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Article

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Better Together(?): A Textual Study of Coordination Between National Actors and C40 Cities

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Abstract:

Following the COP 26 and Stockholm+50 meetings, pressure increased from the international community to more closely assess climate commitments made by state actors. Subnational actors have also been encouraged to develop and revise climate governance documents (city climate action plans or CAPs) through networks like the C40 Cities Climate Leadership Group. In this article, I explore the evidence of cross collaboration of national and city actors in CAPs. I use two interpretive content analysis methods to extract data—patterning and narrative text analysis—to analyze 39 Nationally Determined Contributions (NDCs) and 65 CAPs. I find that only 41% of cities in this sample include national actors in their CAPs and that cities in the Global South more frequently include national level actors in their CAP documents and are also more likely to be included in their corresponding country's NDC documents, compared to cities and countries in the Global North. Additionally, when cities do include national actors in their CAPs, I find that they are most likely to be included in one or more of the following four areas: financing, communications, utilities, and/or public works. The data from this study demonstrates that there is still significant progress to be made in city-national coordination on climate mitigation and adaptation planning.

Keywords: climate change, nationally determined contributions (NDCs), urban climate governance, narrative analysis, C40

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1.1 Introduction

As the impacts of climate change accelerate, cities will endure the brunt of the effects, including urban heat island effects, flooding, droughts, and vector-borne illnesses (UN environment programme 2017). These climate change impacts will also exacerbate and compound issues of urbanization, including lack of accessible housing, insufficient infrastructure, healthcare, and access to essential services (Kumar 2021). Despite the localized impacts of climate change threats, about one-third of country Nationally Determined Contributions (NDCs) under the Paris Agreement neglect to include the urban sector in planning mitigation or adaptation (Tollin et al. 2026). Furthermore, some countries, such as EU member states, have chosen not to actively include city actors as part of their Nationally Determined Contributions (NDCs).

As cities have worked to gain the same level of legitimacy as state actors, they have adopted similar techniques to mimic governance approaches of the state. Chief among these strategies, cities have developed strategic action plans (climate action plans, also known as CAPs) to assess and communicate local climate governance responses to mitigate and adapt to climate change impacts. CAPs have been around since roughly the 1980s and one of the first cities in the world to have such a document is Santa Barbara, California, USA. Cities began organically developing CAPs throughout the last several decades to address localized climate concerns and to plan for climate mitigation actions such as emissions reductions and emergency preparedness. Until the mid 2010s, CAPs almost exclusively focused on climate mitigation with only cursory inclusion of adaptation planning (Cantwell 2021). In the past decade, one norm that has shifted among CAPs is the expectation that CAPs equally include mitigation and adaptation planning. Furthermore, CAPs themselves have become a norm for cities to develop. Private foundations

and development agencies expect cities to have CAPs prior to seeking project funds for climate related projects and look to see if project proposals are in alignment with CAP goals.

CAP creation has also been promoted by the C40 Cities Climate Leadership Group (C40) as part of its leadership criteria for membership. C40 requires all member cities to adopt “resilient and inclusive climate action plan[s] aligned with the 1.5°C ambition of the Paris Agreement” and they are expected to “update[...] it regularly” (C40 Cities, n.d.). Not only does C40 now expect every city in its network to have a CAP, it also expects that these will be “high ambition” (i.e. aligned with Paris Agreement targets) and include key components including emissions neutrality, resilience to climate hazards, inclusivity and benefits, and governance and collaboration. C40 explains that by the end of 2024 “almost all” cities within C40’s membership had a CAP aligned with these ambition requirements (C40 Cities Climate Leadership Group 2025).

Studying whether cities and national actors actively name each other as collaborators, as well as the methods of collaboration on climate change between the two levels of governance, are the subject of this study. There has been some research exploring this topic, such as Hsu et al (2020), who looked at the NDCs of 147 countries using structural topic modeling to study “whether and how national governments incorporate non-state and subnational contributions into their international climate commitments” which found that non-state actors and subnational actors are primary included for specific functions, instead of for cross-sector collaboration, and that the inclusion of these actors is much more frequent in the case of Global North NDCs vs. Global South NDCs (443). Furthermore, recent scholarship focused specifically on NDC considerations of urban actors find that NDCs seem to primarily consider cities in accounting for mitigation and adaptation measures in the energy, waste, transport, and mobility sectors (Tollin

et al. 2026). Although existing research has explored how national actors have considered subnational and urban actors in their governance planning, relatively little scholarship has considered the inverse relationship: how urban actors consider national level actors in climate mitigation and adaptation.

In this study, I explore how frequently national actors are written into city climate action plans (CAPs¹) as collaborators, identify descriptive characteristics of the cities that include national actors into CAPs, and discuss the roles that cities identify and envision for national actors when it comes to collaboration on city climate policy goals. Answering these questions allows researchers and practitioners to understand areas of policy that cities identify as critical areas for city-national collaboration on climate. Thus, I also begin to uncover areas where international or state-level actors may need to concentrate funds or technical resources in support of adaptation and mitigation efforts. Additionally, the analysis of this data contributes to an overall deeper understanding of CAPs, which international organizations and city offices have invested substantial time, effort, and funds constructing. Finally, these patterns of collaborative efforts between cities and national governments as documented in CAPs may provide strategies for policy makers navigating fragmentation and illuminates possible strategies for encouraging polycentricity in climate governance.

To answer these research questions, I analyze a sample of 65 cities and find that only 41% of cities (n=27) include national actors in their CAPs. Cities that plan for national-level

¹ CAPs come in a wide variety of formats and are approved and written through context-dependent processes. Some CAPs are formally planned by the mayor's office or city council. Some are intention documents authored by sustainability directors or climate action committees within cities. C40 encourages cities to develop CAPs so that they have clear, written commitments with benchmarks, and C40 has provided technical and financial assistance to cities in developing CAPs.

coordination in their CAPs are more likely to be in the Global South² (a finding that compliments Hsu et al's findings that Global South countries were more likely to include references to non-state actors). Additionally, cities in the EU mention national-level actors at a much lower frequency than non-EU cities. Additionally, when cities do include national actors in their CAPs, they are most likely to be included in one or more of the following four areas: financing, communications, utilities, and/or public works. I first discuss some of the history and background of this topic. Next, I explain the methods used to examine the research questions, followed by the descriptive and thematic findings. Then, I consider the implications of these findings within the theoretical frameworks. I conclude by discussing the limitations and next steps for this research.

1.2 History and Background

In no way are cities new actors to the scene regarding climate policy. One of the earliest networks of cities acting on the issue of climate change was ICLEI³, which was founded in the 1990s. Since then, several different networks, such as C40 Cities Climate Leadership Group (C40) and Global Covenant of Mayors, have emerged to support city climate action planning and set global priorities and initiatives. Domestic organizations such as the Urban Sustainability Directors Network (USDN) in the United States and Canada have also provided cities with

² For the purposes of this article, I use the South-South cooperation list (http://www.fc-ssc.org/en/partnership_program/south_south_countries), as it aligns with the UN and is related to the financial strength and access to financing for Global South countries. This is also a framework where countries have agreed to be included, which respects the agency of South-South member countries. I would also like to recognize that the definition of a “Global South” country and the use of the label is still contested among members of the global community and that the use of the term in this article is tightly bound.

³ ICLEI used to stand for “International Council for Local Environmental Initiatives” but has rebranded from only focusing on environmental sustainability into focusing on all sustainability issues—as a result, ICLEI isn't truly an acronym anymore.

technical capacity-building support for specific policy initiatives. Although cities have been working on climate action for decades, their integration into international policy processes is more recent. Before the twenty-first session of the Conference of Parties (COP 21) in 2015, cities and other subnational actors had a much more passive role in international climate treaties and negotiations. Beginning with COP 21, cities and subnational actors' commitments to climate action were formally recognized in decision 1/CP.21 because of sustained lobbying efforts by cities, non-state actors, and Indigenous activists (United Nations Framework Convention on Climate Change n.d.).

The formal recognition of non-state actor commitments in international climate action came as some states started to disengage. Shortly after COP 21, the United States and Brazil began disengaging from the Paris Agreement. The election of President Donald Trump in the United States led to a 2017 declaration that the United States would be withdrawing as a party from the Paris Agreement (Shear 2017). This announcement prompted cities, states, and private businesses to follow up the very next day and commit to reducing the US Greenhouse Gas (GHG) emissions level by 26% from their 2005 baseline levels (Tabuchi and Fountain 2017). Following the United States' lead, Brazil's President, Jair Bolsonaro, stated an intent to also withdraw Brazil from the Paris Agreement (Fearnside 2019). While Brazil has not formally withdrawn as of now, President Bolsonaro did skip the COP 26 meeting and is lagging significantly on its climate commitment (Serhan 2021). In response to this, Brazil's local governments (including cities and other subnational actors) fortified their efforts to address emissions (Climate & Development Knowledge Network 2019). The instability of these two major state actors during the period of the Paris Agreement has reinforced the urgency of including and supporting non-state actors in climate action planning. During the COP 26 meeting

in Glasgow, one of the few big wins was the commitment to integrated adaptation planning between local, regional, and national actors recognized in the Glasgow Pact (Perry and Abraham 2021).

Several organizations and scholars have begun to study the climate action planning documents used by cities. Overall, many scholars are skeptical of the ability of CAPs to produce any meaningful results (Millard-Ball 2012; 2013; Deetjen et al. 2018; Camponeschi 2021; Koski and Siulagi 2016; Hui, Smith, and Kimmel 2019; Kane 2021). For instance, Camponeschi (2021) noted that US cities with “low-density, high-population, high-emitting cities in energy-intensive climates” were the most likely cities to have “deficient climate action plans” (78). One shortcoming of many of these studies has been the disproportionate focus on cities located in the United States (US). While cities in the US have large per capita GHG emissions (Wei, Wu, and Chen 2021), the planning processes and outcomes are not generalizable globally. While there are studies of climate action planning processes and documents from outside of the US, including cities in India, Bangladesh, China, Brazil, Turkey, and the EU, there has been little comparative research done on CAPs globally (Peker and Ataöv 2021; Beermann et al. 2016; Fatemi et al. 2020; Baltar de Souza Leão et al. 2020; Scorza and Santopietro 2021; De Gregorio Hurtado et al. 2015). The research explored in this article contributes to this growing body of literature by providing a comparative policy context for CAPs. Furthermore, I consider the symbiotic relationship between national planning and city planning documents.

1.3 Methods

This sample of documents was created by taking the current membership of C40 Cities (n= 95) and eliminating all cities with no CAP at the time of analysis (n=8) from the sample.⁴ I chose C40 Cities as my sample instead of ICLEI since ICLEI has expanded beyond climate action. Additionally, some cities did not have individual CAPs but rather had an integrated plan with their national government, focusing on the individual cities listed. These cities (n=15) were also excluded from the analysis since both the NDC and CAP have reciprocal inclusion of national and city actors. The cities excluded for these reasons are in China, Indonesia, and India. In all these 15 excluded cases, the integrated plans were top-down climate governance models and are not truly separate national and city governance documents. Thus, only cases where there was a distinct CAP and NDC were included in this analysis. Finally, I excluded seven CAPs (Curitiba, Dakar, Guadalajara, Lima, Medellin, Moscow, Venice) due to a combination of language translation and document formatting issues. These exclusions left the final sample size of cities at 65. After identifying the final cities, I matched them with their respective countries (n=39). In total, the 65 city CAPs amounted to 4,638 pages of text. The 39 NDCs totaled 398 pages for the first round of NDCs and the second round (updated + second round) totaled 872.⁵

I analyzed these documents using two interpretive techniques: “patterning” (Fujii 2018) and narrative textual analysis (Shenhav 2015). This approach to text analysis differs from a more positivist approach where social scientists employ deductive reasoning (theory-driven for confirmation) and instead uses a more inductive reasoning approach (using observations to

⁴ This analysis was conducted in December 2021.

⁵ Of the 39 countries in the data set, only 30 of them had submitted an updated first (UF) or second NDC to the UN as of December 2021. In the cases of countries with no UF or second NDC, the coding categories from the first NDC was used.

identify patterns and a possible theory or set of generalizations). Using an interpretive approach to studying and analyzing textual documents, I engaged in an iterative and emergent process for identifying themes and categories. Although it is common for textual coding from a positivist lens to use multiple coders and produce metrics like intercoder reliability scores, interpretivist methodology rarely uses such tools. The goal of interpretive research is not to replicate results and therefore the tools for demonstrating internal validity of findings differ from positivist tools and processes. In interpretivist research, we seek to “construct and understand ... partial, conflicting, ambiguous, and contradictory” logics and explanations of social world that people act and react to (Fujii 2018, 74). While positivist approaches to content analysis seek to standardize and remove ambiguity from coding in service of creating “objective” themes, the use of an interpretivist approach seeks to enhance understanding of the intersubjective and social circumstances that produced the content being analyzed (Fujii 2018, 74). When using approaches like patterning and narrative analysis, individual expertise and lived experiences allow for richer interrogation and contextualization of the content instead of taking the text at face value or treating each piece of text with equal weight or significance (Rowlands 2005; Fujii 2018; Lebovits 2022). Furthermore, patterning and narrative technique use techniques like multiple readings and close readings to ensure that the texts are carefully considered by the researcher and employ indicators like repetition and saturation to speak to the significance of themes across bodies of text.

The coding process for the documents had three phases. First, I scanned for a list of keywords (see Table 1) in the document using both PDF search functions and hand verification. These keywords were generated through reading dozens of NDCs and CAPs, taking notes of language used to refer to city and national actors within the documents. I also drew on my

knowledge and experience working on teams coding for urban climate governance in across many policy and academic texts. The only language analyzed in the CAPs was English.

Although this was an inductive process of analysis, I used the keywords as a starting place to scan the documents and begin identifying patterns for each city and country (i.e. patterning). Each document was closely read to ensure that they were properly coded for city/national actor inclusion. I identified no false positives for city inclusion in CAPs. I did identify false positives in 22 cases (Salvador, Montreal, Toronto, Vancouver, Melbourne, Kolkata, Yokohama, Mexico City, Amsterdam, Karachi, Lisbon, Istanbul, Bangkok, Stockholm, Boston, Miami, New Orleans, New York, Phoenix, Portland, San Francisco, Seattle). In most cases, such as all of the U.S. cities, these false positives were triggered by the CAPs naming national failures or ways that the national government had limited or diminished city capacity to govern climate issues. Some cities were also false positives by framing themselves as national leaders or advocates on climate, such as Seattle and Vancouver. The remainder of false positive cases were passing references to national climate benchmarks or repeating NDC language, as seen in Amsterdam and Yokohama. I did not identify any false negative cases in either NDC or CAP documents.

Second, I read each page of each document to identify patterns with words, phrases, themes, and ideas. I also used this patterning technique to help elucidate the textual narratives (i.e., narrative textual analysis that assists to characterize the social narratives that each city or country created with their respective CAP or NDC). Finally, I revisited all documents to do a final code for city inclusion of national actors and vice-versa. I then used these coded variables to conduct a descriptive analysis.

Table 1: Keywords Indicators for Actor Inclusion

City Inclusion Keywords (searched in NDCs)	Country Inclusion Keywords (searched in CAPs)
Subnational Local City* Urban Municipal* Metro*	National [applicable country name] State Federal

*Note: The * symbol indicates that searches for those words were conducted as “wildcards”—i.e., including various spellings*

After this interpretive coding and analysis process, I also engaged in basic descriptive data analysis of patterns. I summarize the variables I created and the descriptive results in the following subsection.

1.3.1 Variables

City Coordination (CAP_nat): I constructed this indicator during the textual coding. Countries with NDCs that substantially included city or urban actors were coded with 1, indicating city/urban collaboration. NDCs were given a 0 (no coordination) if they failed to mention coordination or collaboration work with cities or urban regions. NDCs were also scored with a 0 in cases where they mentioned a city or urban area, but only in passing. For example, if an NDC merely referenced climate threats to urban areas but did not include urban areas in goals, targets, stakeholder conversations, or other substantial components, it was scored as 0.

National Coordination (recent_subnat_ind): This indicator was constructed during the textual coding process. Cities with CAPs that substantially included national actors coded with 1, which indicated national-level collaboration. CAPs were given a 0 (no coordination) if they failed to mention coordination or collaboration work with the national level of government. CAPs were also scored with a 0 in cases where they mentioned the national government, but only in passing.

For example, if a CAP merely referenced how cities play a role in meeting national goals, there was no mention of national actors or agencies, no responsibilities were meaningfully split with national actors, or there was no other indicator of the national government actively participating in the CAP in some way, it was scored as 0.

Economic strength: I used Global South membership as a proxy measure for economic strength. This is measured using a 0 (not Global South) or 1 (Global South). This column is titled GLOBAL_SOUTH in the dataset.

ICLEI membership: A 0 (non-ICLEI member) or 1 (ICLEI member) indicator. This column is titled ICLEI_IND in the dataset.

EU membership: A 0 (non-EU member) or 1 (EU member) indicator. This column is titled eu_ind in the dataset.⁶

1.4 Results

1.4.1 Descriptive Demographics

Overall, 41% of cities include national actors in their CAPs. 50% of the respective countries of these cities include cities as actors in their NDCs. This is a slightly divergent finding from Hsu et al.'s (2020), which found that 88% of NDCs referenced non-state actors (NSAs). The difference in these findings is most likely due to two factors. First, I narrowed down to a specific type of NSA—cities. This means that NDCs which mention subnational actors like states, regional

⁶ London's CAP was written in 2018, before the finalization of Brexit. London and the UK are coded with the EU indicator of 0 (non-EU) for all data in this project due to the UK submitting an updated, independent NDC.

agencies, NGOs, etc but not cities would not be counted as including cities. Second, since I hand coded all NDC documents and accounted for the context when determining inclusion, I was slightly stricter in the inclusion criteria than the semi-structured, computerized model used in this study. A map of the cities and countries' inclusion of each other can be seen in Figures 1 and 2 below.

I was also able to disaggregate these results by some additional city features. 41% of the cities in this sample are in the Global South. 55% of Global South cities in this sample include national actors in their CAPs. There are 11 cities in the EU included in this dataset, which accounts for 16% of the overall city cases in this study. Within the EU city cases, 45% of cities (n= 5) reference national level actors in their CAPs.

One of the inclusion criteria for this dataset was membership in C40 Cities Climate Leadership Group. However, many cities have multiple memberships in transnational city networks, including multiple memberships to organizations with a focus on climate. In addition to C40, 58% (n= 38) of the cities in this dataset are also members of ICLEI. 44% of cities that are members of both C40 and ICLEI include national actors in their CAPs.

The timing of CAPs also highlighted some intriguing trends. 78% of the CAPs analyzed were drafted after the start of the Paris Agreement (2015 or later), with 27% of the CAPs published during or after the start of the COVID-19 crisis. 64% (n=9) of CAPs crafted prior to the Paris Agreement included national actors. For CAPs released after the start of the Paris Agreement, only 35% (n=18) included national actors.

1.4.2 Emergent Narrative Themes

The combination of descriptive, patterning, and narrative analysis of CAPs and NDCs led to 4 main themes regarding city-national climate change policy: financing, communications, utilities, and public works. These themes were not predetermined but rather emerged throughout the coding and interpretation process, a common approach to analysis when using interpretive methodological tools. Financing related to the role cities or national governments in funding climate change initiatives. Communications refer to climate messages from cities or national actors to stakeholders and residents, as well as their attempts be responsive to challenges posed by changing climate conditions. Utilities characterized energy sources and their development or shifts as needed from national actors and cities. Finally, public works related to waste, water, and transportation, were important areas of infrastructure for city-national collaboration in CAPs. I discuss these themes more in depth below in the discussion with references to specific NDCs and CAPs.

Figure 1: Cities that include national actors as collaborators in their CAPs.



Note: to access a larger, interactive map for this data, visit the linked [Tableau Dashboard](#).⁷

⁷ Hyperlink has been removed here as the weblink would de-identify the author for review. Link will be included in final publication.

Figure 2: Countries that include cities as collaborators in their NDCs.



*Note: to access a larger, interactive map for this data, visit the linked Tableau Dashboard.*⁸

1.5 Discussion

1.5.1 Discussion of Descriptive Results

In this section, I discuss the descriptive patterns related to EU cities as well as cities in the Global South. I further discuss context about the timing of CAPs and how that may influence cities inclusion of national actors across CAPs post-Paris Agreement.

⁸ Hyperlink has been removed here as the weblink would de-identify the author for review. Link will be included in final publication.

First, slightly half of EU cities reference national actors in their CAPs. The number of EU city observations in this data set is small ($n=11$), so there is little we can generalize about the general disposition of EU cities towards national actors when it comes to climate action planning. Rotterdam provides the most comprehensive description about the specific roles and functions of the city and national government in alleviating adaptation threats (A50, 6, 8, and 26). Copenhagen, Madrid, and Athens primarily discuss partnerships with national actors to emphasize the critical need for national climate funds in carrying out their CAP goals (A17, 6; A34, 49; A5, 77). Paris also discusses the use of national climate funds to support climate measures (A44, 36) but also wastes no space in identifying shortcomings in the government response to climate issues and outlining plans to lobby the national climate approach (A44, 20, 35, 46, 58, and 92).

Second, within this sample, the majority of cities in the Global South (55%) reference partnership with national actors. Further, in the types of collaborations that Global South CAPs discuss, most cities reference the need for the national government to provide financial and/or technical support. Many of the plans also reflect a sense of unity and desire to contribute to the NDC goals of their respective countries. In other words, there is a more collectivist discussion of city efforts in relation to national climate goals. Instead of framing city goals as independent from or in competition with national targets, the common theme in many of the Global South CAPs seems to be collaborating for the greater good of adaptation and reducing overall emissions within the countries. While the causal mechanisms behind these trends are beyond the scope of this study, there may be structural reasons undergirding this collaboration. For example, international aid is commonly disbursed to the state level for dissemination to subnational entities. Cities may need to establish a clear connection between the city vision and goals on

climate and the benefits that the national actors could gain from distributing this aid to cities to receive funds. We also know that the impacts of climate to the Global South are also more severe than many Global North countries (Huq and Adow 2022). Given the urgency and salience of climate impacts to many in the Global South, there may just be more awareness of the limitations of the abilities of cities to address climate adaptation and emissions reduction goals.

Finally, the difference in inclusion of national actors in pre- and post- Paris Agreement CAPs (64% vs 35%) is also an intriguing descriptive finding. Again, given the imbalance of cases between the two groups (11 vs. 51) we need to be cautious in making extrapolations. Yet, this imbalance may mirror some shifts in global governance norms and international recognition of non-state actors in climate policy. The start of the Paris Agreement in 2015 also coincided with non-state actors beginning to be recognized with side-events at these international gatherings. Cities, and organizations representing the role of cities in climate governance like C40, had long been making the case for their legitimacy and inclusion in policy processes. CAPs created around or after the start of cities being recognized at UNFCCC events may be reflecting the agency and legitimacy that cities were fighting to project to an international audience. By reducing the discussion of national actors and downplaying their role in CAPs, cities send an implicit message about their critical role in the climate crisis and why they should be taken seriously by international actors.

Of course, these points of discussion are speculative and need further study and investigation to be considered underlying causes of these observed patterns. Future researchers should consider projects that study these discussed phenomena as a way to enhance our understanding of polycentricity and fragmentation within the system of earth system governance.

1.5.2 Discussion of Themes

Through the descriptive and interpretive analysis of these documents, I observed four key areas emerge around city-national climate change policy collaboration: financing, communications, utilities, and/or public works.⁹ Before I discuss these themes and findings more in-depth, I wish to describe some cases where I did not observe collaboration in CAPs. There were several cities that did not meet the threshold for national collaboration in their CAPs due to the language being empty and non-specific when referencing coordination with other actors. For example, there were many statements like the following:

We will continue to work with our residents and local businesses and institutions, as well as international, national and regional partners, to implement our vision of a carbon-neutral Boston (A13, 27).

Statements like this give little indication of how both local and national actors would be held accountable for actions under the CAP. Some cities also used “buzzword” language to describe their multi-level coordination process but stopped short at specifying initiatives. For example, one city describes its coordination as prioritizing “enhanced synergies and alignment between local, regional, national and international strategic plans, frameworks, networks and instruments” (A31, 53). In addition to the broad and “fluffy” statements made by cities about collaboration with national actors, several CAPs merely referenced their document’s singular objective as trying to support national actors in reaching their NDC goal (A25, A 28). In contrast, when city-national climate policy collaborations were observable, they were prone to fall into one or more of the four aforementioned themes.

⁹ The documents referenced as data in this section can be found in Appendix A and Appendix B. Citations to the documents listed in the appendices are structured as follows: (AppendixRow number, page number). For example: (A4, 68) would equate to the 68th pages of Amsterdam’s CAP.

First, one of the most common roles that national actors were requested to play in CAPs was financing city efforts. The role of the national government in directly or indirectly providing funding was discussed across 15 separate CAPs. The direct aid discussed and requested of national governments primarily came in the form of grants to help with infrastructure or direct aid to individuals most vulnerable to the impacts of climate change (A1, 8 and 55; A5, 77 and 104; A14, 72; A15, 60; A26, 46; A29, 100; A34, 49; A39, 96; A40, 6; A62, 5). Many other cities also discussed the need for the national governments to help indirectly through either revising tariff and trade policies (A15, 103; A30, 33; A44, 36) or the creation of market infrastructure such as recyclables (A52, 38) and carbon (A63, 67). One city also discussed their relationship and symbiotic relationship to the national economy (A20, 58). Cities requesting direct aid provided clear arguments that the success of their proposed initiatives depended on the cooperation of the national government. Some cities identified the required dissemination of subnational aid through national governments as a limitation (A29, 100; A34, 49; A26, 46). In cases like the United States under the Trump administration, it means that some eager subnational actors could miss out on funding opportunities due to a lack of interest by national actors. In other instances, weak or corrupt national governance could create challenges for distributing funds to subnational actors due to logistics.

Second, cities strategically included national actors as part of their climate communication. The term communication here broadly represents a way for cities to communicate climate messages to stakeholders and residents and be responsive to challenges posed by changing climate conditions. In many cases, data plays a significant role for cities in communication. Across the CAPs, nine cities named collaboration with national actors to adapt or develop climate data reporting as one major component of their communications (A1, 20, 22,

and 25; A3, 25; A15, 123; A20, 54; A21, 23; A29, 301; A30, 36; A36, 35; A53, 20; A62, 5). This is a particularly important aspect of CAPs, given that many cities cannot independently collect their data or estimate the effectiveness of their policies. This data is also critical to better serve local communities by understanding the dangers of climate action and quickly disseminating that information to residents and national actors to facilitate timely responses to threats.

Furthermore, data allows cities to measure their efficacy in policy implementation. Additionally, in some cases, cities with those capabilities in the United States are vastly under-reporting their GHG emissions (Gurney et al. 2021). Several cities discuss active collaboration with the national government with existing registries and surveillance systems for climate events (A3, 25; A15, 11; A36, 35; A53, 20). Many cities also discussed the need to develop these systems and the city's roles in the drafting and implementation process of metrics and registries (A22, 9; A30, 29; A62, 5, A21, 23 A20, 54). A shortcoming in many conversations over cities becoming more active actors in climate policy has been the inability to monitor and hold cities accountable for their policy plans and actions. More robust data systems and communications about CAPs will help improve global accountability for cities.

Third, cities frequently discussed significant limitations related to utilities such as energy. One common theme across CAPs was discussion of the explicit ways that cities would actively lobby or campaign national governments to create a more robust infrastructure for renewable energy sources (A1, 38; A17, 15 and 16; A44, 46). A collection of cities also discussed current collaborative efforts to develop and implement energy policies at national, regional, and local levels (A14, 76; A15, 24; A44, 20; A21, 24; A58, 10 and 13; A60, 1; A62, 6). There were no instances discussed by cities in their CAPs where cities would be able to solely venture into renewable energy goals without cooperation or assistance from national levels of government.

For cities depending on a switch to renewables to achieve GHG emissions reduction goals, they will almost certainly require direct or indirect coordination with national-level actors to reach those outcomes.

Fourth, public works, such as waste, water, and transportation, were important areas of infrastructure for city-national collaboration in CAPs. Transportation issues required the broadest set of national cooperation. Needs for transportation planning in CAPs included agreement on jurisdictions and zoning for bus lines (A14, 71; A34, 46); building infrastructure for more efficient rail lines (A15, 79; A1, 40; A40, 6; A43, 12; A21, 28 and 40); regulations for vehicle efficiency and inspections standards (A34, 46; A21, 41; A60, 38); and even infrastructure to make public transportation more pleasant, such as the installation of shade (A21, 22). With these types of regulatory and building support, cities estimate making significant gains in their emissions reduction and social conditions within their municipalities. Another popular type of public work included in many CAPs was water—around both access and efficiency. Many cities discussed coordinating with national actors to share water stores between multiple locales or developing technology with national assistance to more efficiently deliver and conserve water (A15, 42; A19, 9; A50, 26; A20, 13, 14, and 15). One city also expressed the need to cooperate with the national government to address security issues with water (A21, 46). Finally, cities also saw opportunities to collaborate with national actors on food and textile waste (A39, 19; A44, 92; A1, 40).

Finally, inclusion of national actors in CAPs was not always an indicator of a positive or productive relationship. In fact, in some cases, national actors were only included to highlight the lack of awareness or consideration that national actors have given cities in their NDCs. Many CAPs took aggressive stances criticizing the lack of government action on critical pieces of

policy or legislation, which is often a roadblock for city progress on CAPs. For example, one CAP referred to the fact that there is “no framework of national legislation” when it came to energy grid policies (A15, 62), while others criticized national policies of fossil fuel subsidies (A29, 101; A49, 15). Many CAPs called out a lack of national urgency and action more generally, including “weak technical capacity and lack of appropriate institutional framework and governance instruments” (A30, ii) as well as inconsistency and revocation of federal action on climate change (A41, 10). One CAP even referred to this as the national government falling down (A42, 2). Another city named the lack of coordination as a specific struggle:

It is quite unfortunate to notice that the National Climate Change Policy has ignored the importance of cities in this respect. The government will do well by reviewing this serious flaw which can cause implications when the policy will be aligned with implementation (A27, 7).

While this statement was one of the most direct in this sample of CAPs regarding the failure of coordination between levels, other cities have expressed concerns with national inaction by requesting more powers and funding from the national government and calling into question the leadership of the national government (A32, 6; A57, 11).

1.6 Conclusion

I find that less than half (41%, n=27) of C40 cities in my sample include national actors in their CAPs. Furthermore, evidence suggests that cities and countries in the Global South have increased frequency of including each other in their respective CAP and NDC documents compared to cities and countries outside of the Global South. When cities include national actors, they tend to focus their collaborative efforts on financing, communications, utilities, and/or public works. Furthermore, some cities use CAPs to call out failures in national collaboration from the top-down.

There are many opportunities to expand on these findings for future research pathways. First, the languages for NDC document analysis were limited to English, Spanish, and French and the CAP analysis was limited to English. Future research that can include omitted languages, such as Italian, Greek, Russian, Spanish, Portuguese, and French would allow for a more thorough understanding of the relationship between national and city actors.

Second, due to the nature of China's national climate action planning strategies, I did not include any Chinese cities and excluded them in my analysis. Given the global significance of China, especially in environmental policy, this does skew the global data trends to exclude cities within China. Furthermore, Jaipur and Jakarta were also excluded for the same reason as the 13 cities in China. This means that Indonesia is unrepresented in this data set entirely and that India, a significant global actor on the issue of climate governance, is not fully represented. Future analysis comparing the nature of top-down collaborative city-national plans to the distinct CAPs/NDCs analyzed in this article may highlight important distinctions between these approaches to subnational and national cooperation.

Third, while interpretive methodology allows me to trace the narratives and contextualize the text, natural language processing may illuminate different relationships among and within the document texts. I had originally hoped to include an LDA analysis in this study. Unfortunately, the formatting of some PDF documents rendered this approach infeasible for this project. Future research on this topic could employ natural language processing to track for textual similarities between CAP and NDC documents and other trends.

Future research also has an opportunity to disaggregate the key areas of collaboration by type of city or country. Disaggregation would allow us to better understand the characteristics of

cities that need support in areas like data reporting or infrastructure financing, which could also have valuable policy implications.

Overall, the data from this study demonstrates that there is still significant progress to be made in city-national coordination on climate mitigation and adaptation planning, at least when it comes to the artifact of governance documents. Researchers should study the various strategies and pathways employed by city and national actors to understand more about the conditions that support vertical coordination and what role (if any) governance documents play in overcoming fragmentation.

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Appendix A: City Climate Action Plan Documents

Item	City	Document Name	Date
1	Accra	“Accra Climate Action Plan: First Five-year Plan (2020-2025)”	2020
2	Addis Ababa	“Addis Ababa Climate Action Plan (2021-2023)”	2021
3	Amman	“The Amman Climate Plan: A Vision for 2050 Amman”	2019
4	Amsterdam	“New Amsterdam Climate: Roadmap Amsterdam Climate Neutral 2050”	2020
5	Athens	“Redefining the city: Athens Resilience Strategy for 2030.”	2017
6	Auckland	“Te Tāruke-ā-Tāwhiri: Auckland’s Climate Action Framework”	2019
7	Austin	“Austin: Community Climate Plan”	2015
8	Bangkok	“Bangkok Master Plan on Climate Change 2013-2023”	2012
9	Barcelona	“Climate Plan 2018-2030”	2018
10	Bengaluru	“Make Bengaluru Climate Friendly: A blueprint for integrated, participatory and inclusive urban governance”	2021
11	Berlin	“BEK 2030: Berlin Energy and Climate Protection Programme 2030”	2018
12	Bogota	“Adaptation and Mitigation to Climate Change Plan for Bogota”	2021
13	Boston	“City of Boston: Climate Action Plan 2019 Update”	2019
14	Buenos Aires	“Climate Action Plan 2050: City of Buenos Aires”	2020
15	Cape Town	“City of Cape Town Climate Change Action Plan”	2020
16	Chicago	“Chicago Climate Action Plan: Our City. Our Future”	2008
17	Copenhagen	“Copenhagen Climate Plan: The short version.”	2009
18	Dar es Salaam	“Tanzania Climate Action Report for 2016”	2016
19	Delhi NCT	“Modified Climate Change Agenda for Delhi 2009-2012”	2009
20	Dhaka	“Bangladesh Climate Change Strategy and Action Plan 2009”	2009
21	Durban	“Durban Climate Action Plan 2019”	2019
22	Ho Chi Minh City	“Action Plan on Climate Change Adaptation and Mitigation in Period to 2015”	2013
23	Hong Kong	“Hong Kong’s Climate Action Plan 2030+”	2017
24	Houston	“Houston Climate Action Plan DRAFT Outline of Recommendations for Public Comment”	2019
25	Istanbul	“Istanbul Climate Change Action Plan: Summary Report 2018”	2018
26	Johannesburg	“Climate Change Strategic Framework: City of Johannesburg”	2015
27	Karachi	“Karachi City Climate Change Adaptation Strategy: A Roadmap”	2012
28	Kolkata	“Roadmap for Low Carbon and Climate Resilient Kolkata”	2017
29	Kuala Lumpur	“Kuala Lumpur Climate Action Plan 2050”	2021
30	Lagos	“Lagos State Climate Change Policy 2012-2014”	2012
31	Lisbon	“Lisbon Resilience Action Plan: Resilience to climate change with focus on urban water cycle 2020-2030.”	2020
32	London	“Zero carbon London: A 1.5 C compatible plan.”	2018
33	Los Angeles	“Metro Climate Action and Adaptation Plan 2019”	2019
34	Madrid	“Plan A: Madrid”	2017
35	Melbourne	“Climate Change Adaptation Strategy Refresh 2017”	2017
36	Mexico City	“Mexico City’s Climate Action Program 2014-2020”	2020
37	Miami	“MiPlan: City of Miami Climate Action Plan”	2008
38	Milan	“Milan 2050 Climate Vision”	2017
39	Montreal	“Climate Plan 2020-2030: Montreal 2030”	2020
40	Nairobi	“Nairobi Metro 2030: A World-Class African Metropolis”	2008
41	New Orleans	“Climate Action for a Resilient New Orleans”	2017
42	New York	“Aligning New York City with the Paris Climate Agreement”	2017
43	Oslo	“Climate and Energy Strategy for Oslo”	2016
44	Paris	“Paris Climate Action Plan: Towards a Carbon Neutral City and 100% Renewable Energies.”	2018
45	Philadelphia	“Clean Energy Vision Action Plan: City of Philadelphia”	2018

46	Phoenix	“City of Phoenix Climate Action Plan: 2021 Edition”	2021
47	Portland	“Climate Action Plan: Local Strategies to Address Climate Change”	2015
48	Quezon City	“Support for Low Carbon Promotion Projects through Intercity Cooperation between Osaka and Quezon (Promoting energy-saving and renewable energy technologies)”	2018
49	Rio de Janeiro	“Climate Change Adaptation Strategy for the City of Rio de Janeiro”	2016
50	Rotterdam	“Rotterdam: Climate Change Adaptation Strategy”	2013
51	Salvador	“Salvador: Climate Action Plan”	2020
52	San Francisco	“San Francisco: Climate Action Strategy”	2013
53	Sao Paulo	“Action Plan of the State of São Paulo”	2013
54	Seattle	“Seattle Climate Action: April 2018”	2018
55	Seoul	“Taking Actions against Climate Change: Promise of Seoul”	2015
56	Singapore	“Singapore’s Climate Action Plan: Take Action Today for a Sustainable Future”	2018
57	Stockholm	“Environment programme 2020-2023”	2020
58	Sydney	“Environmental Strategy 2021-2025”	2021
59	Tel Aviv - Yafo	“Tel Aviv-Yafo Climate Adaptation Action Plan: 2020”	2020
60	Tokyo	“Zero Emission Tokyo”	2019
61	Toronto	“TransformTO Net Zero Strategy: A climate action pathway to 2030 and beyond”	2021
62	Tshwane	“City of Tshwane Climate Response Strategy for a prosperous capital city through freedom, fairness and opportunity”	2017
63	Vancouver	“Greenest City: 2020 Action Plan Part Two: 2015-2020”	2020
64	Washington, DC	“Climate Ready DC: The District of Columbia’s Plan to Adapt to a Changing Climate”	2020
65	Yokohama	“Yokohama City Climate Change Adaptation Strategy Outline (June 2017)”	2017

Appendix B: Nationally Determined Contribution Documents

Item	Country	Document Name	Date
1	Afghanistan	First NDC	2016-11-23
2	Argentina	First NDC	2016-11-17
3	Australia	First NDC	2016-11-09
4	Bangladesh	First NDC	2016-09-21
5	Brazil	First NDC	2016-09-21
6	Canada	First NDC	2016-10-05
7	China	First NDC	2016-09-03
8	Colombia	First NDC	2018-07-12
9	Denmark	First NDC	2016-11-01
10	Ethiopia	First NDC	2017-03-09
11	France	First NDC	2016-10-05
12	Germany	First NDC	2016-10-05
13	Ghana	First NDC	2016-09-21
14	Greece	First NDC	2016-10-14
15	India	First NDC	2016-10-02
16	Israel	First NDC	2016-11-22
17	Italy	First NDC	2016-11-11
18	Japan	First NDC	2016-11-07
19	Jordan	First NDC	2016-11-04
20	Kenya	First NDC	2016-12-28
21	Malaysia	First NDC	2016-11-16
22	Mexico	First NDC	2016-09-21
23	Netherlands	First NDC	2017-07-28
24	New Zealand	First NDC	2016-10-04
25	Nigeria	First NDC	2017-05-16
26	Norway	First NDC	2016-06-19
27	Pakistan	First NDC	2016-11-10
28	Philippines	First NDC	2021-04-15
29	Republic of Korea	First NDC	2016-11-03
30	Singapore	First NDC	2016-09-20
31	South Africa	First NDC	2016-11-01
32	Spain	First NDC	2017-01-12
33	Sweden	First NDC	2016-10-13
34	Thailand	First NDC	2016-09-21
35	United Republic of Tanzania	First NDC	2018-05-18
36	Turkey	First NDC	2021-10-01
37	United Kingdom	First NDC	2016-11-18
38	United States	First NDC	2016-09-03
39	Vietnam	First NDC	2016-11-02
40	Argentina	Second NDC	2020-12-30
41	Australia	Updated First NDC	2020-12-31
42	Bangladesh	Updated First NDC	2021-08-26
43	Brazil	Updated First NDC	2020-12-09
44	Canada	Updated First NDC	2021-07-12
45	Colombia	Updated First NDC	2020-12-30
46	Denmark	Updated First NDC	2020-12-18
47	Ethiopia	Updated First NDC	2021-07-23
48	France	Updated First NDC	2021-03-04
49	Germany	Updated First NDC	2020-12-18
50	Greece	Updated First NDC	2020-12-18

51	Israel	Updated First NDC	2021-07-29
52	Italy	Updated First NDC	2020-12-18
53	Japan	Updated First NDC	2020-03-31
54	Kenya	Updated First NDC	2021-12-28
55	Malaysia	Updated First NDC	2021-07-30
56	Mexico	Updated First NDC	2020-12-31
57	Netherlands	Updated First NDC	2020-12-18
58	New Zealand	Updated First NDC	2020-04-22
59	Nigeria	Updated First NDC	2021-07-30
60	Norway	Updated First NDC	2020-02-07
61	Republic of Korea	Updated First NDC	2020-12-30
62	Singapore	Updated First NDC	2020-03-30
63	Spain	Updated First NDC	2020-12-18
64	Sweden	Updated First NDC	2020-12-18
65	Thailand	Updated First NDC	2020-10-26
66	United Republic of Tanzania	Updated First NDC	2021-07-30
67	United Kingdom	Updated First NDC	2020-12-12
68	United States	Updated First NDC	2021-04-22
69	Vietnam	Updated First NDC	2020-09-11