Implementing the Paris Agreement at the Local Level
A Framework Proposal to Foster Vertical Integration in NDCs

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Urban 20 White Paper

A French Development Agency (AFD), Development Bank of Latin America (CAF) and Inter-American Development Bank (IDB) contribution to the U20 process

U20

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Authored by: AFD *AGENCE FRANÇAISE DE DÉVELOPPEMENT* · CAF DEVELOPMENT BANK OF LATIN AMERICA · IDB *Improving lives*

About Urban 20

Urban 20 (U20) is a new city diplomacy initiative developed under the leadership of Horacio Rodríguez Larreta, Mayor of the City of Buenos Aires and Anne Hidalgo, Mayor of Paris and Chair of C40 Cities Climate Leadership Group (C40). Launched on December 12, 2017 at the One Planet Summit in Paris, the initiative is chaired by the cities of Buenos Aires and Paris, and convened by C40, in collaboration with United Cities and Local Governments (UCLG).

What U20 seeks, is to highlight the expertise of cities in a range of global development challenges and to raise the profile of urban issues within the G20. U20 will offer solutions and clear recommendations to national leaders for their consideration ahead of the 2018 G20 Summit. The first year of the U20 initiative will culminate in the inaugural U20 Mayors Summit in Buenos Aires, October 29-30. With this event, U20 will remain a stepping stone toward ensuring an ongoing dialogue between cities and the G20.

In 2018, 26 cities have participated in Urban 20: Barcelona, Beijing, Berlin, City of Buenos Aires, Chicago, Durban, Hamburg, Houston, Jakarta, Johannesburg, London, Los Angeles, Madrid, Mexico City, Milan, Montreal, Moscow, New York, Paris, Rio de Janeiro, Rome, São Paulo, Seoul, Sydney, Tokyo, and Tshwane.

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About the White Papers

Urban 20 is proud to present a series of White Papers from our Strategic and Advisory Partners that highlight the most relevant topics on the cities development agenda and the forthcoming urban trends. These papers define the challenges that local governments are currently facing and offer open recommendations supported by relevant, up-to-date research and data. The intention of this work is to broaden the understanding and perspective of decision makers and stakeholders as to enhance their ability to tackle these most pressing issues. The White Papers also represent the hard work and dedication of these agencies and organizations to keep the public well informed about the ongoing efforts to address the present and future challenges we share as humankind.

Image Orbon Alija

Implementing the Paris Agreement at the Local Level A Framework Proposal to Foster Vertical Integration in NDCs is a White Paper prepared by AFD, CAF and IDB as a voluntary contribution to enrich the discussions of the Urban 20 process.

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AFD is France's inclusive public development bank. It commits financing and technical assistance to projects that genuinely improve everyday life, both in developing and emerging countries and in the French overseas territories. Our action is fully in line with the Sustainable Development Goals. Through its network of 85 agencies, AFD operates in 109 countries, where it is currently financing, supervising and supporting over 3,600 development projects.

CAF is a development bank created in 1970, owned by 19 countries - 17 of Latin America and the Caribbean, Spain and Portugal- as well as 13 private banks in the region. It promotes a sustainable development model through credit operations, non-reimbursable resources, and support in the technical and financial structuring of projects in the public and private sectors of Latin America. With headquarters in Caracas, Venezuela , CAF has offices in Buenos Aires, La Paz, Brasilia, Bogota, Quito, Madrid, Mexico D.F, Panama City, Asuncion, Lima, Montevideo and Port of Spain.

The Inter-American Development Bank is devoted to improving lives. Established in 1959, the IDB is a leading source of long-term financing for economic, social and institutional development in Latin America and the Caribbean. The IDB also conducts cutting-edge research and provides policy advice, technical assistance and training to public and private sector clients throughout the region.

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Executive summary

By bringing local actors into the discussion of climate change, the Paris Agreement recognizes the role of cities in the implementation of Nationally Determined Contributions (NDCs). Downscaling the Paris Agreement to the local level answers two questions: where climate actions would take place, and how local actors would participate. This paper discusses the financial and institutional frameworks needed to enable subnational governments to actively participate in defining and investing in local climate actions. It reviews the main challenges facing local governments in terms of planning, human capacity development, and investment financing. Countries offer a rich diversity of approaches. To present experiences and opportunities toward a better and stronger involvement of the local level to reach the national goals set in the NDCs, the paper discusses legal and policy frameworks, institutional arrangements that connect actors across governance levels and territories, and financial architectures. Many cities worldwide have demonstrated their ability to spearhead actions that have yielded concrete results. National governments should disseminate these examples and use them when designing national public policies.

Glossary

AFD
French Development Agency

CAP
Climate Action Plan

cCCR
carbon Cities Climate Registry

COP
Conference of the Parties

CRAFT
Climate Risk and Adaptation Framework and Taxonomy

CTC
Territorial Coordinators of the Covenant of Mayors

GCF
Green Climate Fund

GCoM
National Consultative Committee of the Global Covenant of Mayors for Climate and Energy

GHG
Greenhouse gas

GIZ
German Corporation for International Cooperation

GPC
Global Protocol for Community-Scale Greenhouse Gas Emission Inventories

ICLEI
International Council for Local Government

IDB
Inter-American Development Bank

IEAP
Initiatives International Local Government GHG Emissions Analysis Protocol

iNDC
Intended Nationally Determined Contributions

IPCC
Intergovernmental Panel on Climate Change

MRV
Measurement, reporting and verification

NAMA
Nationally Appropriate Mitigation Action

NAZCA
Non-State Actor Zone for Climate Action

NDCs
Nationally Determined Contributions

LEDS
Low Emission Development Strategies

LPAA
Lima-Paris Action Agenda

LULUCF
Land use, land-use change and forestry

PACCM
Mexico City Climate Change Action Program

PAVICC
Secondary Cities Climate Change Adaptation Program

UNEP
United Nations Environmental Program

UNFCCC
United Nations Framework Convention on Climate Change

WRI
World Resources Institute

Introduction

The Nationally Determined Contributions (NDCs) submitted by the various nations are affected by various stakeholders and multiple activities in different sectors and territories, as well as by policy frameworks related to climate change and other development priorities. While NDCs tend to focus on sectoral contributions from the national level, territories and cities also make significant contributions to the implementation and enhancement of NDCs. There are multiple options available to include them to ensure that these efforts are well reflected in NDCs and help enhance their ambition.

Cities can interact with national governments through vertical integration mechanisms. These are endeavors of all levels of government to jointly develop, implement, and monitor strategies, programs, and measures to mitigate greenhouse gas (GHG) emissions. For this purpose, it is useful to view NDCs as public policy, particularly because its stages involve design, implementation, and evaluation. Although national governments lead decision-making processes and the relationship with the United Nations Framework Convention on Climate Change (UNFCCC), most implementation happens at, and must be informed by, the local level. Vertical integration of cities must therefore be an integral part of the process of NDCs in the Paris Agreement, where national and local initiatives inform each other to increase the ambition of the contribution submitted to the UNFCCC.

The interaction between levels of government and the different stages of the NDC is complex and flows in multiple directions. On the one hand, cities' contribution to increasing the ambition and implementation of NDCs can be enhanced through different legal, policy and technical approaches. These include the establishment of formal participation schemes, the alignment of climate change plans and priorities between different subnational authorities and the national government, the provision and joint mobilization of financial and resources, including technical support and capacity building for local governments for technical and policy related needs.

NDCs can also catalyze local action in cities. The enactment of national climate change plans has been found to have a positive impact on the level of engagement of subnational authorities. Policy-oriented guidelines can be developed to assist cities in establishing local plans and objectives. They can also help with selecting and prioritizing specific climate change actions consistent with their budget and policy contexts.

I. Cities, Unique Partners to Achieve Climate Change Goals

a. Cities' Contributions to Tackling Climate Change

Cities are hubs of economic development. They generate more than 80 percent of the world's GDP and are home to more than half of the world's population.[1] Policy actions taken by cities regarding infrastructure and consumption can determine the extent and impact of climate change. Increasing urban climate activities by 2030 could prevent approximately 1.3 million premature deaths per year, generate 13.7 million net jobs in cities, and save 40 billion hours of commuting time plus billions of dollars in reduced household expenses each year (C40, 2018)[2].

At the national level, countries have presented their NDCs as part of their commitment under the Paris Agreement. These pledges define key measures to be taken by countries to mitigate the causes and adapt to the effects of climate change. The target set in current NDCs, and the level of progress to accomplish them, are not sufficient to achieve the average temperature increase of 1.5 to 2°C above the pre-industrial level by the end of the century (CAT, 2017) established in the Paris Agreement.

Global emissions of carbon dioxide are still increasing (about 2 percent in 2017), and the rise in average global temperature has already exceeded 1°C. According to estimates, even if all current national pledges to contribute to the Paris objectives were fully implemented, temperatures would still rise by about 3 degrees (Barkdull and Harris, 2018). In this regard, mitigation actions taken by non-state actors, particularly urban municipal governments or cities, will play critical role in helping countries meet the goal pledged in their NDCs.

Cities face serious hazards from climate change. These include rising sea levels, storm surges, heat stress, inland and coastal flooding, droughts, and others. Coastal and lowland cities, such as New York, Miami, Rio de Janeiro, Amsterdam, and Singapore, among others, face major risks due to their large populations and capital and infrastructure assets. These risks and extreme events are expected to become more frequent and severe. For example, New York City suffered economic losses of over US$11 billion from Hurricane Sandy due to rising water levels (Zandl, 2012). In Mexico, the average annual cost of disasters due to hydrometeorological phenomena increased from US$70 million between 1980 and 1999 to US$1 billion between 2000 and 2015 (National Risks Atlas). Adaptation efforts will be crucial for cities to combat the effects of climate change. In addition to the mitigation actions proposed, they will need to work on enhancing their adaptation capacity, strengthening resilience, and reducing their vulnerability.

Based on the C40 Climate Leadership Group report, actions in urban areas with a population greater than 100,000 inhabitants could deliver 40 percent of the energy efficiency savings and enable achievement of the ambition of the Paris Agreement (C40 & ARUP, 2017). However, to meet this target, cities need to summon the different stakeholders, access the necessary resources, and take coordinated and results-oriented actions as soon as possible. These actions will allow cities not only to tackle climate change but also to become more inclusive, safe, resilient, and sustainable and comply with Sustainable Development Goal #11 and Habitat III agendas.

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[1] http://www.worldbank.org/en/topic/urbandevelopment/overview
[2] Climate Opportunity: More Jobs; Better Health,
https://c40-production-images.s3.amazonaws.com/other_uploads/images/1920_ClimateOpportunity_Summary_online_%283%29.original.pdf?1536323332

Cities' Contribution to Greenhouse Gas Emissions

As economic centers, cities are responsible for 70 to 80 percent of the total energy consumed, (OECD, 2014). However, but accounting for cities' GHG emissions is complex. Cities can analyze their carbon footprint by sector, direct emissions within city limits, and consumption-based GHG emissions. These include GHG emissions associated with the consumption of goods and services by the residents of a city but exclude GHG emissions from visitor activities and those embodied in exports [3] from the city.

Since cities consume goods and services produced outside the city limits, their contribution of GHG emissions to the overall emissions of their country tend to be small in relation to their population. Recent research conducted on four Latin American countries found that large cities such as Buenos Aires, Lima (Metropolitan Area), Mexico City, and Rio de Janeiro contribute between 1.8 and 9 percent to national GHG emissions (Table 1).

Table 1. Population, National, and City Emissions by Country

	POPULATION (MILLIONS)	SHARE OF NATIONAL POPULATION (%)	COUNTRY EMISSIONS (MTCO2E)	CITY % OF COUNTRY'S EMISSIONS
BUENOS AIRES	3.1	7.2	429.4	2.7
LIMA (METROPOLITAN AREA)	10.6	33	170	9
MEXICO CITY	9.6	7.5	665	4.5
RIO DE JANEIRO	6.2	3.0	1271	1.8

Source: "NDCs, what is there for Latin American Cities?" KAS & IIS (2017).

These results show that the importance of cities with respect to emissions is indirect and based on consumption (KAS & IIS, 2017). GHG inventories that only account for sectoral emissions within the city limits diminish the importance of consumption patterns as drivers of climate change (C40, 2018). By contrast, indirect emissions tend to be significant. Eighty percent of the cities studied have larger consumption-based than sector-based GHG emissions. If the emissions attributed to goods and services were considered and accounted for by decision makers in cities, they would play a bigger role in the decisions made and climate actions by creating awareness of their carbon footprint, giving them a wider range of opportunities to take action to reduce emissions. Some of the solutions that are being put forth under this perspective rely on the notion of circular economy policies. The approach entails shaping resource use by decoupling growth from material extraction and consumption, including reusing materials from abandoned buildings and harvesting rainwater for waste management solutions (WEF, 2018).

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[3] https://www.c40.org/researches/consumption-based-emissions

Cities with populations of over 1 million can make the greatest contribution to emissions reduction in a 1.5°C scenario. The size of their economies and populations makes them important actors to reverse the current emissions path. However, it is crucial that new investments and urban trends in emerging cities take a different path than today's large and mega cities to reduce GHG emissions in the future.

Pathways for Cities to Reduce GHG Emissions and Adapt to Cimate Change

A growing number of cities view their impact on GHG emissions and vulnerability as a top priority. More and more of them are committing to establish citywide mitigation and adaptation actions, and to allocating the necessary human and monetary resources for this purpose. These actions have been increasing in number and scale.

In C40 cities in 2011, for example, around 85 percent of the actions were pilot projects or proposals. By 2015, more than 52 percent of the actions implemented citywide had shifted to implementation (C40 & ARUP, 2015). Actions such as transportation policies, urban design, waste management, and building construction, which are the responsibility of local authorities, represent crucial milestones in the paradigmatic shift required for low-carbon and resilient local development.

Adaptation policies are also growing in importance as cities begin to feel the effects of climate change. In Europe in 2014, for example, around 150 cities committed to take adaptation actions as part of the EU mayors' Adapt Initiative (EEA, 2016). However, knowledge on climate vulnerability and resilience is still emerging, and adaptation measures are still difficult to define, measure, and verify. The Climate Actions in Megacities 3.0 report showed that only 16 percent of the actions taken by local government on climate change were in adaptation, a trend that should benefit from the local focus and become a trigger for deepening the knowledge and implementation of resilience interventions.

The growing number of cities that are leading the way toward a low-carbon and resilient future, and in many cases, their actions are independent from national policies. Of the 300 EU cities that have established action plans, around 51 percent are the result of local engagement and are unrelated to any national requirement (Recklen, Heidrich, Salvia, & Pietrapertosa, 2018).

For cities to succeed and to define a sustainable urban agenda, they need to collaborate with different stakeholders, including national and regional governments, the private sector, and academia. According to the 2016 CDP Report, two-thirds of the 533 cities that report their climate actions are already collaborating with the private sector, through knowledge sharing, business development, policy planning, project implementation, or financing (CDP, 2016). It also found that cities that collaborate with other stakeholders are more likely to have an ambitious and achievable emissions reduction target.

To remain within the 1.5 and 2°C target of the Paris Agreement, cities must also develop new institutional and governance mechanism that would improve their capacity to drive the change.

b. From the Paris Agreement to Vertical Integration of Nationally Determined Contributions

The Concept of Vertical integration

"Vertical integration is a form of multi-level governance that consists of engaging and coordinating authorities and aligning policies at various levels of government. This integration is bi-directional and not top-down in nature. Like the hybrid structure adopted in the Paris Agreement, vertical integration acknowledges that climate change can only be addressed by collective efforts for which different stakeholders are better positioned than others depending on the specific objective or activity at hand, within the broad and complex regime of climate action".

"The German Corporation for International Cooperation (Deutsche Gesellschaft für Internationale Zusammenarbeit, or GIZ) sees vertical integration as the joint development, implementation, and monitoring of strategies, programs, and measures to mitigate GHG emissions and achieve the adaptation measures that will increase resilience".

This type of governance has been found to be fundamental for the provision of public goods that would otherwise be perfect incentives for free-riding, given the associated market failures in the form of externalities and imperfect information. In the face of uncertainties regarding the impacts of climate change and the level of contribution by implementing partners, reciprocity and trust go a long way toward fostering collective action (Ostrom, 2010) and can be strengthened through comprehensive, integrated forms of governance.

It is thus fundamental to incorporate vertical integration of cities into the process of designing, implementing, and evaluating NDCs to the Paris Agreement. In this way, national and local initiatives can inform each other to increase the scope of the contributions submitted to the UNFCCC. Aligning priorities and efforts can enhance linked planning processes and increase the effectiveness and scope of climate action.

At the core of effective vertical integration is information. Appropriate information serves two purposes: it enables evidence and information-based decision making and evaluation at all levels of governance, and it integrates data for measurement, reporting and verification (MRV) to

the UNFCCC, which in turn informs global assessments.

Coordinating Local and National Entities - Vertical Integration

Before the Paris Climate Conference—also known as COP 21—which led to the signing of the Paris Agreement, countries had tried to enhance vertical integration of regional and local governments by engaging them in the preparation and implementation of Low Emission Development Strategies (LEDS), Nationally Appropriate Mitigation Actions (NAMAs), and National Adaptation Plans (LEDS GP, 2015). A key example was the V-NAMA project implemented by GIZ in Indonesia and South Africa in 2012. It piloted a multi-level government approach in the waste management and public building sectors, addressing the challenges of vertical integration in the development and implementation of mitigation actions.

The experience on Vertical NAMAs demonstrated the need for coherent and effective integration between national and subnational governments to design and implement mitigation actions. This was meant to reduce risk and improve the impact and efficiency of the actions (GIZ, 2015).

The participation of local government is crucial to increasing the transformational capacity of mitigation actions, since they are sensitive to local needs, priorities, and capacities. National governments should consider such participation an advantage when reviewing their NDC targets.

How Subnational Entities and Cities were Included in the Paris Agreement

Local governments began taking an active role in the UNFCCC process during COP13 in Bali. They launched the Local Government Climate Roadmap 2007–2012, as a parallel process that accompanied the post-Kyoto agreement (World Mayors Council, 2010). The work of local and subnational entities continued during subsequent COPs. Just before COP 16, several local governments adopted the Mexico City Pact, which introduced global transparency and accountability of local commitments through voluntary reporting to the Carbon Climate Registry (World Mayors Council, 2010).

The first dialogue between local and subnational leaders with the COP presidency took place during COP 16 in Cancun. As a result, they were recognized as government stakeholders (UNFCCC, 2011).

Building on the achievement of the Roadmap 2007–2012, local governments met in Nantes in 2013 and agreed on a revised strategy. The Nantes Declaration of Mayors and Subnational Leaders on Climate Change fostered the engagement, as governmental stakeholders, with national governments in the negotiations on climate change, advocated for the adoption of a 10-year action plan, and convened dialogues between ministers and mayors (UCGL, 2013).

In that same year, at COP 19 in Warsaw, a "Cities Day" was made part of the official agenda, and a second decision recognizing the role of cities and subnational authorities in raising the global level of ambition in the pre-2020 period was agreed on (UNFCCC, 2014).

With the launch of the Lima-Paris Action Agenda (LPAA) at COP 20, the cooperation with local and subnational level authorities to enhance the implementation of climate action was institutionalized through the Non-State Actor Zone for Climate Action (NAZCA) portal (COP 20, 2014) (UNFCCC, 2014).

With the launch of the Compact of Mayors before COP 21, a common platform to capture the impact of cities' collective actions was established, providing hard evidence of cities' leadership and the global impact of local actions.

As a result of the Paris Agreement, non-party stakeholders in the UNFCCC process, such as

local governments, subnational authorities, civil society, the private sector, and financial institutions were invited to scale up their efforts and support actions to reduce emissions, build resilience, and decrease vulnerability to the adverse effects of climate change (UNFCCC, 2016). After COP 21, the role of cities in taking action against climate change has taken center stage. Cities have participated actively in subsequent COPs. They have also strengthened their networks through the launch of the Global Covenant of Mayors for Climate and Energy, which brings together the two primary city initiatives on climate change, the Compact of Mayors and the Covenant of Mayors, to accelerate actions on climate actions (UCLG, 2016). In 2017, they issued a call for vertical integration of local authorities in national climate investment plans, building on the need to highlight the importance of cities as economic players, and contributing to the climate finance opportunities in the Paris Agreement. The effort underlines the need to provide pathways for active participation and engagement of subnational governments in the formulation of national climate investment plans. Quito, host of the 2018 meeting, used the opportunity to establish the National Consultative Committee of the Global Covenant of Mayors for Climate and Energy (GCoM), a mechanism to institutionalize the vertical integration of climate action between the different levels of government and other stakeholders. The GcoM will become a working group whose members will be able to influence the inclusion of local climate action in the NDCs and support local governments in their commitments to climate action.

The Talanoa Dialogue, launched during COP 23, built on the Bonn–Fiji Commitments. It has also given cities a space to convene local, regional, and national governments to push multi-level climate actions in the effort to reduce GHG emissions, among other issues and actors. Cities have planned a series of in-country consultations in 2018 that will help accelerate their engagement and allow them to shape and strengthen their countries' NDCs through the examination of the urban dimensions of the proposed climate actions. Although several events have taken place under the Cities and Regions Talanoa Dialogues, a report of the findings will be presented at COP 24.

The urban context has been identified in the NDC, as shown in the UN-Habitat assessment. However, the implementation framework is still not clear. The current Cities and Regions Talanoa dialogue can open a window of opportunity for policy coherence and multi-level coordination to accelerate engagement on climate action.

Source: BID Ciudades Sostenibles

Types of NDCs by Country

The NDCs presented to the UNFCCC were a major effort by national governments to indicate their expected pledges in climate action to limit the average global temperature rise below 2°C and comply with the Paris Agreement. These pledges cover mitigation and adaptation

objectives, in addition to specifying the financial, technical, and capacity support that they may need or be able to offer in the process.

The UNFCCC synthesis report provides an overview of the Intended Nationally Determined Contributions (iNDC) presented to the convention by April 2016. The iNDCs presented are national in scope, addressing all major sources and sinks of national GHG emissions. The types of mitigation targets communicated by countries varies as follow: 32 percent of the countries presented absolute emissions reduction, 45 percent presented business-as-usual targets, 20 percent presented policy and actions, while 4 percent presented intensity targets, 2 percent peaking targets, and 1 percent other (UNFCCC, 2016).

Of the iNDCs presented, 99 percent of them cover energy; 75 percent waste, 65 percent agriculture and LULUCF; industrial processes and other sectors of national importance are mentioned in 44 percent of them. Mitigation measures in the energy sector included the following sub-sectors: power generation (100 percent), transportation (73 percent), residential (68 percent), tertiary (38 percent), and industry (29 percent) (UN Environment, 2017).

> "Regarding the urban context of the NDCs presented by countries to the UNFCCC before August 2016, 68 percent (113 out of 164) mention the urban context. This reaffirmed the importance of cities in helping national governments implement climate actions (UN Habitat, 2017). Energy production, transportation, and waste management were a key focus in the NDCs that contain urban content. Capacity building was identified a key factor in implementing successful adaptation measures at the urban level".

As set forth in the Paris Agreement, all parties are required to communicate or update their NDCs by 2020 to the UNFCCC and review them every five years thereafter. These updates should become more ambitious over time and with each submission. This provides an opportunity to national governments to enhance multi-level participation and promote vertical integration for effective climate actions.

Additionally, the transparency dimension of the Paris Agreement will require a clear mechanism for MRV schemes on all actions. In this process, cities will be a unique partner. They will require the appropriate tools to generate and update the data sets and platforms under which they will identify, implement, and follow up on their climate commitments.

Vertical engagement is not only necessary to achieve the mitigation needed to achieve the goals of the Paris Agreement; it is also vital for adaptation planning and implementation, since making cities resilient requires support from higher levels of government (state and national) related to capacity building, knowledge sharing, and funding. The state of Jalisco in Mexico is an example of vertical integration in climate policies, since it has supported municipalities in the development of their climate action plans and has financed climate projects through its climate fund established in its state law (GIZ, 2017).

II. How can cities frame their commitment into effective climate action?

a. Thriving Cities and NDCs: A Common Vision

The New Urban Agenda strengthens the recognition of the local level as a key player in mainstreaming climate issues through their strategies.

This international commitment, endorsed by a large representation of countries, recognizes that cities need to adopt and implement disaster risk reduction and management guidelines, build resilience and responsiveness to natural hazards, and promote and build sustainable infrastructure for a low-carbon and resilient future.

Cities have translated national instruments into local action. The first step in tackle climate change is to understand how it affects local development and how they can undertake mitigation strategies to reduce the sources of vulnerability and GHG emissions.

Cities require a GHG inventory and a vulnerability map to plan accordingly. The Inter-American Development Bank's (IDB) Emerging Sustainable Cities Program is based on the premise that urban development strategies that are well-planned, integrated, and cross-sectoral, can ensure improvements in the quality of life for citizens and help bring about a more sustainable, resilient, and inclusive future for emerging cities in Latin America and the Caribbean. It includes three interrelated studies: the provision of a GHG inventory, a vulnerability assessment, and a footprint evaluation to allow decision makers at the city level to identify the data required to build their climate profile and elaborate comprehensive solutions to tackle development and climate issues in a holistic way.

b. Climate Actions through Urban Planning

One of the key elements in limiting GHG emissions and reducing climate risks is confronting urban sprawl. Urban sprawl was one of the features of U.S. cities and now characterizes the growth of cities in emerging countries.

Chinese cities, for example, have lost more than 25 percent of their density, thanks to the planned urban growth that China designed over the last decade.

In Johannesburg, while the total population has increased 2.4 times since 1977, the occupied land has multiplied fourfold. The city's attractiveness has led to a rapid and disorganized expansion, which has exacerbated social (impoverishment of the city center, precariousness of remote outlying areas, criminality) and environmental problems (increase in pollution and vulnerability to climate events).

The Johannesburg Metropolitan Municipality has decided to "stitch the city back together" by creating a roadmap to redevelop the city center (Inner City Roadmap), as well as a densification program around public transportation routes, called "Corridors of Freedom." The City of Johannesburg is embarking on a new spatial vision for the city in line with the "Growth and Development Strategy 2040." The aim of this strategy is to implement a transportation-oriented development (TOD) to integrate in an effective manner the most disadvantaged communities and reduce inequalities by improving access to housing, facilities, and employment while promoting low-carbon urban development models.

Following these principles, the Municipality launched a spatial transformation strategy by financing part of the 2014-2017 municipal investment program with an AFD EUR 120m loan. This project reconciles social and environmental impacts.

The shape of the future city will consist of well-planned transport arterials linked to interchanges where the focus will be on mixed-use development—high-density accommodation, supported by office buildings, retail development, and opportunities for leisure and recreation.

The municipality developed the 6D's principles guideline to support the action. These six principles are the following:

1. **Destination**, based on integration land use and transport solution
2. **Distance**, with connected and permeable street networks that facilitate access using complete streets principles
3. **Design** the creation of people-oriented neighborhoods with a strong sense of place and character
4. **Density**, with concentration and intensification of activities around transit station
5. **Diversity**, to encourage a mix of land uses provide for multiple modes and accommodate o variety of users
6. **Demand** management, with establishment of strategies that ensure the system operates efficiency

Adaptation is key as cities build their business cases as climate players in the arena of NDC implementation. Strongly affected by extreme climate events, such as droughts and floods, Minas Gerais is the first Brazilian state to have catalogued its climate change vulnerabilities. In 2012, its authorities began designing a territorial Climate and Energy Plan and have been making major efforts to reduce the social and territorial divide, especially in the area of access to basic public services. Minas Gerais also voluntarily committed to a land-development policy aimed at reducing inequalities and improving access to public services for its poorest citizens. The Minas Gerais Development Bank (BDMG), whose sole shareholder is the State, plays a key role in financing these strategic priorities over the long term. The partnership with BDMG is part of an approach to diversify this bank's resources with the aim of supporting the growth of its activity for municipalities. Its objective is to promote innovative projects that also benefit the fight against climate change.

Planning Instruments

> "Cities around the world are taking climate actions and setting bold targets to reduce their GHG emissions and take other adaptation measures. Todays' champion cities have been including climate change mitigation and adaptation in their planning, long before the Paris Agreement was reached. Some of them have establish a legal framework on climate change. Most importantly, they have good leadership that has enabled them to prioritize climate in local government agendas".

In 2008, Mexico City introduced its first Climate Change Action Program 2008–2012 (PACCM),

followed by a 2014–2020 update.[4] The 2016 evaluation report of the program showed that the program had achieved 46 percent of the 2018 targets, equivalent to a 3.1 million tons of CO_2e[5] (PACCM, 2016), through the implementation of mitigation actions in the energy, transport, water, and waste management sectors. The program also established adaptation measures in the areas of agriculture, forestry, health, biodiversity, and others. One key aspect in Mexico City's successful climate agenda is the establishment of a legal framework, the Mitigation and Adaptation for Climate Change and Sustainable Development Law (ALDF, 2011) adopted in 2011. It built the pillars to provide the government with adequate enabling conditions to implement and foster a medium-to long-term vision.

Another example of a champion city is Paris, which established a Climate Action Plan in 2007 to reduce GHG emissions by 75 percent by 2050 relative to 2004. In its first 10-year evaluation, the actions implemented have reduced GHG emissions by 10 percent (Mairie de Paris, 2018). The plan, which aims to seeks to run on 100 percent renewal energy by 2050. The plan has a strong adaptation and resilience component.

In 2010, Vancouver launched its Greenest City Action Plan, which commits to transition to 100 percent renewal energy for all sectors by 2050. Stockholm has committed to reduce its GHG emissions by 100 percent in 2040 compared to 1990 levels (Carbonn, 2017).

A front runner in the adaptation sphere is the city of Rotterdam. Eighty percent of its territory is below sea level. In 2007, it established the Climate Initiative, a multi-stakeholder initiative that seeks to reduce the city's CO2 emissions by 50 percent by 2025, and fully adapt to climate change. This initiative set the path for its Climate Adaptation Strategy. The strategy includes innovative measures to climate-proof the city, such as reinforcing dikes, installing a facility to absorb water, improving city drainage, and creating floating buildings (Rotterdam Climate Initiative, 2018).

With cities identified as key stakeholders in helping national governments achieve GHG reductions, champion cities are setting and aligning their priorities to meet the targets of the Paris Agreement. In 2014, New York City committed to reduce its GHG emissions by 80 percent by 2050 compared to 2005 levels by identifying strategies in the building, energy, transportation, and waste management sectors. In 2017, with the aim of aligning the city's emissions to the Paris Agreement goal, New York City prioritized a subset of strategies in the same sectors GHG reduction by 2020 (The City of New York, 2017). Implementation of these measures will reduce consumption and increase efficiency in buildings and transportation, two of the biggest sources of GHG emissions in the city. New York City officials have stressed the importance of collaboration with other actors if the mitigation reduction goals for 2020 and 2050 are to be met. This is one of the few examples in which a local government has adjusted its climate policy to achieve national climate goals.

c. Embracing Citizen Action within Local Climate Action: Nantes and Bogota

Effective climate change actions require civic participation. We are living in a time when the relationship between politicians and citizens is being redefined. Climate change is among the greatest challenges affecting the quality of urban life.

The city of Nantes, in northwest France, has a population of 630,000 inhabitants, 36 percent of whom are under 25 years of age. During the past eighteen months, Nantes has been on an innovative journey that has taken the form of a grand débat, or big debate, about the city's future

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[4] https://www.gob.mx/cms/uploads/attachment/file/164914/PACCM-2014-2020completo.pdf
[5] http://www.data.sedema.cdmx.gob.mx/cambioclimaticocdmx/images/biblioteca_cc/PACCM-ingles.pdf

transition to renewable energy. The final product will be a Citizens' Commission report that will inform a new energy transition roadmap to be adopted by the Nantes Metropolitan Authority.

The Municipality of Bogota has adopted a similar philosophy of action—empowering citizens to engage in new, sustainable behaviors. By closing the road network to automobiles on Sundays and holidays, the Ciclovía, or cycleway, has become the world's most successful mass recreation event. It is making citizens' behavior more climate-friendly. From 7:00 AM to 2:00 PM every Sunday and every holiday, 76 miles of streets are partially or fully closed to traffic for the Ciclovía, a program the local government has run since 1974. Some 1.7 million people, or about a quarter of the city's population, turn out for it on average every week.

Thanks to their knowledge of the economic, social, and geographical contexts, local and subnational governments can have knock-on effect for local stakeholders. Remaining on a trajectory that limits warming to 2°C will require huge investments in sustainable urban infrastructure: US$4.5 to 5.4 billion annually over the next 15 years (CCFLA, 2015).

> "International public funding (such as the Green Climate Fund) and private sector funding will not be enough to meet these targets. Countries will also need to engage local governments in implementing the Paris Agreement. Governments will need to contribute financially through national public policies that support and incentivize the full spectrum of subnational governments in their climate actions. It will also be necessary to secure the transfer of regular financial allocations from the central government, while also increasing the financial autonomy of local governments (consolidation of fiscal resources and access to loans)".

d. National Planning to Engage Local Governments

Urban planners, municipal staff, and officials working at the local level can use many methodologies to design, implement, and monitor Climate Action Plans (CAPs). These strategies establish policies and programs for mitigating a community's and territorial greenhouse gas (GHGs) emissions. They typically focus on a sector: transportation, energy use, and solid waste, and they often differentiate between community-wide actions and municipal agency actions.

CAPs are usually based on GHG emissions inventories, which identify the sources of emissions from the community and quantify the amounts. Many of the methodologies for identifying and quantifying emissions include a section addressing adaptation: how the community will respond to the impacts of climate change on the community, such as increased flooding, extended drought, or sea level rise.

Some cities are leading some CAPs for their own initiatives, through new competencies carried by their municipal staff. Others are receiving methodological and financial support from international initiatives by recruiting consultants.

National governments could incentivize subnational governments by instituting new national policies. Some recent examples are instructive in this regard. In France, the role of local governments has been incorporated into the French Energy Transition Law, and a national approach has been put in place that provides a normative framework and technical resources to mainstream climate change activities into local planning.

In Morocco, the new 2011 Constitution devolves a substantial number of administrative tasks to local governments under the advanced Regionalization process, notably in water and energy management. In some cities, local officials oversee climate and energy issues.

In Colombia, the national framework has set climate goals for local governments to involve them in carrying out international commitments made by the national government. Colombia's NDCs contain the State's incentives framework. A national regulatory framework that shares national commitments with local tiers of government could be applied in other countries that are at a sufficiently advanced stage of vertical integration on climate change.

Support from development finance institutions calls for practical application of national public policies in favor of climate change through initiatives led by local governments. For example, the French Development Agency (Agence Française de Développement, or AFD) has supported the Philippine government's decentralization policy through the transfer of climate risk management skills to local governments. The AFD has also supported the Secondary Cities Climate Change Adaptation Program (PAVICC) in Benin.

An analysis conducted by AFD and I4CE in 2017 [6] provided evidence that local territorial climate initiatives seldom go hand in hand with the financial resources needed to put them into practice. The countries analyzed—Argentina, Colombia, India, Mexico, and South Africa—have an advanced decentralization framework that makes it possible to define the linkages between responsibilities and competencies for climate action; they also have the financial and institutional resources to implement them. Colombia, for example, has set up new nationally coordinated administrative entities that have taken on responsibilities for climate support at the local level. Under the National Climate Change Adaptation Plan, a financial management committee ensures the technical viability and financing sources for projects initiated by local governments.

Most countries commit to supporting subnational actors in climate action without supporting them with adequate financial resources. Despite the commitments announced by several signatory countries to the Paris Agreement, the institutional and financial framework only seldom assigns full competence to subnational authorities to pursue the public policies for which they are responsible, with inadequate financial and human resources to shoulder them. To anchor these local climate actions in sustainable public policies, these States will need to develop the local financial framework.

Advanced vertical integration investment needs for resilient and low-emission infrastructure over the next 15 years are immense. The national dialogue with local actors must become a priority, supported by a strengthening of institutional, technical, human and, above all, financial resources (ICLEI, 2015). Implementing the NDCs and their forthcoming revisions offers a real opportunity to come up with concrete responses to this challenge of subnational climate action. Non-state actors (networks of cities, local officials, etc.) must seize on this opportunity to encourage States to integrate them into the NDCs. The agenda for financing local governments, which is inseparable from the agenda for subnational climate action, must be continued if it is to match up to the ambitions of the Paris Agreement.

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[6] "États et initiatives climat des collectivités locales" in Question de Développement no. 37, November 2017, AFD.

III. Higher Ambitions: A Framework for the Revision of NDCs

a. Institutional Links for Vertical Integration: Planning, Implementation and Evaluation

Implementation and Evaluation of NDCs

The Paris Agreement already offers elements of the framework for NDCs around which national processes can be further designed, mainly: that countries have to put forward an NDC every five years, that each subsequent contribution needs to represent a progression from the current one and be informed by the findings of the global stock taking to be held every five years to assess collective progress toward the Paris Agreement's long-term objectives. This sets up a periodic process that, similar to public policy cycles, involves design, implementation, and evaluation of the NDCs, offering an opportunity to involve local governments at each stage in an ongoing conversation and coordinated effort.

From the second submission of NDCs onward, design and evaluation phases will be closely linked together, as they inform each other for ensuring the progression of ambition. Evaluation is a crucial and often overlooked stage of the process toward achieving policy objectives. It is, however critical, as it allows identification of best practices, gaps, level of progress, and necessary adjustments for subsequent design and implementation periods. Cities can contribute significantly to this and all other phases of the NDCs. Finally, MRV plays an important role in the vertical integration of cities as it informs inventories, baselines, and assessments. Future phases of NDCs would benefit from considering the following recommendations.

Establish well-defined participation and decision-making structures throughout all phases

Having a formal process where predictability, continuity, and transparency are at the core would be helpful in establishing an ongoing deliberation where cities and national governments, together with other relevant stakeholders, engage in effective information sharing, capacity building, and decision making. Participating stakeholders, their role, responsibilities, and competencies need to be clearly established, as well as timetables and objectives of the process. This would increases ownership of the NDC and would help countries and cities mainstream climate change into budgeting and planning processes.

NDCs are set up in a periodic and cyclical manner in the Paris Agreement. National schemes for cities' involvement can mirror this so that expected results can be reached in time for them to be included in the submissions to the UNFCCC. These institutional arrangements, including dedicated collegiate bodies, competencies, and processes, can be captured in national climate change laws or policy instruments to embed them with legitimacy and continuity, while ensuring their sustainability through time and changes in government. Expanding these arrangements beyond NDCs and into planning of long-term climate change policies would strengthen the benefits of joining forces to achieve national and international climate change objectives.

In addition, specific coordination roles can be established within the mechanisms to support local and vertical integration efforts. The Territorial Coordinators of the Covenant of Mayors (CTC), for example, are public authorities of higher subnational levels who "commit to providing strategic guidance, financial and technical support by adhering to the Covenant as CTCs, a role officially recognized by the European Commission" (Melica et al., 2018: 731). Support provided to smaller or less experienced municipalities has been useful in catalyzing climate action by facilitating information flows, capacity building, and mobilization of resources.

In Chile, for example, around 10 Regional Committees on Climate Change were established in 2017 with the participation of the national government, academia, the private sector, and local authorities. These efforts follow the Climate Change National Action Plan 2017–2022, which established the regional committees as one of the priorities for the upcoming years in the country's measures to address climate change. The Committees are inclusive and address long-term planning, assessing local needs and opportunities and improving prioritization and allocation of resources, among others.

Provide, facilitate access to, and jointly mobilize finance

Vertical integration requires specific allocation of organizational, temporal, and financial resources for both the institutional aspects of the coordination and implementation of public policy frameworks and projects. Most climate finance is available at the international and multilateral levels where national governments are the main access and contact points. Through this role, and participation mechanisms such as those outlined in the first recommendation, national governments can facilitate cities' access to these funds for local climate action. National budgeting is another way to facilitate vertical integration of cities in climate change efforts, by mainstreaming climate change and allocating resources for the local level and coordination between multiple authorities.

One of the main constraint cities face in implementing their climate plans is access to finance. Cities are diversifying their sources of finance and implementing new schemes that allow them to carry out actions with other sources in addition to public funding.

In 2017, Mexico City issued its first Green Climate Bond, which will help it implement its Climate Change Action Program. Other cities that have issued these types of bonds are Asheville, Gothenburg, Hartford, Johannesburg, Los Angeles, Paris, Stockholm, St. Paul, and Tacoma (GCB, 2016).

Washington, DC implemented a program to encourage private sector participation in solar energy production, by passing a law that allows third party purchase agreements (Compact of Mayors & C40, 2016). Another financial strategy that involves the private sector is the implementation of market-based climate solutions, such as the emission trading scheme implemented by Shenzhen, which encourages the private sector to finance low-carbon projects (Jiang, Ye, & & Ming Ma, 2014).

Almada, one of the 18 municipalities of Lisbon's Metropolitan Area, established a revolving fund to help reduce its carbon footprint through actions in energy efficiency in buildings and renewable energy production (Covenant of Mayors, 2016). Sacramento followed a similar path by creating a revolving loan program for energy efficiency that used seed funding from federal grants (City of Sacramento, 2017). Special funds have also been established to finance resilience capacities and solutions. Some of them started with relatively small investments that generate new fiscal resources to secure public investments in the next round of policies (IDB, 2017). The IDB financed coastal management in Barbados to build resilience to coastal hazards along the island's western and southwestern coastlines.

Another potential financing mechanism includes smart combinations of resilience tax systems for travelers, tourists, and developers in cities of the Caribbean, as well as environmental impact taxes imposed on developers that, for example, contribute to flooding. This approach has been adopted in Castries, Saint Lucia, where the World Bank (2014) funded improving insurance mechanisms and climate change financing for long-term recovery and building resilience against flooding and landslides (IDB, 2017).

Tailor vertical integration to the context and capacity building needs of cities

Vertical integration for implementation of a country's NDC requires clear and possibly enhanced competencies for subnational governments regarding their authority to establish, follow up on, and even enforce local measures or setting of objectives and targets in their jurisdictions. Specific competencies are in turn informed by political structures, in particular the level of decentralization, which varies between countries. Tailoring specific vertical integration mechanisms for cities needs to take these contextual factors into account; the greater the centralization of competencies in the national government, the more efforts will need to be directed at enabling local action; in cases with greater decentralization, efforts will mostly be needed to engage, guide, coordinate, and align autonomous actions.

Effectively implementing climate change measures and participating in vertical integration mechanisms require knowledge and skills from both national and local authorities. These skills might need to be developed or enhanced for better implementation, participation, and follow-up capacity, for which experienced cities, other levels of subnational governments, or national governments themselves can share knowledge and cooperate to help build local capacity.

The establishment of climate-specific agencies at the local level in key jurisdictions can be useful to prioritize and allocate efforts, resources, and competencies for addressing climate change. Alternatively, capacity building can be directed toward local development or planning institutions that can lead climate-change efforts in their jurisdictions. In this case, however, it is important together with capacity building, to allocate specific competencies and resources so that institutional efforts are legitimate and secured.

Local Monitoring

Although much thought has gone into how cities can contribute to NDCs, not much has been said about how an NDC can guide local planning and research. Imagine a scenario where a new mayor and his team, interested in working on climate change issues, are trying to figure out where to start. This is in itself a difficult task particularly, if the city has no previous GHG inventories. If they took the national NDCs and identified the priority sectors with the most GHG abatement potential and prioritized adaptation actions, they could then start to analyze how these align to their city's sectoral profile, adaptation needs, and existing progress or measures to address them. This is particularly beneficial considering that NDCs, unlike national GHG inventories, are forward-looking and can point to opportunities in sectors where the city expects to grow.

Another side of this scenario is the MRV aspect. With an abundance of methodologies available for cities to use, of varying complexities, the most beneficial scenario is where cities and the national organization in charge of national GHG inventories agree on data parameters as early as possible. This can result in extremely useful partnerships for data integration in existing systems and the development of new emission factors.

For cities that already have inventories and climate change plans, NDC development processes and review processes offer a chance to check the alignment of their efforts with national priorities and explore technical and financial support with the national government and international sources, with the additional support of contributing to a main target within the country's NDC.

A recent study carried out for more than 800 cities in the European Union identified three broad factors that influence the development of local climate plans: size of the city, national legislation, and international networks (Reckien et al., 2018). Almost 80 percent of cities with more than 500,000 inhabitants have a comprehensive stand-alone mitigation and/or adaptation plan; cities in countries where national climate policies are in place are nearly twice as likely to produce local mitigation plans, and five times more likely to produce local adaptation plans than cities where national policies are lacking. Finally, international networks are also catalyzers for local plans, especially when autonomous action is not already underway. In the Latin American region, this has been the case for countries like Chile and Costa Rica, where national climate change objectives and policies inform and catalyze local action, as well as guiding the engagement with sector and local authorities. With those examples in mind, future NDCs would benefit from developing guidelines and fostering capacity building for cities.

Develop guidelines and enabling dialogue to support local climate change planning

National and local climate change plans need to be in place and aligned to guide the efforts and facilitate processes of formal participation and consultation. For this purpose, and closely related to formal processes described in Section 3, national governments can develop policy-oriented guidelines derived from priorities identified in the NDC for mayors to consider in their planning. These priorities in turn should be informed by multi-stakeholder consultations, including cities.

Build capacity of cities

Multi-stakeholder trainings can be held to build capacity of cities for policy purposes and for developing and using other tools, such as those related to MRV. These trainings can be addressed at the local government team level, specifically city planning divisions. Capacity building efforts that involve national and local governments allow increased ownership of the objectives and prioritized actions, as well as better and sustained communication between levels of government. It facilitates implementation of relevant measures and tailoring of policies to contextual factors that local authorities know well, thereby increasing the effectiveness of the measures carried out.

b. A Road to Results: Accountability

Cities are more active than ever in climate change action, and their MRV efforts are also rapidly increasing. According to a paper published by the World Resources Institute (WRI) in 2013; "164 cities reported to the carbon Cities Climate Registry (cCCR) in 2012, 73 cities reported to the Carbon Disclosure Project in the same year, and 2,450 cities submitted GHG data to the Covenant of Mayors. Based on the latest count by GHG Protocol (August 2015), there are 175 cities using or committed to using the GPC to develop GHG inventories (Institute for Global Environmental Strategies, IGES). However, unlike national governments, local governments do not have agreed international guidelines to follow when developing their GHG inventories. Instead, they have a plethora of methodologies, protocols, guidelines and formats, and no good way to assess what is best for their needs or improved communication with national MRV systems. In developing countries, it is often the case that the methodologies they follow depend on what is imposed or suggested by international organizations or associations of cities and are not adjusted to their local context.

According to the same WRI document, "The most widely referenced programs include: the International Local Government GHG Emissions Analysis Protocol (IEAP), developed by the International Council for Local Government Initiatives (ICLEI) in 2009; the International Standard for Determining GHG Emissions for Cities, jointly developed by the World Bank, UNEP, and UN-HABITAT in 2010; and the Covenant of Mayors' guidebook for its signatory cities to prepare baseline emission inventories" (WRI, 2013).

In addition, "many organizations have developed software to help cities conduct GHG inventories, such as the GRIP tool in Europe, CO2 Grobbilanz in Austria, Bilan Carbone in France, CO2 Calculator in Denmark, and the HEAT tool for international application" (WRI, 2013). The article continues to enumerate problems, such as inconsistency, incompleteness, and double-counting, that arise with having this array of methodologies.

According to interviews conducted for the development of this document, national government entities in charge of national GHG inventories are finding it extremely difficult to integrate data from city and state inventories into national ones, resulting in no integration in most cases. This means that city efforts may go unseen or under represented, and that national ambition may be affected due to a perception of lower progress than there really is.

Difficulty in vertical integration of GHG and mitigation data is not only due to the diversity in methodologies, but also to their differences with IPCC inputs and the complexity of the latter. IPCC methodologies are mostly developed thinking about sectoral data outputs and are complex. In many developing countries, there are only a handful of experts that know them well and work with these types of methodologies, and they are not distributed evenly in the country's cities, so many lack local capacity for GHG accounting in IPCC standards.

If the capacity exists, cities can improve the data they provide into the national MRV system by analyzing the different IPCC subcategories and aligning their inventories to produce data to fill the ones where they have emissions and emission reductions to report.

Measurement, Reporting, and Verification of Adaptation Processes

MRV methodologies and procedures for adaptation measures are not common. Most of them are designed specifically for a project or a case by case given the need to have the context in mind to frame the adaptation MRV system. However, many developing country NDCs include adaptation, many in a broad fashion, and some with specific targets. Including adaptation in national–local discussions on MRV can increase knowledge of the type of activities being done, how they respond to national priorities included in NDCs, and how they can be measured, and their data are included in national reports. There is no IPCC or internationally agreed guidance in this area, and most cities are not reporting on adaptation action, so there is a good opportunity to encourage MRV and synchronize systems for registering the data from the start. Cities and nations are looking forward to better NDCs, better institutional frameworks, better local capacity, and more financing to reach the goals set for the future. This paper looked at the incentives, planning efforts, and financing difficulties in which cities show their commitment at the operational and policy level. The cases reviewed underscore key ingredients for the future of vertical integration.

Unify city methodologies within the country and developing agreements on vertical integration of data

It is hard to imagine a universal agreement between cities on one standard or methodology for GHG reporting and inventories. There is no official forum that has enough coverage to be presented as speaking for all cities that would be able to deliver such consensus, and it would be difficult to negotiate for cities that have already established processes and methodologies based on different standards.

In 2010, the WRI, C40 Cities Climate Leadership Group, and ICLEI partnered to create a GHG Protocol standard for cities known as Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC).[7] A document that has been refined over the years and will require an effective adoption of cities to ensure they can follow common standards.

The case could be made to have national agreements, as is being done in Costa Rica's "Inventarios Cantonales" initiative. This initiative is part of its "Carbon Neutral Country" program, or at least to have some agreed minimums for data type, quantity, frequency, scope, delivery mechanisms, and others. This would facilitate comparability within cities, avoid double counting and overlapping measurements, and make it easier for the national level to incorporate data into national MRV systems and reports. Introducing tiers to divide cities into nationally determined categories that consider size and other characteristics, such as being coastal, or more urban or rural, that also respond to different capacity and emission profiles can help ensure that resources are used more efficiently.

For cities that have not yet embarked on developing inventories and MRVing of their climate actions, or are willing to adapt to a new system, the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC) can be a valuable resource, since it includes data categories that align with IPCC national guideline requirements.

National authorities need to standardize municipal risks assessments, including methodologies to downscale regional climate models at the local level. Municipal governments are seeking

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[7] https://ghgprotocol.org/sites/default/files/standards/GHGP_GPC_0.pdf

guidelines to assess their climate vulnerability. National authorities should also set guidelines regarding climate risk assessments to better frame the concept of adaptation and resilience strategies that subnational entities and local actors could implement through a common framework that allows multilevel engagement and transparency.

Seek cities' data outputs from cities compatible with IPCC

Related to the previous recommendation, and perhaps one of the most critical steps a city can take even unilaterally, is the need to analyze IPCC data entry subcategories and try to align their data outputs to them, either by adapting the methodology they choose, using methodologies that include these subcategories such as the GC, or guiding themselves completely by IPCC guidelines and adjusting for the areas where they can provide information.

On the other side of this recommendation is one to be considered by the IPCC itself: improve the language and descriptions of subcategory data entry requirements to make them easier to understand form a city perspective.

Help cities improve existing national GHG data collection systems and the development of local emission factors to improve the accuracy of national GHG inventories

Many developing countries already have GHG collection systems in place that need local authorities' input to function. In many cases, these data collection efforts are not done, or are done in a substandard manner, resulting in poor data being fed to national GHG inventories and MRV systems. Capacity-building sessions between the central entities in charge of these systems and processes and those responsible for data collection and input at the local level would greatly improve this situation. It would also help boost capacity in cities for GHG MRV.

Improve MRV capacities in cities

Many cities lack the capacity to even identify when an action is delivering climate change impacts, positive or negative. If they are expected not only to be able to identify them, but also to prioritize climate action, integrate it into their planning, implement them, and then set up and execute MRV systems, support and capacity building must be provided for this purpose. Many, if not most, inventories already done in cities across the Latin America and the Caribbean region have been done by external consultants that do not have the mission of creating capacity locally as they develop these products. This results in processes that are not replicable by the city without having to hire third parties whenever they want to update or change their MRV systems or GHG inventories. This could be changed by requiring contractors to team up with local government staff and local university teams, ensuring capacity is built in cities which can then be used to sustain MRV systems and procedures for themselves. There are various international platforms that can support local entities in these efforts, and national-level entities can also develop capacity-building and support programs.

Generate a national MRV system for adaptation actions in collaboration with cities working on them

On the adaptation front, internationally used indicators such as the ones developed by the Green Climate Fund (GCF) can be a starting point for agreed indicators or data categories between national and local governments. The first NDCs for many countries included adaptation as a broad priority, and in some others broad activities were prioritized, but there was a clear lack of specificity and targets set. Countries are actively working on improving this, creating an opportunity for dialogue with local governments about priorities, targets, and how to measure progress.

CONCLUSION

Now more than ever, mitigation commitments of as many cities as possible are necessary to help achieve the goal set in the Paris Agreement. International climate initiatives and networks can play an important role in helping cities establish mitigation and adaptation commitments by developing local action plans and sharing best practices and tools, like the C40 Climate Action Planning Framework or the Climate Risk and Adaptation Framework and Taxonomy (CRAFT).

Leader cities can also help other cities in climate action planning through collaboration, information sharing, and capacity building. This type of collaboration could help cities set their mitigation and adaptation commitments, identify their challenges and opportunities, and set a path for the implementation of a climate action plan.

Although all cities have a role to play in reducing emissions, cities with populations of over 1 million can make the greatest contribution to emission reduction in a 1.5 degree target scenario, as shown in the C40 report. By developing comprehensive climate action plans, cities can recognize the scale of change they need to make and prioritize them appropriately to meet their goal. The Deadline 2020 showed that 51 percent of the savings needed to achieve a 1.5 degree trajectory can be achieved by C40 cities, with 5 percent of these reductions done by cities unilaterally and the other 46 percent delivered in collaboration through vertical and horizontal integration.

The scale of the challenge ahead is immense. Although cities have the potential to achieve an important percentage of the reductions needed to stay on track for the 2°C goal, they need to collaborate with partners and identify the most valuable, cost-effective opportunities to achieve significant emission reductions.

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