristics of member cities.

Many cities hold all four dimensions of power over their assets or functions.

However, lower levels of influence over budgetary control are common among C40 cities. This suggests that cities may be limited in their ability to deliver climate action directly in certain sectors.

Common power profiles among cities help cities to spread and accelerate best practice. This means that cities do not need to completely re-invent the wheel when working together.

However this work demonstrates that the dimensions of power that mayors hold in each sector are similar across C40 cities. The relative strength (power score) of the different dimensions leads to five main clusters of power signatures that typically characterise mayoral power. These clusters range across a spectrum, from a uniformly high level of control through to uniformly limited power.

The power signatures are a step towards developing typologies of city climate governance.

However, additional aspects of government and governance must be understood. This is developed in the following chapter.

The common distribution of powers within cities suggests they can benefit from sharing delivery strategies with one another, and learn from the ways different cities have delivered action under different power scenarios.

Fig.6

City Power Mix

How Power Signatures Combine and Compare Across All Sectors and Cities

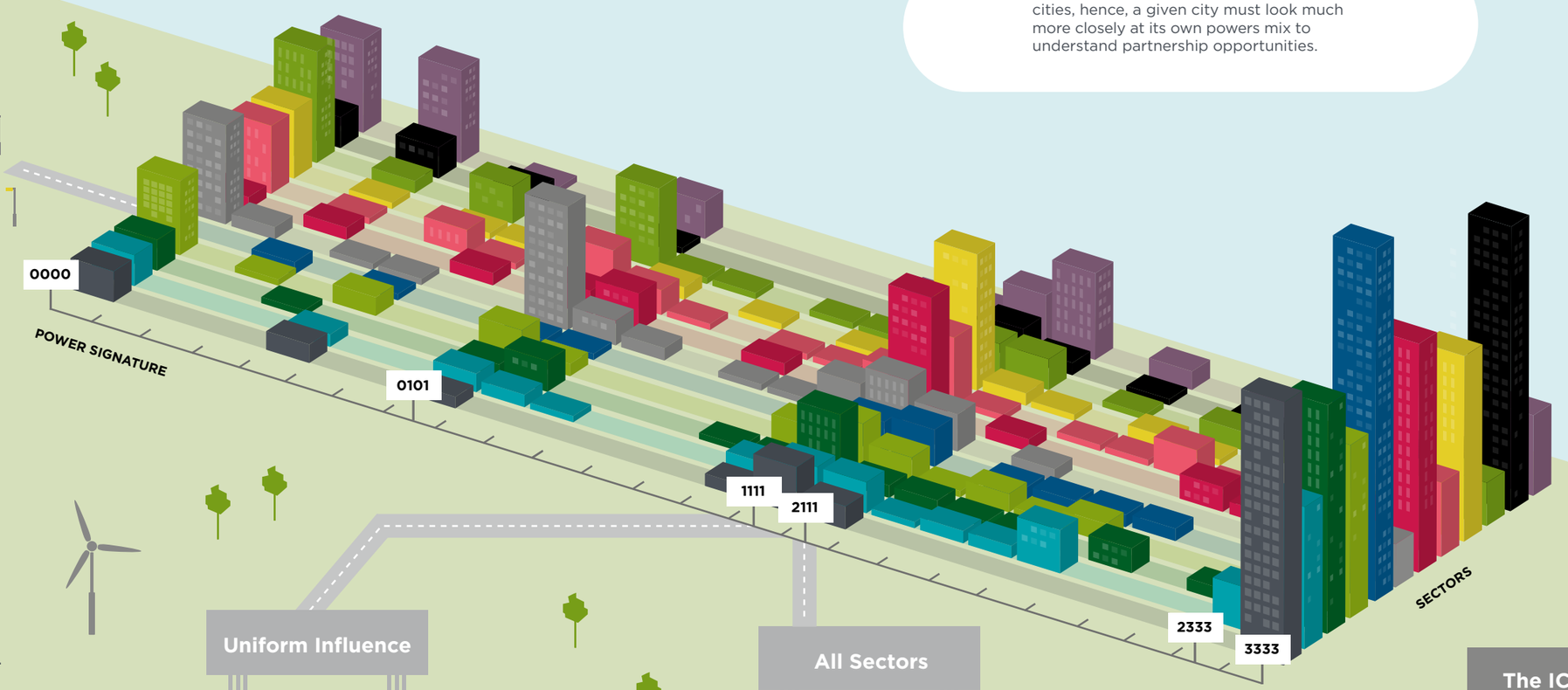
This graph shows the spread of power signatures for all C40 cities, by sector. Including Limited Power on the left increasing towards Uniform Control on the right, with all 256 possible power signatures in between. This graph allows comparison of how common different power signatures are across different sectors. As can be seen, there is different clustering where certain profiles are more popular. Popular power signatures are highlighted with signposts.

Overall, there is a high degree of commonality across cities' mix of powers.

Where there is a high frequency of a given power signature, it may be assumed that an action in this sector that works well in one city is likely to be successful in many other cities.

The Sector with the most distinct signatures are Food and Agriculture and Energy Demand in Buildings.

This implies much less consistency across cities, hence, a given city must look much more closely at its own powers mix to understand partnership opportunities.



Outdoor Lighting

All cities have some power over the Outdoor Lighting sector.

The Outdoor Lighting sector is most dominated by the "Uniform Control" signature. This implies that cities uniformly have full control over these assets. Therefore, the introduction of modern LED lighting represents a quick-win for cities in terms of energy and emissions savings.

Adaptation

Certain sectors, Adaptation in particular, are less dominated by a given signature. In Adaptation, there are five signatures (0000, 1111, 2111, 2333, 3333). This represents a bi-polar power architecture, with components clustered around the weakest and strongest types of power.

Uniform Influence

The "Uniform Influence" signature, 1111, is the third most common overall, and has a strong presence in all sectors.

All Sectors

All sectors share the signature with score 2111, that is, partially owning or operating these assets, while only being able to influence the other dimensions. However, this signature does not feature at all for the Health sector.

The ICT Sector

In the ICT sector, the most common signature is 0101. Cities with this signature have no ownership or budgetary control, and only limited ability to influence policy and vision.

City Power Mix Key Each building represents city power in the following sector:

Adaptation · Energy Demand Buildings · Energy Supply · Finance & Economy · Food & Agriculture · Health · ICT · Outdoor Lighting · Transport · Urban Land Use · Waste · Water

3

The Relationship between Power and Action:

Limited Power Does Not Mean Limited Action

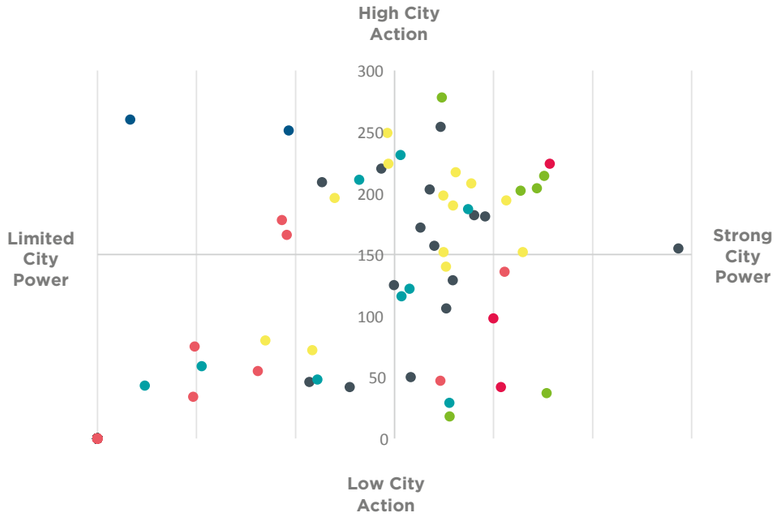
3

The Relationship between Power and Action: Limited power does not always mean limited action

While it could be assumed that cities with strong mayoral powers would take more action, findings from CAM 2.0 show that some cities with limited power are also able to take high levels of action.

The strongest levels of mayoral power cited in CAM 2.0 are associated with owning and operating city assets, suggesting that cities with greater capacity in these areas should be delivering more action. However, the scatter graph below (Figure 7) illustrates that some cities with a lower overall C40 power score (1) are also delivering medium and high numbers of actions. This suggests that cities are utilising alternative delivery routes, such as partnerships with the private sector and other non-state actors. Chapter 4 further explores the varied, and often innovative, pathways that cities are following.

Figure 7: Investigating the correlation between power and action across regions



Regions are represented by the colours indicated in the key. Each dot represents a city.

The four quadrants (Figure 7) are divided by the X-axes for average city power score (0 to 12, totalling scores across all four power dimensions. See Appendix 2A for explanation of power scoring) and Y-axes for average action count per city. The cluster of cities in the lower left quadrant shows that a very low average power score can potentially limit the number of actions cities can take. However, the relationship is not direct; low power does not necessarily denote a low number of actions. For those cities with a low power score and higher number of actions, the evidence suggests that cities are leveraging the powers they do have to encourage, invite, incentivise or require action by others through the development of vision statements, policy frameworks and other mechanisms. For example, in **Washington, DC** the Mayor's College and University Sustainability Pledge (CUSP) was signed by nine universities, establishing their commitment to make DC the "greenest college town in America" through actions such as LEED certification of buildings and purchasing of renewable energy.

Since a higher overall power score can ultimately increase the number of actions a city government is able to take, the data also suggests that cities can supplement their own power mix by partnering with other actors who hold complementary powers. Public-private partnerships, collaboration with other levels of government and facilitation of civil society groups can expand the reach of a city's own power. For example, the Smart **London** Board comprises a group of leading academics, businesses and entrepreneurs who are appointed to help forge a joint, cross-sector approach to place digital technology at the heart of city operations and decision-making.

The evidence suggests that mayoral powers and city climate actions are not directly correlated due to the flexible ways in which cities are accustomed to using their powers. Chapter 4 investigates in more detail the various and innovative ways cities are choosing to deliver climate action; governance structures that allow for collaboration are central to this story.

Although in the broad sense cities are taking extensive action where they have low power, in some areas lacking power may inhibit action. In some specific areas cities with more power on average demonstrate more action in a way that bucks the global trend. For example in the buildings sector, where cities have strong power they deliver almost three times as much action on average per city as those with limited power. For instance cities with strong power are taking 37 actions to deliver Building Energy Management Systems, and 20 actions to deliver Energy Performance Contracting.

Where cities have limited power over assets in Community Scale Development, they deliver half the rate of actions as cities with strong power. For example cities are taking 19 actions to deliver large green and open spaces where they have strong power, but only three actions where they have limited power. In Latin America, where cities have strong power over private transport assets they deliver three times the rate of action when compared to where they have low power.

This evidence may imply that providing cities with stronger power in these areas could result in more action taken.

4

A More Comprehensive Framework:

Understanding the role of government structures and policies

4 A More Comprehensive Framework: Understanding role of government structures and policies

As the powers analysis has shown, city governments frequently hold power over assets in core city service areas, and are therefore well placed to take on the planning, coordination and delivery of actions associated with tackling climate change. However, the research also shows that cities with limited power are also capable of taking action. This implies that there is a range of other factors to be considered, for instance other actors – from private institutions to community groups – with the capacity to influence the direction and delivery of climate action. City governance encompasses these actors and their powers to influence decision-making, together with the city government itself. Further discussion about city government and governance structures can be found in Appendix III.

4.1 The Role of Government Leadership and Structure

The structure of a city government, including factors such as the leader's length of term and mandate, and the hierarchy of the administration, may also influence the number of actions a city is able to deliver.

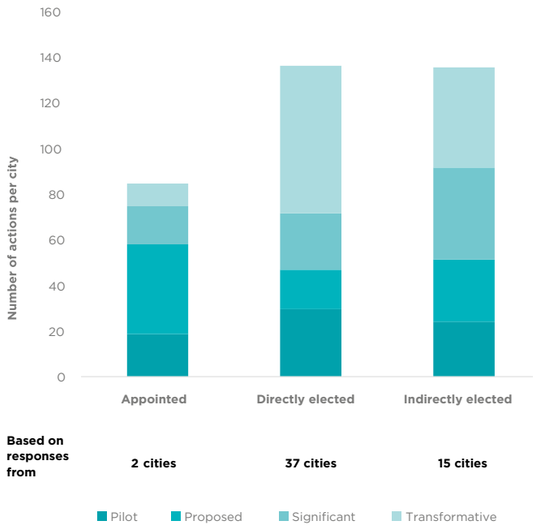
Table 2 explains these characteristics and distinguishes between those that are considered in this study and those that are part of the wider discussion on climate governance. The graphs following the table illustrate the relationship between these structural characteristics and the number of actions carried out across C40 cities.

Table 2: Definitions of key terms and data considered to explore governance in C40 cities

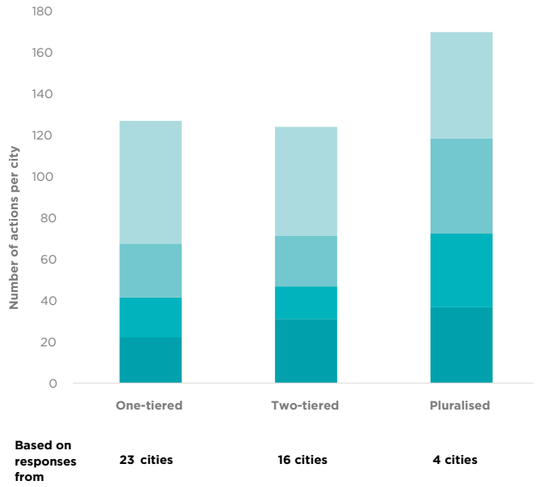
	Data type	Description
Political Context	**Political orientation**	Overarching political ideologies, e.g., socialism and neoliberalism, may influence city government structures and powers
	Length of mayoral term	In years
	Mayor's mandate	Indirectly elected - Elected via a parliamentary system Directly elected - Directly elected by voters Appointed - Appointed by another tier of government
	Existence of a city strategic plan	City-wide plan for the city, not necessarily specific to climate plans
	Political stability	The overall stability of a state may influence a city's capacity to carry out climate action in a number of ways
	Revenue generation capacity	The ability of a city to raise revenues, through taxation, for example
Government Structure	**City leader**	e.g. mayor, council leader
	Structure	• One-tiered • Two-tiered • Pluralised
	Legislative	Elected officials excluding the mayor
	Civil service	State-run agencies responsible for the day-to-day implementation of government policy
	Boroughs	Administrative units
Other Relevant Data	**Modes of governance data**	A review of academic and other contextual literature relating to modes of governance in cities was carried out. This informed the development of a set of governance typologies which were used to understand and assess the role of governance in delivering climate action
	Data on delivery partners	Delivery partners may be state or non-state actors who interact with the city government and influence climate action to varying degrees, including: • Private sector (e.g., financial institutions) • Intergovernmental institutions (e.g., UN) • Transnational networks (e.g., CCP)
	Typology questionnaire responses	City-specific questionnaires were sent to C40 City Advisers who provided real life examples relating to power in selected city sectors.

Figure 8: Exploring the relationship between government structure and city climate action

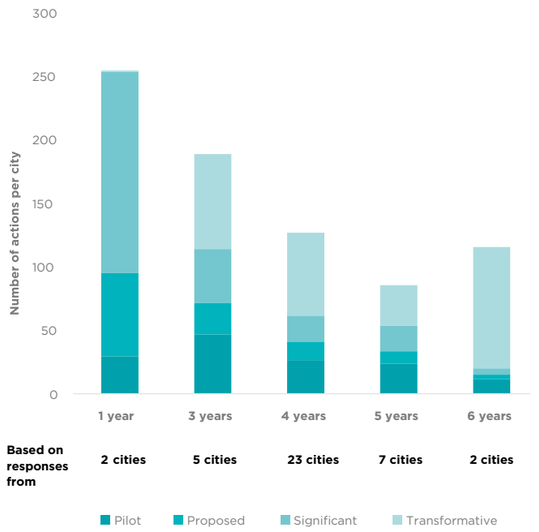
Action scale and status by leader's mandate



Action scale and status by government structure



Action scale and status by leader's term scale and status



Figures 8 through to 10 explore the realtionship between characteristics of government and city climate action. Three interesting suggestions can be made based on this data:

Elected leaders deliver more action, and those directly elected deliver the most transformative action.
The data suggests that mayors who are appointed deliver less action on average. Differing mandates are likely to lead to different mayoral priorities, and it would appear that elected mayors are responding to the public's drive for climate action.

Actions per city may decrease with increasing term length, but the proportion of transformative actions broadly increases.
It takes time to deliver the kind of transformative action required when facing the challenges of climate change. With shorter mayoral cycles, short-term pressures come to the fore, and the concerted effort required to see projects and programmes through to fruition is more difficult to sustain. However, the need to demonstrate progress over a five- or six-year term may drive a far greater number of actions.

City governments with a pluralised system deliver the most actions per city on average, but one-tiered governments deliver proportionally more transformative actions.
This may point to the concentration of powers and functions in a single office committed to the delivery of city-wide infrastructure and action due to the high levels of coordination and high-level decision making required. A pluralised system may, by nature, lend itself to delivery of high action counts due to decentralisation and the presence of a larger administrative staff or civil service.

4.2 **City Governance**

The previous chapters have suggested that a city's ability to deliver climate action is influenced by a range of factors. This chapter draws together the strands of government and governance, and the actors involved in delivering climate action under a comprehensive framework. This is designed to aid the understanding, characterisation and measurement of governance. This approach moves beyond conceptions of direct power to examine the complex and nuanced range of influences that impact the delivery of climate action.

In most cities, governance of urban climate action involves a range of public entities, delivery routes and partners, which together form a pathway to climate action.

The pathway is influenced by background characteristics of the city, such as political orientation and stability, as well as the presence of multiple actors from government (e.g., mayors and civil service) and the wider city landscape (e.g., private sector and civil society). Political characteristics, government structures, relevant city actors and the extent to which they interact will be highly specific to any city. These influences set the context in which cities operate, as illustrated in Figure 9 under 'City Profile' and 'Delivery Partners'.[11] Details of the research carried out in support of these aspects of government and governance can be found in Appendix III.

The pathway to action is focused on the potential delivery routes by which city governments achieve climate action. The boxes and arrows labelled 'Powers' and 'Levers' illustrate the potential routes a city might use.

11 These lists are not exhaustive and the representation of certain actors, – 'private sector' and 'civil society', for example – is a simplification given the diversity of voices within these constituencies.

Fig.9

Urban Climate Governance Pathway

This pathway is a framework to understand how cities deliver climate action. The particular route a city takes along this pathway defines their governance approach.

City Profile

Political Context

- Political orientation
- Length of mayoral term
- Mayor's mandate
- Existence of a city strategic plan
- Political stability

Government Structure

- City leader / Mayor
- Legislative
- Civil service
- Boroughs

Delivery Routes

Powers

- Own / operate
- Set / enforce policy
- Control budget
- Set vision

Assets and functions

Levers

- Project / programme
- Policy / regulation
- Incentive / disincentive
- Procurement

The stages on the Urban Governance Pathway:

The political context and ***government structure*** that describes the type of city from an institutional perspective. The ***power*** that a city has to implement, defined as four main dimensions of power. The ***assets***, such as road infrastructure, and ***functions***, such as promoting economic development, that a city exercises power over. The ***levers*** usedto deliver change within the city, defined as four main levers. The other organisations that a city may ***partner*** with to take more or better action than they could on their own. Finally, all resulting in delivery of climate ***action***, for example a congestion charge.

Government Structure data

Data type	Description
City leader	e.g. Mayor, Council Leader
Structure	• One-tiered • Two-tiered • Pluralised
Legislative	Elected Officials excluding the mayor
Civil service	State-run agencies responsible for the day-to-day implementation of government policy.
Boroughs	Administrative units

Political Context data

Data type	Description
Political orientation	Overarching political ideologies, e.g. socialism, neoliberalism may influence the city government structures and powers.
Length of mayoral term	In years
Mayor's mandate	Indirectly elected - Elected via a parliamentary system Directly elected - Directly elected by voters Appointed - Appointed by another tier of government
Existence of a city strategic plan	City-wide plan for the city, not necessarily specific to climate plans.
Political stability	The overall stability of a state may influence a city's capacity to carry out climate action in a number of ways.
Revenue generation capacity	The ability of a city to raise revenues for example through taxation.

Other Relevant data

Data type	Description
Modes of governance data	A review of academic and other contextual literature relating to modes of governance in cities was carried out. This informed the development of a set of governance typologies which were used to understand and assess the role of governance in delivering climate
Data on delivery partners	Delivery partners may be state or non-state actors who interact with the city government and influence climate action to varying degrees, e.g. • Private sector e.g. financial institutions • Intergovernmental Institutions e.g. UN • Transnational networks e.g.CCP
Typology questionnaire responses	City-specific questionnaires were sent to C40 City Advisors who provided real life examples relating to power in selected city sectors.

Actions

Delivery Partners

- Civil Society
- Intergovernmental institutions e.g UN
- Private Sector actors e.g financial institutions
- Transnational Networks
- Academic Institutions
- National Government

4.3 Exploring Governance Typologies

While it is helpful to understand cities in terms of individual characteristics, like their mayoral term or political orientation, it is often the interrelationships between these characteristics that explain more about how a city operates. On this basis, a set of typologies has been developed in order to understand how combinations of governance characteristics can impact a city's capacity to deliver climate action.

This was informed by a review of existing work on urban climate governance (see Appendix III) and analysis of the C40 data.

The typologies describe the models of climate governance typically displayed by C40 cities. These typologies illustrate the governance and delivery frameworks within which different cities operate. Analysis of the typologies provides in-depth insights into how governance structures influence power and actions, and the trends that are associated with governance models. The typologies are summarised in Table 3.

For the purposes of this analysis, C40 cities were assigned to governance typologies based on their governing characteristics in each sector. The research indicates that C40 cities do not operate via a single governance typology that applies across all sectors; indeed only two cities in the sample fit a single typology. 48 cities fall into at least three different typologies, while 15 cities fall into five of the six typologies. This represents significant cross-sector diversity, showing that cities are dynamic actors whose approach to governance varies enormously depending on the context. Overall, governance typologies are distributed more evenly across cities than power signatures, which show greater clustering of cities. The graphs below illustrate the overall breakdown of typologies by occurrence and region.

Table 3: City governance typologies

Note: the typologies relate to sectors (e.g. transport) and not to whole cities.

Commanding

Uniformly extremely high control over assets and decisions. Most commonly uses regulatory tools to dictate and enforce that action be taken. Able to ensure delivery without non-state actors.

Predominant Power Signature
Uniform control

Regional Context
This typology is most commonly seen in East Asia, and is only found in cities with term lengths of four years and higher. It is, perhaps unsurprisingly, not found in cities with pluralised government structures, and is most common in cities with indirectly elected mayors.

City Examples:

Addis Ababa
Food and Agriculture
Basel
Waste
Beijing
Buildings
Bogota
Buildings
Philadelphia
Finance & Economy
Tokyo
Adaptation

Collaborating

Has uniformly moderate power over assets and decisions, not favouring any particular power type, and therefore at times unable to deliver action directly and unilaterally. Hence uses diverse range of routes to enable action in partnership with others.

Predominant Power Signature
Uniform influence

Regional Context
The Legislating city typology is most commonly found in North America, and is overwhelmingly comprised of mayors with four-year terms.

City Examples:

Athens
Urban Land Use
Austin
Transport
Bangkok
Buildings
Bogota
Waste
Delhi
Transport
Hanoi
Finance & Economy

Legislating

Substantial power over assets and decisions, although has lower control over budgets. City strongly prefers setting regulation and sanctions to deliver action. In some cases this may be because of constrained budgetary control preventing direct action by the city. Requires some limited involvement of non-government actors to ensure delivery.

Predominant Power Signature
Mixture of power signatures

Regional Context
The Legislating city typology is most commonly found in East Asia, and is overwhelmingly comprised of mayors with four-year terms.

City Examples:

Barcelona
Water
Buenos Aires
Urban Land Use
Changwon
Transport
Jakarta
Transport
Johannesburg
Waste
Portland
Finance and Economy

Facilitating

City has limited power to deliver action directly, and so coordinates action through partnerships with private sector, civil society etc. However can encourage and enable partners by using minor policy levers and vision setting to encourage action.

Predominant Power Signature
Partial influence

Regional Context
This typology dominates sectors in South & West Asia, and is also common in Southeast Asia & Oceania and Latin America. It is common in cities with a range of structures and mayoral term-lengths, but rarely appears in cities with appointed mayors.

City Examples:

Singapore
Water
Venice
Food and Agriculture
Yokohama
Energy Supply
Curitiba
Energy Supply
San Francisco
ICT

Implementing

Uniformly very high control over assets and decisions. Is able to take climate action directly through delivering own projects. Able to ensure delivery without non-state actors.

Predominant Power Signature
Uniform control

Regional Context
This typology occurs most frequently in parts of Europe, Latin America and North America. It appears most in cities with directly elected mayors, the vast majority of which are elected for four-year terms.

City Examples:

Basel
Transport
Melbourne
Buildings
Warsaw
Outdoor Lighting
Houston
Finance and Economy
Buenos Aires
Waste
Mexico City
Buildings

Providing

Substantial power over assets and decisions across the board, enabling the city to deliver action directly. Supplemented by providing strong support for partners, including those in the private sector.

Predominant Power Signature
Mixture of power signatures

Regional Context
Popular in North America, Europe and East Asia in particular, the Providing typology is most common in one-tiered governments with directly elected mayors.

City Examples:

Beijing
Energy Supply
Lagos
Adaptation
Mexico City
Urban Land Use
Oslo
Water
Seattle
Waste
Shanghai
Finance& Economy

Figure 10: Percent of cities by governance typologies

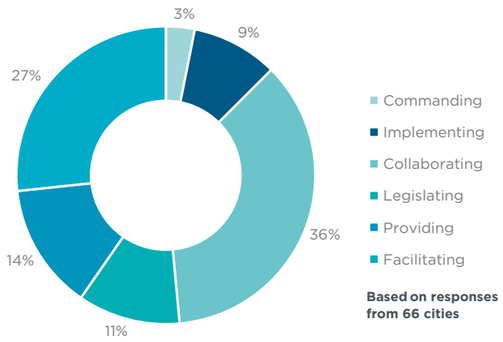


Figure 11: Breakdown of Typologies by C40 Region

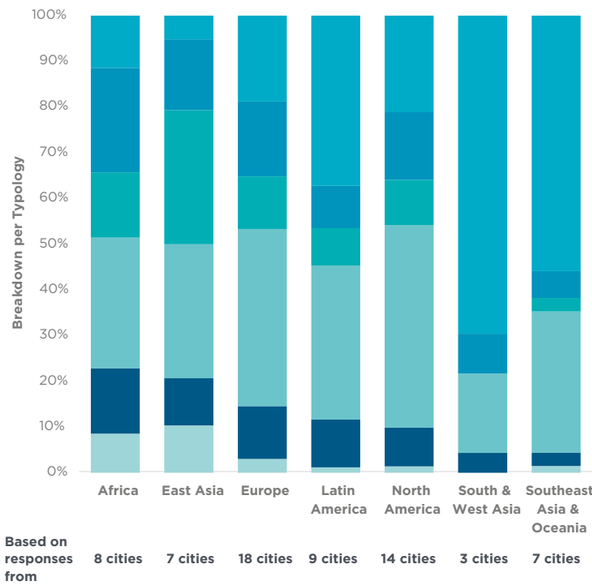


Figure 10 demonstrates the dominance of the Collaborating and Facilitating typologies.

Figure 11 illustrates that there are some natural high-level pairings between regions, and hence the potential for collaboration or sharing of approaches. Of all the regions the two most similar are North American and European cities, with close to identical spreads across all governance types. These cities show very low rates of Commanding governance, and in general are the closest to the global averages across all cities (similar to the spread shown in Figure 10). East Asia and Africa are also similar to one another, with the highest levels of Commanding cities of all the regions and the lowest levels of Facilitating. Finally South West Asia shows a strong similarity to Southeast Asia and Oceania, both showing a Facilitating style governance in well over half of their assets and functions.

More information about the regional spread of powers can be found in Appendix I.

4.4 **Using Governance to Understand Action**

Analysis of the typologies demonstrates that cities are using a variety of governance approaches to deliver action. These range from conventional powers associated with owning and operating assets to more innovative combinations involving collaboration between multiple actors and delivery routes. This section addresses these mechanisms and draws conclusions on how cities might use alternative modes of governance to achieve more climate action.

Typologies were compared across all 10 city sectors for all 59 cities represented in the data. This equates to nearly 600 sector typology assignments. The typologies were analysed for three key sectors: Energy; Transport and Water. These were the dominant sectors reporting the highest number of climate actions in CAM 2.0.

4.4.1 Number of Climate Actions by Governance Typology

The findings show that, on average, cities in the Commanding and Implementing typologies have registered the fewest actions in our survey, although cities in the Commanding typology are able to deliver more transformative action (see Appendix II for full definitions of terminology). This reinforces the findings in Chapter 3 that cities with more limited direct powers are in fact able to take high levels of climate action by employing governance structures involving collaboration.

Figure 12 also shows that the more autonomous models of governance (e.g., Commanding and Implementing), which typically have stronger powers, are not delivering the most actions, while those cities using governance models associated with less strong power - such as Collaborating or Legislating typologies - are delivering a greater number of actions. The graph also shows that despite taking fewer overall actions, cities in the more autonomous typologies are taking a high number of actions at significant or transformative scale. Despite having some of the lowest levels of conventional power, Facilitating cities are delivering more action than Commanding cities, associated with the strongest levels of power.

The role of collaboration is clearly shown in Figure 12. A similar scenario is also reflected in the sector graphs that follow.

Figure 12: Sector-wide perspective: Across all C40 cities, the total average actions being taken in sectors with different dominant governance types

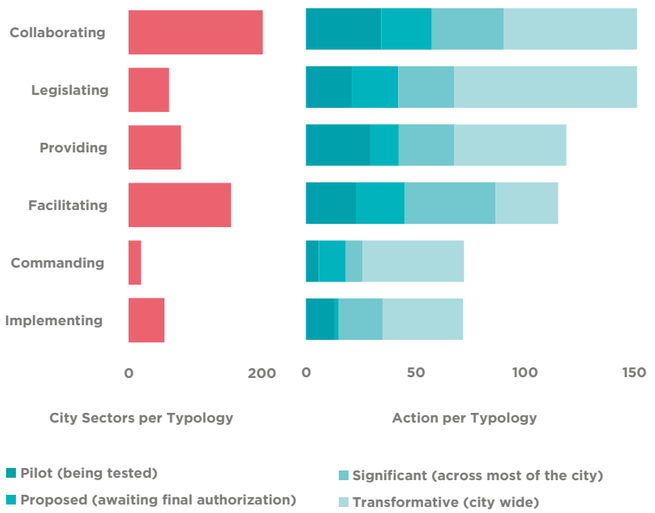
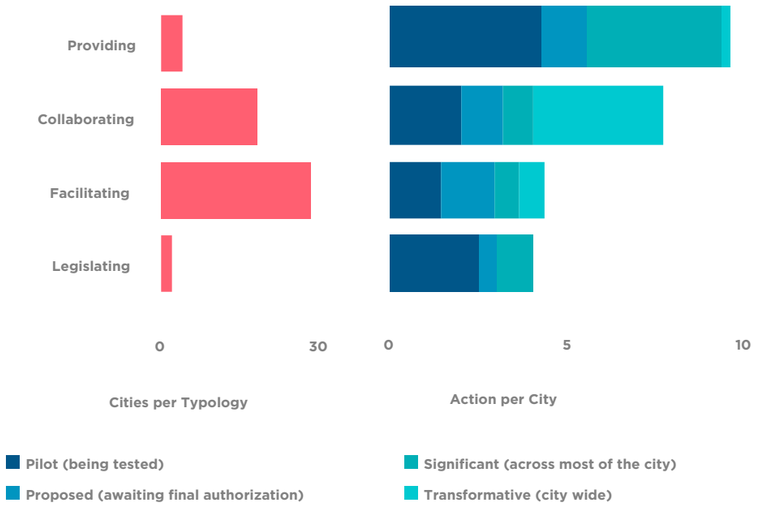


Figure 13: Across all C40 cities, the number of energy actions being taken by cities with different dominant governance typologies for that sector



Energy

Facilitating is the dominant typology in the Energy sector, though the average number of actions per city for Facilitating cities is less than for Providing and Collaborating cities. Collaborating cities have taken, on average, a greater number of transformative actions.

Providing cities have a high degree of control over assets and functions, while Collaborating cities have partial control over assets and functions and Facilitating cities have little or no control over assets or functions. Exemplary performance by the Collaborating cities typology suggests that many cities within the C40 network are able to overcome their limited power and are forming fruitful partnerships with external stakeholders. The comparatively lower performance of cities within the Facilitating typology suggests that either cities are experiencing difficulty forming effective partnerships or that some degree of control over assets and functions is required to be effective in the Energy sector.

London's Decentralised Energy Programme Delivery Unit (DEPDU) is an example of a city using its capacity to facilitate action with minimal direct involvement from the city government itself. The DEPDU programme was initiated by the city's Greater London Authority but operates as an independent organisation that takes guidance from the city but manages its own activities. The project supports London boroughs to produce energy masterplans and identify areas suitable for heat networks across the city. The city does not invest directly in infrastructure but assists other local actors with delivery of action by developing a strong technical evidence base and forming a strategy that may be implemented and adopted easily by other actors.

Figure 14: Across all C40 cities, the number of transport actions being taken by cities with different dominant governance typologies for that sector

Transport

There are significantly more cities in the Collaborating typology than any other category in the Transport sector. While Collaborating cities have the highest average number of actions – including more actions across the whole city or most of the city – Legislating, Providing, and Facilitating cities are taking a comparable number of actions in the Transport sector. This suggests that C40 cities have a good understanding of the powers at their disposal and are often able to overcome limitations to direct action.

In the Transport sector, powers to own or operate assets and functions and set or enforce policies are associated with the Providing typology. Cities in this group are taking, on average, more transformative actions. This suggests that implementing action through a combination of traditional, city government-led initiatives (e.g. policy/regulation) alongside other enabling activities (e.g. with private sector partners) is more effective for delivering climate action than either policy/regulation or partnerships on their own.

Amsterdam is using the Collaborating model of governance to improve the city's fuel economy and reduce CO_2 from motorised vehicles. To do so, the city is implementing new infrastructure and charging points for electric vehicles, while entering into agreements with private companies such as Nissan, Renault and Mitsubishi, and car sharing schemes such as Car2Go to facilitate uptake of the services.

Figure 15: Across all C40 cities, the number of water actions being taken by cities with different dominant governance typologies for that sector

Water

The Providing typology is dominant in the Water sector. The numbers of Facilitating, Legislating and Collaborating cities in this sector are comparable with one another. On average, Providing cities are taking a greater number of actions and more than a third of those actions are transformative. Although the number of cities and average number of actions within the Collaborating and Legislating typologies is less than in the Providing typology, approximately half of actions taken by Collaborating and Legislating cities are transformative.

The common factor between the Providing, Legislating and Collaborating typologies is a high degree of control over water infrastructures and associated assets and functions. This type of power enables cities to successfully take climate action. Cities within the Legislating typology are also using policy and regulatory tools to deliver actions and cities within the Collaborating typology are forming effective partnerships. Facilitating cities appear to achieve fewer actions, suggesting that other influences and types of power are needed to effectively deliver action in the Water sector.

In Stockholm, all buildings are obliged to connect to city-operated wastewater to energy initiatives. As a Providing city in the Water sector, City of Stockholm also takes a fee for the cost of connecting to the sewage network.

Takeaways

The typologies effectively highlight the relationship between governance and climate action. Specifically, the typologies demonstrate:

Across the majority of sectors, cities are forming fruitful partnerships with key stakeholders.

However, the predominance of the Collaborating and Facilitating typologies also suggests that if cities have some control over assets and functions (compared with little or no control) they are more likely to form partnerships that result in more action being delivered.

Regulatory tools are conducive to climate action, as observed by the performance of Legislating cities in the Water sector.

Cities are innovative.

Many cities that do not have strong power over assets and functions are still implementing actions, many of which are significant or transformative in scale.

Although governance approaches vary significantly by region, there are several clear similarities between specific regions, which may form the basis for more collaboration and sharing.

For example, Europe and North America share a broad spread of governance types, whilst cities in South and West Asia and Southeast Asia and Oceania are Facilitating in more than half of cases. East Asia and Africa show the highest levels of Commanding and lowest levels of Facilitating governance typologies.

Mayors with longer terms tend to focus more on delivering fewer but more extensive actions.

Those with shorter terms, for instance 1 or 2 years, take much more action, but these actions are smaller scale actions This possibly represents their desire to deliver as much as possible, without always having the time to take action to its full fruition.

5

Conclusion

5 Conclusion

This study has explored the forces and relationships that together comprise city climate governance, by focusing on the types of power cities hold and the various pathways they use in delivering climate action. Thanks to their capacity to deploy their powers in innovative ways and to collaborate with other actors, C40 cities are in a unique position to catalyse climate action, and at a transformative scale.

Three main takeaways have emerged from the *Powering Climate Action* report, which provide a framework through which conclusions may be drawn and further investigation and action proposed.

5.1 **Takeaways**

1. Cities share remarkably similar profiles of power across regions and sectors, creating an excellent platform for mutual learning and cooperation.

It is sometimes the perception that cities are each of a different type; that working with each city will be a new learning process, and that there is always some need to re-invent the wheel when transferring solutions between them. While cities use a variety of types of power to achieve action, many cities employ the same profile, or combination, of power types across their various assets and functions.

While theoretically there are multiple possible combinations of power dimensions (e.g. the power to own/operate assets and functions, or set and enforce policies and regulations), the research shows that there are in fact only a small number of common profiles. This indicates that power is often structured in similar arrangements across cities, which suggests that cities are both in a position to find 'peers' overseas, but also to make the best of their current power signatures via collaborative action. For example, the analysis indicates that in 8% of cases, C40 cities have uniformly low power over assets or functions.

2. When it comes to delivering action, the ability of cities to partner is more important than the type or degree of power they have.

The research emphasises that having less power to own and operate assets and functions – the powers traditionally associated with achieving more action – does not necessarily lead to cities delivering less action in practice. Instead, cities with powers that are typically considered 'weaker' - such as vision setting - are also delivering action at a significant scale.

This suggests that cities are using innovative approaches to overcome an absence of 'stronger' powers by implementing softer policy tools in combination with harder options to achieve their goals (e.g. the power to set and enforce policies that require others to act).

This research also reveals that there are other important factors to be considered beyond the conventional wisdom that owning assets is equivalent to stronger power and leads to more action. Ownership of assets does not denote a capacity to invest in low carbon or climate resilient improvements. By exploring the link between government structure and climate action and providing a governance perspective, the report demonstrates a wider understanding of the potential delivery routes and actors involved in guiding and influencing climate policies and actions.

How cities use the range of powers they possess is then more important than the core powers they have; limited power does not always mean limited action.

3. Cites are in a unique position to catalyse wider climate action

It is sometimes thought that due to their size and complexity, cities can be challenging partners to work with. However this work demonstrates that many cities are ensuring comprehensive action is taken through collaboration.

Cities possess a variety of tools that enable them to deliver climate action. With their broad range of capacities – to operate services, fund investments, enact policy, and promote targets and goals – at multiple levels of city administration, cities are uniquely enabled to tackle the myriad challenges associated with climate change. As such they are well placed both to provide services and deliver action independently, as well as to work with other actors and achieve their goals through partnerships and collaboration. The capacity to act in a flexible manner depending on the context enables cities to use the tools at their disposal in the most effective ways.

The typology analysis reveals that city governments are often more successful in delivering climate action when they cooperate with other actors, the private sector and civil society. The predominance of the Collaborating typology supports this message. Nurturing partnerships with actors from both state and non-state sectors may afford cities the opportunity to employ their powers most effectively and ultimately catalyse climate action.

5.2 Call to Action

As urban populations continue to grow, so does the prominence of city-led action in tackling global challenges like climate change. The findings of this research confirm that cities are in a strong position to catalyse climate action and many cities are now seeking to confirm that status on the international stage; in December 2015 the United Nations hosts a forum for cities at the international climate change negotiations (COP 21) in Paris. Here, under the Compact of Mayors cities will be making commitments on emission reductions that are analogous to the Independent Nationally Determined Commitments of nation states.

Based on the evidence, this study presents four main recommendations:

- **Cities should recognise that limited power need not necessarily mean limited action** Cities have enormous potential to deliver action through a broader approach to governance. Through partnerships with other cities, government, private businesses, investors and civil society, cities are taking extensive action even where they don't have strong power. Cities have taken 1,027 actions where they have limited power over assets (around 13% of all action). For example, two-fifths of all action C40 cities are taking on renewable energy occurs in cities with "limited" power to affect energy generation.

- **Cities should reach out to partners to collaborate in delivering action.** As this report shows, cities that collaborate deliver more action. In fact, on average, those cities that take a collaborative approach to governance deliver twice as many actions as those that implement through a less partnership-based approach. As such, cities should reach out to the private sector and civil society, as well as other cities, to deliver more action, and get the most out of the actions they take.

- **The private sector should actively seek to partner with cities to capture unique economic opportunities.** Because cities share strong similarities in the types of power they hold, there is no need to reinvent the wheel when working with different cities. There are strong regional similarities in governance, for instance, The mix of governance approaches used by European and North American cities are on average almost exactly the same, with collaboration with partners being the most common governance approach for these cities.

In sectors where cities lack the governance structure to effect top-down changes, they still hold power and can be critical partners for the private sector and others who actually implement changes. For example, although most cities do not operate or have any ownership over the energy supply sector, they have influence over setting the budget for 35 of the sector's assets.

In some sectors, cities have significant control, so private sector partners must collaborate with them to see changes. For instance, C40 cities have full direct control or ownership over 60% of all assets in the transport and buildings sectors. Likewise, 70% of cities own or operate their own building stock, and just as many directly own or operate pavements and sidewalks in their city.

- **The wider international community must empower cities to deliver climate action.** Although in the broad sense cities are taking extensive action where they have low power,in some areas lacking power may inhibit action. *Powering Climate Action* propagates a call to action for governments and other actors at all levels to help cities leverage the powers and resources they need to expand the scale and scope of climate actions. For example, in the buildings sector, where cities have strong power they deliver almost three times as much action per city as those with limited power. In addition, cities with strong power are taking 37 actions to deliver Building Energy Management Systems, and 20 actions to deliver Energy Performance Contracting. Also, where cities have limited power over assets in Community Scale Development, they deliver half the number of actions as cities with strong power. These examples illuminate the need for broader consensus amongst cities and their counterparts at the regional, national and international level.

A

Appendix

A1
Appendix I: Regional Snapshots of Power and Action

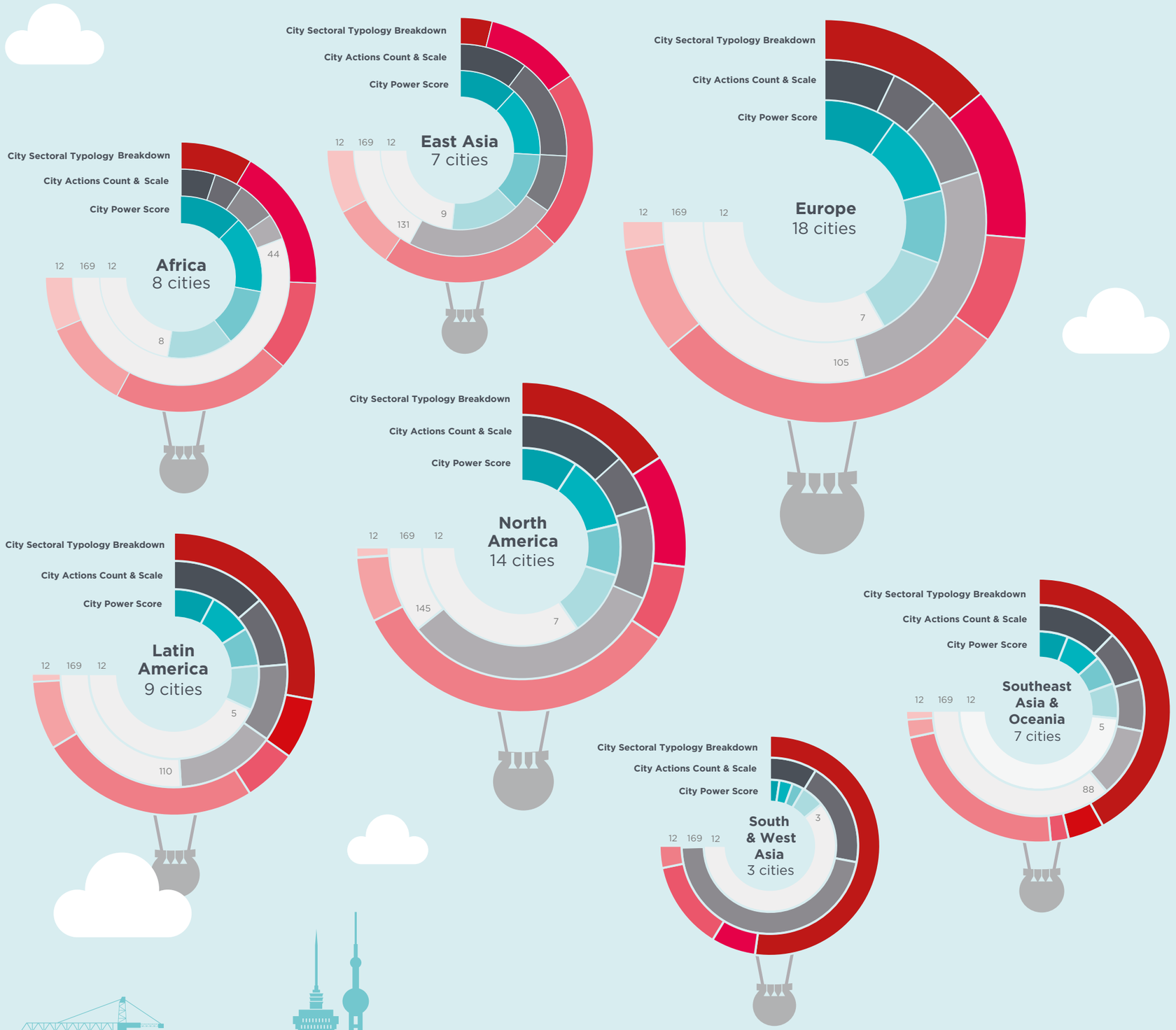
Regional snapshots provide a way to understand city power, governance and action data at the regional level, by compiling data for all C40 cities in each region.

In four concentric three-quarter circles, the regional spirals summarise (i) the average city power score (summed by adding the power scores for each dimension to create a maximum score of 12), (ii) the average city actions count across all sectors by scale, and (iii) the average city sector typology breakdown for each of C40's seven regions: Africa, East Asia, Europe, Latin America, North America, Southeast Asia & Oceania, and South & West Asia.

The numbers at the 9 o'clock position in each spiral represent the maximum observed for each measure. The number of C40 cities in each region is shown in the centre of the spiral. The underlying data is drawn from the C40 Powers database and CAM 2.0, which has been collated to create these regional snapshots.

The regional power spirals show that each region tells its own distinct story of power and governance. Cities in Africa and East Asia have the highest total power scores on average, with powers divided relatively evenly across the four dimensions. While South & West Asian cities have fewer powers, they are taking the most actions on average of all the regions, most of which occur at a significant scale. North American cities, meanwhile, are able to use their relatively strong powers to deliver a high action count, with the most transformative actions.

The Collaborating typology is significant for cities in all regions, with the exception of South & West Asia, which is dominated by the Facilitating typology. Indeed, South & West Asia shows the least diverse mix of typologies among its cities' sectors, which may be influenced by the relatively small sample size.



Cities in **North America** have, on average, a moderate power score and the majority of actions are transformative or significant in scale. Action is carried out in the majority of sectors via the Collaborating typology, suggesting that cities are using both their conventional powers – to own or operate, for example – in combination with alternative forms of powers such as partnerships with other actors.

Action is delivered in the majority of sectors in **Southeast Asia & Oceania** using either the Facilitating or Collaborating typology. Cities in this region have on average a low to moderate level of power and approximately only half of the total actions are at a significant or transformative scale. This suggests cities are compensating for their lack of strong power over assets to coordinate actors and collaborate with partners to deliver action.

In **Latin America**, approximately half of all actions taken by cities are at a transformative or significant scale and have on average a medium power score. On average, sectors in this region fall primarily into the Facilitating or Collaborating typologies.

In **Europe**, the Collaborating typology is most common across the different sectors, though the Facilitating and Providing typologies are also prominent in delivering action. The majority of actions are at a transformative or significant scale.

In **East Asia**, cities have a high average power score and a strong degree of power over their assets in each sector. The Legislating typology is the most common across the sectors, followed by Collaborating. Just over half of city actions are at a transformative and significant scale.

In **South and West Asia**, despite having a low average city power score, a substantial number of actions are at a significant scale. The majority of sectors have implemented climate action using the Facilitating typology, which suggests cities are using innovative ways of enabling action to overcome their lack of access to power.

In **Africa,** cities have a high average power score though they have implemented comparatively few actions. The Providing and Collaborating typologies are most commonly used by cities in this region. This reflects both a high level of control over assets and a tendency for cities to implement action through alternative means and partnerships.

Key

City Power Score

- Set Vision Score
- Budgetary Control Score
- Set/Enforce Policies Score
- Own/ Operate Score

City Actions Count & Scale

- Transformative (city wide)
- Significant (across most of the city)
- Proposed (awaiting final authorization)
- Pilot (being tested)

City Sector Typology Breakdown

- Facilitating
- Providing
- Collaborating
- Legislating
- Implementing
- Commanding

Takeaways

The dominance of the Facilitating and Collaborating typologies aligns with earlier findings that suggest cities are behaving in innovative ways in circumstances where they do not have direct power over their assets and functions.

The Facilitating typology is most commonly associated with cities in Southeast Asia & Oceania, South & West Asia, and Latin America.

This suggests cities in these regions have lower levels of direct power over their assets and functions, which causes them to encourage other actors to deliver action. The importance of leadership is exemplified in these cities' capacities to set climate goals and catalyse action indirectly.

The Collaborating typology predominates in North America and Europe.

This suggests cities in these regions are flexible in the way they govern - using either the city government's direct powers over their assets or enabling other actors through partnerships. Cities in these regions show a more equal spread of typologies compared to the other regions, suggesting cities are taking advantage of the full range of their powers to deliver action.

A2 Appendix II: Analysing Mayoral Powers: The C40 Approach

The analysis underlying this report is drawn from C40 data about cities' powers in relation to a range of assets and functions, together with data collected for the *Climate Action in Megacities 2.0* (CAM 2.0) publication. This section outlines how the data was used to generate the findings of this report.

While the Powers data provides evidence of the types of power that cities hold over different sectors of city operations, CAM 2.0 data contains important information about levers: the delivery mechanisms that are used by city governments to implement climate actions. The CAM 2.0 database lists more than 8,000 climate actions and indicates which of four levers – Procurement, Policy or Regulation, Project or Programme, and Incentive or Disincentive – are used by cities to implement each action. The levers employed by cities are influenced by the powers they hold.

Together, the two datasets illustrate the delivery routes to climate action. Table 4 provides descriptions of the main data types in the C40 Powers database.

Table 4: C40 Powers data – breakdown of data types.

Data type	Description
Sectors	Data was collected from 66 cities across 12 city sectors: • Adaptation • Buildings • Community Scale Development • Energy Supply • Finance • Food and Agriculture • ICT • Mass Transit • Outdoor Lighting • Private Transport • Waste • Water
Assets and Functions	Assets are the city's resources over which power may be exercised in a given sector. These include: • City buses • Street lights • Municipal housing, etc. Functions are the services over which the city has control, including: • Street sweeping/cleaning • Property/municipal tax • Land use planning, etc. There are 70 different assets and functions in the C40 database.

Data type	Description
Power dimensions	The type of control or influence mayors exert over assets and functions across key sectors. Dimensions include: • Own or operate • Set or enforce policy/regulations • Control budget
Action scales	Climate actions are measured at various scales across the city, including: • Transformative (city-wide) • Significant (across most of the city) • Pilot (being tested) • Proposed (awaiting final authorisation)
Levers	Four instruments by which a city government delivers an action, including: • Project or programme • Policy or regulation • Incentive or disincentive • Procurement

A2.1 **Dimensions of City Power**

Mayoral powers over a city's assets and functions are categorised into four dimensions. For each city, this report analyses powers over assets and functions according to the dimensions of power that the city governments hold. These dimensions are fully explained and illustrated in Figure 16 below.

- *Own or operate*
- *Set or enforce policy/regulations*
- *Control budget*
- *Set vision*

Powers Scoring Methodology

To understand the Powers data, each level of power was allocated a score between 0 and 3, or not applicable (for assets/functions that don't exist in a particular city, such as ports in landlocked cities). For cities where mayors are required to obtain authorisation to implement decisions from a city-level body (such as a city council), respondents were instructed to view the mayor as still holding full power. In cases where the mayor is entitled to appoint leaders to organisations that hold power over assets/functions, respondents were instructed to consider this as 'influence' rather than 'control'. Cities that scored a 2 or 3 for a particular asset or function are considered to have control, while those that scored a 1 are considered to have influence. For each asset or function, an overall weighted score was also calculated. This score averaged power across the four power dimensions. Weights were established for each asset or function, placing greater emphasis on power dimensions 'own or operate' and 'set or enforce policies', which are considered to imply a greater level of control. The overall power scores were then segmented as follows:

- *A score of 0 to <1 = limited power;*
- *A score of 1 to <2 = partial power; and*
- *A score of 2 to 3 = strong power.*

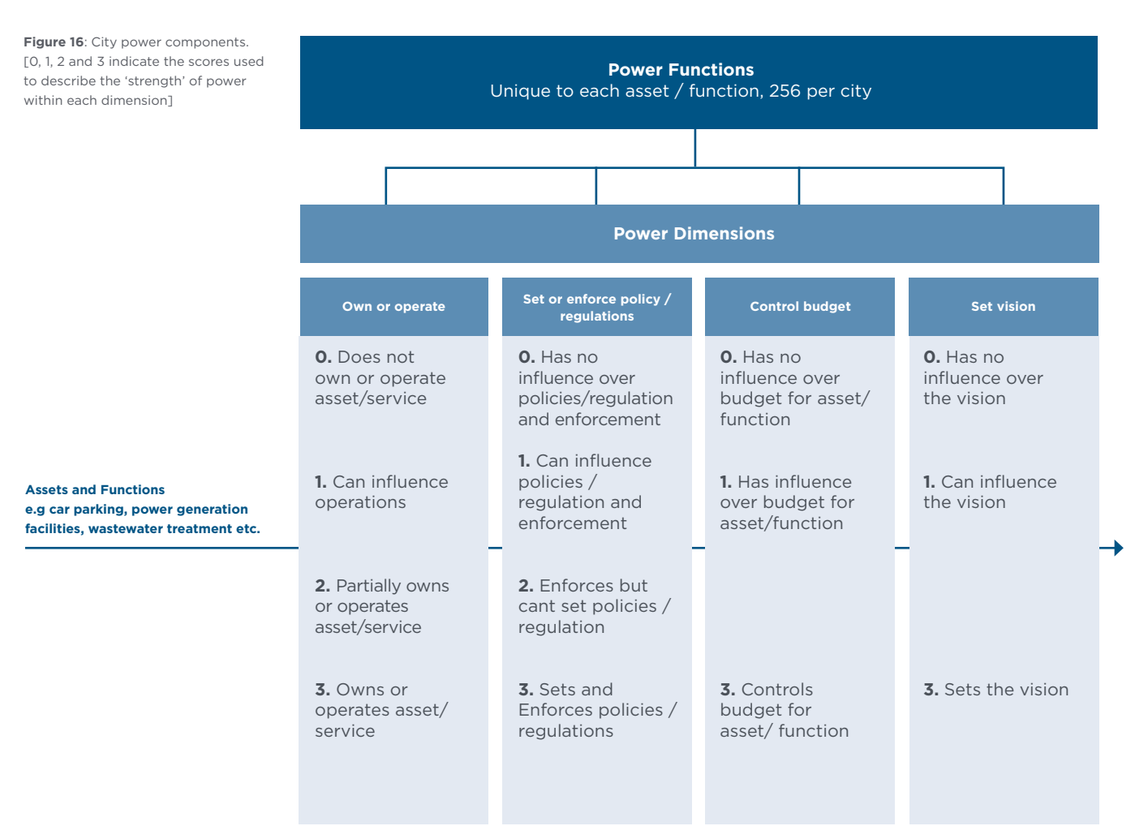
A2.2 **City Power Signatures Methodology**

By scoring each asset or function in the city for each of the power dimensions, it is possible to identify the combinations of powers that are used in relation to each individual asset or function, or amalgamated at the sector level. These combinations are referred to as *power signatures*. This approach is illustrated in the diagram below, and is used as the framework for the analysis.

Power Signature Methodology

- *The Powers database contains 70 assets or functions for all 59 cities in the Powers database, grouped under 12 sectors.*
- *For every asset or function, there are 4 power dimensions, each with a power score from 0 to 3. These power dimensions are: (i) Own / Operate, (ii) Set / Enforce Policy and Regulation, (iii) Control Budget, and (iv) Set Vision.*
- *The combination of these 4 power dimensions form the power signatures of a given asset or function. Theoretically there is a maximum of 256 unique power signatures (i.e. 4x4x4x4 combinations of power dimensions).*

Figure 16: City power components. [0, 1, 2 and 3 indicate the scores used to describe the 'strength' of power within each dimension]



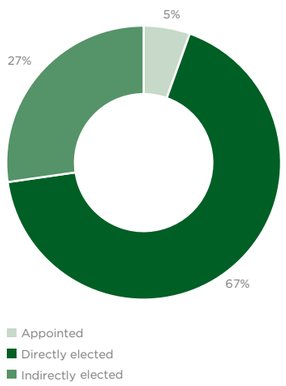
A3
Appendix III: Who Plays a Part in City Governance?

To understand the role that city governments and other actors play in governing climate action, the research team reviewed policy, industry and academic papers, including research on multi-level governance and modes of governance. This section provides a high level synopsis of the research findings, which were used to underpin the development of the pathway to climate action and the city governance typologies.

City governance describes the range of public and private actors who work alongside the government to set a city's strategic priorities, and to deliver and manage the city's core services.[1]

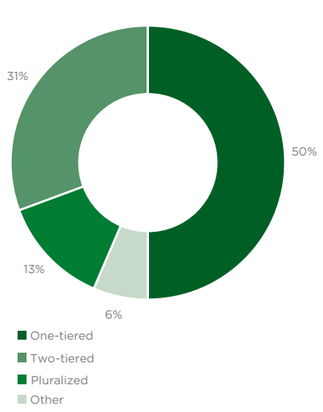
Figure 17:
Government structure analyses

Government structure analysis - cities by leader's mandate



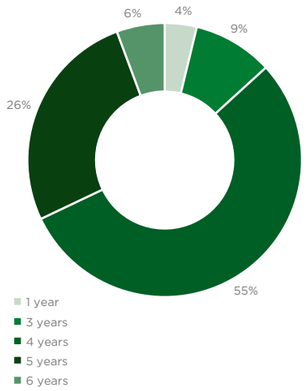
Based on responses from 55 cities

Government structure analysis - cities by government structure



Based on responses from 47 cities

Government structure analysis - by leader's term



Based on responses from 42 cities

A3.1 City Government

A city government is comprised of a set of formal administrative structures led by an elected or appointed leader.[13] Together, the administration and the leader have the mandate to manage the city. This may be done via different structures of government. In some cities the government is comprised of a single tier responsible for all city functions – New York City operates in this way. Other city governments have two tiers: an 'upper' tier that is responsible for strategic planning, and a 'lower' tier that delivers services (e.g. London). Non-hierarchical structures, sometimes referred to as pluralised structures, also exist, as seen in Sydney. These varying structures form the core agency of governance for their respective cities.

City leaders' mandates also vary. For example, city leaders and mayors may be elected directly by voters, as in Bangkok, or indirectly elected via a parliamentary system, as in Delhi. Alternatively, leaders may be appointed by another tier of government, as is the case in Singapore. Figure 17 illustrates how the government structures of C40 cities compare.

Approximately half of C40 cities have a one-tier government structure and a third have a two-tier government structure. Over 90% of C40 city mayors are elected, and the majority serve a four-year mayoral term. Cities also report that the majority of mayors have a clear mandate to take climate action.

A3.2 Multi-level Governance

Multi-level governance is an academic framework used to understand the complex and overlapping relationship between actors involved in decision-making. In the context of urban climate governance, a multi-level approach illustrates how the relationship between state and non-state actors at the international, national, regional, and local levels contributes to the implementation of city climate action.[14] This provides a framework to understand how action is guided and implemented by different actors. Through this framework we can begin to understand the shifting dynamic from governing climate action by way of 'government' towards 'governance', and a broader spectrum of actors. The multi-level approach, combined with CAM and Powers data and wider research, contributed to the development of the typologies in this report.

Multi-level governance incorporates two distinct approaches:

- *Type I, which focuses on the interactions between different tiers of government;*
- *Type II, in which multiple actors both within and outside of the government interact to influence and direct climate action, forming overlapping networks and partnerships in different political and non-political forums*[15,16]

State actors associated with Type I include national and city governments and their agencies. In Type II these actors may also be present alongside non-state actors including transnational networks such as C40, or sub-national networks and partnerships including the Cities for Climate Protection (CCP) programme.[17] Other significant actors considered in Type II are institutional and technical experts, individual leaders and policy entrepreneurs, as well as dominant local business interests, labour unions, and transnational corporations'. [18] These multiple interest groups together combine to form a network of interacting delivery agents for climate action.

A3.3 **Modes of Governance**

The literature on urban climate governance identifies four key modes of governance,[19] which are described in the box below. These modes are widely recognised in academia, as well as by broader industry and policy actors, including the UN and OECD.[20]

Modes of Governance from the Literature

- *Self-governing, where the city government has a high degree of control over its own assets, decisions and use of resources and can govern its own activities without reliance on other actors.*
- *Governing by Authority, which is characterised by the use of traditional forms of authority, such as regulation and sanctions, to incorporate climate policy goals into the strategic planning of key sectors, such as transport, energy and land use planning.*
- *Governing by Provision, where the city government is a key stakeholder in the delivery of services to the public, including the development of urban infrastructure in energy, water, waste, road and rail networks.*
- *Governing by Enabling, which describes the role of city government in coordinating and facilitating climate action predominantly through partnerships with private actors and the voluntary sector, and by engaging with communities.*

17 Bulkeley and Betsill, 2006.
18 Bulkeley and Betsill, 2013
19 Bulkeley, H., Schroeder, H., Janda, K., Zhao, J., Armstrong, A., Chu, S. Y., & Ghosh, S. (2009). Cities and climate change: the role of institutions, governance and urban planning. Change, 28, 30.
Broto & Bulkeley 2013. A survey of urban climate change experiments in 100 cities. Global Environmental Change 23 (2013) 92-102
Alber, G., and Kern, K. (2009), Modes of Urban Climate Governance in Multi-level Systems. In: The international conference on Competitive Cities and Climate Change, Milan, Italy, 9 - 10 October, 2009 - Paris : OECD, 2009 - p. 171 - 196.
Bulkeley at al., 2009
20 OECD, 2008. Competitive Cities and Climate Change. OECD Conference Proceedings, Milan Italy, 9-1 October 2008
UN-Habitat. Global report on human settlements 2011. Cities and climate change. United Nations Human Settlements Programme

ACKNOWLEDGEMENTS

AUTHORS:

C40
Seth Schultz
Tom Bailey
Eric Ast
Brooke Russel
Emily Morris

ARUP
Paula Kirk
Laura Frost
Annie Gibbons
Thomas Hurst
Harriet O'Brien
Alper Ozmumcu

UCL
Dr Michele Acuto
Dr Elizabeth Rapoport
Dr Jyotsna Ram
Laura Hill

CONTRIBUTORS:

Design
Harrybarlow.com
Unreal-uk.com

This work is the first product of C40 and Arup's 3-year research partnership, which aims to advance global knowledge about the fundamental role that cities must play in addressing climate change. Drawing on evidence-based research and unique data sets, it will identify and promote innovative solutions to the climate challenges that cities face.

This report was supported by the City Leadership Initiative at University College London

C40
North West Entrance, City-Gate House
39-45 Finsbury Square, Level 6
London, EC2A 1PX
United Kingdom.

Tom Bailey: tbailey@c40.org

ARUP
13 Fitzroy Street,
London, W1T 4BQ
United Kingdom.

Paula Kirk: paula.kirk@arup.com