



Task Force 4
Refuelling Growth: Clean Energy
and Green Transitions



INDIA 2023



भारत 2023 INDIA

FROM PLANNING TO ACTION: RETHINKING THE ROLE OF CITIES IN ACCELERATING NET-ZERO TRANSITIONS

June 2023

Sanjay Seth, Senior Director, Sustainable Infrastructure Programme, The Energy & Resources Institute (TERI)

Rhea Srivastava, Research Associate, Sustainable Infrastructure Programme, The Energy & Resources Institute (TERI)

Zerin Osho, Director, India Program, Institute for Governance & Sustainable Development

Sarah Harper, Manager, Climate Policy and Partnerships, Energetic Insurance


वसुधैव कुटुम्बकम्

ONE EARTH • ONE FAMILY • ONE FUTURE



Abstract






Cities are responsible for over 70 percent of global greenhouse gas emissions and 75 percent of primary energy consumption. By 2050, over two-thirds of the world population will live in cities, resulting in even greater infrastructure needs and increased carbon emissions. Yet, cities largely remain on the side-lines in the design of national and international green transition policies. Cities can combine policy, practice, and participation by leveraging innovation, technology, and partnerships while transforming local governance models. There is a need for the G20 leaders to recognise and


support the role of cities in accelerating climate action towards net-zero and limiting warming to 1.5 °C. This Policy Brief suggests policy recommendations informed by current trends, Urban20 (U20) engagement group priorities, and previous communications by G20 countries to address the barriers that cities face in implementing effective climate action towards net-zero. These recommendations emphasise on themes around empowering cities; building technical, institutional and financial capacities of cities; facilitating climate finance; and enabling multi-stakeholder participation for achieving integrated urban climate action.



The Challenge



1




The world is experiencing a fast-paced global transformation, and one of the most pressing challenges of this century is addressing climate change impacts, an essential component of which is transitioning to net-zero cities. The Intergovernmental Panel on Climate Change (IPCC) indicates that rapid and extensive transformations are required to restrict global warming to 1.5 °C, with targets that aim for no less than 45-percent reduction in global greenhouse gas (GHG) emissions by 2030, followed by the attainment of carbon neutrality by 2050.¹ Achieving net-zero emissions necessitates decarbonisation approaches and transformative changes across all aspects of human activity, particularly in urban areas.²

Cities are crucial engines of economic growth that generate 80 percent of global GDP.³ The world's 10 largest metropolitan economies together have an estimated GDP of US\$9.5 trillion, which is larger than the economies of Germany and Japan combined.⁴ Cities are now home to more than 55 percent of the world population, and this figure is projected to increase to

almost 70 percent by 2050.⁵ Cities are, however, also responsible for more than 70 percent of greenhouse gas emissions⁶ and 75 percent of global primary energy consumption.⁷ At the same time, cities will face more frequent heat stress events, and the average temperature difference between rural and urban areas is also set to rise.⁸ Urban citizens – particularly the urban poor and marginalised populations – are increasingly vulnerable to multiple climate change risks, such as floods, heatwaves, and disaster-induced displacement.⁹ Population and consumption growth, coupled with accelerating climate risk, puts increasing pressure on already strained municipal areas.

The term 'net-zero cities', interchangeably used with 'climate-neutral cities', 'net-zero energy cities', and 'carbon-free cities', refers to urban areas that strive to achieve a state of equilibrium between the amount of anthropogenic GHG emissions produced and the amount of emissions removed or offset.¹⁰ These cities aim to eliminate or offset their carbon footprint by reducing emissions from various activities such as energy generation, transportation, and waste management,



while implementing measures to remove or capture GHG emissions from the atmosphere. A net-zero urban transition entails a fundamental socio-technical shift^a in the planning, design and governance of cities.¹¹ Being the government closest to urban citizens, city governments also act as catalysts in involving communities to co-create innovative solutions in line with net-zero targets. Many cities are willing to drive this socio-technical shift, and at least 1,000 cities worldwide have already committed to net-zero objectives under the UNFCCC-led 'Race to Zero' campaign.¹² Nonetheless, urban areas face a number of barriers in implementing and accelerating their decarbonisation efforts.

Governance and Regulatory Authority

International climate agreements, such as the Paris Agreement, explicitly highlight the importance of cities in achieving climate neutrality. Some nations have also updated their Nationally Determined Contributions (NDCs) to reflect the role of cities in their

climate action plans.¹³ Such policies and actions at higher scale of governments are useful in guiding and directing cities towards their net-zero targets.

National governments, however, often lack the ability to implement efficient policies that address local issues as compared to city governments which have specialised knowledge on their unique territories and challenges.¹⁴ Municipalities frequently encounter constraints in their legal authority from national and state governments to implement more advanced measures. For example, the 12th Schedule of the Indian Constitution allocates limited jurisdiction to cities. This jurisdiction primarily includes interventions in the sectors of waste management, environmental protection, and urban forest management relating to climate change. Other activities, including energy generation and distribution, transport, and industrial sectors are controlled by the state and central governments. Effectively transitioning to a net-zero state at the urban level requires a combination of autonomy

a A socio-technical shift extends beyond adopting new technologies, and entails an interlinkage between technologies, infrastructure investment, establishment of enabling markets and regulations, and shaping user preferences for a fundamental societal impact.

and coordination, necessitating both horizontal integration by involving multiple actors, and vertical coordination with multiple levels of governments.¹⁵

Financial mechanisms


Cities often lack the financial autonomy and institutional capacity to use innovative funding mechanisms for decarbonisation practices, ranging from land-based financing instruments and property taxes, to public-private partnerships. In developing nations, development requirements including the provision of accessible and adequate infrastructure often take precedence, while funding for climate action is perceived as an added financial challenge.¹⁶ According to UN-Habitat's *World Cities Report 2022*, cities in lower-income countries rely more on community actions, with a focus on climate adaptation, whereas those in higher-income countries tend to pay greater attention to efficiency and leadership for climate mitigation actions in transport and buildings sectors.¹⁷ To support lower-income cities in mitigation efforts, their financial capacity needs to be strengthened.

Additionally, more than 60 percent of urban areas needed by 2050 are yet to be

built.¹⁸ The World Economic Forum and World Bank estimate that the world will need to invest between US\$3.7–US\$5.4 trillion in urban infrastructure every year until then.¹⁹ Advanced economies face the additional challenge of replacing aging urban infrastructure.²⁰ Small-scale governments must be equipped with the financial, legal, and technical capacity to address the threat that climate impacts pose to urban assets in the present and for the decades to come. Such measures can help small-scale governments to better address the influence of insurance, shifting national policies regarding carbon and other greenhouse gases, and international fuel markets.

Technical Capacity and Awareness

The third barrier is the lack of technical expertise, awareness, and resources needed to plan and implement carbon-neutral actions at the local level. Today's evolving technology landscape has enabled cities to experiment with advanced technical approaches aiding low-carbon urban development, such as the deployment of smart grids, energy-efficient buildings, and electric vehicles.²¹ However, these approaches require city stakeholders to possess



high technical capacities and resource mobilisation in order to be implemented properly. Moreover, city officials may not have access to knowledge and resources—such as innovative climate scenario modelling tools, inventories to collect city-level climate data, and other frameworks for implementing climate actions—due to fragmented information and limited networking.


Currently, transnational city alliances and networks, such as the Global Covenant of Mayors for Climate and Energy (GCoM) and the C40 Cities Climate Leadership Group, provide support frameworks to implement climate goals and enable knowledge-sharing horizontally among cities, but their capacity and influence in global governance remain limited.²²



The G20's Role



2




Providing targeted support to cities in the G20 would empower them to play a significant role in the global effort to achieve net-zero emissions by accelerating the response to climate change at the local level with a global perspective.

Rapid urbanisation trends and the impact of globalisation on urban governance have made it crucial for city leadership to adopt a more international approach. Cities have the capacity to undertake essential actions that contribute to advancing net-zero transitions, such as implementing modal shifts, abating emissions from carbon-intensive sectors including buildings and transportation, and reducing resource consumption using measures such as improving energy efficiency. Due to their scale and potential for experimenting with low-carbon innovations that encompass new technologies, policies, and business models, cities are an ideal platform for implementation.

G20 countries have recognised the social and economic influence of cities in creating the Urban 20 (U20) engagement group to bring urban dynamism to international

deliberations. Within just five years, it has established a strong forum of communication between cities and G20 heads, further propelling global development agendas and affirming the role of urban areas in international sustainable development efforts.²³ The deliberations under this engagement group serve as a clarion call for local leadership to reinforce mutually supportive implementation processes, innovative ideas, decisions and actions for achieving global sustainability and climate goals, including the Paris Agreement and the UN Sustainable Development Goals (SDGs).

The role of cities in achieving net-zero has also been acknowledged by the G20 in the Rome Leaders' Declaration of 2021, which committed to support cities "through the G20 Resource Efficiency Dialogue and a recognition of the importance of cities as enablers of sustainable development."²⁴ The Joint G20 Energy-Climate Ministerial Communiqué of 2021 also specifies "the need to enhance the coordination and cooperation between national, regional, and local authorities," and recognised cities as "innovative laboratories of clean, energy-efficient, sustainable, affordable and reliable technologies."²⁵




G20 leaders can further encourage the role of cities in accelerating climate action towards meeting G20 countries' net-zero targets by cutting non-CO₂ super pollutants,^b which could avoid up to 0.6°C of warming by 2050 and up to 1.2°C by 2100.²⁶ Strategies to cut non-CO₂ super pollutants can yield high emission reduction in cities. For instance, 20 percent of methane emissions are from the waste sector which accounts for “35% of total emissions in Kolkata, 31% in Nairobi, and 22% in Rio de Janeiro.”²⁷ Further, more than half the emissions of HFCs, another potent GHG, globally in 2050

and 2100 will be from stationary air-conditioners,²⁸ the growth of which is much higher in urban areas.

The G20's network of development banks and funding facilities can also provide the expertise required to support innovative financial mechanisms. The Smart, Resilient and Sustainable Cities Action Plan,²⁹ produced by UNEP in close collaboration with the Italian Presidency of the G20, also highlights the need to support the capacity of cities for implementation, sustainable finance frameworks, and investment at the local level.

b These include black carbon, methane (CH₄), tropospheric ozone, and hydrofluorocarbons (HFCs) which can avoid four times more warming by 2050 than CO₂ cuts alone can.



Recommendations to the G20



3



i. Empower cities by bolstering multi-level governance and coordination towards net-zero transitions.


The G20 countries should recognise the opportunities, creativity and dynamism that cities provide in bolstering their Nationally Determined Contributions (NDCs) and contributing to the achievement of the Paris Agreement.³⁰ Many cities of the G20 member countries have set their own ambitious policies and plans of reaching net-zero emissions. The Seoul Metropolitan Government (SMG), for example, implemented reforms in its public transportation system in 2004, eventually resulting in Seoul becoming a model city for public transportation.³¹ The reforms resulted in a sharp, 9.4-percent increase in bus ridership between 2004 and 2017.³² These reforms, along with others implemented since, have reduced transport emissions in Seoul by nearly a quarter³³ and the number of electric vehicles sold across the country in 2021 has doubled from 2020.³⁴ Seoul plans to have electric vehicles account for 10 percent of its total registered vehicles by 2026, resulting in potential emission reductions of approximately 43 percent from 2005 levels.³⁵ Similarly,

the city of Mumbai in India has set a target of reaching net-zero by 2050 in its ambitious climate action plan, which is 20 years ahead of India's target of zeroing out carbon emissions by 2070.³⁶

These successes and associated learnings of cities in G20 member countries which have implemented ambitious climate and sustainable development policies should inform national climate policy development. They can also contribute to the knowledge of other G20 cities as they design their own enabling frameworks.

A systems approach to addressing the concurrent challenges cities face recognises the need for collaboration and coordination among different actors, sectors and institutions to effectively gauge their interconnections and interdependencies.³⁷ Without the active involvement of city governments, climate action commitments cannot be translated from global agreements into practical initiatives on the ground.

The G20 can enhance the transformational potential of city efforts by motivating and enabling sub-national governments to pursue more ambitious climate action. Regular dialogues



with urban leaders that offer inter-city coordination and intra-city technical support can be used to solicit localised knowledge of barriers and opportunities, identify gaps and key stakeholder groups, and improve success rates of national climate action plans.³⁸ These dialogues can be coordinated through existing city networks such as U20 or the Global Covenant of Mayors, but would need to be enhanced to include real estate owners, municipal public works departments, extra-mayoral political leaders and other local knowledge holders who influence the development of urban areas and their inhabitants. Multi-stakeholder facilitation efforts foster uptake from industry actors and local businesses, improve rollouts of policy enforcement such as building audits or diesel bans, and turn key players into champions of sustainable development agendas, support knowledge exchange to minimise redundancy in research efforts, maximise efficiency, and attract private capital.³⁹ This approach also generates evidence for the creation of climate policies and effective decision-making.⁴⁰

In this regard, the Urban 20 (U20) engagement deliberations under the G20 should further work towards

enhancing the momentum for integrated urban climate action by encouraging local-level policies and peer-to-peer cooperation. Examples of this could include:

- Peer-to-peer trainings where cities aiming to undertake sustainable development initiatives, including low-carbon transport, energy-efficient buildings, digitalisation, and waste management, can learn from cities with existing efforts, like Paris, Seoul, or London.
- Publishing analyses of existing regulatory frameworks and urban sustainability initiatives and their relative success for carbon mitigation, with each case study evaluating emissions reduction per dollar (MTCO₂eq/USD) alongside social benefits like improved air quality and public health.
- Inter-city collaboration within the G20 countries to scale efforts like appliance collection or addressing methane in municipal waste, which reduces implementation costs and improves participation rates.



ii. Enhance technical and institutional capacities of cities to develop and implement climate action plans.


In order to transition to a carbon-neutral and sustainable future, local governments and administrators require a fundamental transformation in the planning, design, management and financing of urban projects and infrastructure.⁴¹ For this purpose, the Urban 20 engagement group of the G20 should aim at sharing best practices and knowledge in key areas, including low-carbon transport, energy-efficient buildings, digitalisation, and waste management. For instance, the U20 deliberations could focus on accelerating cuts to non-CO₂ super pollutants while pursuing ambitious and equitable decarbonisation, which would also provide the added benefit of reducing air pollution and increasing the quality of life in cities.

Technical tools, city-level inventories, and frameworks related to such actions can be shared among city governments to enable better urban planning and design to tackle climate change impacts. A number of standards and tools are available to quantify

and assess the sustainability of infrastructure through benchmarking and rating systems. For example, the Smart Surfaces Coalition in India has developed a holistic, computer-based methodology that can be used by all cities with their own data, and in partnership with TERI, is conducting city-wide analysis of Smart Surfaces adoption in Bhopal.⁴² Correspondingly, the G20 deliberations should also aim at encouraging skill development of local actors for better understanding of data collection, strategic planning processes, administrative procedures and other coordination.⁴³ For the same, the G20 Working Groups can set universal metrics, common vocabulary, and shared evaluation and monitoring frameworks, largely drawing from existing frameworks and knowledge products. Similarly, the U20 Summit should focus on the capacity building of city stakeholders by providing access to expertise, policy advocacy, and peer learning.

iii. Facilitate the flow of climate finance.

To mobilise financial resources and meet the financial needs for climate projects, cities are faced with a number of capacity constraints,



such as limited knowledge of climate finance sources, low creditworthiness, and underdeveloped debt capital markets.⁴⁴ With support from the U20 and G20 working groups including the Sustainable Finance Working Group, city governments can increase their capacity to identify innovative finance mechanisms, such as property taxes and public-private partnerships, and mobilise climate financing.

Sustainable investment opportunities in emerging markets alone amount to US\$2.5 trillion annually up to 2030.⁴⁵ Multinational banks play an important role in enabling access to mainstream


finance for cities. This could be facilitated further by national approaches to strengthen the creditworthiness of cities.⁴⁶ Furthermore, multinational development banks have the capacity to offer technical assistance that can aid cities to access global financial markets and customised tools, such as credit insurance, loan loss reserves, and municipal green bonds. The G20 deliberations, through their Sustainable Finance Working Group, should therefore aim at tapping this potential and advocate for a greater role of multinational development banks in the financing of low-carbon urban projects by prioritising city-level investments.


Attribution: Sanjay Seth et al., "From Planning to Action: Rethinking the Role of Cities in Accelerating Net-Zero Transitions," *T20 Policy Brief*, June 2023.

Endnotes

- 1 Joeri Rogelj et al., “Mitigation Pathways Compatible with 1.5 C in the Context of Sustainable Development,” in *Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty*, V. Masson-Delmotte et al., ed., 93–174. In Press, 2016, https://www.ipcc.ch/site/assets/uploads/sites/2/2019/02/SR15_Chapter2_Low_Res.pdf.
- 2 Karen Seto et al., “From Low- to Net-Zero Carbon Cities: The Next Global Agenda,” *Annual Review of Environment and Resources* 46, no. 1 (2021): 377-415, doi:10.1146/annurev-environ-050120-113117.
- 3 United Nations Environment Programme (UNEP), “Smart, Sustainable and Resilient Cities: The Power of Nature-based Solutions,” UNEP, 2022, <https://wedocs.unep.org/bitstream/handle/20.500.11822/36586/SSRC.pdf?sequence=1&isAllowed=y>.
- 4 Richard R Florida, “The Economic Power of Cities Compared to Nations,” *Bloomberg CityLab*, March 16, 2017, <https://www.bloomberg.com/news/articles/2017-03-16/top-metros-have-more-economic-power-than-most-nations>
- 5 UN-Habitat, “World Cities Report 2022: Envisaging the Future of Cities,” Nairobi, Kenya: UN-Habitat, 2022, https://unhabitat.org/sites/default/files/2022/06/wcr_2022.pdf.
- 6 United Nations Environment Programme (UNEP) and International Resource Panel, “The Weight of Cities: Resource Requirements of Future Urbanization - Summary for Policymakers,” UNEP, 2018, <https://wedocs.unep.org/xmlui/handle/20.500.11822/31624>.
- 7 UNEP and International Resource Panel, “The Weight of Cities: Resource Requirements of Future Urbanization - Summary for Policymakers.”
- 8 Weilin Liao et al., “Amplified Increases of Compound Hot Extremes Over Urban Land in China,” *Geophysical Research Letters* 48, no. 6 (2021): e2020GL091252; Lei Zhao et al., “Global Multi-Model Projections of Local Urban Climates,” *Nature Climate Change* 11, no. 2 (February 2021): 152–57, <https://doi.org/10.1038/s41558-020-00958-8>. <https://doi.org/10.1029/2020GL091252>.
- 9 Judy L. Baker, “Climate Change, Disaster Risk, and the Urban Poor | Urban Development,” World Bank Publications, 2012, <https://elibrary.worldbank.org/doi/abs/10.1596/978-0-8213-8845-7>.
- 10 Seto et al., “From Low- to Net-Zero Carbon Cities: The Next Global Agenda”
- 11 Frank W. Geels et al., “Sociotechnical Transitions for Deep Decarbonization,” *Science* 357, no. 6357 (2017): 1242-1244. ISSN 1095-9203, <http://sro.sussex.ac.uk/id/eprint/70398/3/Geels-et-al-Accelerating%20transitions%20SECOND%20SUBMISSION%20FINAL.pdf>
- 12 UN-Habitat, “World Cities Report 2022: Envisaging the Future of Cities”

- 
- 13 Nicola Tollin et al., “Accelerated Urban Climate Action: How do the Revised Nationally Determined Contributions Stack Up?” *UN-Habitat*, 2022, https://unhabitat.org/sites/default/files/2022/08/ndcs_urbancontent_whitepaper_2022.pdf
 - 14 Ana Plescia-Boyd and UN-Habitat, “Enhancing Nationally Determined Contributions through Urban Climate Action,” *UN-Habitat*, 2020, https://climatepromise.undp.org/sites/default/files/research_report_document/undp-unhabitat-ndcsp-ndc-guide.pdf.
 - 15 UN-Habitat, “World Cities Report 2022: Envisaging the Future of Cities”
 - 16 “Sustainable Recovery 2020 Investing in Climate Change Adaptation Can Generate More Than USD 7.1 Trillion in Net Benefits,” *IISD*, June 15, 2020, <https://www.iisd.org/sustainable-recovery/news/investing-in-climate-change-adaptation-can-generate-more-than-7-1-trillion-usd-of-net-benefits/>.
 - 17 UN-Habitat, “World Cities Report 2022: Envisaging the Future of Cities”
 - 18 World Bank Group, “Investing in Urban Resilience: Protecting and Promoting Development in a Changing World,” Washington: World Bank, DC, 2016, <http://hdl.handle.net/10986/25219>
 - 19 World Economic Forum, “Inspiring Future Cities & Urban Services: Shaping the Future of Urban Development and Services Initiative,” World Economic Forum, 2016, https://www3.weforum.org/docs/WEF_Urban-Services.pdf
 - 20 Gerd Schwartz et al., eds., *Well Spent*. USA: International Monetary Fund, 2020, Accessed May 23, 2023, <https://doi.org/10.5089/9781513511818.071>
 - 21 Rhea Srivastava and Ayyoob Sharifi, “Smart Cities: Concepts and Underlying Principles,” In *Resilient Smart Cities*, eds. Ayyoob Sharifi and Pourya Salehi, 39-65. Cham: Springer, 2021.
 - 22 Salome Gongadze, “The Emergent Role of Cities as Actors in International Relations,” *E*, August 6, 2019, <https://www.e-ir.info/2019/08/06/the-emergent-role-of-cities-as-actors-in-international-relations/>.
 - 23 Rhea Srivastava, “Cities as Global Actors: Enhancing Urban Leadership at G20,” *The Economic Times*, January 30, 2023, <https://economictimes.indiatimes.com/news/international/world-news/cities-as-global-actors-enhancing-urban-leadership-at-g20/articleshow/97436720.cms?from=mdr>.
 - 24 “G20 Rome Leader’s Declaration,” Rome, October 30, 2021.
 - 25 “Joint G20 Energy-Climate Ministerial Communiqué,” July 23, 2021.
 - 26 Y. Xu and V. Ramanathan, “Well below 2 °C: Mitigation Strategies for Avoiding Dangerous to Catastrophic Climate Changes,” *Proceedings of the National Academy of Sciences* 114, no. 39 (September 26, 2017): 10321, <https://doi.org/10.1073/pnas.1618481114>. ; S. Szopa et al., “Chapter 6: Short-Lived Climate Forcers,” in *Climate Change 2021: The Physical Science Basis*, Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change, 2021), 7, https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Chapter_06.pdf.

- 
- 27 C40 Cities Climate Leadership Group and C40 Knowledge Hub, “Methane: Why Cities Must Act Now,” *C40 Knowledge Community*, July 2022, https://www.c40knowledgehub.org/s/article/Methane-Why-cities-must-act-now?language=en_US.
 - 28 P. Purohit et al., “Electricity Savings and Greenhouse Gas Emission Reductions from Global Phase-Down of Hydrofluorocarbons,” *Atmos. Chem. Phys.* 20, no. 19 (2020): 11305-11327, doi:10.5194/acp-20-11305-2020.
 - 29 United Nations Environment Programme (UNEP), “Smart, Sustainable and Resilient Cities: The Power of Nature-based Solutions,” UNEP, 2022, <https://wedocs.unep.org/bitstream/handle/20.500.11822/36586/SSRC.pdf?sequence=1&isAllowed=y>
 - 30 Global Covenant of Mayors for Climate and Energy (GCoM), “*Climate Emergency: Unlocking the Urban Opportunity Together*,” GCoM, 2019, <https://www.globalcovenantofmayors.org/wp-content/uploads/2019/12/2019-GCoM-Aggregation-Report.pdf>
 - 31 “Fixing a City’s Broken Public Bus Service,” *Development Asia*, March 22, 2023, <https://development.asia/case-study/fixing-citys-broken-public-bus-service>.
 - 32 “Fixing a City’s Broken Public Bus Service,” *Development Asia*, March 22, 2023, <https://development.asia/case-study/fixing-citys-broken-public-bus-service>.
 - 33 “C40-Bloomberg Philanthropies Awards: Seoul’s Transformative Electric Vehicle Programme,” *C40 Cities*, March 17, 2023, <https://www.c40.org/case-studies/c40-bloomberg-awards-seoul/>.
 - 34 Jo He-rim, “EV Sales Almost Double This Year in Korea,” *The Korea Herald*, November 15, 2021, sec. Transport, <https://www.koreaherald.com/view.php?ud=20211115000649..>
 - 35 “C40-Bloomberg Philanthropies Awards: Seoul’s Transformative Electric Vehicle Programme,” *C40 Cities*, March 17, 2023, <https://www.c40.org/case-studies/c40-bloomberg-awards-seoul/>.
 - 36 “Mumbai Becomes First South Asian City to Aim for Carbon Neutrality by 2050,” *India Today*, March 14, 2022, <https://www.indiatoday.in/cities/mumbai/story/mumbai-becomes-first-south-asian-city-aim-for-carbon-neutrality-by-2050-1925056-2022-03-14>.
 - 37 Gabriel Lanfranchi, Kate Kooka, Olivier Richard, and Malcolm Shield, “Delivering National Climate Action through Decarbonized Cities,” *T20 Japan*, 2019, <https://www.cippecc.org/wp-content/uploads/2019/06/t20-japan-tf3-decarbonized-cities-1.pdf>.
 - 38 Ana Plescia-Boyd and UN-Habitat, “Enhancing Nationally Determined Contributions through Urban Climate Action”
 - 39 Jennifer Layke, Eric Mackres, Sifan Liu, Nate Aden and Renilde Becqué, “Accelerating Building Efficiency: Eight Actions for Urban Leaders.” World Resources Institute, 2016, <https://www.wri.org/research/accelerating-building-efficiency>.
 - 40 Ana Plescia-Boyd and UN-Habitat, “Enhancing Nationally Determined Contributions through Urban Climate Action”
 - 41 TERI and South Pole, “Enabling Cities to Implement Innovative Sustainable Urban Solutions,” New Delhi: TERI, 2022, https://www.teriin.org/sites/default/files/files/KP2_Final.pdf.

- 
- 42 Megha Behal, Greg Kats, and Rashad Kaldany, “Ensuring That India’s Cities Remain Liveable Despite Extreme Heat: The Role of Smart Surfaces for Bhopal as Model for Urban India,” *May 2022*, <https://static1.squarespace.com/static/5b104d0b365f02ddb7b29576/t/627db609490def5e34fe394e/1652405770809/Smart+Surfaces+for+Bhopal+5-02Fin.pdf>
 - 43 Gabriel Lanfranchi, Kate Kooka, Olivier Richard, and Malcolm Shield, “Delivering National Climate Action through Decarbonized Cities,” *T20 Japan*, 2019, <https://www.cippecc.org/wp-content/uploads/2019/06/t20-japan-tf3-decarbonized-cities-1.pdf>.
 - 44 TERI and South Pole, “Enabling Cities to Implement Innovative Sustainable Urban Solutions,”
 - 45 Barbara Buchner et al, “*Global Landscape of Climate Finance 2021*,” *Climate Policy Initiative*, December 14, 2021, <https://www.climatepolicyinitiative.org/publication/global-landscape-of-climate-finance-2021/>
 - 46 Hannah Abdullah, Ursula Eicker, Karim Elgendy, Roxana Dela Fiamor, Namita Kambli, and Adeline Rochet, “Empowering Cities in the Race to a Just Net Zero Transition,” *T20 Indonesia*, 2022, https://www.t20indonesia.org/wp-content/uploads/2022/09/TF3_EMPOWERING-CITIES-IN-THE-RACE-TO-A-JUST-NET-ZERO-TRANSITION.pdf.



वसुधैव कुटुम्बकम्

ONE EARTH • ONE FAMILY • ONE FUTURE