The State of Cities Climate Finance 2024

The Landscape of Urban Climate Finance
2nd edition

September 2024

CITIES CLIMATE FINANCE LEADERSHIP ALLIANCE

CLIMATE POLICY INITIATIVE

AUTHORS

Jessie Press-Williams, Priscilla Negreiros, Pedro de Aragão Fernandes, Chavi Meattle, Hamza Abdullah, Arthur Vieira, Jose Diaz, Ben Melling.

ACKNOWLEDGMENTS

The authors would like to thank and acknowledge contributions from CPI colleagues Barbara Buchner, Sasha Abraham, John Michael LaSalle, Alastair Mayes, Francisco Macedo, Baysa Naran, Morgan Richmond, and Costanza Strinati for their advice and internal review. We are also grateful to the OECD and CDP for contributing information boxes and analysis to the report. This report was prepared under the guidance of an Advisory Board and we are especially grateful to the members for their advice and external review (listed alphabetically by organization): Jorge Gastelumendi (Atlantic Council); Andrea Fernández (C40); Katie Walsh (CDP); Eszter Mogyorósy[1] and Maryke van Staden (ICLEI); Brian Motherway (IEA); Carolin Koenig and Marie-Sophie Schwarz[1] (GIZ); Isabelle Chatry (OECD); Sharon Gil and Gulnara Roll (UNEP); Padraig Oliver (UNFCCC); Bella Tonkonogy (US Treasury); and Joanna Mclean Masic (World Bank Group). We thank the following contributors (alphabetical by organization): Emilie Becault and Idan Sassan (CDP); Charlotte Lafitte (OECD); Catarina Fonseca and Elspeth Alexander (Pulsing Tide); Ian Skinner and Marianne Pearson (TEPR). Additionally, we are grateful to the following external reviewers (alphabetical by organization): Eleni Dallas, Sebastian Herold and Ruben Werchan (BMZ); Rudolf du Plessis, Paula Rolffs and Ilgin Warneke (GIZ); André Almeida da Vila (ICLEI); Sandrine Boukerche, Chandan Deuskar, Juan Sebastian Leiva Molano, and Augustin Maria (World Bank Group). We would also like to thank CPI colleagues Angel Jacob, Kirsty Taylor, and Rob Kahn for editing, as well as Pauline Baudry, Elana Fortin, Angela Woodall and Denny Kosasih for graphics and design.

ABOUT THE CITIES CLIMATE FINANCE LEADERSHIP ALLIANCE

The Cities Climate Finance Leadership Alliance is a coalition of leaders committed to deploying finance for city-level climate action at scale by 2030. Trillions of dollars will be required to help cities build the low-emissions, resilient infrastructure necessary to combat and react to climate change. The Cities Climate Finance Leadership Alliance is the only multilevel and multi-stakeholder coalition aimed at closing the investment gap for urban subnational climate projects and infrastructure worldwide.

1 We note that Eszter Mogyorósy and Marie-Sophie Schwarz have now left their respective organizations.

DATA PROVIDERS

FUNDERS

Supported by:

on the basis of a decision
by the German Bundestag

Any opinions, findings, and conclusion or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the funders.

CCFLA SECRETARIAT

DESCRIPTORS

Sector

Urban climate finance

Region

Global

Keywords

Cities, tracking, needs, urban, adaptation, policy, finance

Related CPI Works

State of Cities Climate Finance (2021)

Global Landscape of Climate Finance (2023)

Contact

CCFLA Secretariat
AllianceSecretariat@cpiglobal.org

Media Contact

Angel Jacob
angel.jacob@cpiglobal.org

Recommended Citation

CCFLA. 2024. The State of Cities Climate Finance 2024. Cities Climate Finance Leadership Alliance at: https://citiesclimatefinance.org/publications/2024-state-of-cities-climate-finance

FOREWORD

“

As climate change intensifies, the urban poor are disproportionately impacted. Closing the urban climate finance gap is essential to protect the most vulnerable in our cities. This report highlights the urgency of bridging the gap and provides valuable recommendations for stakeholders to better mobilize finance for city-level climate action at scale, fostering just, sustainable, and resilient cities for all.

—Dr. Heike Litzinger, Head of Division on Energy, Urban Development and Mobility at the German Federal Ministry for Economic Cooperation and Development (BMZ)

“

Bridging the climate investment gap in cities will significantly contribute to reducing global greenhouse gas emissions and advancing sustainable urban development. By evaluating current financial flows and needs, this report helps cities and their partners to identify gaps and develop measures to scale urban climate finance in line with a 1.5°C climate pathway.

Dr. Lutz Morgenstern, Head of Division on General Issues of International Climate Action and Energy Transition and Multilateral Implementation Initiatives, at the German Federal Ministry for Economic Affairs and Climate Action (BMWK)

“

Access to finance is one of the biggest barriers cities face in taking climate action and a top priority for C40 mayors. We have been engaging national governments, financial institutions, climate funds, private funds and banks, and donors on how to scale, expand, unlock, and facilitate access to finance for cities. The State of Cities Climate Finance report is our go-to resource for measuring progress and understanding the dynamics of climate finance flows for urban projects. We look forward to continued collaboration with the CCFLA to address these systemic barriers, and pave the way for investment in greener, healthier, and more resilient cities for all.”

Andrea Fernández, Managing Director, Climate Finance, Knowledge and Partnerships at C40

“

Cities are a key arena for climate and clean energy goals, and finance is in turn key to cities’ progress. This report fills important knowledge gaps on the critical role of urban areas in climate change mitigation and the importance of targeted climate finance. It shines a spotlight on the substantial financial investments required to transform cities into sustainable and resilient environments, consistent with global climate goals.

Brian Motherway, Head of the Office of Energy Efficiency and Inclusive Transitions at IEA

“

The SCCFR is the urban climate finance flagship report, providing a great basis to inform action-orientation. It highlights the urgency but also motivates to continue stepping up our joint efforts.

Carolin König, Finance Partnerships Manager, C40 Cities Finance Facility (CFF)

“

I was glad to be able to support the preparation of this report, which continues to make advances in our understanding of how to assess and track the state of city climate finance.

Joanna Masic, former Global Lead for Cities and Climate Change, and currently Program Leader, World Bank

“

Cities are a pivotal piece of the puzzle in meaningfully and effectively tackling climate change. The State of Cities Climate Finance report is a timely guide on where and how to mobilize more finance for city-level climate action at scale. We saw more than 1,000 cities reporting through CDP-ICLEI Track in 2023, with 636 cities disclosing a total of 2,346 climate-related projects, worth USD 146 billion, seeking financing and funding. Every single city needs investment to be ramped up to meet its climate goals. This report clarifies the state of play for stakeholders and pinpoints where action needs to be taken.

Katie Walsh, Head of Climate Finance for Cities, States/Regions & North America Lead, CDP

“

The State of Cities Climate Finance 2024 report reveals a significant gap in climate adaptation finance, with current estimates falling far short of actual needs, and underscores the urgent need to build capacity at city and sub-national levels. To improve future cost-benefit analyses, it's crucial to account for broader economic impacts—such as those on health systems, agriculture, labor productivity, insurance costs, and biodiversity—beyond just infrastructure investments.

Jorge Gastelumendi, Senior Director of the Atlantic Council's Adrienne Arsht-Rockefeller Foundation Resilience Center (Arsht-Rock)

“

The 2024 State of Cities Climate Finance report provides a detailed analysis of global urban climate finance flows and needs, offering strategic insights to unlock sustainable financing and drive a just transition at the local level. As a founding member of CCFLA, ICLEI leverages these valuable resources to advocate for increased financial flows toward sustainable projects, empowering local governments globally to scale up their climate action and invest in net-zero and resilience initiatives.

Maryke van Staden, Director of Business Development and of The carbonn Center at ICLEI

ABBREVIATIONS

AFOLU	Agriculture, Forestry, and Other Land Use
DFIs	Development Finance Institutions
EMDEs	Emerging Markets and Developing Economies
EV	Electric Vehicle
FI	Financial Institution
FUA	Functional Urban Area
GCoM	Global Covenant of Mayors
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GLCF	Global Landscape of Climate Finance (CPI 2023)
HVAC	Heating, Ventilation, and Air Conditioning
LDCs	Least Developed Countries
LMICs	Low- and Middle-Income Countries
MDB	Multilateral Development Bank
NbS	Nature-based Solutions
NDCs	Nationally Determined Contributions
OECD	Organization for Economic Cooperation and Development
PPP	Public-Private Partnership
SCCFR	State of Cities Climate Finance Report
SOE	State-Owned Enterprise
SOFI	State-Owned Financial Institution
UNFCCC	United Nations Framework Convention on Climate Change

EXECUTIVE SUMMARY

Cities are indispensable actors in the climate transition but need much more investment to meet climate goals. Currently, 56% of the world's population lives in cities and 70% of people are expected to reside in urban areas by 2050 (World Bank 2023a). This increasing urbanization underscores the importance of climate finance for cities. Many are already facing frequent and intense extreme weather events such as floods and extreme heat, particularly in emerging markets and developing economies (EMDEs). For example, 2024 has already seen flooding in Brazil's Rio Grande do Sul state that displaced 200,000 people and caused USD 3.7 billion in damages (OHCA 2024), while temperatures exceeding 52°C in Delhi worsened public health challenges and water shortages (Reuters 2024).

Cities have demonstrated motivation to collaborate with national governments and lead subnational climate action. At COP28, the Local Climate Action Summit highlighted local leaders' role in emissions reduction while the Coalition for High Ambition Multilevel Partnerships, endorsed by 72 governments, promoted multilevel collaboration on updated Nationally Determined Contributions (C40 2023a, UNFCCC 2023).

However, our data shows that annual urban climate finance must increase more than fivefold to attain a 1.5°C climate pathway. This reveals a great investment opportunity in low-emissions and resilient infrastructure if the following key challenges can be overcome (see Table ES1).

Table ES1: Summary of systemic challenges to closing cities' climate finance gap

Systemic challenge	Overview	Impact on urban climate finance
Insufficient commitment to urban climate action	Global and national climate discussions prioritize national commitments and often overlook urban needs.	• Reduces national governments' political will to commit to long-term funding for cities. • Weakens the enabling environment for urban investments. • Lowers investor awareness of urban climate finance opportunities.
Weak enabling environments	Inefficient cooperation between levels of government misses the opportunity to strengthen city-level climate policy, provide predictable and stable regulatory and financial support for cities, and create a multi-level governance system that elevates cities' needs.	• Undermines climate policy, planning and investment processes, and municipal fiscal autonomy. • Hinders multi-level governance, impacting project approvals and investor confidence.

Systemic challenge	Overview	Impact on urban climate finance
City-level capacity gaps	Cities often lack the capacity to craft climate policies, develop necessary financial and investment plans, and make data-driven decisions relating to climate risk and resilience.	• Creates financing gaps due to a lack of targets for climate action. • Limits the ability of cities to source, prepare, and implement investable projects.
Inadequate capital mobilization	Cities struggle with poor creditworthiness, limited access to capital markets, and limited fiscal capacity. This is particularly pronounced in EMDEs, which often suffer from inadequate capital flows.	• Increases reliance on insufficient local revenues. • Deters direct investment in cities due to repayment risk.

The 2024 State of Cities Climate Finance report (SCCFR) provides the most comprehensive assessment of urban climate flows and needs globally. It aims to inform action on the Cities Climate Finance Leadership Alliance (CCFLA) goal of mobilizing finance for city-level climate action at scale by 2030.

This work builds on the framework of the SCCFR 2021, ensuring data comparability and revealing trends in urban climate flows over time. This information can be used to monitor, benchmark, and inform progress. The current report also makes methodological improvements for assessing urban climate finance and, for the first time, presents a granular estimate of what cities need to reach crucial climate benchmarks.

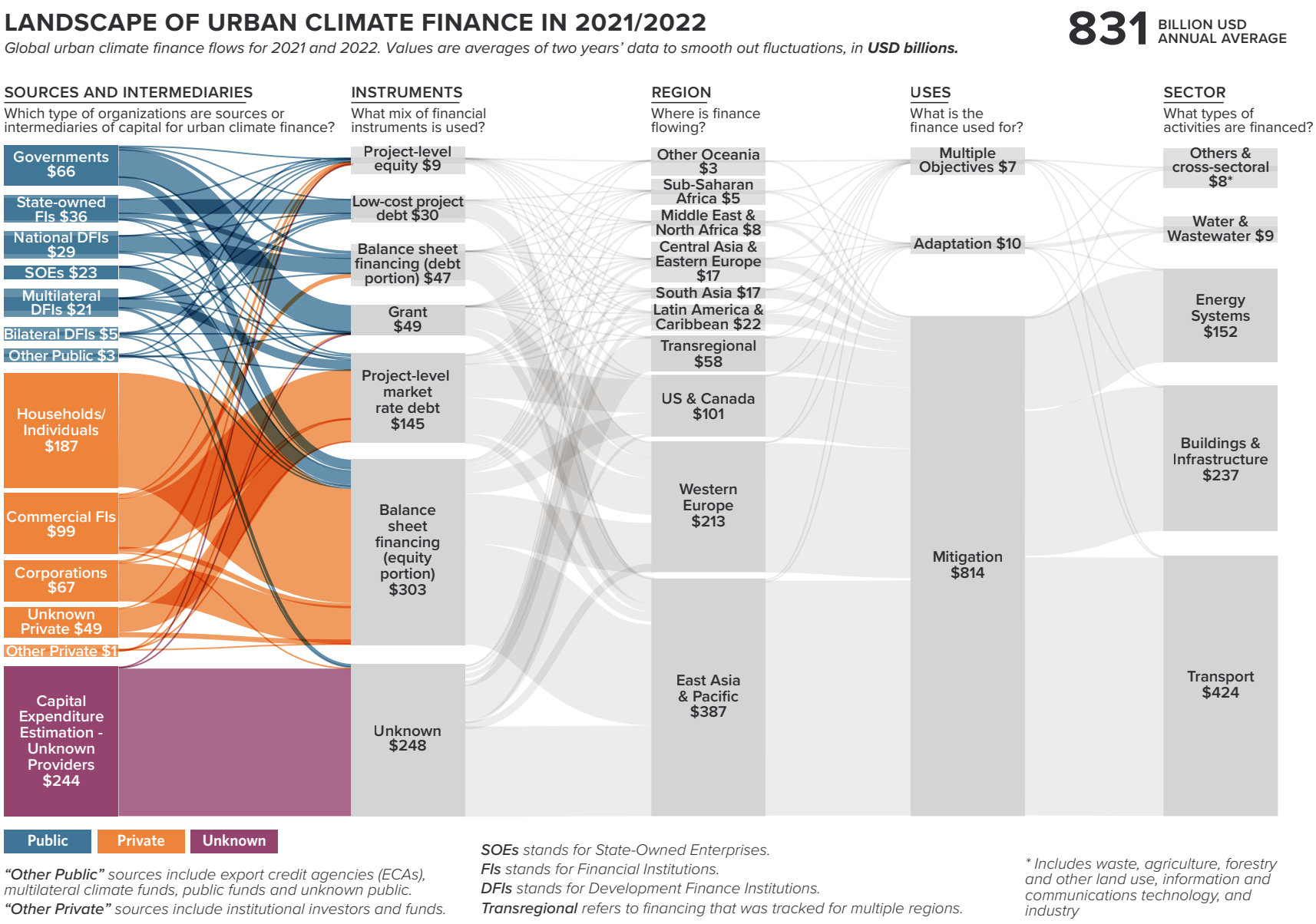
WHERE ARE WE NOW?

Tracked urban climate finance flows[2] have more than doubled between 2017 and 2022, reaching USD 831 billion in 2021/2022. Most of this increase (USD 391 billion) represents additional finance over time, especially for mitigation activities in transport, energy systems, and buildings and infrastructure. Improvements to our methodology and data sources account for the remaining growth (USD 57 billion).

Private finance accounted for 49% (USD 404 billion) of total urban climate finance, and public finance accounted for 22% in 2021/2022.[3] Private finance tripled between 2017 and 2022, while public finance more than doubled. The largest source of tracked private finance was households and individuals (USD 187 billion, 46% of private finance), mostly investing in electric cars (USD 128 billion) and the buildings sector (USD 36 billion).

2 This report defines "urban climate finance" as including all sources of finance flowing within cities and channeled by all types of public and private actors (including households/individuals) for climate mitigation and adaptation. These tracked flows are a combination of primary project-level investments and capital expenditure estimations across different sectors.
3 The sources of the remaining 29% are unknown, largely due to capital expenditure estimations.

Figure ES1: The landscape of urban climate finance in 2021/2022 (USD billion)



"Other Public" sources include export credit agencies (ECAs), multilateral climate funds, public funds and unknown public.
"Other Private" sources include institutional investors and funds.

SOEs stands for State-Owned Enterprises.
FIs stands for Financial Institutions.
DFIs stands for Development Finance Institutions.
Transregional refers to financing that was tracked for multiple regions.

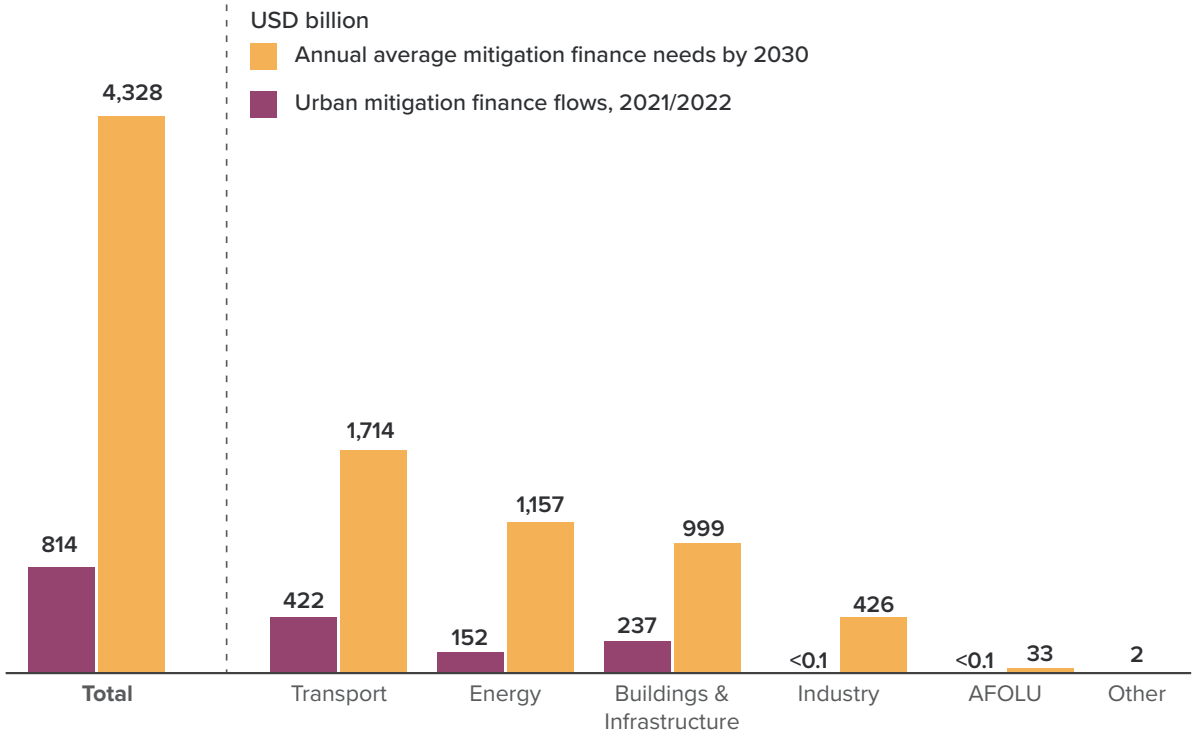
* Includes waste, agriculture, forestry and other land use, information and communications technology, and industry

National governments and development finance institutions (DFIs) were the largest providers of public urban climate finance in 2021/2022. These actors committed 36% (USD 66 billion) and 30% (USD 56 billion) of total public investments, respectively. Within the DFI group, national DFIs provided more climate finance to cities than multilateral DFIs, even though the multilaterals provided more climate finance overall, according to CPI's Global Landscape of Climate Finance (2023).

Domestic sources provided 69% of overall urban climate finance (USD 570 billion). This is particularly true for private flows, where domestic sources accounted for 96% (USD 389 billion).[4] Most of this tracked domestically sourced private finance was in developed countries (USD 240 billion or approximately 62% of domestic private finance), followed by EMDEs (USD 147 billion or almost 38%), with just 0.2% (USD 0.8 billion) in least developed countries (LDCs). Regionally, 92% of total private finance was concentrated in East Asia and the Pacific (USD 146 billion), Western Europe (USD 133 billion), and the US and Canada (USD 92 billion).

Some key mitigation sectors saw increased finance (energy, transport, and buildings and infrastructure) in 2021/2022, but all sectors remain underfunded relative to their needs. Urban transport received the most mitigation finance, amounting to 52% (USD 422 billion) of these funds, with a focus on electric cars and metro infrastructure. This was followed by buildings and infrastructure, receiving 29% (USD 237 billion), concentrating on appliances, lighting, and energy efficiency investments. The next-largest recipient sector was energy, receiving 19% (USD 152 billion), mostly for solar PV.

Figure ES2: Climate finance in key urban mitigation sectors vs finance needs



4 Chinese domestic private flows reached USD 124 billion, including USD 86 billion of investment in electric cars by Chinese households.

Tracked urban climate finance remained heavily skewed toward developed economies and China.[5] Flows were severely insufficient in developing economies in South Asia (at USD 17 billion), the Middle East and North Africa (USD 8 billion), and sub-Saharan Africa (USD 5 billion). Limited investment in these rapidly urbanizing and developing regions highlights inequity in global climate finance flows, undermining their ability to mitigate and adapt to climate change and exacerbating urban vulnerabilities.

Urban adaptation finance rose to USD 10 billion in 2021/2022, up from USD 7 billion in 2017/2018. Adaptation flows to EMDEs totalled USD 6 billion. Most tracked adaptation finance was in the water and wastewater sector (68%, or USD 7 billion). Private and public sources provided similar amounts of urban adaptation finance, about USD 4 billion each. We note that a lack of data limits our ability to fully track adaptation finance.

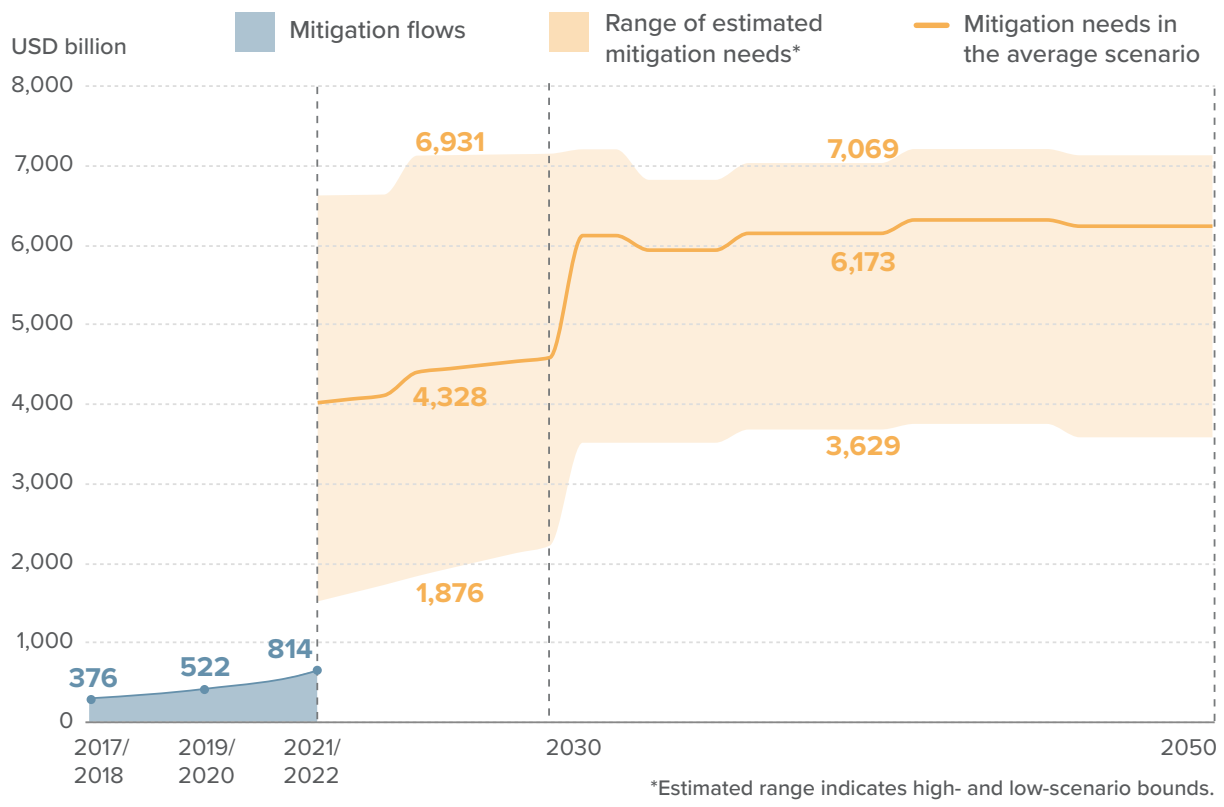
WHAT DO CITIES NEED?

For climate mitigation alone, cities require an estimated USD 4.3 trillion annually from now until 2030, and over USD 6 trillion per year from 2031 to 2050. This report provides the first granular assessment of urban mitigation finance needs, disaggregated by sector and region. Underlying data gaps prevent a similarly comprehensive estimate of urban adaptation needs, though we present initial estimates for some EMDEs.[6] Comparing urban climate finance flows and needs data can elucidate the climate investment required globally in cities and the opportunity gaps by region, climate uses, and other critical factors. CCFLA's urban climate mitigation needs estimates are based on projections of the finance required to fund action to keep global temperature rise within 1.5°C on average by 2100.[7]

Transport, energy, and buildings dominate cities' mitigation investment needs. Until 2030, cities will require annual investment of USD 1.7 trillion for transport solutions (e.g., EVs and urban rail systems), and USD 1.2 trillion for energy (particularly for renewable power and heat generation). They will also need USD 1 trillion for retrofitting buildings and new construction, as well as energy-efficient Heating, Ventilation, and Air Conditioning (HVAC), water heaters, and cooking systems. The regions with the highest annual urban mitigation investment needs by 2030 are East Asia and the Pacific (USD 1 trillion), Western Europe (USD 978 billion), and the US and Canada (USD 618 billion).

5 East Asia and the Pacific received 47% of global urban climate finance in 2021/2022, with China alone accounting for 28% of global flows.
6 Adaptation needs estimates cover Non-Annex I countries only, a subset of EMDEs. For consistency with the rest of the report, we refer to these as EMDEs. Details are provided in the SCCFR Methodology document.
7 These needs are compiled in the Climate Policy Initiative (CPI) Global Landscape of Climate Finance (GLCF) Climate Finance Needs Database based on predictive models and scenarios, representing pathways aligned with the temperature goals. CCFLA applied estimations to disaggregate these needs into city-specific climate finance according to our definition of urban climate finance. Methodological challenges limit our ability to calculate the urban climate investment gap for every sector.

Figure ES3: Urban climate finance compared with urban mitigation needs by 2050



Note: The range of estimated needs represents high- and low-scenario finance bounds based on predictive models across sectors. This highlights climate-compatible scenarios that vary due to differences in data, assumptions, models, and scope (see SCCFR Methodology Document).

Adaptation needs are more difficult to project due to a general lack of data, particularly from the private sector. We currently only cover the needs of cities in EMDEs, which total USD 147 billion per year until 2030 and USD 165 billion from then until 2050. These estimates are likely gross underestimations due to multiple uncertainties over climate impacts and risks, as well as limitations with the underlying scenario-based models, data, and methodologies. Further, our estimates do not fully capture future adaptation needs, such as the anticipated threefold surge in cooling demand globally by 2050 (IEA 2018), which could require an additional USD 1.5 trillion investment in India alone by 2040 (World Bank 2022).

Moreover, the high cost of climate inaction in cities globally highlights the urgency to close the adaptation financing gap. The economic impacts of climate-related events are massive, with some cities already experiencing billions of dollars in losses due to water shortages, flooding, and infrastructure damage.[8] The costs of inaction could be severe in the future, with projections for damage covering many different types and geographies of cities.

8 For example, Jackson, Mississippi, faced losses of USD 2 billion after flooding in 2022 (Pettus 2023). Auckland, New Zealand, and Durban, South Africa, incurred USD 2 billion (Munich Re 2024) and USD 1.5 billion (Swiss Re 2023) in insured losses from floods in 2023 and 2022, respectively, while the Indian city of Chennai's 2015 flood damages were estimated to be around USD 1.1 billion (The Hindu 2015).

CLOSING CITIES' CLIMATE FINANCE GAP

The global shift to a sustainable economy will hinge on cities, and it is crucial to ensure that they receive adequate finance to achieve climate targets and undergo an equitable transition. Building on our analysis, CCFLA proposes **four key recommendations to scale urban climate finance**:

1. **Improve the quantity and quality of urban climate finance.**

   The growing flows of urban climate finance must accelerate even faster—by at least fivefold—to achieve decarbonization goals and safeguard cities from climate hazards**.** Enhancing the quality of finance—how it is distributed among sectors, addresses underlying inequities, and strengthens enabling environments—is also key. The limited available public finance must be used strategically to crowd in private investment to fill these gaps. Cities' climate action is typically financed by regular market instruments such as balance sheet equity and market-rate debt financing. While grant financing will remain limited, this can be used more strategically to mitigate risk and increase flows. Finally, addressing inequities both between regions and within cities has huge potential to enhance the effectiveness of urban climate finance as it scales.

2. **Strengthen domestic markets through the strategic use of public finance.**

   The urban climate finance ecosystem will need to bolster domestic markets so cities and local governments can better access both public and private finance. This can be done through 1) active collaboration to create country platforms that prioritize urban climate investment, ensuring that cities have a voice in these efforts, and 2) strengthening local governments' capacity to access domestic markets by enhancing capacity building, project preparation, and improving fiscal, financial, and data management.

3. **Rapidly scale urban adaptation finance, particularly in EMDEs.**

   The urgency of investing in urban adaptation cannot be overstated, as adaptation finance flows are far from where they need to be. Increasing adaptation finance may require widening the definition and understanding of urban adaptation activities in order to encompass broader resilience-building efforts. Standardized metrics and methodologies that can be widely adopted to track and report adaptation finance will also help to increase coordination and alignment. Cities urgently need to build their capacities to identify climate risks and build the resilience of essential utilities, such as water and energy services. Furthermore, national and local governments should collaborate with DFIs and the private sector to mobilize innovative financial instruments such as blended finance, green bonds, and resilience bonds, which can attract private investments and diversify risks on adaptation finance.

4. **Improve data and tracking of urban climate finance flows and needs.**

   There is a significant need to enhance the tracking of urban climate finance and the availability of related data across all public and private institutions. It is also essential for reporting institutions to use harmonized taxonomies of urban climate finance to enhance the interoperability of these tools to reduce reporting inconsistencies. Tracking urban climate finance generates crucial data to support policy and investment decisions by both national and subnational policymakers, as well as impact-oriented investors. This

data is essential for identifying progress, gaps, and opportunities in the green transition of cities.

Addressing systemic barriers and implementing these four recommendations will require coordinated action across sectors, levels of government, and actors. To achieve this, CCFLA proposes that all actors adopt **the 4C Urban Climate Finance Agenda: Commitment, Collaboration, Capacity, and Capital Mobilization.**

Figure ES4: The 4C Urban Climate Finance Agenda

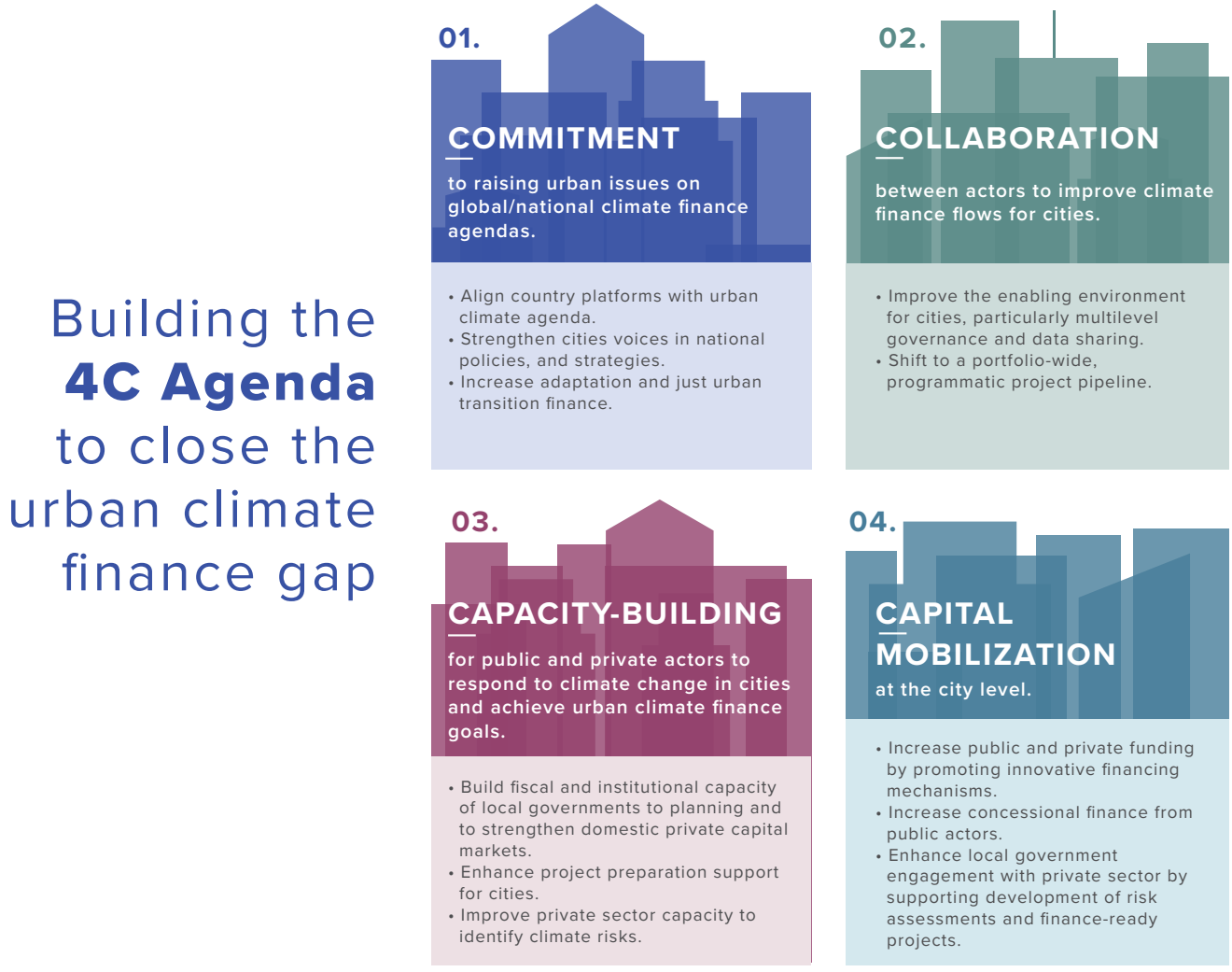


TABLE OF CONTENTS

1. Introduction 1

2. Challenges and opportunities for urban climate finance 5

3. The landscape of urban climate finance 9
- 3.1 Urban climate finance definitions 9
- 3.2 Total urban climate finance flows 10
- 3.3 Providers of finance 12
- 3.4 Climate uses 18
- 3.5 Sectors 23
- 3.6 Instruments 31
- 3.7 Regions 33

4. Urban climate finance needs 36

5. Conclusion and recommendations 42

6. References 47

7. Annexes 55
- 7.1 Full recommendations by actor 55
- 7.2 Cities climate finance taxonomy 59

1. INTRODUCTION

Cities are indispensable in the global climate transition, and today's urban investments will shape the world's future.[9] Urban areas contribute to 70% of global GHG emissions and 75% of global energy consumption, with almost 10% of the increase in global emissions since 2015 being attributed to urbanization (IEA 2024). Cities are, therefore, central to the realization of the Paris Agreement goals, including Nationally Determined Contributions (NDCs). Cities are also global economic powerhouses, generating over 80% of global gross domestic product (World Bank 2023a). As a result, they present a multitrillion-dollar climate investment opportunity for the public and private sectors in both developed economies and emerging markets.[10] Moreover, cities' crucial role in implementing local public policies that directly impact citizens' lives creates the need for local-level climate action to meet the 1.5°C pathway and address increasing climate-related hazards.

The importance of climate finance for cities is growing with increasing urbanization. Currently, 56% of the world's population—4.4 billion people—live in cities, and this is expected to double by 2050, when 7 in 10 people will live in urban areas (World Bank 2023a). Given the lifespan of many infrastructure assets, decisions made today will determine how cities expand and operate for decades. New urban construction is trending *toward*, rather than *away* from, those cities that are at increasing risk of climate hazards such as floods and extreme heat (World Bank 2023b).

Many cities, particularly in emerging markets and developing economies (EMDEs), are already grappling with grave risks of flooding, heat and water stress, and urban ecosystem degradation. The urban heat island effect means cities are warming at twice the global average rate (UNEP 2021), and by 2050 over 970 cities across the globe will face average summertime highs of 35°C, nearly three times the current number (Arsht-Rock 2023). Almost 700 million people live in urban areas that are less than 10 meters above sea level, and sea-level rise could cost coastal cities USD 1 trillion annually by 2050 (UCCRN et al. 2018) (UNEP et al. 2021). These climate risks will most adversely affect people living in urban poverty, and cities in EMDEs, in particular, will need financial support to protect their large, vulnerable populations residing in informal settlements (CCFLA 2022a).

There is no one-size-fits-all solution for financing urban climate action. Cities around the world differ greatly in terms of their current performance on sustainability, resilience, infrastructure, and inclusivity. While insights can be gained from studying similar types of cities in different contexts, various pathways are required to limit climate change and build resilience.

Cities have demonstrated motivation and leadership to collaborate with national governments as well as national and international organizations to tackle climate and economic challenges. At COP28, the Local Climate Action Summit highlighted local leaders'

9 This section refers to city governments and city-specific actors as 'cities', as opposed to cities as a unit of analysis such as Functional Urban Areas, which we define in the SCCFR Methodology document.

10 According to the Glasgow Financial Alliance for Net Zero, achieving global net zero by 2050 requires USD 4.5 trillion annually post-2026, totaling USD 125 trillion. Private investors are expected to cover 70% of this, highlighting their crucial role. Most of this investment is needed in urban-related sectors including buildings, transport, and energy, especially in developed, highly urbanized countries, presenting significant opportunities for cities (UNFCCC 2021; GFANZ 2024). In developing economies, the IFC identifies USD 29.4 trillion in climate urban investment opportunities across six key sectors (IFC 2018).

role in emissions reduction (C40 2023), while the Coalition for High Ambition Multilevel Partnerships, endorsed by 72 governments, promoted multilevel collaboration on updated NDCs (UNFCCC 2023). In addition, over 13,000 cities are members of the Global Covenant of Mayors (GCoM), and more than 1,100 have committed to the C40 Cities' Race to Zero initiative (CCFLA 2023a; C40 n.d.).

Successful urban climate action requires directing climate finance to the city level. Despite growing momentum to increase urban climate action, financial flows have remained insufficient, particularly in developing and rapidly urbanizing economies. Without adequate investment, cities face significant climate risks, missed economic opportunities, and the lock-in of emission-intensive growth. This highlights the need for targeted climate investment to harness cities' investment potential and bridge their climate finance gap.

1.1 METHODOLOGICAL IMPROVEMENTS TO THE STATE OF CITIES CLIMATE FINANCE REPORT

This 2024 edition of the SCCFR provides the most comprehensive available assessment of global climate finance flows and needs. It is intended to help all urban climate finance actors mobilize finance for city-level climate action at scale by 2030. Covering the years 2019-2022, this report builds on CCFLA's 2021 SCCFR,[11] ensuring data comparability and facilitating an understanding of evolving trends in urban climate finance. This report provides an updated comprehensive taxonomy for urban mitigation and adaptation (see Annex 7.2).

The current report also presents a first-time granular estimation of urban mitigation needs by compiling underlying scenarios to estimate the amount of mitigation finance required for cities by 2030 and 2050. It also includes a preliminary estimate of some urban adaptation needs for EMDEs. CCFLA's emerging needs assessment methodology[12] can be used to identify sectoral and regional gaps while monitoring and benchmarking progress. The gaps in current needs estimations underscore the benefit of improved urban climate finance data and projections of how urbanization intersects with climate change. Urban climate finance needs are likely underestimated due to data and methodological limitations, including uncertainties around future emissions and climate impact scenarios, policies, and investment choices**.** The underestimation is particularly true for adaptation needs due to data limitations, limited coverage of adaptation geographies and subsectors, and uncertainties over modeling climate impacts and risks.

This report tracks urban climate finance by combining project-level investments and capital expenditure estimates across various sectors. Data is sourced from CPI's Global Landscape of Climate Finance (GLCF) and other databases. The analysis builds and improves upon the methodology of the 2021 SCCFR while ensuring comparability to comprehensively track urban climate finance over time (see Box 1).[13] The tracked urban

11 This report builds particularly from Part 1 of the 2021 State of Cities Climate Finance Report entitled "The Landscape of Urban Climate Finance", which was authored by the CCFLA Secretariat (Climate Policy Initiative) in partnership with the Atlantic Council's Adrienne Arsht-Rockefeller Foundation Resilience Center.

12 There is no globally accepted definition or methodology for calculating climate finance needs to date. CCFLA builds on CPI's GLCF methodology and presents available estimates as ranges of required investments.

13 See the SCCFR Methodology document for more information.

climate flows represent a conservative estimate due to a lack of reporting and data. Limited disclosure from private actors (particularly in the transport and buildings sectors), a lack of standardized reporting, inconsistent definitions, and insufficient granularity make it difficult to track urban climate finance.

Box 1: Key methodological improvements in urban climate finance tracking for the 2024 SCCFR

- **Expansion of keyword list for better urban tagging of climate projects:** An enhanced bespoke keyword list was used for every sector based on the revised urban climate finance taxonomy. A more comprehensive list of urban settlement names was adopted with increased representation of low- and middle-income countries.
- **Incorporation of new project-level data sources:** New data sources have been tapped, which better represent Chinese investment as well as primary financing for projects in under-reported sectors (i.e., water, waste, and municipal infrastructure).
- **Improved capital expenditure estimates:** The transport and buildings sectors follow the previous SCCFR methodology but have been reviewed and expanded to update assumptions and include new technologies.

These changes have significantly enhanced the accuracy and comprehensiveness of our urban climate finance tracking while still allowing comparison with the 2021 SCCFR. Of the total tracked urban climate finance in 2021/2022, new project-level data sources and keyword list expansion for urban tagging methodology account for only an additional 2% (USD 20 billion), and improvements on capital expenditure estimations for only an additional 4% (USD 37 billion). The remaining increase of 93% comes from growth in climate finance flows on a comparable basis with the 2021 SCCFR (CCFLA 2021).

Figure 1: Summary of estimated urban climate finance (2021/2022 average, USD billion)

*New data sources and improved keyword search.

Both the flows and needs datasets are built on a best-effort basis using publicly available and proprietary sources. Existing investment datasets rarely include urban climate tagging, given that donors, development finance institutions (DFIs), and local governments have yet to adopt the practice of tagging and reporting urban projects widely. As Figure 2 shows, project-level data consists primarily of international public finance for most sectors, which includes measures such as capacity building. We continue to face adaptation finance tracking challenges for both public and private flows. The lack of comprehensive disclosure of local budgets also hinders tracking.

Figure 2: Urban climate finance flows coverage by sector and provider type (2021/2022 average, USD billion)

MITIGATION	Private	Public International	Public Domestic (National)	Public Domestic (Subnational)	Unknown Source
Transport	191	10	25	?	197
Buildings & Infrastructure	120	9	61	?	46
Energy Systems	87	3	61	?	
Water & Wastewater	?	1	<0.1	?	
Information & Communications Technology	?	0.1	<0.1	?	
Industry	0	<0.1	0	?	
AFOLU	0	0.1	0	?	
Waste	0.2	0.1	<0.1	?	
Others & Cross-sectoral	0.1	2	0.1	?	
ADAPTATION	4	4	0.4	?	
DUAL BENEFITS	0.8	5.9	<0.1	?	

USD billion

- **TRACKED** Project-level data and capital expenditure estimation
- **TRACKED** Project-level data
- **TRACKED WITH DATA LIMITATIONS** Project-level data
- **NOT TRACKED** No or very limited data
- **ESTIMATED** Using capital expenditure approach

2. CHALLENGES AND OPPORTUNITIES FOR URBAN CLIMATE FINANCE

The urban climate finance gap persists due to various barriers, yet its identification presents significant opportunities for transformative climate action. This chapter highlights the challenges and opportunities in scaling urban climate finance across city roles, government levels, stakeholders, and different types of action.

We identify four overarching challenges to urban climate investment:

1. **Insufficient commitment to urban climate action.**
2. **Weak enabling environments.**
3. **City-level capacity gaps.**
4. **Inadequate capital mobilization.**

Scaling urban climate finance depends on addressing these challenges while increasing investment to kickstart a positive trajectory for urban development and global climate response.

CHALLENGE 1: INSUFFICIENT COMMITMENT TO URBAN CLIMATE ACTION

Most countries' NDCs either only partly address (39%) or do not explicitly mention urban sector priorities (34%), missing an important means of incorporating cities' needs into national climate plans (UN-Habitat 2024). Further, multilateral development banks (MDBs) should prioritize the urban climate agenda more prominently, particularly amid international calls for MDB reform (see Box 2).

Box 2: MDB reform for accelerating urban climate finance

In 2023, CCFLA collaborated with C40 Cities and GCoM to present the first assessment of ten MDBs' contributions to urban climate finance in low- and middle-income countries (LMICs) (CCFLA 2023a). The analysis revealed that 21% of climate-related MDB finance directed to LMICs between 2015 and 2022 was allocated to urban projects, and this percentage had remained relatively stable over time despite increasing global urbanization. The report recommends that MDBs should:

1. Increase the volume and share of urban climate finance in their portfolios.
2. Increase urban focus in their strategies and coordination and track urban shares of climate finance.

3. Adapt their operating models to scale up direct and indirect financing to cities, including by adopting a programmatic approach to policy, project pipeline development, and financing, as well as by increasing technical assistance.
4. Sharpen focus on capital mobilization through risk-mitigation instruments and intermediated finance.
5. Enhance policy environments by championing national-level reform initiatives and extending capacity-building support to city governments.

The report also highlights the importance of collaboration between MDBs, national governments, and cities in implementing these recommendations.

Global commitment to urban climate issues can also be driven from the city level. Cities and local governments can set bold net-zero commitments and spur mitigation action by directly investing in and incentivizing renewable energy, electric vehicles (EVs), and green buildings. At the same time, they can climate-proof their investments and integrate adaptation measures into their policies and operations. Some cities are modeling such actions, but more can follow suit. For instance, a CDP study found only 14% of a sample of 939 cities to have high ambition, transparency, and action on climate change, despite 80% of them being affected by climate hazards (CDP 2023).

CHALLENGE 2: WEAK ENABLING ENVIRONMENTS

Despite recognizing the urgency for action, many cities and local governments face weak enabling environments for urban climate finance. Impactful urban climate action can only thrive within a supportive framework of policies, institutions, and systems (World Bank 2021). This requires coordinated efforts from all levels of government, including national, regional, and local (CCFLA & Urban-Act 2024). A strong national enabling environment is crucial to providing regulatory clarity, strengthening institutional capacity, mitigating investment risks, and promoting stakeholder engagement (see Box 3). Such an environment also delivers direct financing-related benefits, enabling cities to improve their creditworthiness and fiscal capacities and access diversified funding sources. It also helps them utilize instruments like green bonds and public-private partnerships (PPPs), integrate robust climate data, and engage in multilevel coordination for sustainable urban development (World Bank 2021; OECD 2023; CCFLA & Urban-Act 2024).

Successful urban investments in climate action require collaboration across all levels of government. Effective multilevel governance frameworks balance responsibilities assigned to subnational governments with their available resources. Data from the OECD-UCLG World Observatory on Subnational Government Finance and Investment (SNG-WOFI) shows that among a sample of 135 countries worldwide, subnational governments in 58 countries—mainly in Africa and Latin America—had a low level of public spending in 2020 (accounting for less than 8% of GDP and 20% of total public expenditure), indicating a high degree of centralization, a lack of subnational government participation in program budgeting, and limited multilevel collaboration (OECD 2022a). Combined with an unclear allocation of responsibilities, this may result in un- or under-funded mandates, hampering subnational climate action (OECD 2022a).

Box 3: Successful national enabling environments for urban climate finance

A strong enabling environment comprises cohesive policies, legal frameworks, governance structures, implementation capacity, and financing and investment structures. CCFLA and Urban-Act developed a set of assessment tools for national and subnational enabling environments and applied these at the national level in India and Indonesia (CCFLA & Urban-Act 2024). The principles focus on building a strong national enabling environment, though all levels of government must ultimately work together to enable urban climate finance. Effective national enabling environments follow the below key principles:

- **Climate Policy:** Good national climate policies set clear targets for mitigation and adaptation. National climate policies and plans include specific urban content. The national government requires the active and effective involvement of subnational/urban governments in its planning processes.
- **Budget and Finance:** There are national funding sources for subnational climate action, including both international and domestic public and private finance. There is national support for subnational green budgeting. There are reliable intergovernmental transfers that incentivize subnational climate action. Fiscal decentralization is balanced by a diversified funding system and revenue sources (including grants, tax revenues, tariffs and fees, and property income). Subnational borrowing is allowed, and access to varied sources of external capital is supported by the national framework.
- **Climate Data:** The national government has access to quality national climate data and ensures the availability of good quality subnational climate data.
- **Vertical and Horizontal Coordination:** The national government coordinates horizontally across its own departments and facilitates horizontal coordination between municipalities. The national government also coordinates vertically to ensure all levels of government are collaborating to address cities' issues. The national government supports subnational engagement with civil society, the private sector, and vulnerable stakeholder groups.

CHALLENGE 3: CITY-LEVEL CAPACITY GAPS

Cities and local governments often lack the technical capacity needed for the climate transition, including to do the following:

- **Prepare data-driven climate action and investment plans.** While 6,000 cities have developed climate action plans globally, many have not, and more struggle to integrate climate action into their capital investment plans and establish supportive legislation to attract required investment. Additionally, cities often lack the data management tools needed for informed climate action planning, such as emissions inventories and digital systems for monitoring climate risks and performance (CCFLA 2023b).
- **Access available sources of climate finance and manage financial aspects of climate projects.** Many city or local government administrations lack the financial expertise and management capacity to navigate international and domestic accounting standards, effectively integrate climate change into their budgetary processes, and take advantage of appropriate financing mechanisms. Many cities—especially small and intermediary

ones—require assistance to manage projects to achieve climate targets and undertake reporting (OECD 2022b).

- **Attract private investment.** Many city governments lack the technical capacity to prepare projects that can attract private partnerships, limiting investment opportunities to key mitigation sectors. Private partnerships for resilient investments are also hindered when cities cannot afford long-term fixed-price climate insurance due to underdeveloped insurance markets (CPI 2022a).

CHALLENGE 4: INADEQUATE CAPITAL MOBILIZATION

Cities need more revenue to finance climate action, either through their own resources, reliable intergovernmental transfers, or by accessing capital markets. Many cities, particularly in EMDEs, lack sufficient and diversified own source revenues and instead rely on intergovernmental transfers, grants, and/or subsidies. This creates a barrier to financing climate action directly and also to accessing external finance, whether through credit or capital markets (OECD 2022a). Less than 4% of the 500 largest cities in EMDEs have been deemed creditworthy, restricting their access to international and private capital markets (World Bank 2017).

Private investors and DFIs face significant obstacles in investing in urban climate action. Private investors often lack the knowledge and appropriate financial instruments to source and invest in quality pipelines of climate projects, including resilient urban infrastructure. Furthermore, most climate activities, especially those focused on adaptation, have long investment horizons, difficulty in monetizing projects, high upfront costs, and relatively long payback timelines, which impact investor interest (C40 2022; Choi et al. 2023). More generally, climate finance in and outside of urban settings, faces the challenge of high risk perceptions associated with newer sustainable technologies.

3. THE LANDSCAPE OF URBAN CLIMATE FINANCE

3.1 URBAN CLIMATE FINANCE DEFINITIONS

Comparing cities and urban areas across regions and countries is challenging due to inconsistent national definitions and varying administrative boundaries. As in its previous edition (CCFLA 2021) this report employs the concept of Functional Urban Areas (FUAs).[14] This report defines urban climate finance as follows:

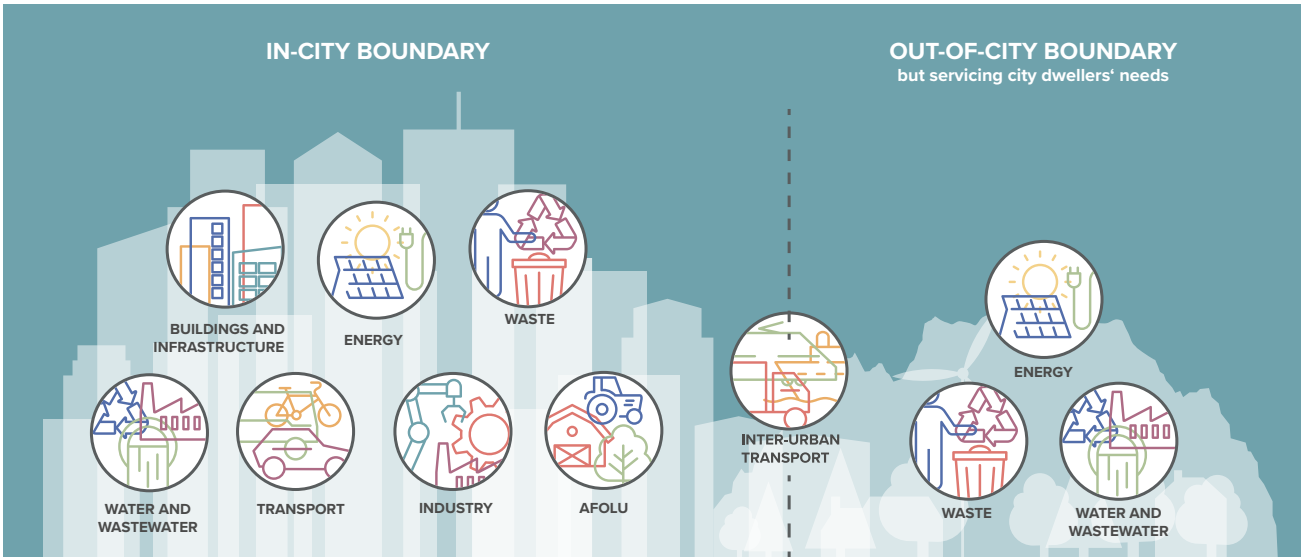
> Urban climate finance refers to financial resources directed to activities aimed at limiting city-induced greenhouse gas (GHG) emissions and to activities intended to address climate-related risks faced by cities.[15]

Under this definition, **urban climate mitigation** encompasses projects reducing or avoiding GHG emissions within a city's boundaries or GHG emissions resulting from activities occurring within the city, following the Global Protocol for Community-scale GHG Emissions Inventories approach.[16] For example, waste management projects are considered urban-relevant if they aim to reduce emissions from activities occurring within the city. The infrastructure related to that activity could be located inside or outside of city boundaries, and its related investment would still count as climate finance (see Figure 3).

Urban climate adaptation involves projects to enhance cities' adaptive capacity and resilience to climate-related risks that directly impact urban areas, such as reinforcing river basins and wastewater collection systems. For climate adaptation, projects were included if they were located within city boundaries or aimed to address a climate risk faced by the city, depending on the type of activity. **Dual-benefits finance** covers activities contributing to both mitigation and adaptation.

14 The FUA concept was developed by the OECD and the EU Commission (2020). FUAs consider cities' economic and functional scope based on the daily movements of people to and from surrounding administrative units. They include areas relevant to a city's activity, such as peripheral residential or industrial areas. The FUA definition enables focus on climate finance flows to projects and activities within a city's administrative boundaries and those that extend beyond, considering their climate impact resulting from broader urban dynamics.
15 This definition is adapted from the definition of climate finance developed by CPI in the GLCF (CPI 2023a), which aligns with the recommended operational definition of the United Nations Framework Convention on Climate Change (UNFCCC) Standing Committee on Finance.
16 This approach offers cities a comprehensive GHG emissions accounting framework and is used by cities reporting through the CDP-ICLEI Unified Reporting System (C40 et al. 2014).

Figure 3: Urban climate finance inclusion rules[17]



Note: To account exclusively for urban climate finance, activities such as large-scale renewable energy projects and agriculture activities located outside of urban boundaries and inter-urban transport were excluded when it could not be determined that such activities were for the sole benefit of urban dwellers. Waste management facilities that serve cities exclusively were included. See Annex 7.2 for a detailed taxonomy and urban inclusion rules.

Building on the previous SCCFR (CCFLA 2021), this report introduces a revised taxonomy for urban mitigation and adaptation activities, which applies sector-specific urban inclusion rules to climate finance projects.[18]

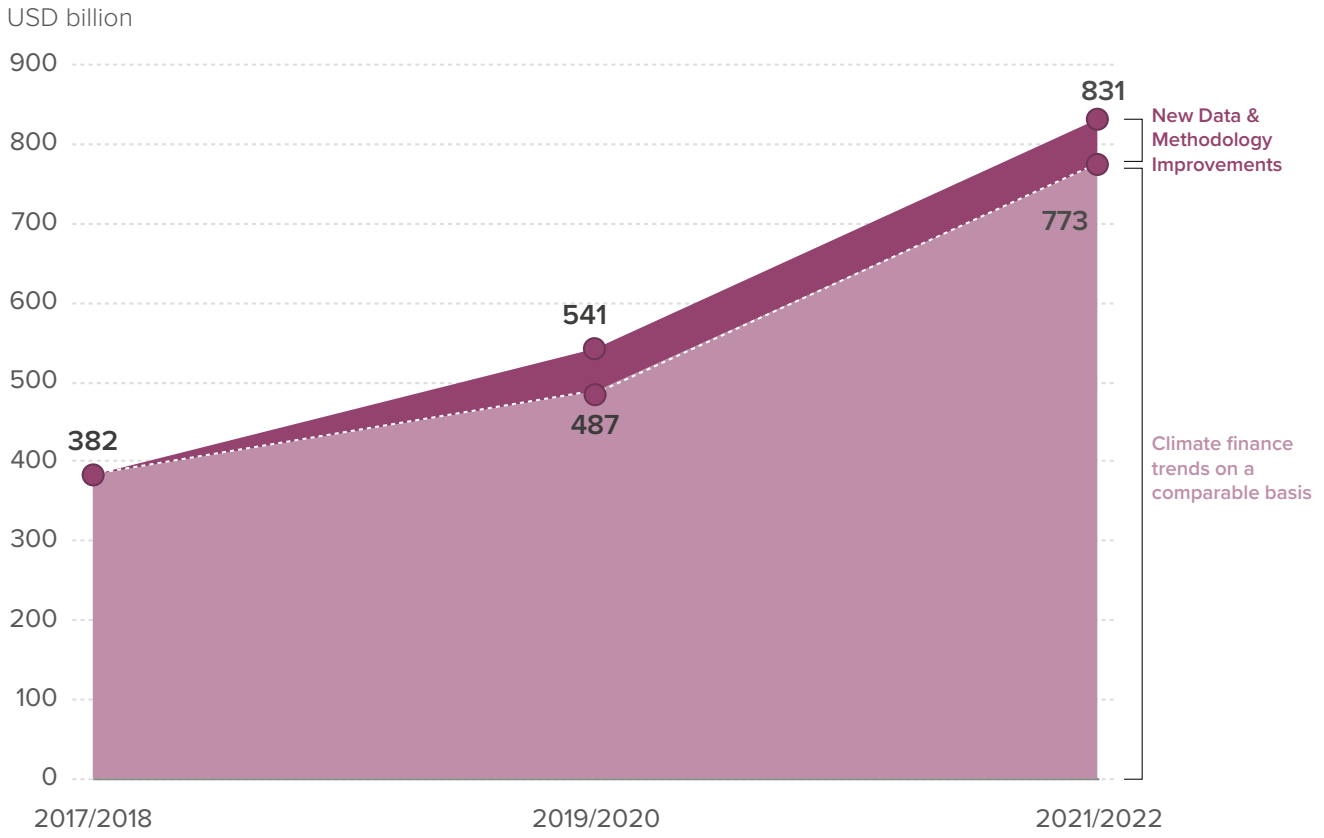
3.2 TOTAL URBAN CLIMATE FINANCE FLOWS

Tracked urban climate finance has more than doubled since 2017/2018, reaching USD 831 billion in 2021/2022.

Urban climate finance globally averaged USD 831 billion in 2021/2022,[19] increasing by 54% compared to USD 541 billion in 2019/2020, and by 117% since 2017/2018. This rise represents a USD 391 billion increase on the flows tracked in 2017/2018, as well as USD 57 billion that has been added to our most recent dataset through methodological improvements and new data sources, augmenting the amounts tracked across years. Without these data improvements, the annual finance flows tracked in 2021/2022 would have been USD 773 billion (See Figure 4). See Figure 5 for a breakdown of our coverage of urban climate finance.

17 To account exclusively for urban climate finance, activities such as large-scale renewable energy projects and agriculture activities located outside of urban boundaries and inter-urban transport were excluded when it could not be determined that such activities were for the sole benefit of urban dwellers. Waste and Water & Wastewater facilities that serve cities exclusively were included. See the Methodology document for a detailed taxonomy and urban inclusion rules.
18 See Annex 7.2 for the full taxonomy. This revision is also based on the definitions of climate activities used in the GLCF (CPI 2023a).
19 Values are averages of two years' data to smoothen out fluctuations, as per GLCF Methodology (CPI 2023b).

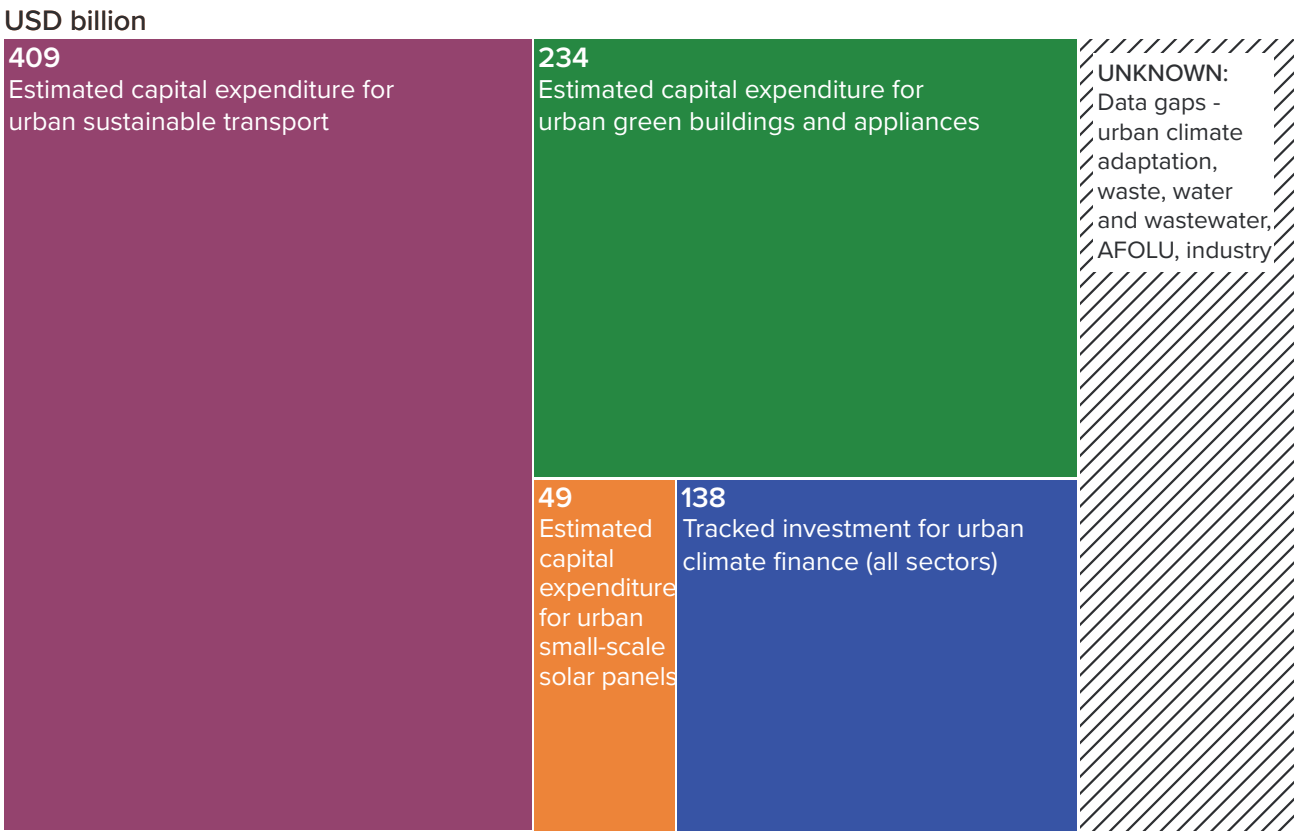
Figure 4: Overall urban climate finance flows



Note: The previous SCCFR (CCFLA 2021b) reported total urban climate finance as USD 384 billion for 2017/2018; this figure has since been adjusted to USD 382 billion due to methodological improvements.

Despite increasing flows—mainly for mitigation activities in the transport, energy systems, and buildings and infrastructure sectors—a large urban climate finance gap remains. Urban mitigation finance needs alone are estimated to be USD 4.3 trillion annually between 2023 and 2030 to achieve a 1.5°C scenario. At the current rate, the gap is set to widen both absolutely and cumulatively between 2030 and 2050, as mitigation needs increase to over USD 6 trillion per year.

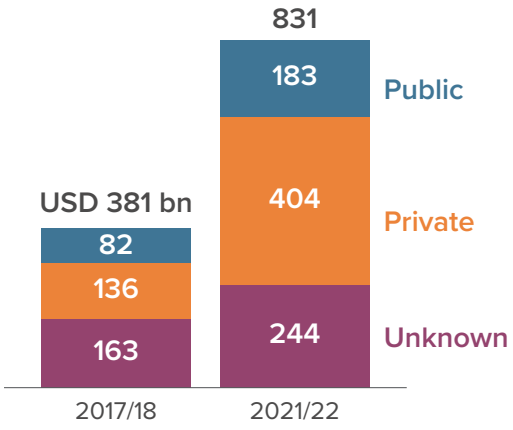
Figure 5: Summary of estimated urban climate finance flows, annual average 2021/2022.



3.3 PROVIDERS OF FINANCE

Private and public actors accounted for 49% and 22% of total urban climate finance, respectively, in 2021/2022, with the remainder from unknown sources.[20]

Figure 6: Urban climate finance flows by source



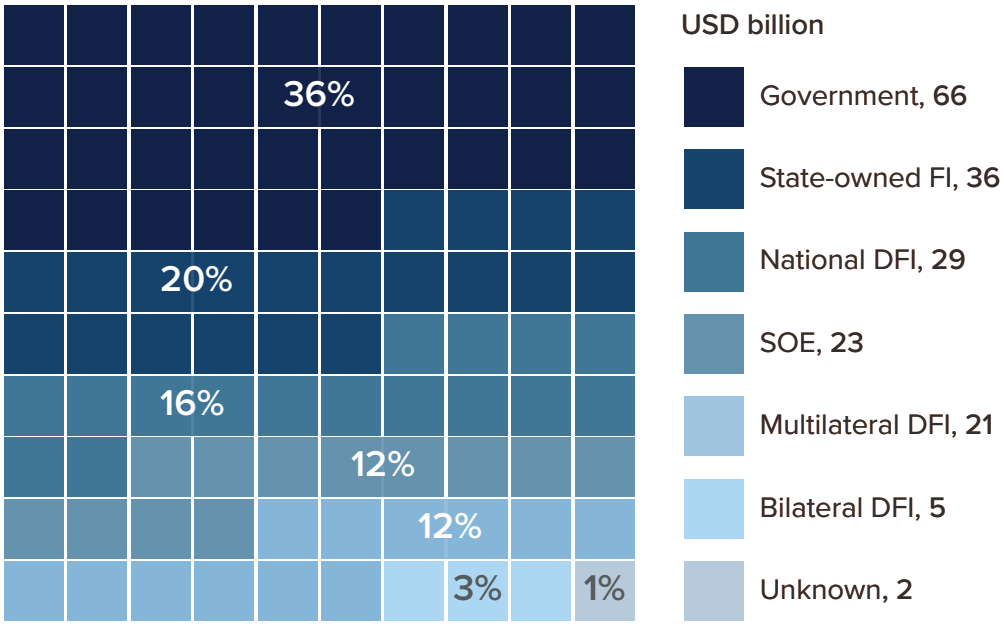
20 The majority of finance from unknown sources stems from our capital expenditure estimates, where we are unable to distinguish between public and private providers.

3.3.1 PUBLIC FINANCE

Public finance increased to USD 183 billion 2021/2022, more than doubling from 2017/2018. The largest single source of public finance was national governments (36%).

National government flows have largely stagnated, rising by only 10% from 2017/2018. The largest increase in public finance came from DFIs, which more than doubled their contribution from 2017/2018. Public finance overall remains severely unevenly distributed: half went to China, while remaining EMDEs received 7%, and LDCs less than 2%.

Figure 7: Urban climate finance by public actors in 2021/2022



< 1% : Multilateral Climate Funds: **0.03**; Export Credit Agency (ECA): **0.03**

National governments were the biggest providers of public urban climate finance (36%, or USD 66 billion) in 2021/2022, with a slight increase from USD 60 billion in 2017/2018. Of this, USD 34 billion went to developed countries, USD 31 billion to EMDEs, and only USD 0.6 billion to LDCs. China provided USD 30 billion, and Western Europe USD 32 billion. National government finance mainly went to enhancing buildings' energy efficiency (via new construction and retrofits), reaching USD 33 billion (51%) globally, as well as new electric cars, at USD 24 billion (36%).

DFIs committed USD 56 billion (30% of public funds) in 2021/2022, more than doubling from USD 20 billion in 2017/2018. Among DFIs, national DFIs were the largest providers at USD 29 billion (16% of public flows), mainly from China making debt balance sheet

investments in solar PV. Bilateral DFIs provided USD 5 billion of urban climate finance, with USD 3 billion flowing to the railways subsector.

Multilateral DFIs' urban climate finance rose by 19% from 2017/2018 to 2021/2022, a modest boost compared to their increase in overall climate finance of 63% (CPI 2020; CPI 2023a).[21] MDBs provided 12% (USD 21 billion) of total public urban climate finance in 2021/2022, with the largest share going to the transport sector (USD 8 billion or 38%), followed by other and cross-sectoral uses (USD 5 billion or 24%), and energy systems (USD 3 billion or 14%). Around USD 12 billion (57%) of MDBs' urban climate flows went to developed countries, USD 7 billion (33%) to EMDEs, and USD 2 billion (9%) to LDCs. Multilateral DFIs' urban climate finance was mainly allocated via project-level market-rate debt (70%).[22]

Multilateral Climate Funds provided 92% (USD 0.5 billion, out of 0.6 billion total) of their urban climate finance to EMDEs, with Latin America and the Caribbean receiving the most (USD 0.4 billion). Investments were mainly in transport (65%), and the primary financial instruments were grants (30%) and low-cost project debt (47%).

State-owned financial institutions (SOFIs) provided most of their urban climate finance for buildings and infrastructure (73%). **State-owned enterprises (SOEs)** almost exclusively provided balance-sheet equity for solar plants in China (USD 21 billion).

Local and regional governments, and city governments in particular, are key to funding urban climate action. Yet, the current climate finance landscape is ill-equipped to quantify these governments' contributions, creating the likelihood of underreporting and underestimation (see Box 4).

Box 4: Subnational government expenditure and revenue for climate action[23]

Better tracking of climate finance from subnational governments is critical to support them in funding their climate and environmental actions. Subnational governments lead on various climate-relevant policy areas (e.g., transport, water, waste management, and housing), often in collaboration with central governments. However, there is a significant knowledge gap on subnational governments' climate investment, and whether their revenue sources support net-zero goals, hindering the mobilization of additional funding and financing in return. This is due to the fact that the international public finance system does not distinguish between the various levels of subnational government (e.g., cities, regions, and other public entities), and the classification of functions of government of the System of National Accounts does not account for the cross-cutting nature of climate.

21 The 2021 SCCFR (CCFLA 2021) reported MDB's total urban climate finance as USD 20 billion for 2017/2018, but this figure has since been adjusted to USD 18 billion due to methodological improvements.
22 We were unable to associate 23% of MDB investments with specific instruments due to lack of information on surveys.
23 Box 4 was contributed by the OECD.

Subnational governments accounted for 63% of all "climate-significant" public expenditure (1.1% of GDP) and 69% of "climate-significant" public investment (0.4% of GDP), among 33 OECD and EU countries, as of 2019, based on calculations using a pioneering OECD methodology derived from the National Accounts' Classification of the Functions of Government.[24] These figures offer the first comprehensive comparison of public climate-related expenditures and investments across countries, including on environmental protection, transport, energy, waste, water management, and housing.

Further efforts are needed from the international community to better understand subnational governments' climate finance contributions**,** by developing global definitions, common metrics, and better data coverage. Unlocking the full potential of climate finance tracking can, and must, also take place at a more granular level, through the budgets of cities and regions, via practices such as green budgeting and green public procurement.

In 2021/2022, most public urban climate finance was sourced domestically, totaling USD 148 billion (81%) compared to USD 36 billion (19%) from international sources. Public domestic climate finance—that raised and spent within the same country—was mostly concentrated in East Asia and the Pacific (USD 91 billion), led by China, followed by Western Europe (USD 52 billion). Significant domestic investments were made in solar PV (USD 60 billion) and energy efficiency projects in buildings and construction work (USD 54 billion). Public international finance was primarily channeled to the transport sector (USD 12 billion) and energy efficiency in building retrofits (USD 5 billion). Multilateral DFIs provided most international public finance (USD 20 billion). International public flows largely went to Western Europe (USD 15 billion, 42%) and South Asia (USD 5 billion, 15%).

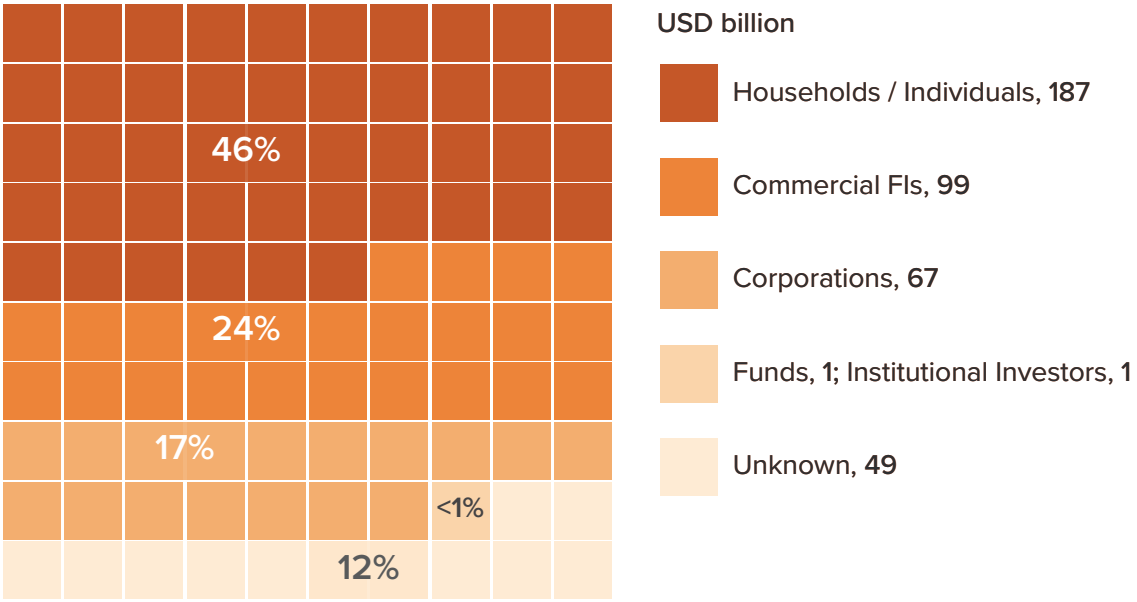
China accounted for USD 91 billion of all public finance, the remaining EMDEs for USD 13 billion and LDCs just USD 4 billion. Developed countries received 41% of total urban climate public finance (USD 75 billion), with Western Europe responsible for USD 67 billion (37%).

3.3.2 PRIVATE FINANCE

Private actors almost tripled their urban climate finance contribution to reach USD 404 billion in 2021/2022, from USD 136 billion in 2017/2018. Almost half of tracked private finance came from households and individuals (USD 187 billion), largely as purchases of electric cars.

24 Data for 2019, based on the Subnational Government Climate Finance Database.

Figure 8: Urban climate finance by private actor in 2021/2022



Households and individuals were the main providers of private urban climate finance (USD 187 billion or 46%) in 2021/2022. Electric cars received the largest share of household investments (USD 128 billion, or 69%), with USD 86 billion (46% of total household investments) of these in China alone. This aligns with the finding of CPI's GLCF that household climate spending was led by EV sales, supported by strong domestic policies (CPI 2023a).

Commercial financial institutions provided USD 99 billion (24% of private flows) in 2021/2022, three times more than in 2017/2018. This was mostly in the form of market-rate project debt (USD 83 billion). This investment was also led by electric car financing (USD 52 billion), and was concentrated in developed countries (USD 81 billion or 82%), facilitated by their more mature capital markets.

Corporations provided USD 67 billion (17% of private finance) in 2021/2022, mainly in the form of balance sheet equity. Solar energy projects received USD 43 billion of this finance. Corporate urban climate flows were split evenly between developed countries and EMDEs, with each receiving around USD 33 billion.

Limited reporting by institutional investors and funds[25] led to only USD 1.4 billion of urban climate finance being tracked from them. These flows were mostly channeled to solar energy in East Asia and the Pacific, the US and Canada, and Western Europe. This points to an opportunity for subnational pension funds to enhance their role in urban climate finance by adjusting asset management strategies, directing investments locally, and using financial mechanisms such as guarantees and green bonds to de-risk investments and stabilize returns (CCFLA 2022b).

Similar to public finance, 96% of private urban climate finance was sourced and invested domestically (USD 389 billion). These investments were mostly in electric cars (USD

25 Institutional investors include insurance companies, asset management firms, pension funds, foundations, and endowments. Funds include private equity, venture capital, and infrastructure funds.

188 billion), and the buildings sector (USD 120 billion). The USD 15 billion coming from international financiers mostly went to solar generation (USD 5 billion), and the water and wastewater sector (USD 4 billion).

Developed economies accounted for the majority of private urban climate finance (61% or USD 245 billion), followed by EMDEs (39% or USD 157 billion), with just 0.20% (or USD 0.8 billion) for LDCs. Regionally, 92% went to Western Europe (USD 133 billion), the US and Canada (USD 92 billion), and East Asia and the Pacific (USD 146 billion) combined. While transport was the main recipient in East Asia and the Pacific (USD 98 billion), buildings and infrastructure received the biggest share in the US and Canada (USD 42 billion) and Western Europe (USD 62 billion).

Box 5: Increasing private investment in urban climate finance: The role of private insurance

Urban climate finance barriers that hinder private investment for many types of cities (see Section 2) are particularly pervasive for urban adaptation investments in developing economies. There is no one-size-fits-all approach to addressing this problem and enhanced public-private coordination is required, in addition to an improved enabling environment for urban climate investment (see Section 5.2).

Insurance, however, can encourage investment in climate resilience and safeguarding cities. Insurance is a key protection mechanism for urban underinvested sectors (e.g., water) to operate in a climate-stressed world. Furthermore, insurance is a flexible mechanism with products offering protection across all phases of a climate disaster: from anticipation through to relief, recovery, and reconstruction. This type of guaranteed liquidity is essential in a relief scenario for a climate-induced disaster when cities need to bring essential service provision back online as quickly as possible whilst repairing infrastructure for the mid-to long-term.

Figure 9: The key roles that cities play in mitigating risk and encouraging insurance provisioning

CITY AS PROVIDER	CITY AS STEWARD	
Consumers of Insurance	**Manage Risk: Policy & Planning**	**Convene ond Champion**
• Pool risk • Purchase parametric insurance • Insure public assets • Raise funding for risk management	• Measuring risk and hazards • Adaptation/resilience planning • Reform land use and building codes	• Convene experts • Leverage outside support to measure and manage risk • Lobby other spheres of government for improved insurance uptake

Note: This graphic is reproduced from CCFLA 2021b.

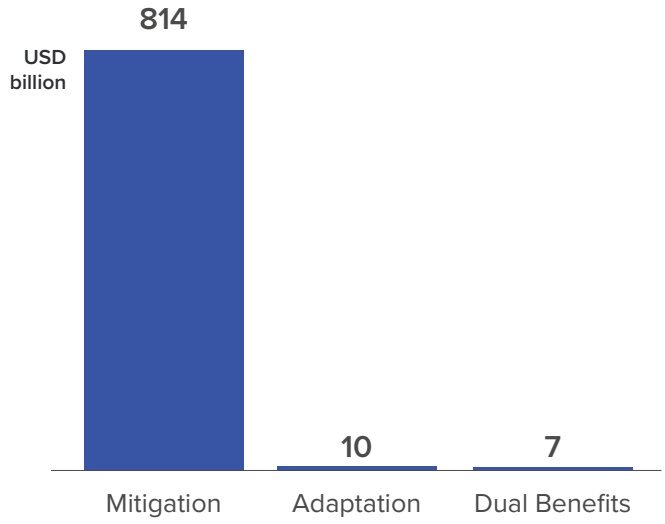
Cities are consumers of insurance and also facilitate its uptake by managing risk through policy and planning or convening and championing (see Figure 9) (CCFLA 2021b). City governments can use insurance, such as catastrophe bonds, to encourage investment in adaptation. For example, cities in Mexico have employed a natural capital-based parametric insurance

initiative (developed by the UNDP, the Nature Conservancy, and insurance partners) which monetizes the protective benefits of coral reefs, which absorb storm surges and prevent inland flooding. The instrument, Reef2Resilience, identifies resilient infrastructure investment opportunities and packages them as resilience bonds or direct investments for the private sector, aiming to strengthen local communities' protection against natural disasters (Carter and Boukerche 2020).

3.4 CLIMATE USES

Urban climate finance primarily went to mitigation efforts (USD 814 billion),[26] **with far less designated for adaptation (USD 10 billion) and dual benefits (USD 7 billion).** This distribution reflects the global trend, of adaptation and dual benefits finance typically constituting a smaller share of total climate investments (CPI 2023a).

Figure 10: Sources of urban climate finance by use, 2021/2022



3.4.1 MITIGATION FINANCE

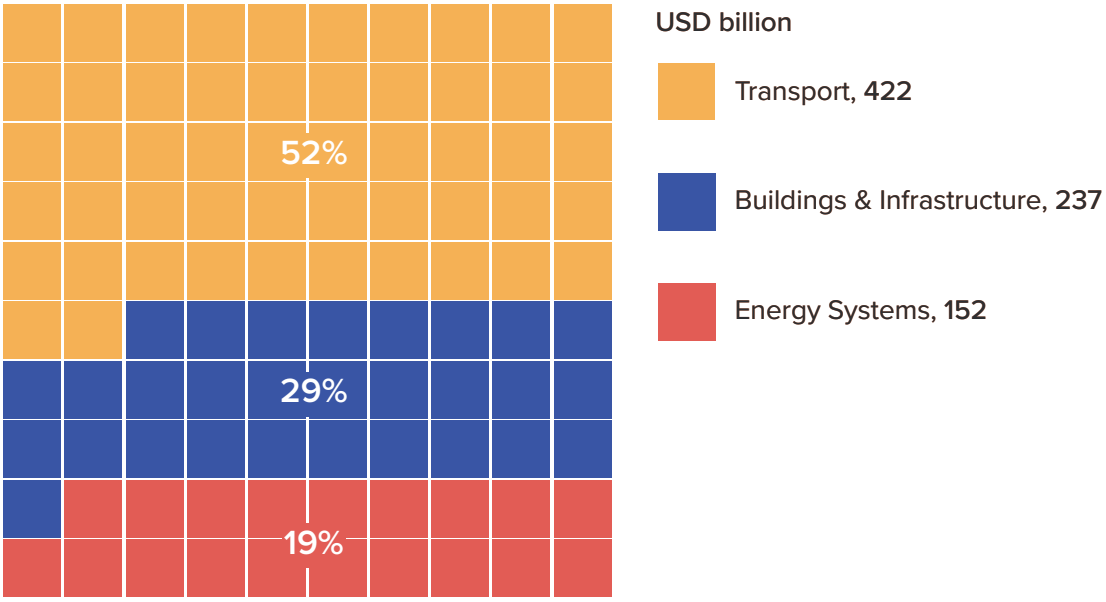
Tracked urban mitigation finance more than doubled from USD 376 billion in 2017/2018[27] to USD 814 billion in 2021/2022, mainly driven by the transport, buildings and infrastructure, and energy systems sectors.

26 Out of the USD 814 billion going to mitigation finance, USD 122 billion was tracked at the project level, while USD 693 billion came from capital expenditure estimation from the transport, energy systems and buildings and infrastructure sectors.
27 The 2021 SCCFR reported total urban mitigation finance as USD 377 billion for 2017/2018, but this figure has since been adjusted to USD 376 billion due to methodological improvements.

Transport was the leading destination for urban mitigation finance, receiving 52% (USD 422 billion), mainly for electric cars and metro infrastructure. Buildings and infrastructure received 29% (USD 237 billion), especially for appliances and lighting and energy efficiency investments. Energy systems accounted for 19% (USD 152 billion).

Private entities were the main providers of urban mitigation finance (USD 398 billion), while public actors financed USD 173 billion. Private investments depend on commercial viability, and thereby favor consolidated technologies such as electric cars and solar energy with greater potential for profitability as well as long-term sustainability benefits.

Figure 11: Urban mitigation finance by sector, 2021/2022



< 1% : Others & Cross-sectoral, Water & Wastewater, Waste, AFOLU, Information and Communications Technology

3.4.2 ADAPTATION FINANCE

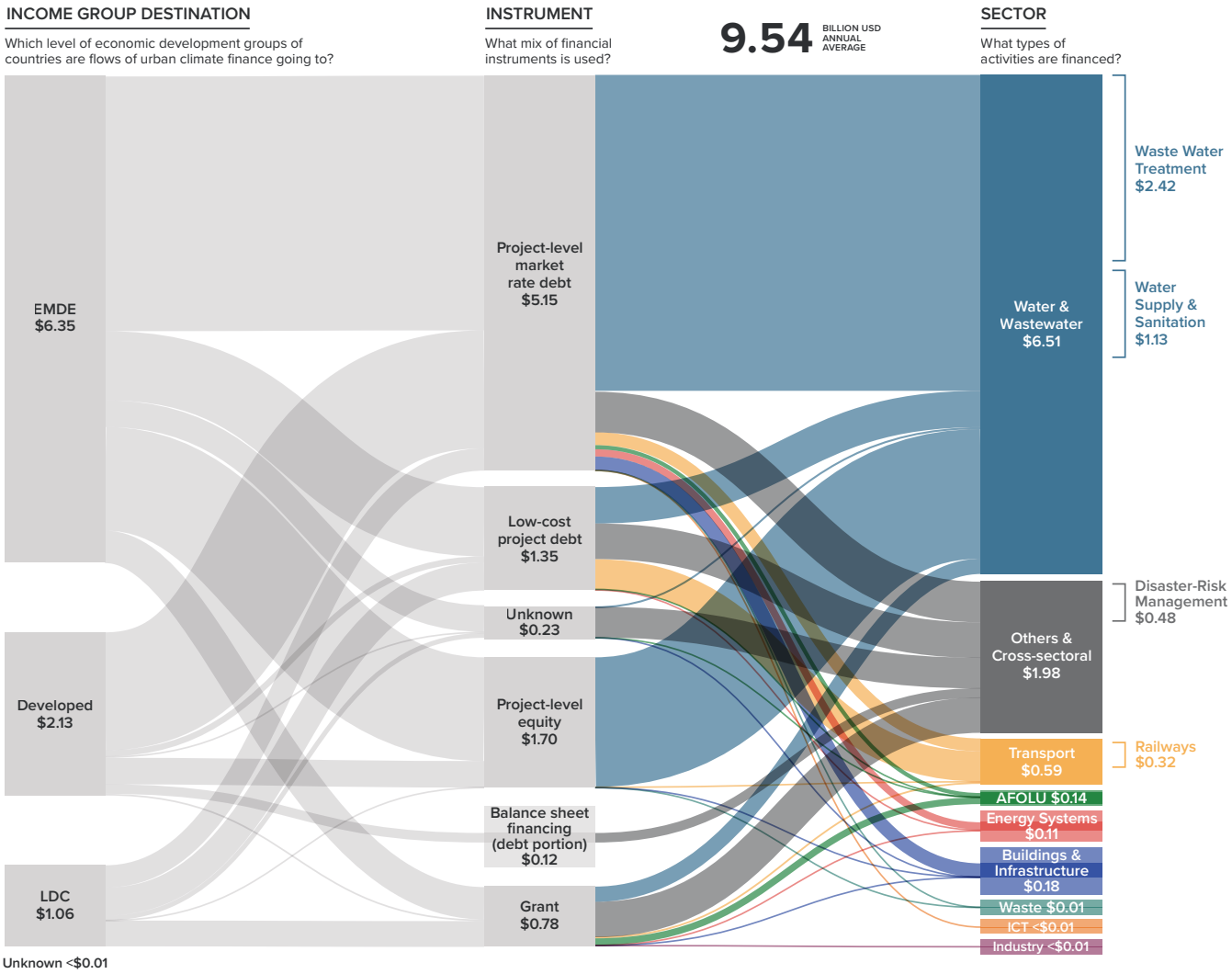
Finance for urban adaptation projects rose to USD 10 billion in 2021/2022 from USD 6 billion in 2017/2018.[28]

Water and wastewater activities received 68% (USD 7 billion) of urban adaptation finance. This aligns with overall adaptation finance, reflecting the relevance of such infrastructure

28 The 2021 SCCFR reported total urban adaptation finance as USD 7 billion for 2017/2018, but this figure has since been adjusted to USD 6 billion due to methodological improvements.

to building climate resilience (CPI 2023a). Cross-sectoral urban climate solutions such as disaster-risk management and coastal protection received 21% (USD 2 billion).

Figure 12: Urban Adaption Finance flows 2021/2022



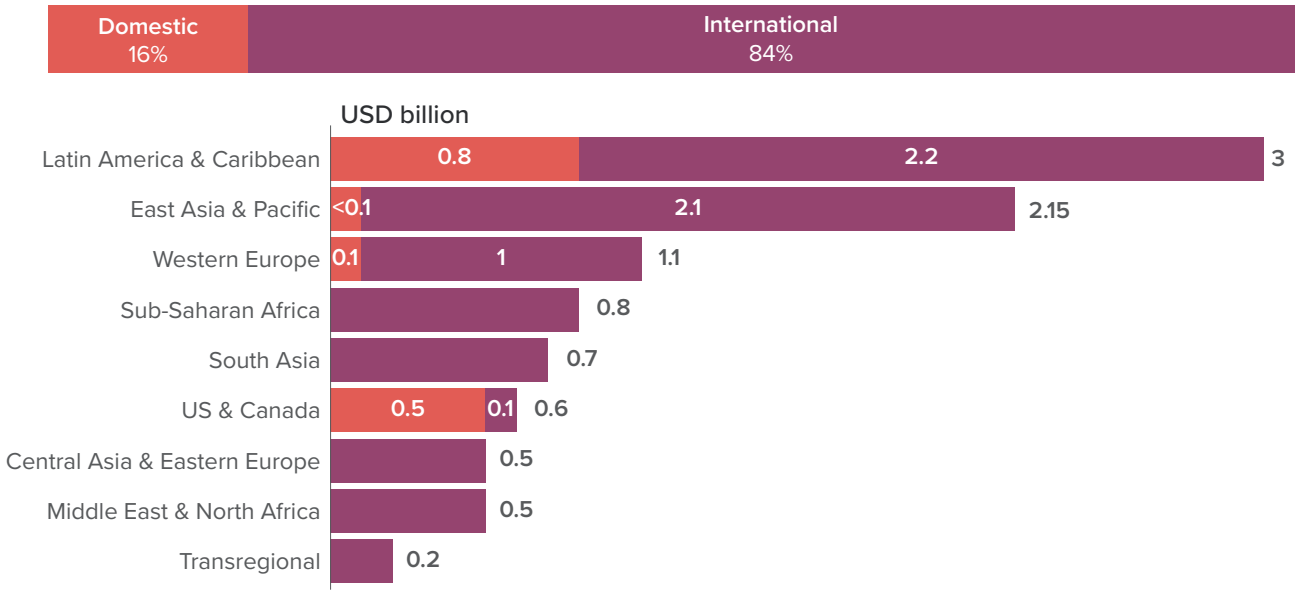
Urban adaptation projects tracked similar amounts of finance from private and public sources, which contributed USD 4 billion and USD 5 billion, respectively. These numbers contrast with the overall landscape of climate finance, where 98% of tracked adaptation finance came from public actors in 2021/2022 (CPI 2023a). The urban figures may be skewed due to data and tracking challenges, which include the context-dependency of what counts as urban and adaptation, the complexity in linking adaptation and resilience outcomes with climate risks, the absence of clear impact metrics, limited access to state or local budgets, and a lack of local-level reporting requirements (CPI 2023a).

This results in many adaptation initiatives being underreported and not captured in financial flows. For instance, adaptation and resilience are largely subnational issues in India and state governments are the primary contributors for public expenditure in adaptation-relevant

sectors, such as water and urban development (CPI 2024a). However, our tracked urban climate finance does not include flows from state or local budgets.[29]

Almost all urban adaptation finance data relates to the water and wastewater sector, which is increasingly dominated by private finance due to its commercial viability (See Box 6). Meanwhile, public sector adaptation funds were spread out among cross-sectoral investments (43%), including disaster-risk management and coastal protection, water and wastewater (35%), and transport (13%). Multilateral DFIs provided over half of total public urban adaptation finance (USD 2 billion).

Figure 13: Urban adaption finance flows by region 2021/2022, USD billion



Almost all tracked urban adaptation finance went to EMDEs (USD 6 billion). The largest share went to Latin America and the Caribbean (USD 3 billion), and East Asia and the Pacific (USD 2 billion), coming from international providers. Domestic finance accounted for just 16% of all adaptation finance tracked, mostly as private sector water investments.

Adaptation tracking is limited by our taxonomy, and without careful consideration certain investments may lead to maladaptation or even increased emissions in cities. Frequent and intense extreme heat events will increase cities' need for air conditioning as an adaptation measure.[30] However, reliance on air conditioning, especially in urbanizing EMDEs like China,[31] is leading to a significant rise in emissions due to the predominant use of fossil fuels for electricity generation (IEA 2018). A recent study of 334 Chinese cities found that air conditioner sales rose with each additional hot day, resulting in more investment requirements in emissions reduction (Duan et al. 2023). Preventing such maladaptation

29 See the accompanying methodology document for details on the scope of the accounting of urban climate finance.
30 Most cooling today occurs in towns and cities due to higher incomes as well has higher temperatures than rural areas (IEA 2018). Yet, this report does not count cooling as an adaptation tagged activity.
31 The global stock of air conditioners is projected to grow from 1.6 billion to 5.6 billion by 2050, with developing and rapidly urbanizing economies like China, India, and Indonesia driving half of the demand (IEA 2018).

will be essential to ensuring that cities are on track for mitigation goals in the future while providing a safe, liveable environment for all residents.

Box 6: Corporate response to water security

Corporations are increasingly recognizing the material risk that climate change poses to industrial water supply. CDP collects voluntary expenditure data from businesses globally on the reduction of their water-related risks. Between 2019 and 2022, 818 industries reported their expenditure, with 96% addressing climate-related risk. While identifying the exact urban share of this investment is challenging, given the nature of reported business activities, a significant portion can be considered to be urban-focused.

Investments reducing water-related risk in businesses' supply chains reached USD 27 billion on average invested 2019/2020, and USD 18 billion in 2021/2022. The largest spending was in the energy utility networks, chemicals, and thermal power generation industries. Data indicates that private investment is being channeled to climate resiliency activities at the business level. Activities range from capital expenditure for water recycling technology, installation and operational expenditure for multi-hazard early warning systems to hiring additional resources to monitor and manage the risk.

3.4.3 DUAL BENEFITS

Finance tagged as dual benefits—delivering both climate mitigation and adaptation benefits—reached USD 7 billion in 2021/2022. Most of this came from public actors (88%), mainly multilateral DFIs (USD 4 billion) and bilateral DFIs (USD 1 billion). Dual-benefit investments were mostly cross-sectoral (USD 3 billion), and in water supply and sanitation (USD 1 billion) or transport (USD 1 billion).

Box 7: Nature-based solutions for cities

Nature-based solutions (NbS) use natural processes to address social and environmental challenges. The International Union for Conservation of Nature defines NbS as "actions addressing key societal challenges through the protection, sustainable management and restoration of both natural and modified ecosystems, benefiting both biodiversity and human well-being" (IUCN 2020).

NbS provide cities with dual benefits of mitigation and adaptation by enhancing biodiversity for carbon sequestration and improving urban temperatures, air quality, water management, and resilience to extreme weather. They also create recreational spaces and jobs. Examples include urban agriculture and forestry, drinking water infrastructure, green roofs, and coastal and riverine protection (CCFLA 2021), as illustrated by the examples below:

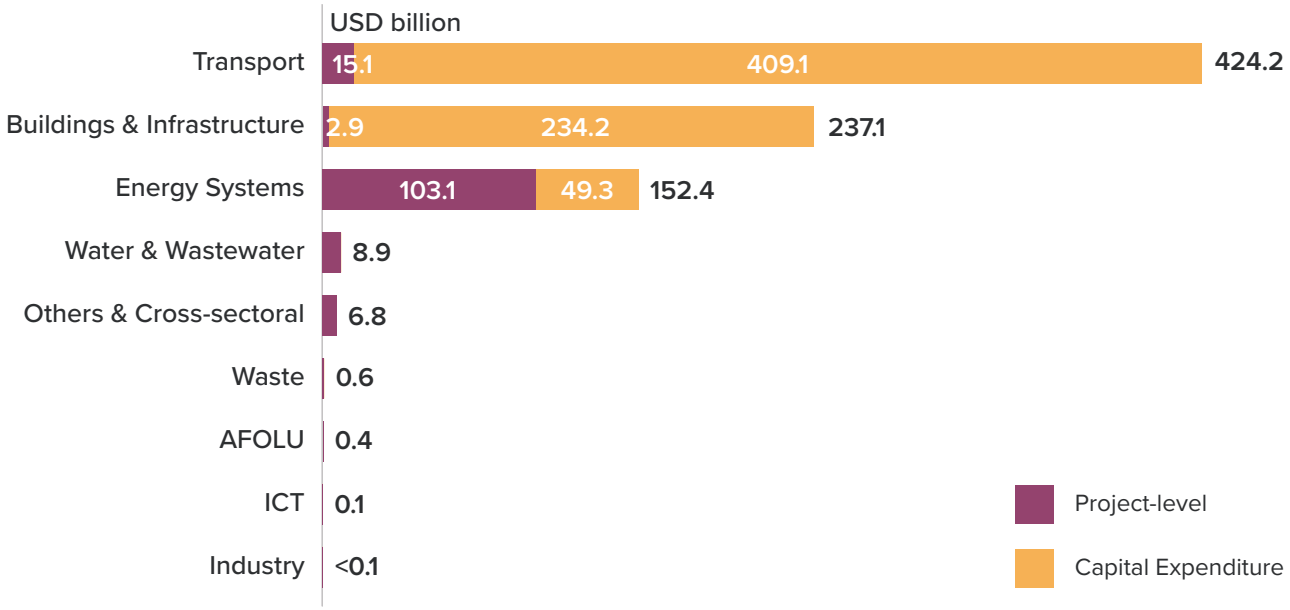
- In 2000, Quito, Ecuador, established the Quito Water Fund as a trust fund to reinvest revenues from water users, public utilities, and private companies in restoration and sustainable land use practices in order to restore watershed functions and alleviate quality and supply challenges (Arias et al. 2010).

- In 2016, Washington, the US, developed the Stormwater Retention Credit Trading Program, which allows developers to earn revenue for projects that reduce harmful stormwater runoff by installing rain gardens or green roofs or by removing impervious surfaces (DC GIS n.d.).
- In 2018, Reykjavik, Iceland, launched its first green municipal bonds to raise funds for its climate action plan. This plan targeted interventions in various sectors, including sustainable land use through wetland reclamation to prevent GHG emissions (CCFLA 2023c) (City of Reykjavik 2020).
- In 2020, Freetown, Sierra Leone, partnered with NGOs to plan and develop an employment program for tree monitoring and care, aiming to plant 1 million trees to reduce the risks associated with extreme heat, landslides, and flooding (CCFLA 2021).

3.5 SECTORS

Urban climate finance continues to go predominantly to the transport (USD 424 billion) and buildings sectors (USD 237 billion), with significant investment also in energy systems (USD 152 billion).

Figure 14: Sector split by public and private finance flows 2021/2022



3.5.1 TRANSPORT

Transport accounts for 51% of urban climate finance (USD 424 billion), and investment flows have increased by twofold since 2017/2018. Urban transport is a key sector for both global and urban emissions, contributing 40% of global passenger transport sector emissions (ITF 2021). The need to reduce local air pollution, which city dwellers and policymakers prioritize due to its severe health impacts, is a strong driver of investment in the transport sector.

Due to limited data, only USD 15 billion of transport investment was tracked at the project level.[32] Using investment data from the International Energy Agency (IEA), the International Association of Public Transport, and other sources, we estimated through a capital expenditure approach that an additional USD 409 billion of transport finance was attributed to urban areas in 2021/2022. This includes sales of new electric and hydrogen vehicles and transport infrastructure, including expenditures on new bus rapid transit systems, metro infrastructure, and EV charging stations (see the SCCFR Methodology Document).

Private actors accounted for 45% (or USD 191 billion) of transport financing, mainly from household spending on electric cars. Households accounted for 67% of the identified private expenditure. Commercial financial institutions funded most of the remaining private investment in the sector (27% or USD 52 billion) through market-rate debt and also targeting mainly electric car sales. This was supported by strong domestic fiscal policies to support the uptake of low-carbon technologies (CPI 2023a), particularly in China.

The public sector accounted for at least 9% (or USD 36 billion) of total transport spending.[33] Government financing (USD 24 billion) was mostly through grants—mainly in the form of subsidies—to the electric car market. National subsidies for individual consumers through both direct payments and other tax incentives have been a common source of partial funding for many types of EV, including two- and three-wheelers and trucks (IEA 2023). The IEA estimates that 10% of global expenditure on electric cars comes from governments (i.e., subsidies), such as China's direct incentives along the EV supply chain to ramp up domestic production during the past decade (IEA 2023a). Governments wishing to spur private household investment in EVs can implement similar policies and/or raise taxes on non-EVs to decrease the price differential. EMDEs accounted for 54% of the spending on electric car subsidies, mostly in China, and developed countries took up the remaining 46%, mainly Germany, France, the UK, and the US.

32 Project-level data refers to detailed, specific information about individual projects including information on project description, timeline, cost, location and source of finance. While project-level data provides detailed insights into financing flows, comprehensive data for every sector remains incomplete. We therefore use supplementary top-down capital expenditure data for key sectors.

33 While it was possible to identify that at least 45% of the total financing was from private actors, and at least 9% was from the public sector, it was not possible to identify the funding source of the remaining 46% of transport financing due to data limitations (see the SCCFR Methodology Document). `

Figure 15: Urban climate finance flows for transport by subsector in 2021/2022

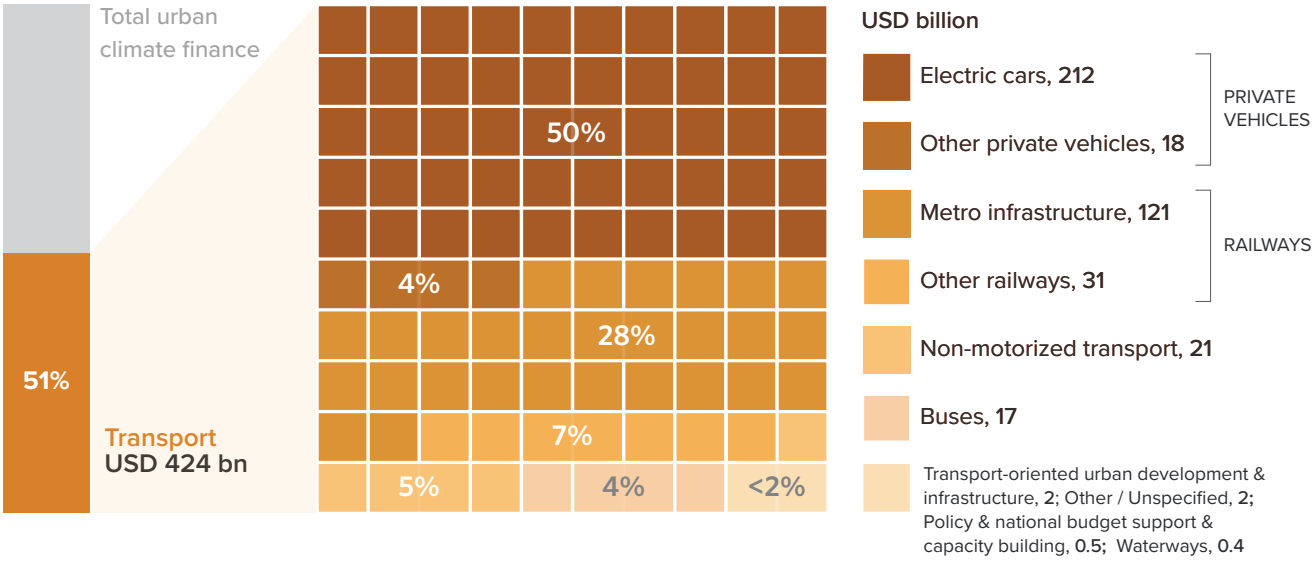


Figure 15 shows that around 50% of tracked transport finance went to electric cars. Metro infrastructure and metro vehicles were also key areas for urban climate transport investment, respectively receiving USD 121 billion and USD 13 billion in 2021/2022. We were not able to disaggregate metro investments by source, though these are likely from public sources and loans from financial institutions. In densely populated cities in East Asia (e.g., Tokyo, Taipei, Shanghai, and Seoul), fares are more likely to cover metros' operational costs and sometimes even capital costs, reducing the need for subsidies (IEA 2019). Supporting rail companies in diversifying funding sources can spur the expansion of urban rail needed by 2050. Several rail companies have used green bonds, including for urban rail projects in Paris (CBI 2018) and New York (CBI 2024). In addition, some authorities have developed more innovative ways to fund metro systems, such as via Hong Kong's land value capture (CBI 2019).

Investment in non-motorized transport, other private vehicles, and electric buses accounted for 5%, 4%, and 4% of total urban climate finance, respectively. Although data is not available to enable a breakdown by financial instrument, most spending on bicycles[34] (which accounts for the majority of non-motorized transport spending) likely comes from households, with some company purchases (e.g., for bike-sharing schemes) and government subsidies (e.g., for e-bikes). Government subsidies can be an important driver of funding for these technologies, especially in the early stages. For example, between 2017 and 2022, France paid EUR 65 million to support the purchase of e-bikes (Government of France 2023), and Sweden SEK 50 million (or EUR 35 million) each year from 2018-2020 to support the purchase of e-bikes (European Cyclists' Federation 2017).

Electric buses, whose urban climate finance reached USD 16 billion, also benefit from subsidies supported by municipal authorities to supplement their revenues. Sales of electric buses in China, which make up the vast majority globally, have received declining subsidies, leading to reduced sales between 2019 and 2020. However, sales started to rebound in

34 This includes investments in new bikes, e-bikes, and other electric micro-mobility vehicles.

2021 and 2022, suggesting that subsidies have successfully kick-started the country's electric bus market (IEA 2023a). Other countries, such as Chile and India, have used bulk procurement to purchase electric buses at lower costs (CMM Chile 2020; WRI India 2022). Banks can also offer loans for electric buses, which cities can repay using funds from operational savings (CIB 2024).

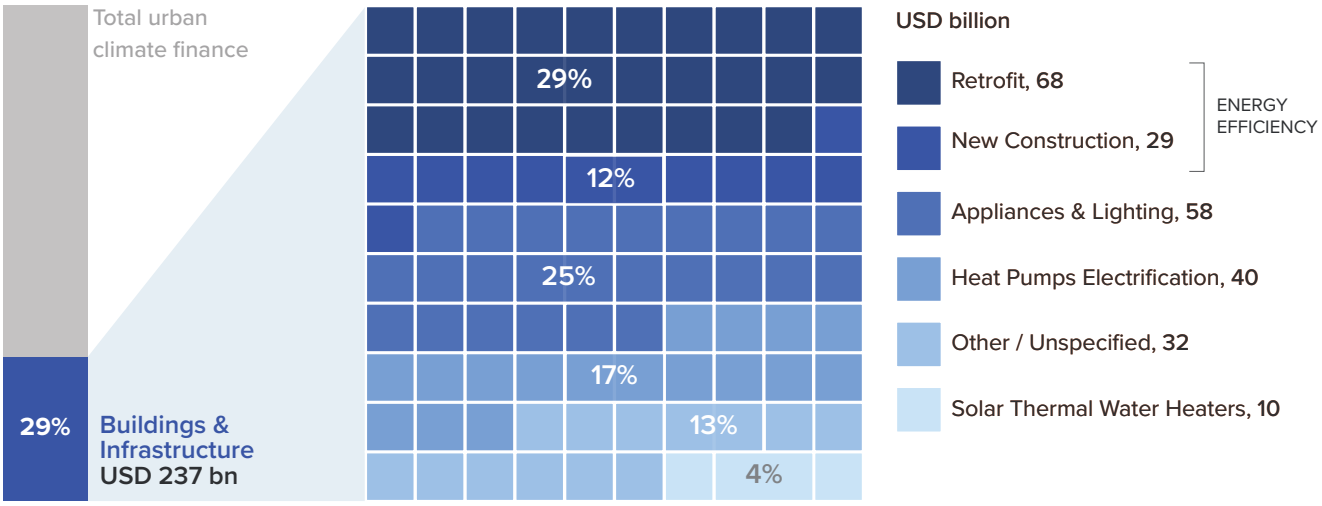
East Asia and the Pacific is the leading region investing in urban transport climate finance (60%), mostly on railways, followed closely by private EVs. Western Europe (19%) and the US and Canada (9%) invested mainly in private EVs.

When China was removed from the analysis of urban climate finance for transport, the sector received USD 202 billion.[35] Private vehicles remained the largest recipient subsector (63%), followed by railways (23%). However, a larger share of the remaining finance (61%) occurred in developed countries, mainly investments in electric cars. In comparison, EMDEs totaled 26%, primarily investing in non-motorized transport such as new bike fleets.

3.5.2 BUILDINGS

Buildings and infrastructure received the second-largest share of urban climate finance (USD 237 billion). Climate finance for buildings in urban areas grew by 74% in 2021/2022 compared to the USD 136 billion tracked in 2017/2018.[36] This aligns with the sector's key role in decarbonization; it contributes an average of 40% of global energy-related CO_2 emissions and sometimes up to 70% in large cities (OECD 2022c).

Figure 16: Urban climate finance flows for buildings by subsector



35 Metro infrastructure capital expenditure estimations in East Asia were also removed, as the numbers are aggregated at the regional level. We assume that most investment to metro infrastructure in East Asia and the Pacific went to China, which has the world's largest urban rail transit system (Metro Report International 2022).

36 Buildings and Infrastructure total investment reported for 2017/2018 was originally USD 167 billion. Originally, small solar panels were classified under this sector. However, recent changes in taxonomy classification have seen these reclassified under the energy systems sector. While this aligns with the evolving landscape of energy technology and investment, the methodology for estimating the capital expenditures for small solar panels remains similar to the previous report. As a result, the numbers are comparable, ensuring continuity and accuracy in our financial assessments.

Due to limited data availability and the fact that investments in retrofits and new buildings are incremental in nature,[37] only USD 3 billion of buildings' investment was estimated at the project level. Using investment data from the IEA, BNEF, and other sources, we estimated through the capital expenditure approach that an additional USD 234 billion of building finance was attributed to urban areas in 2021/2022. This includes incremental energy efficiency measures in residential, commercial, and industrial buildings, including incremental capital expenditure to acquire physical assets such as energy-efficient appliances (see the SCCFR Methodology document).

Private actors accounted for 51% (USD 120 billion) of financing to buildings, and public actors for 30% (USD 71 billion), with the remaining share unknown.[38] **Commercial financial institutions and households accounted for USD 30 billion and USD 36 billion, respectively.** Among public actors, national governments and SOFIs provided 57% (USD 40 billion) and 37% (USD 26 billion) of public finance for buildings, respectively. Governments played an important role in transitioning the building sector toward net zero through direct financing and improving the market conditions. For example, Sweden's leading heat pump uptake is driven by subsidies for installation, lower energy costs that disincentivize the use of fossil-based heating, and training programs that improve market competition (Baker et al. 2022).

Appliances and lighting (USD 58 billion), retrofit energy efficiency (USD 68 billion), and Heating, Ventilation, and Air Conditioning (HVAC) and water heaters (USD 50 billion) account for the largest tracked investments in buildings. Developed economies led investments in appliances and lighting, energy efficiency retrofits, and heat pump electrification. Meanwhile, developing economies provided most for energy efficiency for new constructions and solar thermal water heaters. All buildings subsectors experienced an increase in urban climate finance 2021/2022 compared to 2017/2018.

Policy and incentives drive investment in sustainable buildings. The majority of tracked building finance to urban areas happened in Western Europe, accounting for 47% of the total in 2021/2022. Programs in Western Europe, such as Italy's Superbonus program, have helped increase spending on energy efficiency measures, including buildings in urban areas (UNEP 2024). The next-largest regions for urban climate spending buildings were the US and Canada (18%) and East Asia and the Pacific (16%) in 2021/2022.

When China was removed from the buildings and infrastructure sectoral analysis, the sectoral flows reached USD 206 billion. Developed economies accounted for 78% of this, EMDEs for 4%, and the country destination of the remainder is unknown.

Investments in buildings' energy efficiency are expected to decrease in the face of construction market uncertainty in Asia, South America, and Europe. This uncertainty is driven by rising borrowing and construction costs, limited awareness of funding options, rising energy prices, and supply chain disruptions due to geopolitical conflicts (UNEP 2024a). Additionally, changes in European energy efficiency programs have reduced the

37 According to (CPI 2021): "*Energy efficiency investments in new buildings and retrofits are incremental in nature as they lead to a decrease in energy use compared to a baseline situation. Therefore, energy efficiency investments in buildings per se correspond to the incremental investment made towards energy efficiency improvements only and not the total investment towards building and construction. Because most energy efficiency investments in buildings are components within larger projects, they are difficult to extract from the overall cost of the project.*"

38 The majority of unknown providers stem from our capital expenditure estimates, where we are unable to distinguish between public and private providers.

availability of funding. For instance, Germany's KfW has discontinued its energy efficiency grants and Italy's Superbonus program has scaled back tax incentives for energy-efficient construction amid budgetary constraints (IEA 2023b).

This decrease makes it even more important for cities to lead in funding green buildings. As owners and operators of city-level infrastructure, facilities, and utilities, cities can identify opportunities to integrate renewable energy into urban infrastructure, especially city-owned assets such as streetlights and public buildings. For example, Cape Town has undertaken renewable energy and energy efficiency initiatives to reduce its heavy dependence on fossil fuels. This includes solar-powered municipal buildings and micro-hydro generation turbines at water treatment plants, meeting 5% of the total electricity used for municipal operations (IRENA & ICLEI 2018).

Box 8: CCFLA's network analysis supporting cities to decarbonize their buildings

CCFLA applied network analysis to examine the interdependencies between 75 policy and finance instruments, as well as 22 barriers, to support cities' transition to net-zero-carbon buildings. This allows us to move beyond case studies to explore potential high-impact pathways for cities to effectively support a low-carbon transition for the building sector.

Cities can employ various policy and financing instruments, including mandates to report lifecycle building emissions, audits and tune-ups, energy efficiency building codes, and a ban on extremely high-emitting building materials. Incentives can include subsidies, density bonuses, zoning-use exemptions, expedited permitting for carbon efficiency, awards, and publicity. Subsidies can be designed to reduce the costs of decarbonization projects and make them supportive of people living in urban poverty (CCFLA 2023d).

3.5.3 ENERGY SYSTEMS

Investments in low-carbon energy systems located in or established to serve cities witnessed the largest increase, reaching USD 152 billion in 2021/2022. This marked a more than fourfold increase on the USD 35 billion invested in 2017/2018.[39] As well as an actual increase in financial flows, this also reflects an update in the SCCFR methodology to 1) include estimations of small-scale solar PV capital expenditure and 2) improve our project-level urban tagging by expanding the keyword list to include more cities and larger energy projects serving exclusively urban areas (see the SCCFR Methodology document for details). While capital expenditure estimations for small-scale solar PVs accounted for 32% of tracked investments in the sector (USD 49 billion), project-level data accounted for USD 103 billion (68%) in 2021/2022 (changes in the urban tagging methodology accounted for approximately 15% of the tracked project-level data in the sector).

Solar PV projects received 91% (USD 139 billion) of total urban renewable energy generation. These included grid-connected and non-grid PV plants and rooftop commercial

39 2017/2018 number is a sum of USD 4 billion from renewable energy generation with USD 31 billion from renewable solar electricity in buildings.

and residential solar PV. Other urban renewable energy investments were in biofuel/biomass (USD 5 billion) and waste-to-energy (USD 2 billion).

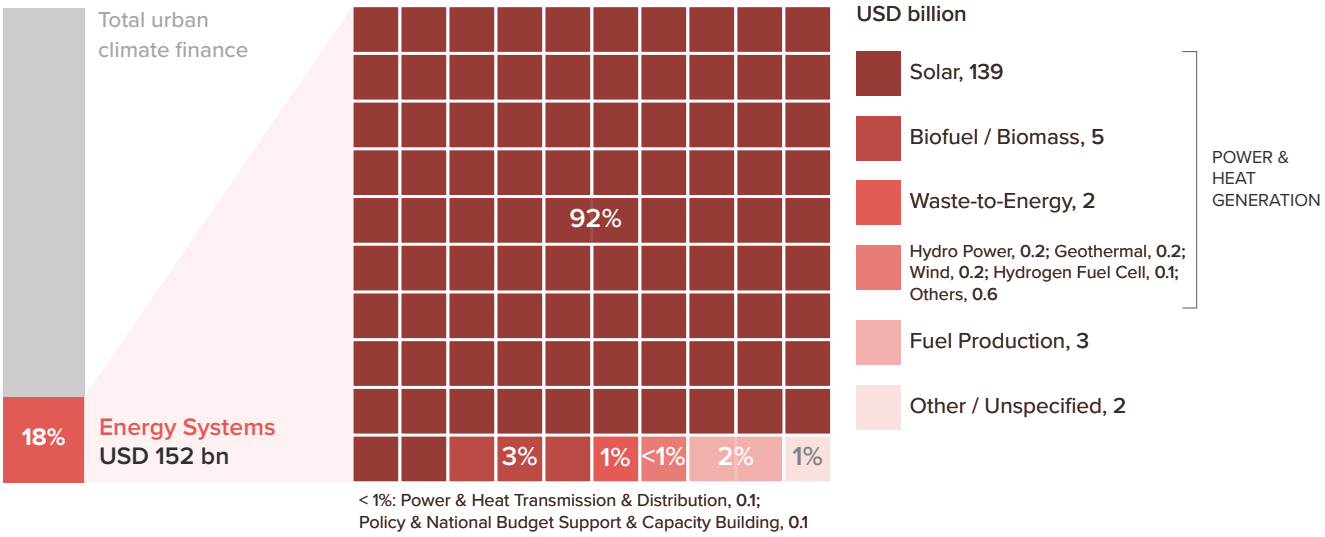
Private investments accounted for 57% (USD 87 billion) of total energy investments. This was split between corporations (31%) through mainly balance sheet equity; households own resources (15%); and commercial financial institutions (10%), mainly through debt. Meanwhile, public investments (43%, USD 65 billion) were largely split between national DFIs (19%), mostly through balance sheet debt; SOEs (15%) through mainly balance sheet equity; and SOFIs (6%) through mainly balance sheet debt.

China was the main destination for urban investments in energy (USD 80 billion, 52%), mostly in solar. Other EMDEs (USD 20 billion, 13%) and developed countries (USD 51 billion, 33%) were the next largest recipient regions. LDCs received only 1% of total energy urban investment.

When analyzing the data without China, the urban energy sector received USD 72 billion. Solar energy generation remained the largest activity (USD 60 billion), with developed countries accounting for USD 42 billion and developing economies for USD 17 billion of solar investments. By removing China, developed economies represent 70% of total investments in the sector, EMDEs 27%, and LDCs 2%.

The underinvestment in LDCs is concerning as these countries face severe risks from climate change despite contributing a small share of historical GHG emissions. They need enhanced financial support to develop resilient and sustainable urban energy systems. Increasing renewable energy investments in LDCs presents an opportunity to reduce their dependence on expensive fuel imports, thereby cutting energy costs for households and businesses (SolarPower Europe 2023). This will ultimately improve energy security among low-income households, allow businesses to grow, and improve governments' fiscal capacity to focus spending on essential services.

Figure 17: Urban climate finance to the energy systems sector by subsector



3.5.4 WATER AND WASTEWATER

Despite the importance of water for cities, particularly for adaptation, tracked urban climate finance to the water sector remained limited. Amid increased risks from climate events such as flooding and sea-level rise, proper planning and development can help cities achieve safer, water-secure futures (ADB 2023).

At the same time, the water sector has been overlooked as a source of emissions reduction (ADB 2023). Current estimates suggest that GHG emissions from the water sector amount to approximately 845 million tonnes of CO_2 equivalent, accounting for as much as 1.8% of global anthropogenic carbon emissions and 4.7% of global methane emissions (Global Water Intelligence 2022). Addressing these emissions is critical for both climate change mitigation and the protection of vital water resources.

USD 9 billion of climate finance was tracked for the urban water sector in 2021/2022, compared to USD 6 billion in 2017/2018. Private actors, such as commercial financial institutions and corporations, provided most investments (USD 5 billion), followed by public finance (USD 3 billion). CDP voluntary expenditure data shows that 818 industries reported their water-risk related expenditures between 2019 and 2022, with 96% addressing climate-related risks (see Box 6).

Project-level market-rate debt was used to channel 61% of urban climate finance to the water sector; marking a higher rate than for urban climate projects overall (17%). The key recipient regions of urban climate investments in the sector were Latin America and the Caribbean (USD 3 billion or 37%) and East Asia and the Pacific (USD 2 billion or 22%).

The low levels of grants and concessional debt in EMDEs and LDCs raise concerns about the risk of increasing debt burdens. In 2021/2022, EMDEs received nearly three-quarters of the total water and wastewater investments. Yet, of EMDEs investments, almost 44% was market-rate debt and 17% project-level equity. Grants and concessional loans only accounted for 3% and 6%, respectively. LDCs received 1% and 3% of the sector's total tracked grants and concessional debt, respectively.

Subnational governments are often responsible for water and sanitation services but depend upon unreliable and delayed budget transfers in many EMDEs and LDCs (World Bank, 2024). The water sector requires multifaceted investment, including in maintenance, governance, and capacity, and this can exacerbate underinvestment, particularly in urban slums and other underserved areas. This underpins a need for a more integrated approach to water investment, leveraging grants and technical assistance. Some Asian cities have financed water infrastructure through well-structured PPPs. In Indonesia's Umbulan Water Supply Project, for example, the Ministry of Finance and PT SMI provided support to structure the PPP, guarantees and viability gap financing, and to mitigate risks (ADB 2022). Similarly, Coimbatore city's water supply project in India benefited from an integrated financing approach under the Tamil Nadu Infrastructure Development Act, which included preparation support and a robust PPP framework. This enabled capital grants from state and national governments to cover 70% of costs and encouraged private involvement (ADB 2022).

3.5.5 OTHER SECTORS

While the waste, industry, and AFOLU (agriculture, forestry, and other land use) sectors are critical for urban climate action, current finance data shows significant gaps for these sectors, indicating a need for future research.

Waste: In 2021/2022, the waste sector summed just USD 0.6 billion in urban climate finance, with the main destination being EMDEs. Decarbonizing this sector in cities is key as activities such as landfilling and waste incineration are significant GHG emitters.

AFOLU: AFOLU represents a small part of tracked urban climate finance (USD 0.4 billion, less than 1%). Most investments came from the public sector (mainly bilateral DFIs), with finance primarily destined for South Asia. Urban and peri-urban agriculture can reduce food transportation emissions, improve air quality, and aid in urban waste management (Arosemena Polo et al. 2024). Examples of urban agriculture activities include community and rooftop gardens, and vertical farming, which make efficient use of limited urban space and have been implemented in cities like London, Atlanta, and Singapore (City of Atlanta 2021; London Environmental Network 2021; Singapore Food Agency 2024).

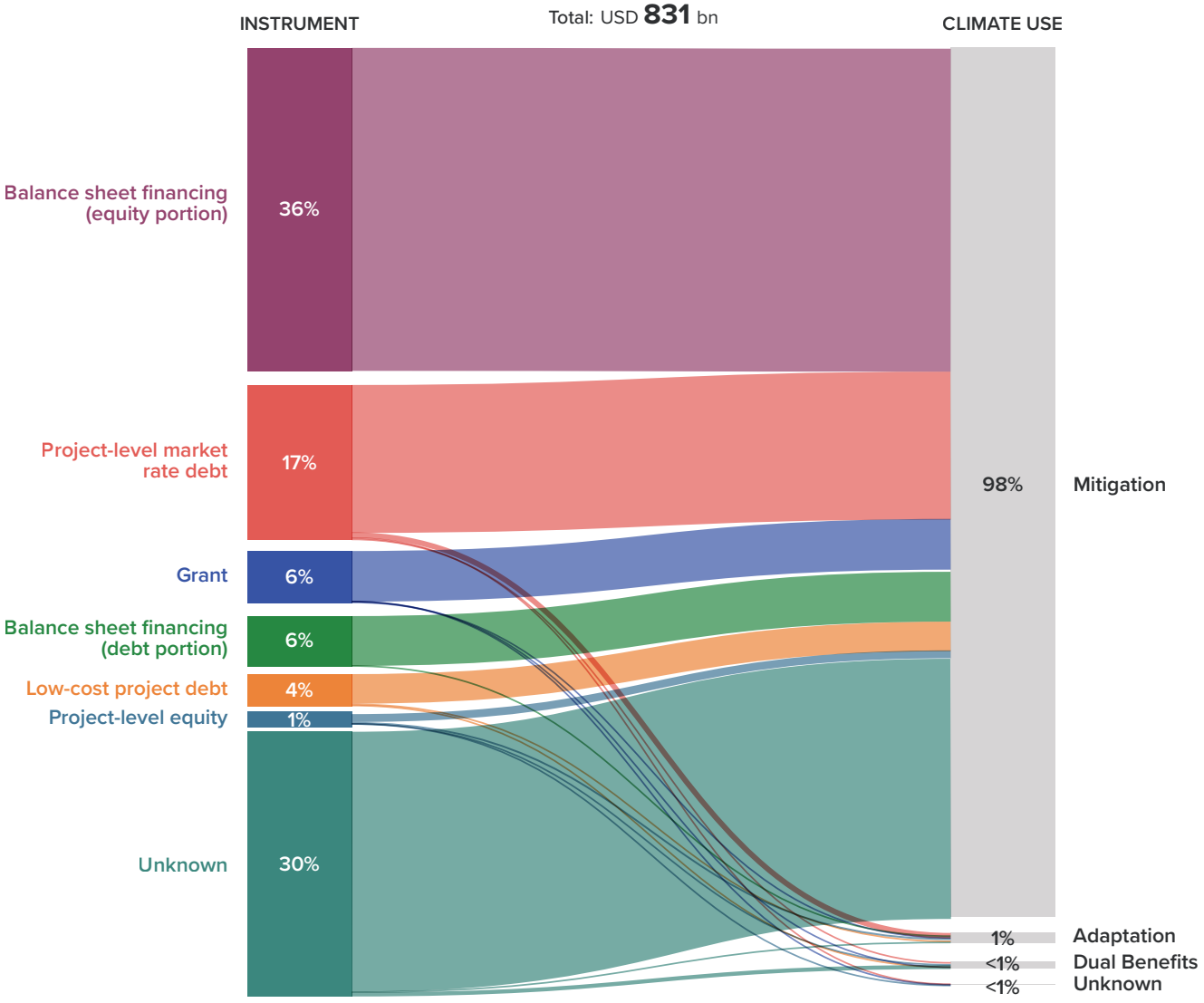
Industry: Industry represents a small part of urban climate finance (USD 0.05 billion, less than 1%). Most of this finance came from the public sector (mainly multilateral DFIs and national governments), with finance destined primarily for East Asia and the Pacific, and Western Europe. The presence of industry in urban areas varies significantly, depending on factors such as the region, economic development, urban planning policies, and historical patterns of industrialization. Historically, cities like Detroit, São Paulo, Johannesburg, and Lagos have had industrial bases, while Dhaka and Mumbai have seen significant growth in manufacturing and textiles (Marr 2016; Urban Manufacturing Alliance 2018; Hassan et al. 2020; Clean Air Fund 2023; Portes and Rodríguez 2024). In contrast, cities in China have seen rapid urbanization in the industrial zones, and cities like New York, San Francisco, Bangalore, and Hyderabad are now hubs for technology and finance (Grondeau 2007; Zhang 2017; Bian 2021; Cheng et al. 2023). Decarbonizing industry in urban spaces and focusing on clean industries can have great benefits for air quality, especially in densely populated urban areas such as Delhi and Cairo, where pollution severely affects public health (Ghanem et al. 2023; Raiser 2023).

3.6 INSTRUMENTS

Of the USD 831 billion in urban climate finance tracked for 2021/2022, only USD 582 billion had enough granularity to allow analysis of the financial instruments employed.

Equity financing was the most-used instrument for urban climate investments in this period, accounting for USD 312 billion or 38% of the total. These investments were focused on commercially attractive solutions, including electric cars, solar power, and sustainable appliances and lighting for buildings.

Figure 18: Urban climate finance flows by use and instrument



Debt financing accounted for USD 222 billion, or 27% of total finance tracked. This included market-rate debt (USD 145 billion), balance sheet debt (USD 47 billion), and low-cost project debt (USD 30 billion). Around 80% of low-cost project debt was provided by SOFIs, demonstrating the role of the public sector in cheaper financing for urban climate projects.

Grant financing totaled USD 49 billion, or 6% of urban climate finance. Of this amount, 94% was provided by national governments and 5% by SOFIs. Grant investment mostly comprised public-sector subsidies for EV purchases (USD 24 billion) and energy efficiency retrofits (USD 19 billion). Tracked numbers also show that 66% of grant financing for urban climate projects went to Western Europe.

While mitigation projects' finance had a higher share of equity instruments (38%) versus debt (26%), adaptation projects received more finance as debt (69%) and grants (8%). This reflects our capital expenditure estimates, which had a high share of equity financing and are mostly mitigation-focused.

Box 9. Financial Instruments Toolkit[40]

CCFLA's financial instruments toolkit showcases potential innovative financial instruments that can help cities overcome the multiple barriers they face in accessing climate finance. The toolkit aims to inform cities of the financial instruments available and provide practical examples of their use in financing urban climate projects.

The library includes 72 state-of-the-art financial instruments available for urban climate projects, divided into 13 categories. For example, the library catalogs 16 different debt financing instruments ranging from commercial loans (lent by private banks and financial institutions such as insurance companies and pension funds to municipalities) to infrastructure debt funds (an investment pool, such as a mutual fund or exchange-traded fund, in which the core holdings comprise fixed-income investments). The library also includes aggregation models such as pooled finance mechanisms, which support local governments that are too small to undertake debt structuring and negotiations on their own.

The financial instruments case studies repository shares 25 successful examples of the implementation of innovative financial instruments in urban climate projects.

3.7 REGIONS

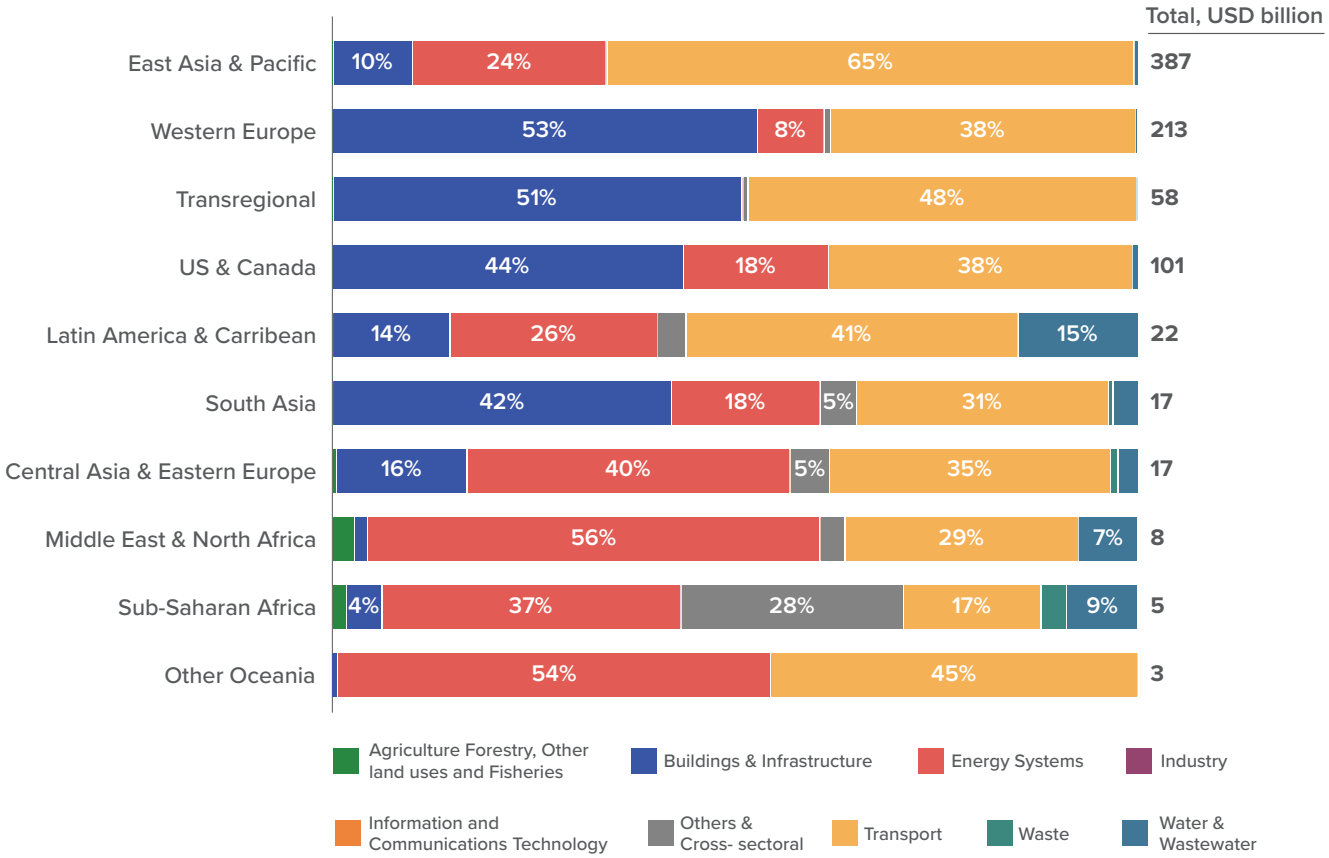
Urban climate finance in 2021/2022 predominantly flowed to cities in developed economies (USD 339 billion) and China (USD 336 billion).[41] EMDEs received only 11% of the total (USD 88 billion), while LDCs received just 1% (USD 57 billion).

Climate finance flows from developed economies to cities in EMDEs and LDCs accounted for less than 2% of the total (USD 16 billion), far below global climate finance trends (where 7% of total flows from developed economies went to EMDEs and LDCs).

40 The Financial Instruments Toolkit is available at: https://citiesclimatefinance.org/financial-instruments

41 As in the Transport section (3.5.1), we assume investments that in metro infrastructure capital expenditure estimations in East Asia and the Pacific (USD 104 billion) are mostly going to China.

Figure 19: Region Destination 2021/2022



Most developed economies focused their urban climate investments on buildings (USD 160 billion) and transport (USD 123 billion). Cities in Western Europe received USD 213 billion, mostly for energy efficiency in buildings (USD 74 billion), electric cars (USD 65 billion), appliances and lighting (USD 26 billion), and small-scale solar panels (USD 11 billion). The US and Canada received USD 101 billion, mostly for electric cars (USD 33 billion), appliances and lightning (USD 20 billion), and HVAC and water heaters (USD 16 billion).

EMDEs (excluding China) invested mainly in transport (USD 52 billion), followed by energy (USD 20 billion). LDCs invested mainly in tranport (USD 7 billion).

China has invested USD 336 billion (40% of total urban climate finance). These Chinese flows have mostly gone to electric cars (31%), metro infrastructure (31%), and solar energy generation (24%). Investments by other countries in East Asia and the Pacific totaled USD 51 billion, again focused on transport (USD 30 billion), followed by energy systems (USD 13 billion), and buildings and infrastructure (USD 7 billion).

Latin America and the Caribbean mostly invested in transport, with a focus on railways (USD 6 billion), followed by energy systems (mainly solar), and other investments in water and wastewater. In contrast, South Asian cities concentrated investments in buildings, followed by transport (especially railways), and energy systems (mainly solar power). Cities in the Middle East and North Africa, as well as those in Other Oceania, prioritized energy, followed by transport.

Sub-Saharan Africa received USD 5 billion, going to energy systems (USD 2 billion), cross-sectoral uses (USD 2 billion), and transport (USD 1 billion). Despite its rapid urbanization, real and perceived risks prevent investors from expanding in the region. These include currency instability, regulatory and governance problems, lack of bankable project pipelines, and information asymmetries (CPI 2022b). Therefore, across climate finance, private investment remains concentrated in a handful of countries with more developed financial markets: South Africa, Nigeria, and Kenya (CPI 2022b).

In 2021/2022, 69% of urban climate finance (USD 570 billion) across all regions came from domestic actors. Sub-Saharan Africa was the only region where most was from international sources (69%), with international flows also seen to a lesser extent in Latin America and the Caribbean (35%), and the Middle East and North Africa (40%). Nonetheless, financing from developed economies to EMDEs and LDCs economies summed just USD 16 billion (or less than 2% of total urban climate finance). This disparity for cities is even starker than for global climate finance, as reported in the GLCF, where 7% of overall climate finance represents international flows committed by developed economies to EMDEs and LDCs (CPI 2023a).

Closing the climate finance gap sustainably will require an integrated and just approach. Equitable access to finance is key, especially for cities in EMDEs, which are not only undergoing rapid growth and urbanization but are also facing increasing climate impacts. Understanding the distribution of climate risks within cities can also enhance the effectiveness of finance to benefit the most vulnerable populations. In rapidly urbanizing regions like Asia and sub-Saharan Africa, even a small increase in urban population can grow informal settlements (UN-Habitat 2022a). The informal economy provides crucial livelihoods in many cities, but also leaves workers vulnerable to climate and health impacts, exacerbated by unplanned urbanization in in informal settlements, which are often overlooked by policymakers (IIED 2022a). In the event of global temperature increases, this will disproportionately expose populations in these areas to severe risks due to vulnerabilities stemming from inadequate housing and insufficient access to climate-resilient infrastructure and basic services (UN-Habitat 2022a; UNEP 2024).

4. URBAN CLIMATE FINANCE NEEDS

In order to inform a practical framework that supports cities' transition to sustainable and resilient futures, **this report provides a granular assessment of global urban climate finance needs for the first time**. Understanding the funding needs for achieving climate-aligned scenarios will help to direct investments to where they have the greatest impact.

This assessment disaggregates findings from CPI's Top-down Climate Finance Needs work to focus on the needs of cities (CPI 2024b).[42] We present the average annual urban climate investments needed for mitigation by 2030 and 2050, which are milestone years in the global climate agenda. We also include some estimates of urban adaptation needs only for EMDEs, though these are limited in scope. Sectors covered are determined by data availability from underlying scenarios that do not evenly cover all sectors or technologies.

4.1 CLIMATE USES

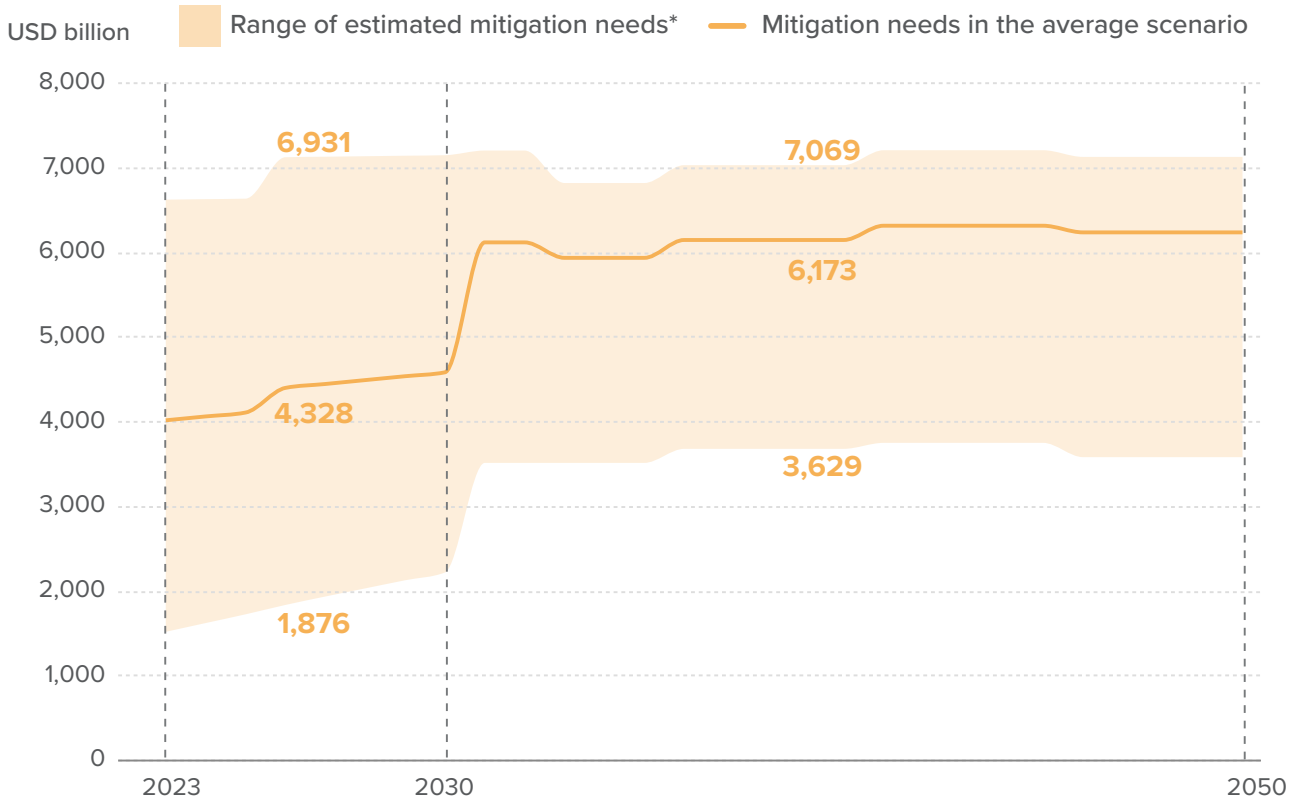
This needs assessment is based on scenarios for mitigation and adaptation, which are presented separately in this chapter. While mitigation scenarios cover all countries, the underlying adaptation investment needs projections used cover only EMDEs. Therefore, we cannot directly compare mitigation and adaptation investment needs for cities nor the relative proportion of each type of climate use investment. Despite its limited coverage, adaptation investment needs still provide a benchmark indicating what sectors are important for building city resilience and framing the conversation on climate adaptation in EMDEs.

4.1.1 URBAN MITIGATION FINANCE

For mitigation, cities require an estimated USD 4.3 trillion annually from 2023 to 2030 and over USD 6 trillion on average per year through to 2050 to align with a 1.5°C scenario.

42 See CPI's Climate Finance Needs work at: https://www.climatepolicyinitiative.org/climate-finance-needs/

Figure 20: Annual mitigation average needs for 2023-2030 and 2031-2050



*Estimated range indicates high- and low-scenario bounds.

Cities' estimated mitigation needs until 2030 range from USD 1.9 trillion to USD 6.9 trillion, depending on the approach. These scenario bounds are based on predictive models across sectors, which vary widely due to differences in data, assumptions, models, and scope (see the SCCFR Methodology document for more). We use the average estimation of USD 4.3 trillion when talking about investment gaps, though this is likely an underestimation. Urban mitigation investment needs estimates include activities in the following sectors: transport, buildings, energy, industry, and AFOLU.[43]

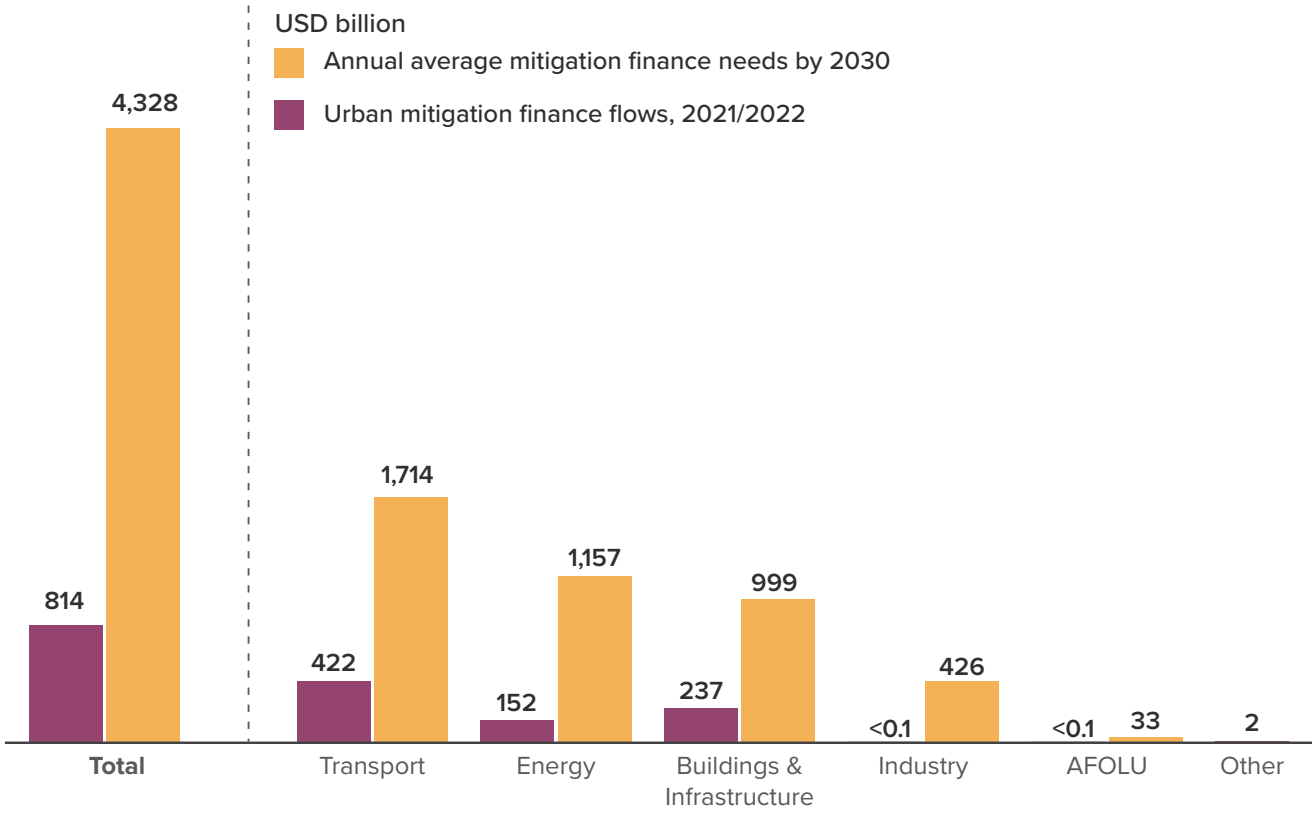
Transport, buildings, and energy cumulatively require 89% of total urban mitigation investments until 2030. During this period, transport is estimated to account for 40% (USD 1.7 trillion annually) of these investment needs. Most climate-aligned transport investments will focus on urban areas, driven by the requirements for EVs and urban rail systems. The investment needs of the energy sector, requiring 27% of the total until 2030,[44] are primarily in power and heat generation, including renewable energy installations (particularly solar PV and onshore wind), and corresponding energy storage to overcome fluctuations in demand and transition to renewables. Investments are also needed fossil-fuel carbon capture.

From 2031 to 2050, the urban transport sector has the greatest needs, increasing to over USD 2.7 trillion annually. During this period, the buildings sector is also expected to

43 We could not find any reliable top-down needs estimations for net zero scenarios for water and wastewater sectors, so these have been excluded.
44 We note that energy requires a lower share of climate finance needs at the urban level than at the global level, given that most energy investments are focused on regional and/or national grids rather than for urban projects (see the SCCFR Methodology document for details).

see significant growth representing 32% of mitigation investment needs (USD 2 trillion), largely due to demand for HVAC systems for increased cooling,[45] water heaters, and clean cooking systems.

Figure 21. Average annual investment need (USD billion)



4.1.2 URBAN ADAPTATION FINANCE

Urban adaptation needs are difficult to estimate comprehensively and to the same degree of granularity as mitigation. Our estimates—which cover only limited adaptation sectors and only EMDEs—show **average annual investment needs of only USD 147 billion by 2030 (USD 54-225 billion range), increasing to USD 165 billion by 2050.** Underlying predictive scenarios are based on six key climate hazards (floods, heat stress, tropical cyclones, sea-level rise, water stress, and wildfires). They cover a limited number of adaptation sectors: early warning systems and social protection, health, infrastructure, river floods, and coastal adaptation.

Scenarios may underestimate compounding urban vulnerability risks and the adaptation components of required urban infrastructure investments (such as improving the resilience of water systems). They also do not consider the cost of inaction or insured losses, lack quantified goals for adaptation,[46] and may not cover investment in future technologies

45 Globally, cooling demand is projected to more than triple by 2050, consuming as much electricity as the current total usage of China and India, as nations worldwide experience rising temperatures and gain increased access to air conditioning (IEA 2018).
46 See the SCCFR Methodology document for a more detailed discussion of our potential underestimation of adaptation needs.

that are yet to be created. Further, our estimates do not comprehensively capture future adaptation needs, such as the projected tripling of global cooling demand by 2050 (IEA 2018), which could require an additional USD 1.5 trillion investment in India alone by 2040 (World Bank 2022). We present our results here to provide a starting estimate for urban adaptation finance.

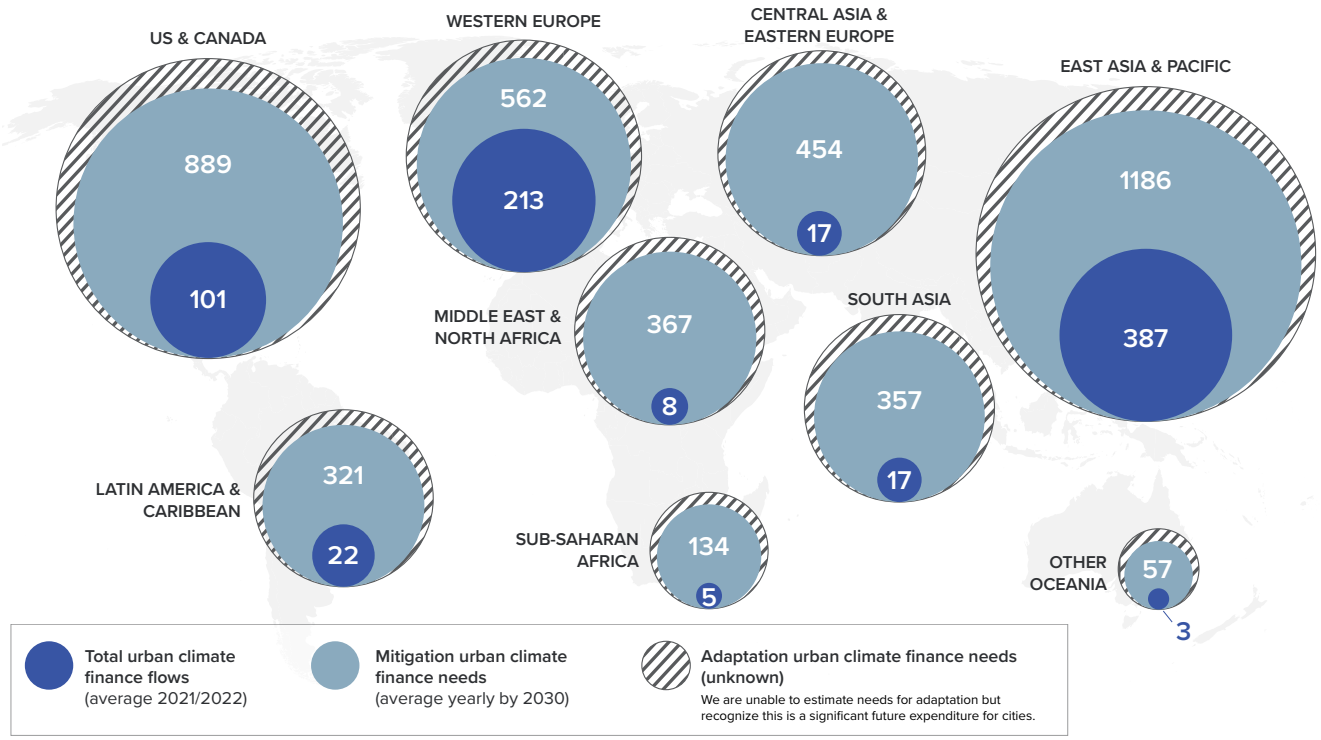
Yet, the need for urban adaptation investment in cities is significantly higher. For comparison, CDP-ICLEI Track's self-reported city data, covering 14% of the world's urban population, shows that adaptation represents 32% of the climate finance needs for 2023 (USD 21 billion out of USD 65 billion) (see Box 10). The top sectors for cities' financing requests are water management, NbS, and public and green spaces. Importantly, out of 727 total CDP-reported projects on adaptation, 113 have the potential to also facilitate mitigation—an important insight on dual-use investment that is not tracked in our data. This also suggests that city governments are already spending far more on urban adaptation investments than estimated.

The severe data limitations that prevent additional estimation of urban adaptation needs should serve as a call to action. More research is needed to understand how climate shocks will affect cities around the world and what types of investments will be needed to combat this. Needs estimates can be improved by additional scenarios that take into account overlapping climate risks, the cost of inaction, and various infrastructure investment trajectories.

4.2 URBAN MITIGATION NEEDS ARE CONCENTRATED IN THREE REGIONS

East Asia and the Pacific, the US and Canada, and Western Europe, are the regions with the highest urban mitigation investment needs until 2030. Based on our estimates, these regions account for over 60% of the total urban mitigation needs, aligning with Asia Pacific's significant share of the world's urban population. Furthermore, these needs estimates are consistent with data indicating that North American urban areas have the highest CO_2 emissions per capita, followed by East Asia and the Pacific and Europe and Central Asia (Gap Fund 2022).

Figure 22: Urban mitigation needs and tracked finance by region



Methodological challenges prevent us from disaggregating regional needs by sector, though we can provide the following estimates on required investments between 2030 and 2050.

The majority of the required investment across three regions—East Asia and the Pacific; the Middle East and North Africa; and Central Asia and Eastern Europe—will be for buildings and energy. This reflects these regions' significant focus on upgrading infrastructure and energy systems in line with their predicted rapid urbanization (Ritchie et al. 2024).

For sub-Saharan Africa and South Asia, the largest mitigation needs are for transport, energy, and buildings. Studies show that these sectors are historically underinvested in cities in sub-Saharan Africa and South Asia, which may lead to lower projections for the future investment needs (IMF 2021; UN-Habitat 2022; World Bank 2023b). For example, the dominance of non-motorized transport, two-wheelers, and public transport in cities in sub-Saharan Africa and South Asia may result in lower projected investment needs for EVs than for developed economies (UN-Habitat 2013; Arroyo-Arroyo and Frame 2021; MobiliseYourCity 2023; World Bank 2023c).

CCFLA's adaptation needs estimates report that 33% of these needs are required for Latin America and the Caribbean and 30% required for East Asia and the Pacific. These estimates are only for EMDEs within each region, which hinders our ability to comprehensively and accurately track and forecast adaptation needs for all cities. Sub-Saharan Africa requires 14% of adaptation needs reports, and South Asia requires 11%. In fact, both mitigation and adaptation needs are low for sub-Saharan Africa and South Asia, two regions that are known to have both high climate vulnerability and urbanization rates.

CDP reports that a higher percentage of cities in the Global South do not have a climate action plan (32% of cities), potentially contributing to data gaps in forecasting cities' climate plans and needs.

Box 10: Findings from the CDP's Global Snapshot of Climate Finance[47]

Cities' demand for climate finance is increasing year-on-year (CDP 2023b). In 2023, 636 cities from 86 countries reported on 2,346 climate infrastructure projects currently seeking funding and/or financing to CDP-ICLEI Track, encompassing 2023 project data. These projects, worth USD 146 billion, are seeking USD 65 billion in investment. Covering 14% of the world's urban population, these figures are a representative sample, highlighting a significantly greater need for capital to align with a sustainable and resilient future. This analysis can serve as a "bottom-up" comparison to the top-down needs presented by CCFLA in this chapter; while cities' project financing asks may not always align with 1.5°C or top-down adaptation scenarios, they provide granular data on their desired projects. Highlights from the report include:

- **Reported needs are concentrated in developed economies**, with 674 projects in Europe (including the UK and Turkey), 590 in Latin America, and 569 in North America. Africa and Asia Pacific saw the most significant increases in projects seeking funding/financing, with 53% and 33% growth, respectively, since 2022, totaling 497 projects across both regions. While EMDE projects amount to just 28% of total needs, they more often seek full funding (38%) than in developed countries (21%).
- **Globally, buildings and energy efficiency led in terms of reported projects,** with a total of 482 seeking USD 14 billion. Transport was the second-largest sector (359 projects; USD 17 billion), followed by waste management (300 projects; USD 3 billion). However, waste and water management were the top sectors in EMDEs, while buildings' energy efficiency and transport were top in developed economies.
- **Climate adaptation represents 32% of total needs (seeking USD 21 billion).** While 55% of climate adaptation projects (400 of 727) were reported by cities in EMDEs, these represent only 24% of total climate adaptation finance needs (USD 5 billion of USD 21 billion).
- Of the projects with cost estimates, 40% are small-scale (less than USD 500,000). Most of these were disclosed by cities with small- and medium-sized populations. The average project cost in EMDEs is around USD 39 million, compared to USD 116 million in developed economies.
- Nearly half (48%) of all reported projects are at an early stage, demonstrating the importance of project preparation support and grants.
- Municipal accountability and transparency are paramount. Robust, accurate, and timely disclosure of climate-related projects—alongside essential climate metrics—will bolster subnational ambitions, help identify replicable solutions, and point out target areas for investment.

47 Box 10 was contributed by CDP, based on its 2023 Global Snapshot of Cities Climate Finance report developed in partnership with the Global Covenant of Mayors for Climate & Energy. The Snapshot is based on self-disclosed responses to CDP-ICLEI Track in 2023.

5. CONCLUSION AND RECOMMENDATIONS

This report highlights the importance of scaling urban climate finance in response to the global climate change crisis. Tracked urban climate finance has more than doubled since 2017/2018, reaching USD 831 billion in 2021/2022. However, cities will need at least USD 4.3 trillion per year until 2030 and over USD 6 trillion per year until 2050 for mitigation alone to achieve 1.5°C pathways. It is crucial to ensure that global flows of urban climate finance are increased and that the global shift to a sustainable economy includes enough funding for cities to respond to climate change to avoid leaving urban residents behind.

Building on our analysis, CCFLA proposes **four key recommendations** to scale urban climate finance. See Appendix 7.1 for full recommendations by actor.

5.1 FOUR KEY RECOMMENDATIONS TO SCALE URBAN CLIMATE FINANCE

1. IMPROVE THE QUANTITY AND QUALITY OF URBAN CLIMATE FINANCE.

The growing flows of urban climate finance must accelerate even faster—by at least fivefold—to achieve decarbonization goals and safeguard cities from climate hazards. This is required to achieve city and country mitigation targets, NDCs, and Paris Agreement goals. While the urban climate investment growth seen in 2021/2022 was largely driven by investment in transport, energy systems, buildings, and infrastructure, these sectors still face the clearest finance gaps. Meanwhile, little investment was tracked in other important sectors, such as water and wastewater, and waste.

Enhancing the quality of finance—how it is distributed among sectors, addresses underlying inequities, and strengthens enabling environments—is also key. The limited available domestic public finance must be used strategically to crowd in private investment and fill gaps. Cities' climate action is typically financed by regular market instruments such as balance sheet equity and market-rate debt financing. While grant financing will remain limited, this can be used more strategically to mitigate risk and increase flows. Domestic public finance plays a crucial role in aligning investments in public goods with climate action, as the public sector is responsible for significant investments in urban infrastructure such as public transport, flood protection, and water and wastewater systems. Urban climate finance actors can identify and seize opportunities to use concessionality where it can mobilize the most additional funds. Local governments should also explore innovative financing instruments such as using blended finance to de-risk projects and scale up sustainable investments.

Further, there is an opportunity to scale household spending to support mitigation and adaptation efforts, particularly in population-dense cities, given that private finance

is dominated by households and individuals. Strategies to do this will vary by region, particularly in EMDEs, where domestic markets are often characterized by limited financial resources, informal economies, and a lack of green financing options. Policy can help encourage household spending on building and infrastructure for both mitigation and adaptation. For example, the UK, France, and Germany have used public funds to leverage household investment in home retrofits, achieving a leverage ratio (percentage of private funds to public funds) of 37% to 400% (Kerr and Winskel, 2018).

Addressing inequities between regions and within cities has huge potential to enhance the effectiveness of urban climate finance as it scales. The largest gaps remain in South Asia and sub-Saharan Africa, putting these regions at risk of being left behind for much-needed adaptation action. East Asia and the Pacific received the most urban climate funding, with Chinese cities receiving 60% of the region's total, and 28% of all global funds. This creates an imperative for greater investment in African and South Asian cities, which will be the largest cities on the planet and some of the only cities projected to still be growing by 2100 (Bearak et al. 2021). Without significantly increased investment, these regions' cities may underperform in GHG mitigation and be unable to address their climate adaptation needs.

To scale the quantity and quality of urban climate finance, cities should develop and implement climate investment strategies, including project identification and aggregation. Joint green procurement and demand-side aggregation mechanisms should be implemented, while investments should be de-risked through blended finance instruments like guarantees, with DFIs offering technical assistance to promote these risk-mitigation tools. DFIs also need to increase the volume and share of urban climate finance in their portfolios, investing directly in urban climate action and through intermediaries to boost private sector engagement.

2. STRENGTHEN DOMESTIC MARKETS THROUGH THE STRATEGIC USE OF PUBLIC FINANCE.

The majority of urban climate finance is sourced and provided domestically, and this trend is likely to grow. The urban climate finance ecosystem will, therefore, need to bolster domestic markets so cities and local governments can better access both public and private finance. This can be done through 1) active collaboration to create country platforms that prioritize urban climate investment, ensuring that cities have a voice in these efforts, and 2) strengthening local governments' capacity to access domestic markets by enhancing capacity building, project preparation, and improving fiscal, financial, and data management.

National and local governments, DFIs, and other enablers should collaborate to create country platforms that prioritize urban climate investment, ensuring that cities have a voice in these efforts. These platforms should integrate policy and technical support with financial mobilization strategies encompassing public, private, and concessional funding sources, fostering a comprehensive approach to urban climate finance. DFIs and national development banks have key roles to play by aligning their efforts to channel funds effectively and support urban climate priorities, ensuring that financial resources are directed where they are most needed. Yet, cities need to play an active part too. City-level departments, including those focused on climate, budget, and sectoral planning, need to

coordinate closely to incorporate climate considerations into all aspects of city planning, from strategic and spatial planning to capital investment and budgeting.

To enable effective subnational and urban climate finance, national governments should work to improve the enabling environment through capacity building, funding, and expertise for city officials. This includes helping cities and local governments to develop and implement climate action and investment plans, prepare climate finance projects, implement green budgeting, and enhance their creditworthiness. Additionally, structuring local capital markets to provide suitable instruments for urban climate investments, such as aggregation mechanisms, blending tools, and smaller ticket sizes, is crucial. National governments should also support local governments in improving their tax bases and revenue collection to create a stable and reliable financial system for climate projects.

3. RAPIDLY SCALE ADAPTATION FINANCE, PARTICULARLY IN EMDES.

The urgency for urban adaptation investment cannot be overstated. Despite having increased to USD 10 billion in 2021/2022, adaptation flows remain far below what's required. We estimate that it will take around USD 147 billion for EMDE cities to respond to climate change, with current flows meeting only 4% of this need. Most tracked urban adaptation finance went to developing economies and was concentrated in the water and wastewater sector. We must channel investments into adaptation efforts in developing economies and expand our taxonomy of risks to effectively address and respond to climate disasters.

National governments, international organizations, and DFIs should adopt a broad definition and understanding of urban adaptation to ensure comprehensive resilience-building, particularly involving the private sector. It is crucial to balance this broad approach with thorough assessments to avoid maladaptation. To effectively track and report adaptation finance, standardized metrics and methodologies should be developed and adopted across cities, national governments, and DFIs, creating a common language for tracking and assessing progress.

To scale investments, cities must identify climate risks and develop city-level adaptation plans that include clear targets and actively engage diverse stakeholders, including marginalized communities. These plans should be investment-ready and integrate climate resilience into infrastructure development, building codes, and government procurement processes. Additionally, cities can enhance their urban and climate action planning by incorporating NbS, such as blue-green infrastructure, mangrove coastal protection, urban forestry, and water body rejuvenation, which offer benefits like flood mitigation and reduced urban heat island effects.

Cities should build their capacity to identify climate risks and develop comprehensive climate adaptation plans, including hazard, risk, and vulnerability assessments and documentation of local-level loss and damage. To enhance the resilience of essential utilities like water and energy, cities should expand insurance offerings, such as parametric and disaster insurance, to ensure quick recovery after climate disasters. Furthermore, national governments and cities should collaborate with DFIs and the private sector to mobilize innovative financial instruments like blended finance, green bonds, and resilience

bonds, which can attract private investments and diversify risks through PPPs and insurance mechanisms.

4. IMPROVE DATA AND TRACKING OF URBAN CLIMATE FINANCE FLOWS AND NEEDS.

There is a significant need to enhance the tracking and availability of urban climate finance data across all types of public and private institutions. It is also essential for reporting institutions to use harmonized taxonomies of urban climate finance to enhance the interoperability of these tools to reduce reporting inconsistencies for urban climate finance actors. Tracking urban climate finance generates crucial data to support policy and investment decisions by both national and subnational policymakers, as well as impact-oriented investors. This data is essential for identifying progress, gaps, and opportunities in the green transition of cities.

Better tracking of climate finance from subnational governments is critical to support them in funding and financing their climate and environmental actions (see Box 4). Actors need to distinguish between levels of subnational government to better understand subnational governments' climate finance contributions. City-level green budgeting and green public procurement can help to increase tracking at a granular level.

DFIs and finance providers should enhance their focus on urban climate finance through improved strategies, coordination, and tracking. This includes intensifying efforts across DFIs, donors, and all levels of government to tag and report on urban climate finance expenditures and revenue streams, with local governments using climate budget tagging to measure progress and mobilize resources more effectively. DFIs can also lead the development of best practices by creating harmonized definitions, taxonomies, and methods for tracking urban climate finance, and by incorporating urban tagging into reporting frameworks to provide more accurate investment estimates.

All stakeholders should prioritize disaggregating data to address urban poverty and informal settlements, particularly in underreported sectors like water, to better understand the intersection of these issues with climate finance. There is also a need for increased voluntary reporting on urban mitigation and adaptation investments, along with the publication of open data on climate risk assessments to enhance municipal capacities. Disaggregation and tracking of climate-related expenditures and revenues at the subnational level are critical, as current international finance systems often overlook the specific investments made by cities and regions, creating gaps in understanding and alignment with climate goals.

Private financial institutions and corporations should be encouraged to report standardized data on their climate-aligned urban investments to central repositories like the IFRS Accounting Standards or the CDP-ICLEI Unified Reporting System. Given the lack of comprehensive disclosure and standardized tracking methods in the private sector, there is a need to define low-cost, easy-to-implement tracking approaches that can be widely adopted. Enhanced collaboration and data sharing between public and private entities can improve the transparency and effectiveness of urban climate finance tracking.

5.2 THE 4C AGENDA TO CLOSE THE URBAN CLIMATE FINANCE GAP

Scaling urban climate finance will require coordinated action across sectors, levels of government, and actors to address systemic barriers. Our recommendations for this are structured as the 4C Urban Climate Finance Agenda: Commitment, Collaboration, Capacity, and Capital Mobilization. This framework, based on CCFLA analysis of enabling environments, can be used to organize solutions to build successful integrated national and local platforms.

Table 1. The 4C Urban Climate Finance Agenda

4C Agenda	What the 4C Agenda means for urban climate finance
Commitment to raising urban issues on global/national climate finance agendas.	• Align national country platforms with urban-specific climate agenda items. • Strengthen reflections of local ownership in national policies, and strategies. • Increase adaptation finance, climate resilience, and a just urban transition.
Collaboration between actors to improve climate finance flows for cities.	• Improve the enabling environment for cities, particularly multi-level governance, reporting, and knowledge and data sharing. • Shift to a portfolio-wide, programmatic project pipeline.
Capacity-building for public and private actors to respond to climate change in cities and achieve urban climate finance goals.	• Build fiscal and institutional capacity (and awareness) of local governments to advance climate action planning, strengthen domestic private capital markets, and tailor opportunities for private urban climate investment. • Enhance project preparation and advocacy for subnational climate finance issues. • Improve private sector capacity to identify climate risks and formulate climate adaptation plans that include investment needs
Capital Mobilization at the city level.	• Increase public and private funding, innovative financing, and concessional finance from public actors like DFIs. • Provide business development support for local governments to enhance engagement with the private sector to align priorities, identify finance-ready projects, and better assess risks to lower the cost of capital.

6. REFERENCES

ADB. 2022. A Governance Approach to Urban Water Public–Private Partnerships: Case Studies and Lessons from Asia and the Pacific. Asian Development Bank. https://www.adb.org/publications/governance-approach-urban-water-ppps.

ADB. 2023. Decarbonizing the Water Sector in Asia and the Pacific: Best Practices, Challenges, and Opportunities for Practitioners. Asian Development Bank. https://www.adb.org/publications/decarbonizing-water-sector-asia-pacific.

Arias V, Benitez S, Goldman R. 2010. Water fund for catchment management in Quito, Ecuador. TEEBCase. https://www.teebweb.org/wp-content/uploads/CaseStudies/Water%20fund%20for%20catchment%20management%20in%20Quito,%20Ecuador.pdf.

Arosemena Polo JD, Toboso-Chavero S, Adhikari B, Villalba G. 2024. Closing the nutrient cycle in urban areas: The use of municipal solid waste in peri-urban and urban agriculture. Waste Manag. 183:220–231. doi:10.1016/j.wasman.2024.05.009.

Arroyo-Arroyo, Fatima and Frame, Gladys. 2021. Traffic Management in African cities: The way forward. Washington, DC: SSATP. https://www.ssatp.org/sites/ssatp/files/publication/Traffic%20Management%20for%20African%20Cities_web_single.pdf.

Arsht-Rock. 2023. Hot cities, chilled economies: Impacts of extreme heat on global cities. Adrienne Arsht – Rockefeller Foundation Resilience Center. https://onebillionresilient.org/hot-cities-chilled-economies/.

Baker W, Acha S, Jennings N, Markides C, Shah N. 2022. Decarbonisation of buildings: Insights from across Europe. Imperial College London. http://spiral.imperial.ac.uk/handle/10044/1/100954.

Bearak M, Moriarty D, Ledur J. 2021. Africa's rising cities. https://www.washingtonpost.com/world/interactive/2021/africa-cities/.

Bian L. 2021. Smart spaces and places. London: Routledge.

Carter, Lauren and Boukerche, Sandrine. 2020. Catalyzing Private Sector Investment In Climate-Smart Cities. Invest4Climate Knowledge Series. Washington, DC: World Bank. doi:10.1596/978-1-4648-1112-9. License: Creative Commons Attribution CC BY 3.0 IGO

C40. 2022. How cities can encourage private sector adaptation finance. [accessed 2024 Jun 10]. https://www.c40knowledgehub.org/s/article/How-cities-can-encourage-private-sector-adaptation-finance?language=en_US.

C40. 2023. COP28 catch-up #1: What have city leaders been up to? C40 Cities. [accessed 2024 Jul 22]. https://www.c40.org/news/cop28-catch-up-1-what-have-city-leaders-been-up-to/.

C40. n.d. Cities Race to Zero. C40 Cities. [accessed 2024 Mar 22]. https://www.c40.org/what-we-do/building-a-movement/cities-race-to-zero/.

CBI. 2019. Green Bonds: The State of the Market 2018. Climate Bonds Initiative. https://www.climatebonds.net/files/reports/cbi_gbm_final_032019_web.pdf.

CCFLA. 2021. The State of Cities Climate Finance Part 1: The Landscape of Urban Climate Finance. Cities Climate Finance Leadership Alliance. https://www.climatepolicyinitiative.org/wp-content/uploads/2021/06/SCCF_PART1-FINAL-1.pdf.

CCFLA. 2021b. Building Climate Resilience in Cities Through Insurance. Available at: Building-Climate-Resilience-in-Cities-Through-Insurance.pdf (citiesclimatefinance.org)

CCFLA. 2022a. How to Increase Financing for Urban Climate Adaptation and Resilience. Cities Climate Finance Leadership Alliance. https://www.climatepolicyinitiative.org/wp-content/uploads/2022/10/Policy-Brief-How-to-Increase-Financing-for-Urban-Climate-Adaptation-and-Resilience.pdf.

CCFLA. 2022b. Increasing Subnational Pension Funds' Climate Investments. Cities Climate Finance Leadership Alliance. https://citiesclimatefinance.org/publications/increasing-subnational-pension-funds-climate-investments.

CCFLA. 2023a. Accelerating Urban Climate Finance in Low- and Middle-Income Countries: An important strategic dimension of MDB reform. Cities Climate Finance Leadership Alliance. https://www.climatepolicyinitiative.org/wp-content/uploads/2023/11/Full-Report_Accelerating-Urban-Climate-Finance-in-Low-and-Middle-Income-Economies.pdf.

CCFLA. 2023b. Improving Local Enabling Conditions for Private Sector Climate Investments in Cities. Cities Climate Finance Leadership Alliance. https://citiesclimatefinance.org/wp-content/uploads/2023/05/Improving-Local-Enabling-Conditions-for-Private-Sector-Climate-Investments-in-Cities.pdf.

CCFLA. 2023c. Financial Aggregation Blueprints for Urban Climate Infrastructure - Annex 2: Municipal Green Bonds Blueprints. https://citiesclimatefinance.org/wp-content/uploads/2023/05/Annex-2-Municipal-Green-Bonds-Blueprints.pdf.

CCFLA. 2023d. Net Zero Carbon Buildings in Cities: Interdependencies between Policy and Finance. https://citiesclimatefinance.org/publications/net-zero-carbon-buildings-in-cities-interdependencies-between-policy-and-finance.

CCFLA & Urban-Act. 2024. Assessing National Enabling Framework Conditions for Urban Climate Finance - A Tool and Guide by CCFLA and Urban-Act. Cities Climate Finance Leadership Alliance and Urban-Act. https://citiesclimatefinance.org/publications/assessing-enabling-framework-conditions-for-urban-climate-finance.

CDP. 2023. New class of 119 “A List” cities show climate action becoming mainstream for world’s cities - CDP. [accessed 2024 Jul 8]. https://www.cdp.net/en/articles/citiesannouncements/new-class-of-119-a-list-cities-show-climate-action-becoming-mainstream-for-worlds-cities.

Cheng J, Chen M, Tang S. 2023. Shenzhen – A typical benchmark of Chinese rapid urbanization miracle. Cities. 140:104421. doi:10.1016/j.cities.2023.104421.

Choi ES, Jang E, Laxton V. 2023. What it takes to attract private investment to climate adaptation. Climate Champions. [accessed 2024 Jul 12]. https://climatechampions.unfccc.int/what-it-takes-to-attract-private-investment-to-climate-adaptation/.

CIB. 2024. Zero-Emission Buses Initiative. https://cib-bic.ca/en/zero-emission-buses-initiative/.

City of Atlanta. 2021. City of Atlanta's New Policy to Allow Urban Farms to Sell Directly to Consumers. Adoption of farm stand ordinance will increase access to fresh and affordable food.

City of Reykjavik. 2020. The City of Reykjavík Green Bond Impact Report 2019. https://reykjavik.is/sites/default/files/2020-04_reykjavik_green_bond_annual_impact_report_published.pdf.

Clean Air Fund. 2023. From Pollution to Solution in Six African Cities. https://www.cleanairfund.org/clean-air-africas-cities/#explore-the-report.

CMM Chile. 2020. From Pilots to Scale: Lessons from Electric Bus Deployments in Santiago de Chile. Case Studies and Best Practice Examples. https://c40.my.salesforce.com/sfc/p/#36000001Enhz/a/1Q000000kW6c/knYCd6z53PMEDuWdggFpR0kinupp_K30zr8Bmes4r.8.

CPI. 2020. Updated View on the Global Landscape of Climate Finance 2019. Climate Policy Initiative. https://www.climatepolicyinitiative.org/publication/updated-view-on-the-global-landscape-of-climate-finance-2019/.

CPI. 2021. Tracking Incremental Energy Efficiency Investments in Certified Green Buildings. https://www.climatepolicyinitiative.org/wp-content/uploads/2021/12/Incremental-Investments-in-Energy-Efficiency-in-Green-Buildings.pdf.

CPI. 2022a. Climate Insurance-Linked Resilient Infrastructure Financing (CILRIF). CPI. [accessed 2024 Jul 8]. https://www.climatepolicyinitiative.org/publication/climate-insurance-linked-resilient-infrastructure-financing-cilrif/.

CPI. 2022b. Landscape of Climate Finance in Africa. Climate Policy Initiative. https://www.climatepolicyinitiative.org/publication/landscape-of-climate-finance-in-africa/.

CPI. 2023a. Global Landscape of Climate Finance 2023. Climate Policy Initiative. https://www.climatepolicyinitiative.org/wp-content/uploads/2023/11/Global-Landscape-of-Climate-Finance-2023.pdf.

CPI. 2023b. Global Landscape of Climate Finance 2023 Methodology. Climate Policy Initiative. https://www.climatepolicyinitiative.org/wp-content/uploads/2023/11/GLCF-2023-Methodology.pdf.

CPI. 2024a. Financing Adaptation in India. Climate Policy Initiative. https://www.climatepolicyinitiative.org/publication/financing-adaptation-in-india/.

CPI. 2024b. Assessing Top-Down Climate Finance Needs: Methodology. https://www.climatepolicyinitiative.org/wp-content/uploads/2024/05/Assessing-Top-Down-Climate-Finance-Needs.pdf.

Creutzig F, Agoston P, Minx J, Canadell J. 2016. Urban infrastructure choices structure climate solutions. https://www.nature.com/articles/nclimate3169.epdf?sharing_token=fMAmrPaNG57dHfdDSYlw39RgN0jAjWel9jnR3ZoTv0OrBRTg__aBbKAljQnnJ9DWqk04MDOPbxquPouHs8mzevGBbQf0VfksuhzgnLUHdlrO1ZTUule5n59MSzXEZg4Otsmh8DpWTzNQDpMEpTJ5VbciVaEhwtSZc_v8WLyVvx7U5_dXJZVxodcdvDV2ifTtjamhn_g7iJTvRlhYsmEhdJlTycZYevLkXVbRTJ3sBfE%3D&tracking_referrer=www.carbonbrief.org.

Davis L, Gertler P, Jarvis S, Wolfram C. 2021. Air conditioning and global inequality. Global Environmental Change. 69:102299. doi:10.1016/j.gloenvcha.2021.102299.

DC GIS. n.d. SRCs Reduce Stormwater Runoff with Green Infrastructure. [accessed 2024 Sep 3]. https://dcgis.maps.arcgis.com/apps/Cascade/index.html?appid=0e4b27630f5a4ecdbd651a802824b3fd.

Duan H, Ming X, Zhang X-B, Sterner T, Wang S. 2023. China's adaptive response to climate change through air-conditioning. iScience. 26(3):106178. doi:10.1016/j.isci.2023.106178.

European Cyclists' Federation. 2017. ECF's Swedish member achieves multi-million government funding for e-bikes. And it's a win-win for the European bike industry. https://ecf.com/news-and-events/news/ecf%E2%80%99s-swedish-member-achieves-multi-million-government-funding-e-bikes-and-it%E2%80%99s.

Gap Fund. 2022. Global Urban Carbon Emissions: Data Sources. City Climate Finance Gap Fund. https://www.citygapfund.org/sites/default/files/2023-03/221227-gap-fund-technical-notes-data-sources.pdf.

Gap Fund. 2023. Low-carbon Slum Upgrading. City Climate Finance Gap Fund. https://www.citygapfund.org/sites/default/files/2023-03/230117-gap-fund-technical-notes-low-carbon.pdf.

GFANZ. 2024. We need to reach net zero emissions by 2050. Race Zero - Finance Roadmaps. https://www.gfanzero.com/netzerofinancing/.

Ghanem S, Ferrini S, Di Maria C. 2023. Air pollution and willingness to pay for health risk reductions in Egypt: A contingent valuation survey of Greater Cairo and Alexandria households. World Dev. 172:106373. doi:10.1016/j.worlddev.2023.106373.

Global Water Intelligence. 2022. Mapping Water's Carbon Footprint: Our net zero future hinges on wastewater. https://www.globalwaterintel.com/documents/mapping-water-s-carbon-footprint.

Government of France. 2023. Plan Vélo & march 2023-2027. https://loiret.franceolympique.com/loiret/fichiers/File/2305-dp-plan-velo-2023.pdf.

Grondeau A. 2007. Formation and emergence of ICT clusters in India: the case of Bangalore and Hyderabad. GeoJournal. 68(1):31–40. doi:10.1007/s10708-007-9051-6.

Hassan MM, Alenezi MS, Good RZ. 2020. Spatial pattern analysis of manufacturing industries in Keraniganj, Dhaka, Bangladesh. GeoJournal. 85(1):269–283. doi:10.1007/s10708-018-9961-5.

IEA. 2018. The Future of Cooling. International Energy Agency. https://www.iea.org/reports/the-future-of-cooling.

IEA. 2019. The Future of Rail: Opportunities for energy and the environment. OECD. https://www.oecd-ilibrary.org/energy/the-future-of-rail_9789264312821-en.

IEA. 2023a. Global EV Outlook 2023: Catching up with climate ambitions. Paris Global EV Outlook. International Energy Agency. https://iea.blob.core.windows.net/assets/dacf14d2-eabc-498a-8263-9f97fd5dc327/GEVO2023.pdf.

IEA. 2023b. World Energy Investment 2023. International Energy Agency. https://www.iea.org/reports/world-energy-investment-2023.

IEA. 2024. Empowering Urban Energy Transitions. International Energy Agency. https://www.iea.org/reports/empowering-urban-energy-transitions/executive-summary.

IFC. 2018. Climate Investment Opportunities in Cities - An IFC Analysis. International Finance Corporation. https://www.ifc.org/en/insights-reports/2018/cioc-ifc-analysis.

IIED. 2022a. Urban climate justice: connecting social justice and decarbonisation. International Institute of Environment and Development. https://www.iied.org/urban-climate-justice-connecting-social-justice-decarbonisation.

IIED. 2022b. Prioritising action on health and climate resilience for informal workers. International Institute of Environment and Development. https://www.iied.org/sites/default/files/pdfs/2022-07/21036iied.pdf.

IMF. 2021. Boosting Climate Responsiveness in Sub-Saharan Africa's Public Investment. International Monetary Fund. https://www.imf.org/en/Publications/fandd/issues/2021/12/Africa-Boosting-Climate-Responsiveness-SubSaharan-Public-Investment.

IRENA & ICLEI. 2018. Mitigating Climate Change through Renewable Energy Development - Cape Town, South Africa. International Renewable Energy Association and International Council for Local Environmental Initiatives. https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2018/Dec/IRENA_Cities_2018b_Cape-Town.p.

IUCN. 2020. Ensuring effective Nature-based Solutions. [accessed 2024 Sep 3]. https://iucn.org/resources/issues-brief/ensuring-effective-nature-based-solutions.

ITF. 2021. ITF Transport Outlook 2021. OECD Publishing, Paris(2021), *ITF Transport Outlook 2021*, OECD Publishing, Paris, https://doi.org/10.1787/16826a30-en

Kerr, Niall and Winskel, Mark. 2018. Private household investment in home energy retrofit: reviewing the evidence and designing effective public policy. ClimateXChange. Available at: https://www.climatexchange.org.uk/wp-content/uploads/2023/09/cxc-epe-evidence-review-full-report.pdf

London Environmental Network. 2021. Urban Agriculture. https://www.londonenvironment.net/urban_agriculture#:~:text=Several%20bylaws%20have%20been%20updated,zoned%20as%20Agricultural%20(AG).

Marr S. 2016. Worlding and wilding: Lagos and Detroit as global cities. Race Cl. 57(4):3–21. doi:10.1177/0306396815624863.

Metro Report International. 2022. China dominates list of the world's top 10 longest metro networks. https://www.railwaygazette.com/metros/china-dominates-list-of-the-worlds-top-10-longest-metro-networks/61865.article.

MobiliseYourCity. 2023. Global Monitor. MobiliseYourCity. https://www.mobiliseyourcity.net/sites/default/files/2023-05/Global%20Monitor%202023_final.pdf.

Munich Re. 2024. Record thunderstorm losses and deadly earthquakes: the natural disasters of 2023. [accessed 2024 Aug 29]. https://www.munichre.com/en/company/media-relations/media-information-and-corporate-news/media-information/2024/natural-disaster-figures-2023.html.

OECD. 2022a. 2022 Synthesis Report World Observatory on Subnational Government Finance and Investment. https://www.oecd-ilibrary.org/urban-rural-and-regional-development/2022-synthesis-report-world-observatory-on-subnational-government-finance-and-investment_b80a8cdb-en.

OECD. 2022b. Financing low-carbon and resilient intermediary cities. In: Intermediary Cities and Climate Change: An Opportunity for Sustainable Development. OECD. https://www.oecd-ilibrary.org/development/intermediary-cities-and-climate-change_23508323-en.

OECD. 2022c. Decarbonising Buildings in Cities and Regions. OECD (OECD Urban Studies). https://www.oecd-ilibrary.org/urban-rural-and-regional-development/decarbonising-buildings-in-cities-and-regions_a48ce566-en.

OECD. 2023. Financing Cities of Tomorrow: G20/OECD Report for the G20 Infrastructure Working Group under the Indian Presidency. The Organization for Economic Cooperation and Development. https://www.oecd.org/cfe/financing-cities-of-tomorrow-51bd124a-en.htm.

Pettus E. 2023. Mississippi impeding funds for Jackson's water. AP News. [accessed 2024 Aug 29]. https://apnews.com/article/jackson-mississippi-water-system-problems-95cffa1203671572b69920e224799868.

Portes A, Rodríguez M. 2024. Urbanization and Migration in Three Continents. First edition. Routledge.

Raiser M. 2023. A united South Asia can beat air pollution. World Bank Blogs. https://blogs.worldbank.org/en/endpovertyinsouthasia/united-south-asia-can-beat-air-pollution.

Ritchie H, Samborska V, Roser M. 2024. Urbanization. Our World in Data. [accessed 2024 Jun 21]. https://ourworldindata.org/urbanization.

Singapore Food Agency. 2024. Strengthening our food security. https://www.ourfoodfuture.gov.sg/30by30/.

SolarPower Europe. 2023. Solar For All - SolarPower Europe. [accessed 2024 Sep 4]. https://www.solarpowereurope.org/insights/thematic-reports/solar-for-all.

Swiss Re. 2023. Natural catastrophes and inflation in 2022: a perfect storm - Swiss Re sigma | Swiss Re. Swiss Re Institute. [accessed 2024 Aug 29]. https://www.swissre.com/institute/research/sigma-research/sigma-2023-01.html.

The Hindu. 2015. TN govt. pegs flood damage at Rs. 8,481 cr. The Hindu. [accessed 2024 Aug 29]. https://www.thehindu.com/news/national/tamil-nadu/TN-govt.-pegs-flood-damage-at-Rs.-8481-cr.-Jayalalithaa-writes-to-Modi/article60297262.ece.

UCCRN, C40, GCOM. 2018. The Future We Don't Want: How Climate Change Could Impact the World's Greatest Cities.https://www.c40.org/what-we-do/scaling-up-climate-action/adaptation-water/the-future-we-dont-want/.

UNEP. 2021. Beating the heat: a sustainable cooling handbook for cities. Nairobi, Kenya: United Nations Environment Programme. https://www.unep.org/resources/report/beating-heat-sustainable-cooling-handbook-cities.

UNEP and UN-Habitat. 2021. GEO for Cities - Towards Green and Just Cities. Nairobi: United Nations Environment Programme and United Nations Human Settlements Programme. https://www.unep.org/resources/report/geo-cities-towards-green-and-just-cities.

UNEP. 2024a. 2023 Global Status Report for Buildings and Construction: Beyond foundations - Mainstreaming sustainable solutions to cut emissions from the buildings sector. United Nations Environment Programme. [accessed 2024 Jul 25]. https://wedocs.unep.org/20.500.11822/45095.

UNEP. 2024b. Buildings and Climate - Global Forum. United Nations Environment Programme and Government of France. https://www.unep.org/news-and-stories/press-release/buildings-and-climate-global-forum-declaration-de-chaillot.

UNFCCC. 2021. Net Zero Financing Roadmaps - Key Messages. UNFCCC Race to Zero campaign. https://assets.bbhub.io/company/sites/63/2021/10/NZFRs-Key-Messages.pdf.

UNFCCC. 2023. Coalition For High Ambition Multilevel Partnerships (CHAMP). [accessed 2024 Jul 22]. https://www.cop28.com/en/cop28-uae-coalition-for-high-ambition-multilevel-partnerships-for-climate-action.

UN-Habitat. 2013. Sustainable Urban Mobility in Southern Asia - Global Report on Human Settlements 2013. United Nations Human Settlements Programme. https://unhabitat.org/sites/default/files/2013/06/GRHS.2013.Regional.Southern.Asia_.pdf.

UN-Habitat. 2022. World Cities Report 2022: Envisaging the Future of Cities. https://unhabitat.org/sites/default/files/2022/06/wcr_2022.pdf.

UN-Habitat. 2024. Urban Content of NDCs: Local climate action explored through in-depth country analyses: 2024 Report (advance copy). United Nations Human Settlements Programme. https://unhabitat.org/urban-content-of-ndcs-local-climate-action-explored-through-in-depth-country-analyses-2024-report.

Urban Manufacturing Alliance. 2018. The State of Urban Manufacturing: Detroit City Snapshot. https://www.urbanmfg.org/wp-content/uploads/2018/02/City-Snapshot-Detroit-Final.pdf.

World Bank. 2017. How many of the Developing World's top 500 cities are creditworthy?. https://collaboration.worldbank.org/content/sites/collaboration-for-development/en/groups/city-credit-worthiness/blogs.entry.html/2017/11/03/how_many_of_the_deve-EeUs.html.

World Bank. 2021. State of Cities Climate Finance 2021 Part 2: The Enabling Conditions for Mobilizing Urban Climate Finance. © World Bank. License CC BY 3.0 IGO. Link here https://citiesclimatefinance.org/wp-content/uploads/2021/06/2021-State-of-Cities-Finance-Part-2.pdf

World Bank. 2022. Climate Investment Opportunities in India's Cooling Sector. World Bank. https://documents.worldbank.org/en/publication/documents-reports/documentdetail/099920011222212474/P15743300f4cc10380b9f6051f8e7ed1147.

World Bank. 2023a. Urban Development Overview. World Bank. https://www.worldbank.org/en/topic/urbandevelopment/overview.

World Bank. 2023b. Thriving: Making Cities Green, Resilient, and Inclusive in a Changing Climate. World Bank. https://openknowledge.worldbank.org/entities/publication/7d290fa9-da18-53b6-a1a4-be6f7421d937.

World Bank. 2023c. The Economics of Electric Vehicles for Passenger Transportation | Sustainable Infrastructure Series. World Bank. https://elibrary.worldbank.org/doi/pdf/10.1596/978-1-4648-1948-3.

World Bank. 2023d. Taking Stock August 2023 : Making Public Investment Work for Growth. World Bank. https://documents.worldbank.org/en/publication/documents-reports/documentdetail/099408408092319382/IDU0301a3e760c732046e509d3106e81810de4b9.

WRI India. 2022. https://wri-india.org/blog/expanding-footprint-grand-challenge-across-tier-ii-india.

Zhang KH. 2017. Urbanization and Industrial Development in China. In: Tang Z, editor. China's Urbanization and Socioeconomic Impact. Singapore: Springer Singapore. p. 21–35. http://link.springer.com/10.1007/978-981-10-4831-9_2.

7. ANNEXES

7.1 FULL RECOMMENDATIONS BY ACTOR

The below tables present suggested actions by stakeholder group for each of our key recommendations:

1. Improve the quantity and quality of finance (Table A1);
2. Strengthen domestic markets (Table A2);
3. Rapidly scale urban adaptation finance (Table A3);
4. Improve data and tracking of flows and needs (Table A4).

The recommendations are organized according to our 4C Urban Climate Finance Agenda: Commitment, Collaboration, Capacity, and Capital Mobilization. This framework, based on CCFLA analysis of enabling environments, can be used to organize solutions to build successful integrated national and local platforms.

Table A1. 4C Recommendations to improve the quantity and quality of finance

Commitment
• **National governments** should increase and prioritize local action (e.g. urban content) in their NDCs and National Adaptation Plans (NAPs), and enable achieving city-specific targets through policies and programs, particularly for renewable energy, sustainable mobility, and building decarbonization**,** to drive investment.[48] • Local governments should develop and implement Climate Action Plans for their cities, with clear climate investment plans.[49] They should not only set an ambitious strategic target but unpack interim targets as well as targets for key sectors (e.g., decarbonizing buildings and increasing reliance on clean energy). By outlining well-defined strategies to achieve these targets, direction for investments in provided and can attract private sector partners. • **Together, local governments, national governments, DFIs, and private finance institutions** should sharpen their focus on climate-just decarbonization and resilience in key sectors, aligned with a just and inclusive transition. Examples of such actions include investing in green buildings in informal settlements and prioritizing community-based renewable energy projects that create local green jobs and give access to affordable energy.
Collaboration
• **National and local governments** should consolidate cities' needs and opportunities for climate investments and increase multi-sectoral coordination, particularly for urban adaptation finance and to build a local project pipeline. These actions should take advantage of available project pipeline opportunities, e.g. those offered by city networks such as ICLEI and C40. • **National and local governments** should work with private finance entities to align priorities for mutually beneficial investments and engage in public-private partnerships, based on a sound sustainable public procurement framework.

48 CHAMP 2-Pager.pdf - Google Drive and Coalition For High Ambition Multilevel Partnerships (CHAMP) (cop28.com). (GCom)
49 https://www.oecd-ilibrary.org/sites/164dc75c-en/index.html?itemId=/content/component/164dc75c-en#section-d1e39742

- **DFIs** need to provide clear guidance to local governments on investment criteria and project investment types to assist in preparing appropriate, bankable projects in cities.

Capacity

- **Local governments** need to allocate capacity to lead analytical and planning work to define priorities and sequence ambitious climate and development projects, or work with city networks to this end. This will also require support from development banks, financial institutions, and national governments.
- **National governments** can promote national project preparation capacity for urban climate finance by strengthening inclusive and integrated (multi-sectoral) national project pipelines.
- **DFI** project preparation impacts can be strengthened by improving linkages between DFIs' project preparation and financing activities, building project preparation capacity to support cities within DFIs, coordinating with urban-focused project preparation facilities, and considering a joint DFI project preparation facility for urban climate projects.

Capital

- **Local governments** need to prepare and implement a climate investment strategy, identifying and aggregating projects to increase the volume and so attract finance and investment.
- **All levels of government** can implement sustainable procurement and other demand-side aggregation mechanisms.
- **Public and private actors** can work together to de-risk climate investments through blended finance instruments, such as guarantees. DFIs can provide technical assistance to derisk investments and promote risk-mitigation instruments. This will also help to increase private-sector engagement.
- **DFIs** need to increase volumes and shares of urban climate finance in their climate portfolios, explicitly considering urban challenges and opportunities. DFIs can strengthen finance to the private sector by investing in urban climate action directly and through intermediaries.

Table A2. 4C recommendations for strengthening domestic markets

Commitment

- **Together, national and local governments, DFIs, and enablers** should develop national platforms that prioritize urban climate investment and include cities' voices. These platforms should integrate policy and technical support with practical financial mobilization covering public, private, and concessional financing sources.

Collaboration

- **Different city-level departments** (e.g., climate, budget, sectoral, and administrative) should coordinate to define and embed aligned climate considerations in all levels of city planning (strategic, spatial, capital investment, and budgetary).
- **DFIs and national development banks** should coordinate to channel funds and support urban priorities.

Capacity

- **National governments** can help to improve the national enabling environments for subnational and urban climate finance. This can include capacity building, funding, and expertise to enable city government officials to (i) develop and implement climate action plans and investment plans; (ii) plan, identify, and prepare climate finance projects in-house; (iii) implement green budgeting; (iv) issue municipal bonds; and (v) collect and analyze subnational climate data.

Capital
• **National governments** need to structure local capital markets to provide appropriate instruments for urban climate investments, which include aggregation mechanisms, blending mechanisms, derisking tools, and smaller ticket sizes.
• **National governments** need to support improvements to city creditworthiness and allow them authority to borrow to finance climate projects. At the city level, this will include improving cities' tax bases, enhancing revenue collection, and diversifying revenue sources to create a more stable, reliable fiscal architecture. • **National and subnational development banks** should design new sustainable financing products and instruments directed at financing investments at the local level.

Table A3: 4Cs to rapidly scale urban adaptation finance

Commitment
• **Local governments** need to identify climate risks and develop city-level adaptation plans and targets. This will involve ensuring that risk assessments include provisions for engaging diverse stakeholders including marginalized communities. • **Local governments** should develop finance-ready municipal adaptation plans for their cities and incorporate climate resilience into infrastructure development, building codes, and government procurement. • **Cities** can integrate NbS into urban and climate action planning. Such NbS can include blue and green infrastructure, coastal protection through mangroves, urban forestry, biodiversity conservation, and rejuvenation of urban water bodies to provide benefits such as flood mitigation and reduced heat island effects. • **All levels of government** can establish climate-proofing mechanisms to ensure new public investments are resilient to climate change.
Collaboration
• **National governments, international organizations, and DFIs** should include a wide range of activities when defining and financing urban adaptation activities. A narrow definition of adaptation finance risks missing broader resilience-building efforts, especially with private sector engagement. To avoid maladaptation, broadening urban adaptation activities must be balanced with a robust assessment of such activities for underlying climate risks. • **Cities, national governments, and DFIs** can develop standardized metrics and methodologies that can be widely adopted to track and report adaptation finance effectively. Concerted efforts are needed across public and private sector actors to agree upon a common language for tracking adaptation finance (CPI, 2022d).
Capacity
• **Cities** can work to increase capacity to identify climate risks and develop a climate adaptation plan with investment needs. The plan should include provisions for conducting hazard, risk, and vulnerability assessments and documenting local-level loss and damage. • **National and local governments** can build city-level capacity for climate-risk identification to ensure resilient action is cross-cutting. Decisions and investments made at the city-level should incorporate adaptation and resilience considerations.

Capital
• **Cities** should prioritize building the resilience of essential utilities, such as water and energy services, by expanding insurance offerings, including parametric and disaster insurance. These insurance products provide flexible, guaranteed liquidity, crucial for restoring service provision and repairing infrastructure in the aftermath of climate-induced disasters, ensuring mid- to long-term sustainable service delivery.
• **National governments and cities** should engage with DFIs and the private sector to mobilize innovative financial instruments for urban adaptation, such as blended finance, green bonds, resilience bonds, and credit guarantees, allowing favorable interest rates and increasing private investments. They can diversify risks using public-private partnerships, risk-pooling instruments, and insurance, clarify funding mandates, and invest in critical adaptation sectors to prevent future losses.

Table A4: 4Cs to improve data and tracking of urban climate finance.

Commitment
• **DFIs and finance providers** need to improve the urban focus in strategy, coordination, and tracking of climate finance. • **All actors** can work to improve urban climate finance data availability. DFIs, donors, national, regional and city governments, should intensify their efforts to tag and report expenditure and revenue streams related to urban climate finance projects. Local governments could benefit from using climate budget tagging to measure progress and enhance the coordination and mobilization of climate finance. • **DFIs** can take the lead in developing and promoting best practices for tracking and reporting urban climate finance projects by creating harmonized definitions, taxonomies, and methods. Tracking and reporting the urban shares of climate finance in the Joint Reports on MDBs' Climate Finance, including urban tagging guidance in their methodologies for adaptation and mitigation, would help produce more accurate estimates of urban climate finance investments and provide approaches that other investor groups can adopt (CCFLA 2023a). • **Cities** should consistently report on their investments and needs using platforms such as the CDP-ICLEI Unified Reporting System.
Collaboration
• **All actors** should disaggregate data to identify the funding needs for solutions that address climate issues related to urban poverty and informal settlements. This will help elucidate the intersection of climate change with informality, poverty and climate finance provision. For example, there is a need for disaggregated data on the type of urban water services receiving climate finance. This can help identify the need for increased climate finance to reduce risks to informal urban water services at all stages of disaster risk and response. • **All actors** could increase data collection and participation in voluntary reporting to provide more data on urban mitigation and adaptation investment, the adaptation components of investments, and associated risks. Additionally, it is important to publish open data on risk assessments and enhance risk assessment capacities for municipalities.

Capacity

- **Cities and national governments** need better disaggregation and tracking of expenditure significant for climate at the subnational level. Existing international finance systems typically do not distinguish between different levels of subnational government (e.g., cities, regions, and states), leading to significant gaps in understanding how much cities and regions invest in climate-related sectors. The same holds true on the revenue side, with few incentives to align public revenues with net-zero goals.[50]
- **City and national governments** can enhance municipalities' capabilities for monitoring and impact tracking to ensure cities are informed of the climate impacts on all relevant sectors, the cost of inaction, and how to best harness available resources.

Capital

- **Private financial institutions and corporations** should be encouraged to report standardized data on their climate-aligned urban investments to a central repository, such as the IFRS or the CDP-ICLEI Unified Reporting System. There is a need to define low-cost and easy-to-implement tracking methods adapted for the private sector. Currently, there is no comprehensive or standardized disclosure from private finance institutions regarding urban climate-related investments, and there is a limited exchange of methods for disclosing urban climate-related investments among private entities or between public and private entities.

7.2 CITIES CLIMATE FINANCE TAXONOMY

The SCCFR urban climate finance taxonomy specifies activities that qualify as climate mitigation (Table A5) and adaptation (Table A6) finance. It is an updated version of 2021 SCCFR taxonomy (CCFLA 2021), incorporating the most recent sectoral categories of the 2023 GLCF taxonomy (CPI 2023b) and an in-depth mapping exercise of other climate finance taxonomies and terminologies.[51]

The "Urban Inclusion Rule" column provides the reasoning used to determine whether identified projects could be considered as exclusively urban relevant following our definition of urban climate finance.

50 For detailed insights, refer to Box 4 on subnational climate finance tracking.

51 EU's Sustainable Finance Taxonomy (European Commission 2020), Climate Bonds Initiative Taxonomy (CBI 2021), Japan's Sustainable Finance Definitions (OECD 2020a), China's Green Finance Definitions (OECD 2020b), ASEAN's Taxonomy for Sustainable Finance (ASEAN Taxonomy Board 2024), South Africa's Green Finance Taxonomy (National Treasury of South Africa and International Finance Corporation 2022), Colombia's Green Taxonomy (Government of Colombia 2022), Mongolian Green Taxonomy (Financial Stability Commission of Mongolia 2019), EU Extended Taxonomy (EU Platform on Sustainable Finance 2022), IPCC6 Report Chapter 6: Cities (IPCC 2023b), UNEP Adaptation Gap Report (UNEP 2023)

7.2.1 MITIGATION TAXONOMY

Table A5: Climate mitigation activities and urban inclusion rules

SUBSECTOR	SOLUTION/ACTIVITY	URBAN INCLUSION RULE
AGRICULTURE, FORESTRY, OTHER LAND USES AND FISHERIES		
Agriculture	Improve existing carbon pools	If the area is located within the city's physical urban boundary
	Reduction in energy use in agricultural processes	
	Reduction of non-CO_2 GHG emissions from agricultural practices and technologies (e.g. paddy rice production, reduction in fertilizer use)	
	Supply chain management (commercialization, primary processing & storage)	
	Supporting infrastructure: Drip, flood and pivot irrigation systems	
	Sustainable Crops & Agroforestry & Livestock Production	
Biosphere Conservation and Restoration	Projects (including payments for ecosystem services) seeking to reduce emissions from the deforestation or degradation of ecosystems	If the area is located within the city's physical urban boundary
	Supporting Infrastructure	
Fisheries	Supply chain management (commercialization, primary processing & storage)	If the area is located within the city's physical urban boundary
	Sustainable fish production	
Food & Diet	Food waste reduction	If the area is located within the city's physical urban boundary
	Low-carbon diets	

SUBSECTOR	SOLUTION/ACTIVITY	URBAN INCLUSION RULE
Forestry	Afforestation and reforestation, sustainable forest management activities that increase carbon stocks or reduce the impact of forestry activities	If the area is located within the city's physical urban boundary
	Forest Conservation	
	Supply chain management (commercialization, primary processing & storage)	
Policy & Budget Support & Capacity Building	Support for national, regional or local mitigation policy, through technical assistance or policy lending	If exclusively for the benefit of city dwellers, usually under municipal control but also regional or national
BUILDINGS & INFRASTRUCTURE		
Appliances & Lighting: domestic efficient appliances, office equipment, and lights	Cooking domestic appliances: exchange of cooking appliances with more efficient and/or low carbon	If the building is located within the city's physical urban boundary
	Energy efficient commercial equipment including office equipment and process equipment: exchange of commercial equipment with that exceeding Minimum Energy Performance Standards (MEPS)	
	Energy efficient domestic appliances: exchange of electric and not electric appliances with appliances exceeding MEPS	
	Reduction of chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs), and hydrofluorocarbons (HFCs) emissions: exchange of appliances with those resulting in less CO_2 GHG emissions	
Buildings & Infrastructure Construction Work (residential, commercial, and public buildings)	Energy Efficiency - New Construction (use of highly efficient architectural designs, building techniques, materials, and equipments reducing emissions during the building operation phase)	If the building is located within the city's physical urban boundary
	Energy Efficiency - New Retrofit (technological energy efficiency improvements and other building site measures resulting in energy savings)	
	Rainwater harvesting and utilization	
	Reduction of embodies emissions: use of low carbon building material	

SUBSECTOR	SOLUTION/ACTIVITY	URBAN INCLUSION RULE
HVAC & Water Heaters (installation of heating and cooling systems with those using solar, sustainable biomass, geothermal or other low-carbon energy technologies)	CHP (Combined Heat and Power)	If the building is located within the city's physical urban boundary
	Cooling facilities	
	Energy Efficient HVAC	
	Heat Pumps Electrification	
	Renewable Energy-based HVAC	
	Solar Thermal Water Waters	
	Wind-driven pumping systems	
Measures promoting behavioral changes including sufficiency	Digitalization for sufficiency: promotion of digitalization which results in the reduction of unnecessary operation of buildings and therefore emission reduction	If the building is located within the city's physical urban boundary
	Measures promoting a circular economy approach: measures contributing to reuse of buildings, materials and equipment	
	Measures towards behavioral change: measures enabling flexible comfort requirements	
	Sector coupling approaches: measures towards synergy between sectors reducing energy consumption and emissions of buildings	
	Shared economy approach applied to buildings: sufficiency measures which include sharing economy approaches	
Policy & Budget Support & Capacity Building	Support for national, regional or local mitigation policy, through technical assistance or policy lending	If exclusively for the benefit of city dwellers, usually under municipal control but also regional or national
Urban built environment	Street lighting infrastructure and traffic light infrastructure: retrofit of existing street lighting infrastructure and traffic light infrastructure with advanced elements, installation of new advanced street lighting and traffic lighting infrastructure, exchange of lighting technologies with more efficient and/or low carbon	If exclusively for the benefit of city dwellers, usually under municipal control but also national

SUBSECTOR	SOLUTION/ACTIVITY	URBAN INCLUSION RULE
ENERGY SYSTEMS		
Fuel Production	Low-emission fuels: biogas, biofuel, green hydrogen	If can be shown or assumed to be for city dwellers' use exclusively
Fuel Transmission & Distribution	Low-emission fuels transport and storage	Only if transmission and distribution can be shown to be exclusively for city distribution
Policy & Budget Support & Capacity Building	Pricing: efficient pricing of fuels and electricity (such as subsidy rationalization, efficient end-user tariffs, and efficient regulations on electricity generation, transmission or distribution, and on carbon pricing)	If exclusively for the benefit of city dwellers, usually under municipal control but also regional or national
	Support for national, regional or local mitigation policy, through technical assistance or policy lending	
Power & Heat Generation	Carbon Capture Use and Storage (CCUS) in fossil fuel power plants	If can be shown or assumed to be for city dwellers' use exclusively. Either decentralized neighborhood-scale RE and geographically localized in cities, OR procurement by city or for city-owned utilities (municipal entity)
	Energy efficiency: retrofitting of existing renewable energy plant retrofits	
	Energy storage: battery, mechanical, pumped storage, capacitors, compressed air storage and flywheels	
	Renewable Energy (RE): wind, solar, geothermal, biomass/biogas, ocean power, hydropower, biofuels	
Power & Heat Transmission and Distribution	Renewable Energy (RE): new, expanded and improved/upgraded transmission and distribution lines for renewable energy integration; undergrounding of lines where exposed to climate risks; ICT technologies like smart grid & mini grid (controls, computers, automation, sensors, smart meters, ICT platforms and technology that is dedicated to smart systems)	Only if transmission and distribution can be shown to be exclusively for city distribution
	Retrofit of transmission lines to reduce energy use and/or technical losses	

SUBSECTOR	SOLUTION/ACTIVITY	URBAN INCLUSION RULE
INDUSTRY		
Industrial, Extraction and Manufacturing Process	Carbon clean-up (e.g. carbon capture and storage, carbon scrubber)	If geographically located in the city boundary
	Energy-use improvements & other GHG cuts: measures in existing supply chains dedicated to improvements in energy efficiency or resource efficiency upstream or downstream, leading to an overall reduction in GHG emissions	
	Non-energy and fugitive GHG reduction	
	Substitution with hydrogen from renewables: industrial processes using hydrogen shifting from FF-based hydrogen to RE-based hydrogen	
Industry Infrastructure & Warehouse	Energy efficiency: low-consumption warehouses and light industry buildings	If geographically located in the city boundary
Policy & Budget Support & Capacity Building	Support for national, regional or local mitigation policy, through technical assistance or policy lending	If exclusively for the benefit of city dwellers, usually under municipal control but also regional or national
INFORMATION AND COMMUNICATION TECHNOLOGIES		
Data Centers	Data hubs including data storage centres: new highly energy efficient centers or energy efficient retrofits	If geographically located in the city boundary or if exclusively for services supplied to the city
Low Carbon Technologies: Projects producing components, equipment, or infrastructure dedicated to the renewable and energy efficiency sectors,	Broadband networks: fiber optic and cable networks internet exchange points	If geographically located in the city boundary or if exclusively for services supplied to the city
	IT solutions: connectivity (teleconferencing and telecommuting software and service)	
	Power management: infrastructure software and hardware for remote power management for appliances and load balancing of renewables. In situ power management including automatic switching energy monitoring & data systems	
Policy & Budget Support & Capacity Building	Support for national, regional or local mitigation policy, through technical assistance or policy lending	If exclusively for the benefit of city dwellers, usually under municipal control but also regional or national

SUBSECTOR	SOLUTION/ACTIVITY	URBAN INCLUSION RULE
OTHERS & CROSS-SECTORAL		
Policy and National Budget Support & Capacity Building	Capacity building: education, training, capacity-building and awareness-raising on climate change mitigation or sustainable energy or urban transport; mitigation research	If exclusively for the benefit of city dwellers, usually under municipal control but also regional or national
	Polices and planning: national, sectoral or territorial policies/planning/action plans/planning/ institutions dedicated to mitigation such as NDCs, Nationally Appropriate Mitigation Actions (NAMAs) and plans for scaling up renewable energy; sectoral regulations leading to climate change mitigation or energy efficiency standards or certification schemes, for example	
	Support for national, regional or local mitigation policy, through technical assistance or policy lending	
	Systems of monitoring the emission of greenhouse gases	
WASTE		
Policy & Budget Support & Capacity Building	Support for national, regional or local mitigation policy, through technical assistance or policy lending	If exclusively for the benefit of city dwellers, usually under municipal control but also regional or national
Solid Waste Management	Biological treatment facilities: anaerobic digestion for sewage sludge, composting of bio-waste	If exclusively for waste produced by activities located within city physical boundaries. We assume this is the case if the facility itself is located within city physical boundaries
	Landfill with gas capture: waste management projects that capture or combust methane emissions to existing, closed landfill facilities	
	Waste collection, reusing and recycling projects: preparation, consisting of collection, sorting and material recovery; reusing, consisting of refurbishing, repairing, cleaning components or products to re-use in their original form; recycling of metals, plastics, glass (except aggregate) and paper to be used as inputs into new products or as a resource	

SUBSECTOR	SOLUTION/ACTIVITY	URBAN INCLUSION RULE
WATER AND WASTEWATER[52]		
Policy & Budget Support & Capacity Building	Support for national, regional or local mitigation policy, through technical assistance or policy lending	If exclusively for the benefit of city dwellers, usually under municipal control but also regional or national
Wastewater Treatment	Construction extension and operation of wastewater collection and treatment facilities	If exclusively for wastewater generated by the city. We assume this is the case if the facility itself is located within city physical boundaries
	Renewal of wastewater collection and treatment facilities	
Water Supply & Sanitation	Construction extension and operation of water collection treatment and supply systems	If exclusively for water supplied to the city. We assume this is the case if the facility itself is located within city physical boundaries
	Renewal of water collection treatment and supply systems	

52 The SCCFR 2021 taxonomy was reviewed and updated to include additional mitigation activities, focusing on the construction, extension, operation, and renewal of water and wastewater systems to enhance efficient water management and sanitation practices.

SUBSECTOR	SOLUTION/ACTIVITY	URBAN INCLUSION RULE
TRANSPORT[53]		
Buses	New bus fleet: electric or hydrogen	Must provide service to the city. Can include partial urban to rural area, as they may benefit some of the urban area, or be operated or owned by city authority
	Operation and maintenance of urban mass transport	
	Retrofit of existing bus fleet with low-carbon technologies	
	Supporting infrastructure for bus rapid transit, ensuring a modal shift from a more carbon intensive mode of transport	
Intermodal	Installation, maintenance, modernization and operation of ICT that improves asset utilization, flow and modal shift, regardless of transport mode (public transport information, car sharing schemes, smart cards, road charging systems, relevant apps such as ride-sharing apps and mobility service apps, which integrate travel info, payment and ticketing, etc)	If the service benefits city population mostly, for example if the ride-sharing app is functional for a city and its surrounding area
	Installation, maintenance, modernization and operation of intermodal freight facilities and freight consolidation facilities	
	Installation, maintenance, modernization and operation of intermodal passenger terminals (for example, to improve journey times), smart freight logistics	
Non-motorized transport	Infrastructure and supporting activities for non-motorized modes: infrastructure for pedestrians (including pedestrianization and car free zones) and cyclists (cycle lanes)	If used for transport/commute within or to urban physical boundary area. Pedestrian and cycling infrastructure to be partially or fully geographically located within the urban physical boundary
	New bikes and electric bikes fleet: cycling schemes and purchase of bicycles, including electric bicycles, for use as an urban mode of transport (rather than for leisure)	

53 See The SCCFR Methodology Document for a detailed overview of what was included for capital expenditure estimations in transport. Our transport taxonomy for capital expenditure was updated from SCCFR2021 to cover costs related to ongoing operation, modernization, and maintenance across several categories of urban transport: Urban Railways, Urban Waterways, Urban Buses and Trolleybuses, Non-Motorized Transport, Micro-Mobility, Electric and Hydrogen Vehicles (including specific entries for electric two- and three-wheelers, and trucks).

SUBSECTOR	SOLUTION/ACTIVITY	URBAN INCLUSION RULE
Policy & Budget Support & Capacity Building	Support for national, regional or local mitigation policy, through technical assistance or policy lending	If exclusively for the benefit of city dwellers, usually under municipal control but also regional or national
Private road vehicles (passenger/ freight & cars/vans/trucks/two-and-three wheelers)	New electric and hydrogen powered vehicles	If providing exclusive service to the city. For passengers residing or freight operating significant portion of time within urban physical boundary. For example, proving that private vehicle is registered in city jurisdictions
	Recharging infrastructure for electric vehicles and refueling infrastructure for hydrogen vehicles	
	Retrofit of existing vehicles with low-carbon technologies	
Railways (passenger/ freight)	New rail fleet: new rolling stock and vehicles for electricity, battery electric or hydrogen-powered public transport (rail, trams, trolleybuses, cable cars)	Must provide service to the city. Can include partial urban to rural area, as they may benefit some of the urban area. Inter-urban transport, from city to city, is excluded.
	Operation and maintenance of urban mass transport	
	Retrofit of existing rail fleet with low-carbon technologies	
	Supporting infrastructure for electricity, battery electric or hydrogen-powered rail ensuring a modal shift of transport from road or air to rail	
Transport-oriented urban development	Integration of transport and urban development planning: Dense development, multiple land-use, walking communities, transit connectivity, and so on which leads to a reduction in the use of passenger cars	If geographically located within city boundary or directly adjacent, or put in place by city government
	Transport and travel demand-management measures: Installation, maintenance and modernization of high occupancy vehicle lanes, dedicated bus lanes, urban vehicle access restrictions (congestion charging schemes, low emission zones, restriction or auctioning of license plates), shared mobility schemes (e.g. car sharing)	

SUBSECTOR	SOLUTION/ACTIVITY	URBAN INCLUSION RULE
Waterway (passenger/ cargo)	New boat fleet with zero emission propulsion systems	Must provide service to the city. Can include partial urban to rural area, as they may benefit some of the urban area, or be operated or owned by city authority
	Operation and maintenance of urban mass transport	
	Retrofit of existing boat fleet with low-carbon technologies	
	Supporting infrastructure for waterway transport, ensuring a modal shift from a higher carbon mode of transport	

7.2.2 ADAPTATION TAXONOMY

Table A6: Climate adaptation activities and urban inclusion rules

SUBSECTOR	SOLUTION/ACTIVITY	URBAN INCLUSION RULE
AGRICULTURE, FORESTRY, OTHER LAND USES AND FISHERIES		
Agriculture	Growing of non-perennial crops: planting of non-perennial that do not last for more than two growing seasons; provision of information on crop diversification options to farmers; use of crops/varieties less susceptible to temperature related diseases and pests and to frost; controlled agriculture, vertical farming; use of integrated pest control measures; use of multi-functional field margins; enhancement of soil retention; improved land drainage	If located within city physical boundaries
	Growing of perennial crops: development and planting of perennial crops including grains with deep and dense root systems	
	Land management: improved management of slopes and basins to avoid/reduce the impacts caused by increased soil erosion; identification of protected areas and establishment of migration corridors to maintain or increase climate resilience of ecosystems	
	Livestock/aquaculture production: increased production of fodder crops to supplement rangeland diet affected by climate change; adoption of sustainable aquaculture techniques to address changes in fish stocks resulting from climate change impacts and supplement local fish supplies, etc.; increased resilience of shepherds and small ruminants to climate change through sustainable rangeland management	
	Water management: enhance the resilience of existing agricultural production systems, including water control and management measures; increased water availability and efficient use through water harvesting and irrigation technologies	

SUBSECTOR	SOLUTION/ACTIVITY	URBAN INCLUSION RULE
Forestry	Afforestation: early warning systems and wildfire control measures including thinning measures; regeneration material less sensitive to strong wind	If located within city physical boundaries
	Existing forest management: maintain biodiversity, productivity, and regeneration capacity of forests	
	Reforestation: growing of coppice, pulpwood and firewood and the operation for forest tree nurseries	
	Rehabilitation and restoration: use of species less susceptible to drought; diversification of species and ecotypes	
Policy & Budget Support & Capacity Building	Support for national, regional or local adaptation policy, through technical assistance or policy lending	If exclusively for the benefit of city dwellers, usually under municipal control but also regional or national
BUILDINGS & INFRASTRUCTURE		
Existing Infrastructure Resilience: adaptation in projects to improve climate resilience of existing infrastructure	Improving the resilience of electricity transmission also increases the resilience of operations that depend on electricity	If affecting the city
	Improving the resilience of gas transmission and distribution networks for safety and energy system resilience purposes	
	Operation of transmission systems that convey the electricity from the generation facility to the distribution system	
	Flood protection for human settlements	If located within city physical boundaries
	Flood protection of riverine infrastructure, canals and associated infrastructure	
	Heat and flood resilience building of existing transport infrastructure	
	Undergrounding of power lines	

SUBSECTOR	SOLUTION/ACTIVITY	URBAN INCLUSION RULE
New Infrastructure Resilience: building resilience into new infrastructure such as protection systems	Improving the climate resilience of new renewable electricity generation to improve the climate resilience of other sectors that rely on electricity	If affecting the city
	Protection systems for dams to reduce extreme weather vulnerability	
	District heating and cooling networks	If located within city physical boundaries
	Green spaces and corridors in urban areas that provide urban ventilation and reduce urban heat island effect	
	Urban farming and gardening (thereby increasing water infiltration capacity of the soil and providing additional shading)	
Policy & Budget Support & Capacity Building	Support for national, regional or local adaptation policy, through technical assistance or policy lending	If exclusively for the benefit of city dwellers, usually under municipal control but also regional or national
INDUSTRY		
Industrial, Extraction and Manufacturing Process	Extractive industries: climate resilience investments or programs in extractive industries (oil, gas, mining, etc.)	If affecting the city
	Manufacturing (e.g., design of climate-resilient equipment)	
	Processing and distribution: use of increased cooling requirement in food processing distribution & retail resulting from more extreme heat events (e.g., increased water-efficiency in processing)	
Policy & Budget Support & Capacity Building	Support for national, regional or local adaptation policy, through technical assistance or policy lending	If exclusively for the benefit of city dwellers, usually under municipal control but also regional or national

SUBSECTOR	SOLUTION/ACTIVITY	URBAN INCLUSION RULE
OTHERS & CROSS-SECTORAL		
Policy and National Budget Support & Capacity Building	Capacity building: develop technical and institutional capacity of government and civil society (private sector, local communities, NGOs) to address increasing climatic risk in climate change adaptation planning	If located within city physical boundaries
	Knowledge sharing/awareness raising: knowledge dissemination of lessons learned on climate-smart agriculture and adaptation planning; climate index insurance initiated, policy influenced, and lessons learned and shared through a knowledge management system	
	Policies: water restrictions and consumption cuts	
	Knowledge creation: development of climate models, and research for reducing uncertainty on climate change projections and impact assessments; scientific research on and development of methodologies for the evaluation of potential, effectiveness and efficiency of implemented adaptation solutions; scientific research on and development of adaptation technologies and solutions (incl. introduction of pilot studies/ early warning systems etc.)	If affecting the city
Financial Services	Establishing a microfinance credit system	If located within city physical boundaries
	Incentivizing adaptation behavior, requiring minimum building standards, or adherence to build-back-better principles	
	Insurance against climate-related hazard against climate-related hazards	
Coastal protection	Grey infrastructure: building of improved or new dykes to protect infrastructure and to enhance the climate resilience to increased storms and coastal flooding, and sea level rise	If located within city physical boundaries. For rehabilitating coral reefs and seagrass areas, it must target a risk affecting the city
	Nature-based solutions: Mangrove planting to build natural barriers to adapt to increased coastal erosion and to limit saltwater intrusion into soils caused by sea level rise; additional or improvements in coastal and riverine infrastructures (including built flood protection infrastructure) in response to increased flood risks; rehabilitating coral reefs and seagrass areas	

SUBSECTOR	SOLUTION/ACTIVITY	URBAN INCLUSION RULE
Disaster risk management	Flood (pluvial and fluvial) & drought prevention, preparedness & protection: infrastructure for flood risk prevention & protection; system resilience building for flood risk prevention and protection infrastructure; sustainable urban drainage systems (SUDS): the facilities aim to align modern drainage systems with natural water processes; nature-based solutions for flood and drought risk prevention and protection for urban water sector; the protection conservation and restoration of terrestrial freshwater and marine ecosystems that provide climate resiliency ecosystem services to urban water sectors; infrastructure for drought risk prevention preparedness and protection; system capacity strengthening for drought risk prevention and protection infrastructure	If affecting the city
	Monitoring and warning systems: early warning / emergency response systems to adapt to increased occurrence of extreme events by improving disaster prevention, preparedness and management and reducing potentially related loss and damage; monitoring of disease outbreaks and development of a national response plan (to adapt to changing patterns of diseases that are caused by changing climatic conditions); ICT data-driven systems for monitoring, early warning and emergency response systems (Data processing, hosting and related activities) and development of data processing methods, especially machine learning and statistical approaches	
	Post-disaster management: disaster response coordination & disaster relief	
Other	Health systems' adaptation to changes in disease vectors or other climate change health impacts (e.g., development of a national response plan for diseases outbreaks)	If affecting the city
	Cross-sector activities such as financial services like incorporation of climate risk assessment in ministerial investment appraisal processes (if not included in the categories above); retreat from high-risk areas	If located within city physical boundaries
WATER AND WASTEWATER		
Water Collection: construction, extension and operation	Alternative water resources: rainwater collection from ground surfaces-small reservoirs and micro catchments, rainwater harvesting from roofs, water reuse, water reclamation, stormwater retention and detention systems, production of all additional alternative water resources	If affecting the city
	Traditional water resources: expansion of reservoirs, reinforcement of river basins, boreholes and tubewells, household water safe storage, well flood resilience, pump stations, dam construction	

SUBSECTOR	SOLUTION/ACTIVITY	URBAN INCLUSION RULE
Water Treatment: construction, extension and operation	Construction and/or upgrade of water treatment plant	If affecting the city
	Desalination	
	Household water treatment	
	Renewable energy solutions for water treatment	
	Stormwater drainage	
Water Supply: construction, extension and operation	Construction and/or upgrade of water distribution networks	If affecting the city
	Creating water pricing and risk transfer/insurance schemes to help manage water supply and demand cycles	
	Establishing financial mechanisms in river watersheds	
	Increased use of water efficient fixtures and appliances	
	Leakage management, detection, and repair in piped systems	
	Production purchase and deployment of water saving monitoring storage and distribution technologies and systems	
Wastewater Collection Networks: construction, extension and operation	Construction or upgrade of sewer systems	If affecting the city
	Raw water supply	

SUBSECTOR	SOLUTION/ACTIVITY	URBAN INCLUSION RULE
Wastewater Treatment: construction, extension and operation	Anaerobic digestion of bio-waste	If affecting the city. For pumped marine outfalls, if located within city physical boundaries
	Anaerobic digestion of sewage sludge	
	Brine discharge	
	Composting of bio-waste	
	Construction or upgrade of wastewater treatment plants	
	Other urban wastewater treatment activities for climate adaptation, not included above	
	Phosphorus recovery from urban wastewater	
	Pollution prevention and control from urban water sector	
	Pumped marine outfalls	
	Renewable energy solutions for wastewater treatment	
	Reuse of sludge	
Policy & Budget Support & Capacity Building	Support for national, regional or local adaptation policy, through technical assistance or policy lending	If exclusively for the benefit of city dwellers, usually under municipal control but also regional or national

citiesclimatefinance.org