Scoping gaps in current assessments of cities and climate change

A report on the outcomes of a three-day virtual workshop.

The nexus of cities and climate change is becoming increasingly relevant. As the Paris agreement is moving forward and nation states advance their respective climate action agendas, municipalities turn to implementation on the ground. The heat records of the year 2023 and associated heat waves, but also extreme precipitation events and other impacts, demonstrate the need to move fast forward with mitigation and adaptation agendas.

The scientific community is answering to the urgency of action and the underlying need for facts and evidence: the literature on case studies and cities and climate change at large is growing exponentially and faster than other literature on climate change[1]. Recent assessment chapters or reports on cities and climate change – notably by the IPCC and the UCCRN – provide firm grounding and establish a platform to further scientific research. The IPCC is institutionally further responding to the urgency for spatially grounded action by initiating a special report on cities and climate change as a firestarter to the 7th Assessment Report cycle.

This raises the question of what the new IPCC special report should cover, and more broadly, how the wider scientific community can contribute effectively in research to advance climate change mitigation, adaptation and impact insights at the level of cities and human settlements.

To answer this question, Felix Creutzig of the MCC Berlin convened a 3-day virtual workshop in November 2023 of more than 50 expert academics from all over the world attempting but not fully achieving balance in representation (gender ratio female/male: 44%/56%; developing country background 31%). It involved both authors of preceding city and climate change assessments, and authors outside the assessment process with fundamental expertise on aspects less covered in existing reports. The virtual workshop addressed the current state of city and climate change assessments and focused on joint discussions and documentations of relevant gaps that could be

[1] See Lamb, W. F., Creutzig, F., Callaghan, M. W., & Minx, J. C. (2019). Learning about urban climate solutions from case studies. *Nature Climate Change*, *9*(4), 279-287.

Montfort, S. A. et al. A Global Systematic Map and Database of Climate Change Research on Cities (in preparation)

addressed in the upcoming special report on cities and climate change of the IPCC's 7th assessment's cycle. The virtual workshop is part of the What Works Climate Solution Summit process, which will take place in June 2024 in Berlin[2].

The results of this "gap finding" discussions are documented in this short white paper. Gaps are organized and conceptualized in six clusters: urban form, policies, governance, data & AI, system transformation, and sustainability and equity. All of these clusters intersect with essential considerations and analysis in sectors and topics – mobility, shelter, food, thermal comfort, water and health (see Figure below). Notably, the clusters are highly integrative and aim to advance a holistic perspective. This is required to overcome silos not only in research but also in urban climate governance. However, this approach also bears considerable risks: if many issues are considered simultaneously, system boundaries of analysis become blurred, and reproducibility and generalizability may become compromised. As a result findings could become too generic to be useful. Hence, sound qualitative and quantitative research, based on harmonized system boundaries, that aims to connect issues previously less well considered, will be required as foundation for holistic assessment.

Highlighting a few emerging issues: 1) The workshop participants observe a need for a variety of typologies of cities to enable generalizable recommendation that remain relevant for specific types of cities. Such typologies should go beyond urban form and geographical situation to include issues of power, resources, capacities, socio-economic inequalities and risk. 2) There is a need to focus on the spatial dimension (urban form), a crucial dimension, which makes urban climate action different from nation-wide or international climate action. 3) Data-based approaches (also involving AI) become an increasingly important starting point of analysis, sometimes enabling unbiased and comparative analysis, but also remaining subject to epistemological risks, e.g., by ignoring less well quantified dimensions. The precision of analysis should hence remain second to the relevance of concern. 4) Causal analysis, such as pursued by urban economics and novel data scientific approaches, that optimally also considers qualitative considerations, deserves more scope in assessments of cities and climate change. 5) Demand for food, e.g., by investigating urban food environments, may be worthy of specific attention, considering its outsized significance in terms of GHG emissions. 6) Urban action is never only about climate change but also always about pragmatic concerns, such as public good provisioning and the well-being of urbanites, requiring investigations that integrate different goals (that may often align well).

[2] https://whatworksclimate.solutions/

Our contribution is one of several initiatives aiming to advance coherent research on climate change and cities. For example, the IPCC cities and climate change conference in Edmonton 2018 convened the community and resulted in a research agenda[3]. Other communities and authors also advanced suggestions of how to bring different epistemic communities together around the nexus of cities and climate change[4]. In this light, our report should be seen as an additional impulse advancing the discussion of how to design a comprehensive assessment on cities and climate change.

The full list of authors is at the end of this document.

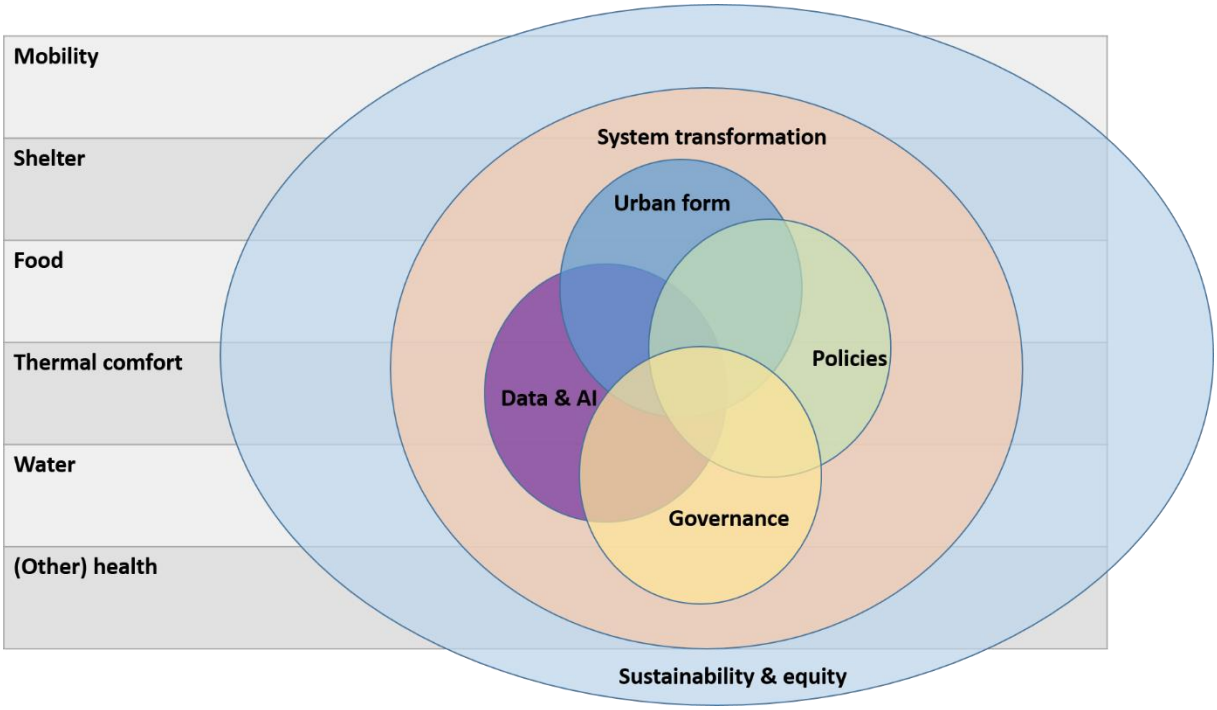

Figure 1. The workshop participants identified 6 clusters of research gaps. For each cluster, sector and topic specific issues (mobility, shelter, food, thermal comfort, water, public health) deserve attention. Adequate assessment of cities requires a back-and-forth between the particular and the universal. Typologies offer a bridge between these domains.

[3] Bai, X., Dawson, R. J., Ürge-Vorsatz, D., Delgado, G. C., Salisu Barau, A., Dhakal, S., ... & Schultz, S. (2018). Six research priorities for cities and climate change. *Nature*, *555*(7694), 23-25.

[4] Solecki, W., Seto, K. C., Balk, D., Bigio, A., Boone, C. G., Creutzig, F., ... & Zwickel, T. (2015). A conceptual framework for an urban areas typology to integrate climate change mitigation and adaptation. *Urban Climate*, *14*, 116-137.

Acuto, M., Parnell, S., & Seto, K. C. (2018). Building a global urban science. *Nature Sustainability*, *1*(1), 2-4.

Creutzig, F., Lohrey, S., Bai, X., Baklanov, A., Dawson, R., Dhakal, S., ... & Walsh, B. (2019). Upscaling urban data science for global climate solutions. *Global Sustainability*, *2*, e2.

Bai, X. (2023). Make the upcoming IPCC Cities Special Report count. *Science*, *382*(6670), eadl1522.

Content

1 Urban form, geography, and land use

1.1 Data Gaps and Methodological Challenges in Urban Climate Assessment

There is a substantial understanding of cities and human settlements and, in many cases, action agendas are clear. However, more granular data are necessary to support urban planners with a more spatially explicit and contextualized understanding of climate action.

- **Granular Data on Urbanization**: The need for more sophisticated data, such as high-resolution information on urban infrastructure and built environments.
- **Quantifying Urbanization and Climate Interaction**: Better identification of how land use change and urbanization trends impact climate change in urban settings.
- **Action Points**:
    1. Utilize granular data to analyze degrees of urbanization and its impact on emissions. Map past, recent and projected emissions as well as urban climates (urban atmospheric conditions including heat, moisture and air quality).
    2. Create time-series data to understand how urbanization and infrastructure influence emissions and urban climates over time. Develop high-resolution projections and scenarios of future developments of GHG emissions and urban climates.
    3. Develop new methodologies and tools to assess the interaction between urban form, land use changes, and climate processes. Include considerations of compound and cascading effects.

1.2 Complexity of Urban Form and Its Impact on Climate Solutions

- **Beyond Simple Dichotomies**: Moving past the urban-rural dichotomy to understand the complexities of urban typologies and how they influence lifestyle and behavior changes. Understanding the role of behaviours and lifestyle changes and evaluating/understanding them in different contexts present a large research gap.
- **Quality of Urban Density**: Focusing on the 'quality of density' and mixed-use policies to improve accessibility and reduce carbon-intensive mobility.
- **Action Points**:
    1. Develop more nuanced, flexible typologies that capture the diversity of urban forms and degrees of urbanization, reflecting different aims and scopes of analysis. Include typologies grounded in a forward-looking evolutionary basis,

i.e. group cities together that have similar pathways to climate change mitigation and/or adaptation. Regional typologies can provide useful resolution to local policy makers.

2. Investigate the impact of specific urban forms on sustainable behavior and lifestyle choices, and the potential of specific urban forms for development and retrofitting both for mitigation and adaptation. Categorize by development history (e.g. timeline of transport infrastructures) and political and infrastructural lock-ins.
3. Study the role of land-use mix and urban density quality in promoting low-carbon urban living.

1.3 Interaction Between Urban Land Use, GHG emissions and Climate Change Adaptation

- **Urban Space Reorganization and Teleworking**: Understanding how shifts like teleworking impact urban commuting dynamics and land use, especially in the context of mixed-use downtowns. Differentiate according to transport systems and land-use regulations.
- **Urban Planning for Climate Resilience**: Analyzing how urban greening and edible cities can mitigate heat waves and contribute to food security as well as ecosystem adaptation. If feasible, identify threshold values (e.g., percentage of green spaces of different types) to meet different goals (e.g., mitigation heat waves by 1°C on average).
- **Action Points**:
    1. Research the reorganization of urban spaces due to evolving work patterns and its impact on emissions. Consider different configurations of transport infrastructures and policies.
    2. Develop strategies for integrating urban agriculture and green spaces as part of climate adaptation. Integrate strategies with water supply and water storage requirements (e.g., sponge city concepts).
    3. Assess how changes in land value influence urban spatial form and the location of critical infrastructure.
    4. Consistently assess infrastructure projects in terms of trade-offs and synergies between climate change mitigation and adaptation across different types of cities

2 Policies, costs, and losses

2.1: Refinement of Urban Climate Policies and Their Economic and Environmental Impacts

- **Effectiveness of Urban Policies**: There is a need for a better understanding of what urban policies have worked, where, and why, in terms of both economic and environmental costs and benefits.
- **Standardization and Metrics**: The lack of standardized metrics to measure adaptation and the absence of defined adaptation targets in cities lead to difficulties in assessing policy effectiveness and costs.
- **Action Points**:
    1. Conduct context-specific studies and compile case studies – optimally harmonized along comparable boundary conditions - that guide policymakers on economically effective urban climate actions. Compare case studies across representative matrices to understand economic implications in different urban contexts.
    2. Develop standardized metrics and targets for urban adaptation to assess economic and environmental impacts systematically.
    3. Perform ex-post policy evaluations and improve the representation of cities in prospective modelling.

2.2: Economic Losses, Financing, and Risk Management in Urban Climate Context

- **Quantifying Economic Losses**: There are significant gaps in understanding and quantifying economic losses in cities due to climate impacts, including indirect effects on rural areas. For example, productivity losses due to extreme weather in urban environments deserve comprehensive assessment.
- **Financing Adaptation and Mitigation**: Challenges exist in financing climate adaptation and mitigation, including insurance and financial risks and opportunities.
- **Action Points**:
    1. Produce more knowledge and develop techniques to systematically quantify and assess existing urban loss and damages, including those due to climate impacts on supply chains (including food) and rural areas.
    2. Assess financing climate actions, including co-benefits and climate-related financial disclosures.

3. Identify risk indicators and transition risk indicators for financial disclosures, especially for local governments.

2.3: Integration and Transformation Potential of Climate Policies

- **Spatial and Systemic Policy Impact**: A lack of understanding exists regarding the effectiveness of subnational climate mitigation policies, their spatial impacts, and potential positive spillovers as cities emulate each other.
- **Synergies of Coordinated Policies**: There is a lack of understanding about the how to design synergertic and coordinated policy packages, and also about their corresponding benefits and outcomes.
- **Action Points**:
    1. Use urban economic causal analysis to spatialize Climate Action Plans and assess their impact in different spatial and socio-economic settings.
    2. Research policy packages over single policies, including a focus on policy sequencing, and evaluate them according to climate mitigation and adaptation effectiveness, well-being, and economic impact.
    3. Foster an integrated approach to policy-making that considers both direct and indirect economic effects of climate policies in urban contexts.

3 System transformation

3.1 Comprehensive System View incorporating well-being into the assessment of climate solutions

- **Systems Perspective on Wellbeing**: Emphasizing a systems view that incorporates factors like people's health and wellbeing alongside CO2 emissions.
- **Interconnected Solutions**: Recognizing the need for interconnected solutions that include physical and social systems, reflecting ecological and technological infrastructures. Develop tools for understanding our complex systems and the high-leverage points to change them
- **Action Points**:
    1. Apply models and frameworks that integrate social, environmental, and economic dimensions beyond CO_2 and economic throughput metrics, e.g., by building on the well-being assessment of AR6, WGIII[5].
    2. Encourage a holistic approach to solutions and the use of tools that can be helpful for understanding complex systems (such as Causal-loop diagrams), connecting different sectors and geographical areas.
    3. Focus on the mechanisms through which climate policy regimes change and how they can drive systemic transformation.
    4. Develop methodologies that allow distinguishing policies, investments, technologies, etc. that have the potential to trigger systemic transformation from those that are rather contributing to continued path dependency and lock-in of unsustainable systems. This analysis could lead to a new typology for cities (according to the level of lock-in of different systems into unsustainable results -including high carbon emissions and others)- and for understanding transformative action depending on the degree of lock-in (see also 1.2).

3.2 Governance and Mechanisms for Systemic Urban Change

- **Integrated Urban-Rural Perspective**: Overcoming the urban-rural divide in literature and policy to foster a more integrated and nuanced view of system change.

[5] Compare with Chapter 5: Demand, services and social aspects of mitigation in the WGIII report of the 6th assessment cycle (2022). Also: Creutzig, F., Niamir, L., Bai, X., Callaghan, M., Cullen, J., Díaz-José, J., ... & Ürge-Vorsatz, D. (2022). Demand-side solutions to climate change mitigation consistent with high levels of well-being. *Nature Climate Change*, *12*(1), 36-46.

- **Governance Structures for System Change**: Establishing governance structures that facilitate systemic change, including coordination across sectors and geographies.
- **Action Points**:
    1. Investigate incentives for cities to collaborate beyond their jurisdictions and foster cross-sector strategies.
    2. Define and implement governance mechanisms that support system transitions and positive tipping points. Include a consideration of a wide set of actors, including those from real estate, finance, crafts, building managers, utilities and others.
    3. Assess how to transform institutions aligned with climate goals within these broader systems. Specify how this can work along ongoing polarization in societies.

3.3 Practical Frameworks and Tracking for Transformative Change

- **From Theory to Practice**: Moving from theoretical frameworks to practical applications in transformation and system change.
- **Tracking Transformative Progress**: Developing conceptual and methodological approaches to establish a baseline and track progress in transformative change at the city level, such as transformative change scorecard approach.
- **Action Points**:
    1. Create actionable frameworks (including indicators) that guide cities in achieving robust net-zero and decarbonization strategies. Inter alia build on studies of technological and social change and transition studies (Grubler, Nemet, Geels, etc.) as well as literature on systems thinking (D. Meadows).
    2. Identify and utilize high-leverage points for system change, including social, institutional, functional, political, ecological, legal, technological, financial, and identify thresholds that would allow triggering postive tipping points (e.g. changing loop dominance or creating new dynamics in the system).
    3. Develop comparative research approaches (similar and dissimilar) that enable learning and interpreting from diverse urban experiences and stakeholder perspectives.

4 Governance and Planning

4.1: Understand barriers, lock-ins and leverage points in Urban Climate Governance

- **Understanding Formal and Informal Political and Institutional Barriers**: Investigate the diverse political, legal, and institutional barriers across different urban contexts to tailor governance structures effectively. Considering formal and informal institutions in governance and planning can provide a more holistic view of the dynamics of governance settings and mechanisms.
- Such understanding can also lead to comparative research on governance and planning typologies and how they open up or constrain opportunities for transformative adaptation.
- **Understanding Discourses and Cultural Inertia and Lock-ins**: Identify and address unwritten rules, shared beliefs and norms that shape specific practices that hinder sustainable and resilient urban development.
- **Action Points**:
    1. Conduct in-depth analyses of political complexities and barriers in varied urban settings to devise context-specific governance strategies.
    2. Develop frameworks to assess and reform outdated institutional norms and practices that contribute to policy inertia. Include considerations of finance and real estate sector.
    3. Instigate interdisciplinary research to understand and mitigate the impact of political complexities on urban climate governance.

4.2 Effective Coordination and Implementation of Urban Climate Policies

- **Sectoral and Geographic Coordination**: Enhance coordination across various sectors and geographical areas to create more integrated urban climate strategies.
- **Addressing Implementation Gaps**: Focus on understanding the disconnect between policy design and its practical implementation in urban contexts.
- **Action Points**:
    1. Create platforms for inter-sectoral and inter-regional dialogue to enhance policy coordination and integration.
    2. Implement mechanisms for monitoring and evaluating the effectiveness of urban climate policies to ensure their successful implementation.

3. Investigate the role of social media and societal polarization in public acceptance and support for urban climate policy implementation, and develop strategies to counteract these challenges.

4.3 Adaptive Governance Frameworks for Urban System Transformations

- **Decentralized and Bottom-up Approaches**: Explore governance strategies that support decentralized and community-driven urban climate actions such as citizen assemblies. Research can compare across urban typologies and geographies to see where, when and how servitisation (by business) for energy and climate change works in urban environments.
- **Stakeholder Engagement and Power Dynamics**: Identify key actors in urban areas who can drive or block transformative change and understand their influence and capabilities.
- **Action Points**:
    1. Identify the extent to which different governance models empower local communities and encourage bottom-up initiatives for urban climate action.
    2. Assess studies to identify the influence of key urban stakeholders like real estate developers, local businesses, and community leaders.
    3. Identify the potential and constraints of capacity building of municipal officials for driving climate act ion in urban areas. Rank cities according to capacity and lack of capacity.
    4. Investigate how framing of cities is a promising way to make climate change understandable and tangible; showcase narratives that work to catalyze action.

5 Data management, technology, and smart cities

5.1: Monitoring and Assessing Climate Actions with Emerging Technologies

- **Critical assessment of data availability and data needs:** Compare data availability to data that is most needed for supporting climate action. Assess how questions and analysis based on data availability (streetlight effect) can lead to biased and even problematic avenues of climate action.
- **Real-Time Tracking and Smart City Data Storage**: Develop near real-time tracking datasets for monitoring urban changes, and address challenges in data storage for smart city solutions.
- **Action Points**:
    1. Investigate how city decision makers respond to different types of data, including real-time monitoring and dashboards, and how these data shape urban policy decisions
    2. Based on critical assessment, build datasets for real-time tracking of urban carbon emissions and pollutants, assessing the feasibility and acceptability of smart city strategies.
    3. Integrate top-down and bottom-up approaches in greenhouse gas emission assessments, utilizing projects like ICOS Cities for comprehensive monitoring.
    4. Evaluate the environmental impact of new technologies like AI in urban areas, including their carbon footprint.

5.2 Smart Cities, Digital Twins, and Urban Transformation

- **Digitalization and Smart City Strategies**: Explore the role of digitalization and smart cities in managing big data for climate mitigation and adaptation.
- **Techno-Optimism and Emission Assessment**: Understand the limits of techno-optimism in the context of urban emissions and the role of new technologies in generating carbon emissions. Understand the trade-offs and conflict points between smart city technologies and sustainability.
- **Action Points**:
    1. Investigate how technologies like digital twins and platform urbanism can aid urban transformation towards climate resilience.
    2. Analyze the causal impacts of smart city initiatives on climate change adaptation and mitigation, focusing on co-benefits and synergies.

3. Explore the extent of policy substitution effects – whether new technologies such as electric vehicles reduce political willingness for policies such as demand management
4. Determine the data and metrics needed for sustainable urban development, evaluating the suitability of existing and emerging data sources.

5.3 Utilizing Big Data and AI for Low-Carbon and Resilient Urban Planning

- **Advancement through Big Data and AI**: Employ big data and machine learning to enhance low-carbon urban planning and design resilient cities.
- **Urban Governance and AI Tools**: Specify how urban governance can effectively leverage big data and AI tools for climate action.
- **Action Points**:
    1. Assess and consolidate novel big data and AI research relevant to both urban adaptation and mitigation.
    2. Develop guidelines and frameworks for cities to utilize big data and AI in governance, identifying both opportunities and potential hindrances.
    3. Give examples and specify how municipalities can make use of AI and big data insights into urban planning processes to shape low-carbon and resilient urban design.

6 Sustainability, equity and social aspects

6.1 Integration of Equity in Urban Impact Assessment and Climate Action

- **Understanding Distributional Impact**: A deeper analysis of how climate change, and different mitigation and adaptation strategies, can have differential impacts on various groups within and between different urban areas.
- **Tackling Gentrification and Equity Challenges**: Addressing the tension between making places more sustainable and the resultant gentrification and displacement, and the tension between improving people's life condition and resulting increased resource consumption and environmental costs.
- **Action Points**:
    1. Synthesize existing literature on urban climate justice and equity, specifically focusing on uneven economic opportunities, social capabilities and resources to implement necessary mitigation and adaption strategies, within and between urban areas.
    2. Evaluate place-based studies to understand the synergies and trade-offs of mitigation solutions with respect to equity and other Sustainable Development Goals (SDGs).
    3. Assess strategies to integrate equity in urban planning to support rather than hinder sustainable development. Also evaluate the political economy and narratives related to equity and climate action in different urban environments.
    4. Identify root causes behind climate change, inequalities and other social and environmental short-coming (e.g. biodiversity loss)

6.2: Quality of Life and Synergies of Climate Policies

- **Measuring Co-Benefits**: Identifying and making visible the synergies and trade-offs between adaptation and mitigation strategies, especially in terms of quality of life and improvements of health and well-being (see also 3.1). Include evaluation of outcomes especially for disadvantaged groups that are currently most at risk from air pollution and heat waves due to their living situations in cities. Evaluate outcomes also for stakeholders that are relevant in urban political economies (such as suburban commuters).
- **Equity and Food Security**: Given the outsized mitigation potential of dietary shift: Understanding how changes in urban food environments can enhance sustainability and reduce inequity in access to healthy food.

- **Action Points**:
    1. Evaluate the social benefits and costs of urban policies, such as parking regulations, and their link to climate outcomes. Cross-evaluate fairness in space allocation and related externalities with climate policies and outcomes.
    2. Explore the sociological aspects of climate change consensus and evidence, focusing on how urban narratives can be shaped by local experiences.
    3. Identify how food environments induce structural shift in dietary choices (priming and default effects).
    4. Investigate the equity outcomes of specific climate actions for different groups over time, particularly in housing and food security. Also include a focus on the affluent and luxury consumption.

6.3: Fair Share Contribution and New Metrics for Urban Sustainability

- **Fair Share in Global Climate Mitigation**: Defining what fair share contributions to global climate mitigation mean for cities and how they can be operationalized.
- **New Indicators for Multidimensional Progress**: Utilize new indicators and metrics that capture the multidimensional progress of cities towards sustainability and equity.
- **Action Points**:
    1. Define and clarify methodologies for cities to adopt 'fair share' net-zero targets, aligning with UN High-Level Expert Group recommendations.
    2. Apply composite indicators for cities that link mitigation efforts with sustainability, equity, and social implications.
    3. Specify how social infrastructure is integrated with green and technical infrastructure for a holistic approach to sustainable development.

Author list

Name	Affiliation
Felix Creutzig	Mercator Research Institute on Global Commons and Climate Change, Berlin, and Technical University Berlin
Aimée Aguilar Jaber	OECD
Sohail Ahmad	Environment & Geography, University of York
Asad Asadzadeh	Urban Planning Group, IGG, University of Bonn, Germany
Xuemei Bai	Fenner School of Environment & Society, Australian National University
Adam Millard-Ball	Luskin School of Public Affairs, UCLA
Ronita Bardhan	Department of Architecture, University of Cambridge, UK
Sophia Becker	Technical University Berlin & Research Institute for Sustainability - Helmholtz Centre Potsdam
Peter Berrill	TU Berlin, MCC Berlin, Germany
Vanesa Castan Broto	Urban Institute, University of Sheffield
Harriet Bulkeley	Department of Geography, Durham University
Jenni Cauvain	Nottingham Trent University, UK
Ralph Buehler	School of Public and International Affairs, Urban Affairs and Planning, Virginia Tech, Arlington, Virginia, USA
Alexandra Bussler	Institute of Social Sciences, Lisbon University | Technical University Berlin
Winston Chow	College of Integrative Studies, Singapore Management University
Amelia Clarke	School of Environment, Enterprise & Development, University of Waterloo, Canada
David Corbett	ICLEI - Local Governments for Sustainability
David Dodman	Institute for Housing and Urban Development Studies (IHS), Rotterdam, Netherlands
Daniel Fenner	Chair of Environmental Meteorology, University of Freiburg, Germany
Matthias Garschagen	Dept. of Geography, LMU München, Germany
Franziska Gaupp	Potsdam Institute for Climate Impact Research (PIK)
Rafiq Hamdi	Royal Meteorological Institute of Belgium
Bronwyn Hayward	Hei Puāwaitanga: Sustainability, citizenship and civic imagination research group. University of Canterbury, New Zealand
Marie Josefine Hintz	Institute of Landscape Architecture and Environmental Planning, Technical University Berlin
Angel Hsu	University of North Carolina at Chapel Hill

Sheikh Tawhidul Islam	Institute of Remote Sensing and GIS, Jahangirnagar University, Dhaka, Bangladesh
Şiir KILKIŞ	The Scientific and Technological Research Council of Türkiye (TÜBİTAK), Türkiye
Radhika Khosla	School of Geography and the Environment, University of Oxford
Charlotte Liotta	CIRED, TU Berlin
Chenxi Lu	TU Berlin, MCC Berlin, Germany
Michael Osei Asibey	Department of Planning, Kwame Nkrumah University of Science and Technology, Ghana
Sadie McEvoy	Delft University of Technology, Delft
Timon McPhearson	Urban Systems Lab, The New School, 79 5th Avenue, 16th Floor, New York, NY 10003, USA
Fred Meier	Chair of Climatology, Institute of Ecology, TU Berlin, Germany
Nikola Milojevic-Dupont	TU Berlin, MCC Berlin, Germany
Jan Minx	Mercator Research Institute on Global Commons and Climate Change
Daniel Moran	The Climate and Environmental Research Institute NILU
Simon Montfort	University of Bern (Switzerland)
Mani Nepal	Lead Economist and Program Coordinator, SANDEE, ICIMOD, Nepal
Peter Newman	Curtin University, Australia
Leila Niamir	International Institute for Applied System Analysis (IIASA), Austria
Minal Pathak	Global Centre for Environment and Energy, Ahmedabad University, India
Rafael H. M. Pereira	Institute for Applied Economic Research (Ipea), Brazil
Lisa Pörtner	Potsdam Institute for Climate Impact Research (PIK) / Charité Berlin
Joana Portugal-Pereira	Alberto Luiz Coimbra Institute for Graduate Studies and Research in Engineering, Federal University of Rio de Janeiro (Coppe/UFRJ)
Manuel Riemer	Viessmann Centre for Engagement and Research in Sustainability, Wilfrid Laurier University, Waterloo, Canada
Philipp Rode	LSE Cities, London School of Economics and Political Science
Pourya Salehi	ICLEI - Local Governments for Sustainability
Ayyoob Sharifi	Hiroshima University, The IDEC Institute, Japan
Chandni Singh	School of Environment and Sustainability, Indian Institute for Human Settlements, Bangalore INDIA
William Solecki	City University of New York - Hunter College
Diana Ürge-Vorsatz	Department of Environmental Sciences and Policy, Central European University, Austria

Vincent Viguié	CIRED, Ecole des Ponts ParisTech, Paris, France