by
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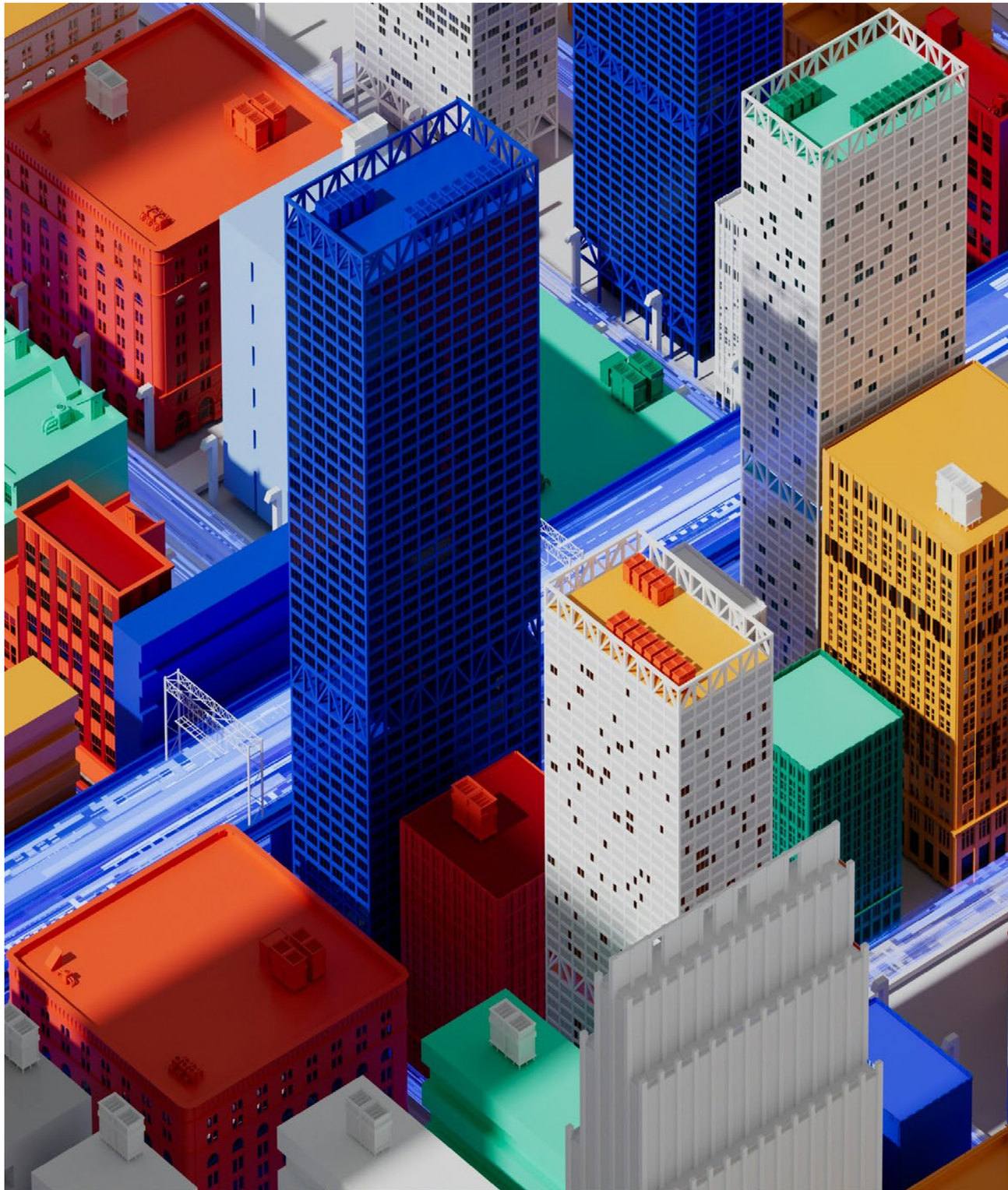
BUILDING URBAN RESILIENCE

Cities can lead on services, resources, and partnerships.

Cities are on the frontline of climate and urban challenges, and must lead efforts to build resilience in housing, services, and infrastructure in the wake of growing climate risks and post-pandemic vulnerabilities.

Five key areas for action — affordable housing, reliable municipal services, collaborative governance, equitable energy transitions, and resilient water management — have been identified, with real-life examples of solutions offered.

Urban resilience depends on inclusive policies, local innovation, and global partnerships. By sharing knowledge and acting collectively, cities can drive sustainable change and build a more equitable and climate-resilient future.



Cities have been the beating hearts of human civilisation over the past 5,000 years; today, they stand at the forefront of complex, interconnected challenges. With over half of the world's population now living in urban areas, a figure projected to rise to nearly 70 percent by 2050,[1] the urgency for transformative action in cities has never been clearer, especially given the complex dynamics between the natural and human systems, as well as the process of urbanisation. The challenges embedded in urban environments are further exacerbated by the worsening socioeconomic vulnerabilities in communities that are still grappling with the worst aftereffects of COVID-19.

Having observed the collision of climate change and urbanisation, I have argued that cities are on the front lines of dramatic climate impacts, and are uniquely positioned to lead adaptation efforts.[2] In fact, mayors and city leaders across both developed and developing countries continue to face rising expectations to deliver affordable housing, reliable municipal services, collaborative governance, a just energy transition, and resilient water management, all while navigating fiscal constraints and social inequities in addition to climate risks.

There is thus a need to develop urban resilience – the property of 'bouncing back better' from shocks to our urban systems that are becoming more common today. In my view, there are five critical areas for action in building urban resilience, which are drawn from scientific literature and case studies across Asia. This essay highlights how cities can reimagine their futures together, supported by policy frameworks, local innovation, and global collaboration. It concludes with a message of hope: cities, as hubs of human ingenuity and collective action, are uniquely positioned to lead the transition to a more resilient, inclusive, and sustainable world.

AFFORDABLE HOUSING: A FOUNDATION FOR INCLUSIVE URBAN FUTURES

Housing is more than shelter; it is a cornerstone of human dignity, social stability, and economic opportunity. Yet housing affordability remains a persistent challenge in cities worldwide. In Asia, this is acutely visible in megacities such as Mumbai, Manila, and Jakarta, where rapid urbanisation and informal settlements often outpace infrastructure and housing provision.[3]

Thankfully, innovative solutions are emerging. For example, Singapore's national public housing authority, the Housing & Development Board (HDB), has built a long-term and successful model of state-supported, high-density, and affordable housing that integrates green spaces, public services, and community facilities. Over 80 percent of Singapore's residents live in HDB flats, showcasing how government-led planning and financing can deliver quality, affordable housing at scale. In Thailand, the Baan Mankong programme empowers low-income communities to design, finance, and build their own housing through participatory planning and pooled resources, supported by a Thai public agency called the Community Organizations Development Institute (CODI).[4]

Key policy strategies for cities include:

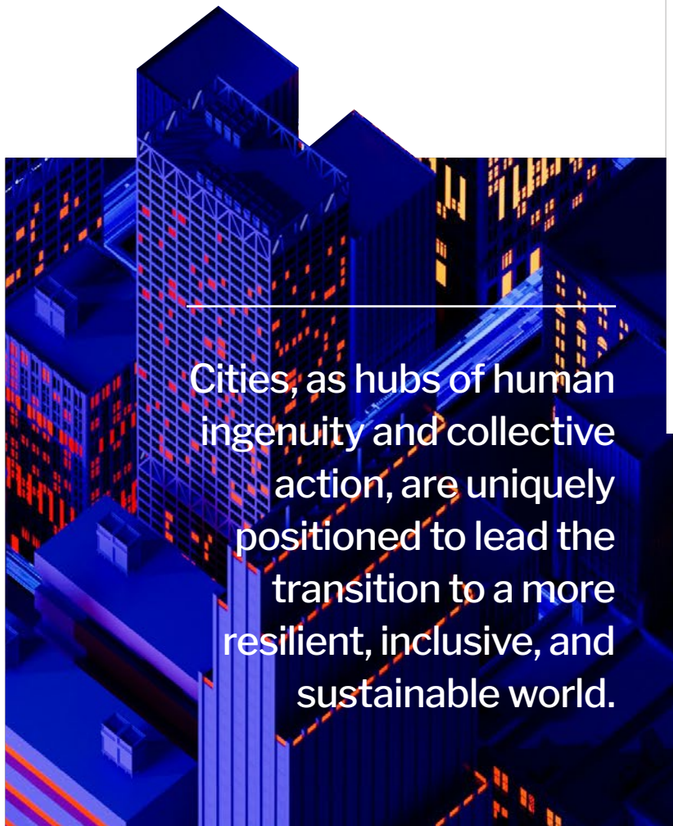
- *Reforming zoning laws to enable mixed-use, higher-density developments, which reduces land costs.*[5] Such developments also cut carbon footprint per capita because residents can live closer to jobs, services, and amenities, which leads to lower dependency on transport, including cars.
- *Investing in modular and prefabricated housing technologies, which can cut costs and carbon emissions.*[6] This approach can be found in several Asian cities, from Tokyo, Osaka, and Shanghai to Kuala Lumpur, Surabaya, and Singapore. In the Philippines, 53 two-storey row houses and one two-storey duplex house were built on a four-hectare land area (about the size of 7.5 soccer fields) in Cavite Province, providing quality and affordable housing.[7] The structures are also built to withstand typhoons and earthquakes – extreme events common to the area – up to a certain degree.
- *Repurposing underutilised public land for social housing, ensuring equitable access to central urban areas.*[8] This includes parking lots that have been mandated due to a regulatory requirement on a minimum number of parking lots for new developments. This often leads to underused parking in struggling downtown areas, thus limiting the space that can be used for other purposes, such as transit stations and even housing.

Affordable housing is not a luxury; it is an essential building block for equitable, resilient cities. Access to affordable and safe housing that stands up to extreme weather events, and which facilitates the delivery of essential services, is critical. Climate resilience is not a nice-to-have; it is a necessity in the strategy to build sustainable and climate-resilient cities.

RELIABLE AND EFFICIENT MUNICIPAL SERVICES: THE BACKBONE OF URBAN LIFE

Urban resilience depends on the delivery of basic services: waste management, public transport, energy, sanitation and sewerage, and emergency response. Yet many cities, particularly those in the Global South and Least Developed Countries (LDCs), struggle with fragmented systems, ageing infrastructure, and budgetary constraints. Disruptions in municipal services can exacerbate inequality, erode trust, and undermine resilience; in other words, the non-maintenance of physical infrastructure can have ramifications for social infrastructure.

Asian cities are demonstrating innovation in this arena. In Seoul, the "Smart Seoul Data of Things" initiative by the Seoul Metropolitan Government uses Internet of Things (IoT) sensors to monitor and analyse urban phenomena such as particulate matter and noise and light intensity, enabling responsive and efficient service delivery.[9] In Surabaya, Indonesia, a community-driven waste management programme offers free bus rides in exchange for plastic bottles, encouraging recycling while addressing mobility needs.[10] In fact, 60 percent of bus passengers preferred to pay with the plastic waste, leading to the city collecting 39 tonnes of plastic bottles in the first 10 months since its April 2018 inception. These examples highlight the potential of digital technologies and community engagement to improve urban services.



Critical actions for cities include:

- *Investing in digital platforms and sensor networks to monitor and optimise service delivery.*[11] This is illustrated by the implementation of smart water management in the city of Busan, South Korea. The city government put in place sensors such as smart water meters and other features that enabled automated detection and drainage of pollutants, as well as water reuse.
- *Empowering communities through co-production models, especially in informal settlements.*[12] For example, residents in Orangi Town, Karachi, worked with technical experts to address the acute lack of sanitation services. Specifically, in the absence of government-led efforts, they organised themselves at the small street level into committees to discuss and manage their sanitation needs. In turn, technical experts provided technical guidance, including the design of low-cost sanitation systems that could be constructed and maintained by the Orangi residents themselves.
- *Building capacity in municipal workforces to ensure that digitalisation complements, rather than replaces, human expertise.* Bangkok's Traffy Fondue platform routes the complaints of local issues by residents through the LINE messaging app to the appropriate municipal departments. This move has compressed resolution time from a month to just two days.[13] "Traffy" is a Thai shorthand for "traffic", while "fondue" is a clever play on the Thai word "fongdu", which means "to report".[14] This digital initiative has enhanced responsiveness in public services by empowering citizens. It has been recognised internationally as a model for innovation in climate-adaptive and citizen-centric urban governance.[15]

Urban systems are deeply interconnected; disruptions in essential services can cascade across sectors, amplifying vulnerabilities and undermining resilience. Reliable services are therefore the lifeblood of liveable cities; their operational effectiveness underpins public health, economic productivity, and social well-being.

COLLABORATIVE CITIES IN ACTION: LEARNING AND LEADING TOGETHER

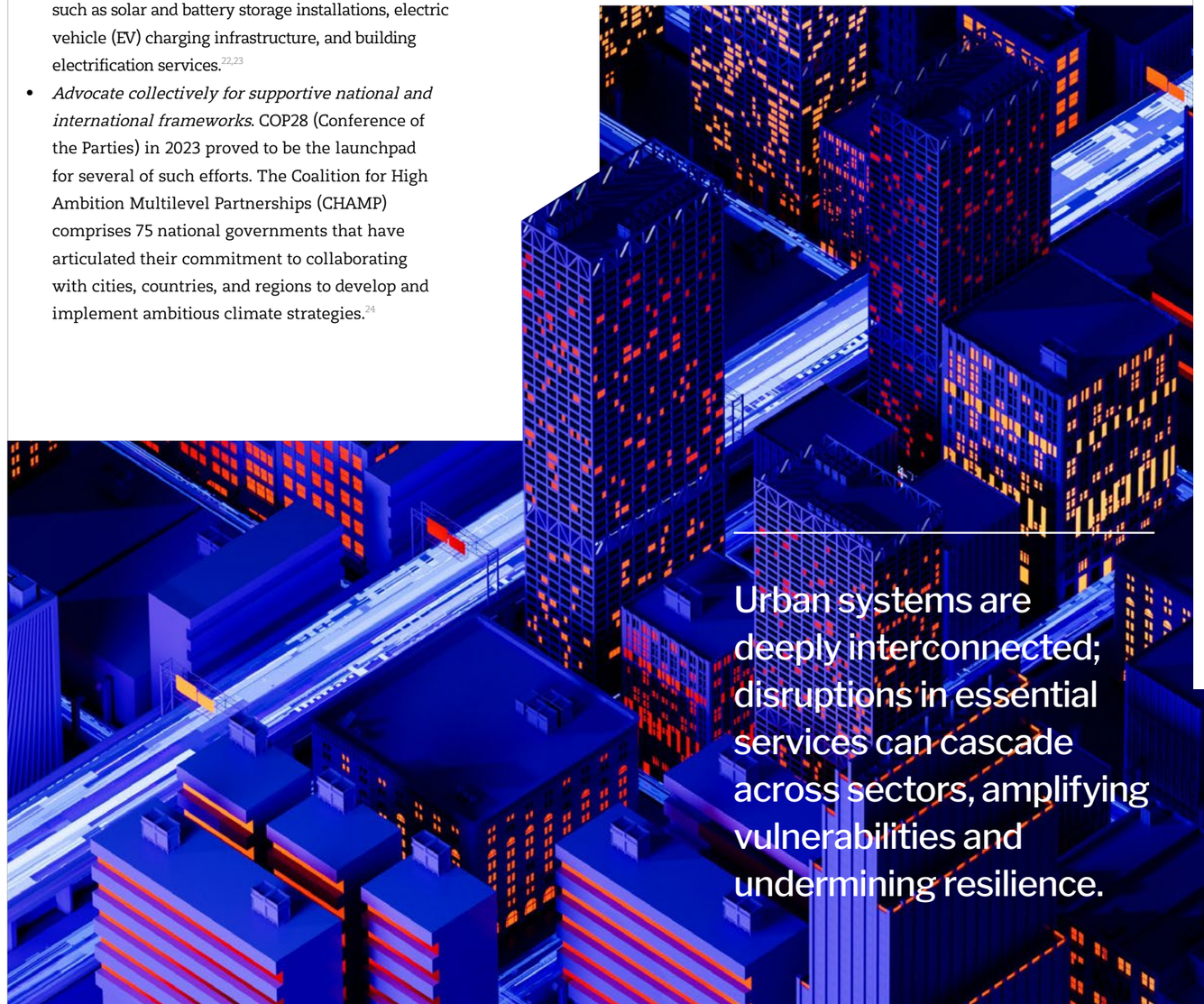
Urban challenges are global in nature, yet solutions must be localised. Collaboration among cities fosters knowledge exchange, policy innovation, and collective advocacy. City networks such as C40 Cities Climate Leadership Group, ICLEI (Local Governments for Sustainability), and the Global Covenant of Mayors for Climate & Energy have demonstrated the power of collaborative governance in driving climate action and resilience.[16]

Asian cities are also increasingly active in these networks, which are a channel to access funding and technical expertise. Membership of these networks thus enables these cities to address local climate vulnerabilities and align their actions with global commitments like the Paris Agreement. The Asian Cities Climate Change Resilience Network (ACCCRN) initiated by The Rockefeller Foundation has facilitated peer learning among cities in India, Indonesia, Vietnam, and the Philippines, leading to locally adapted climate resilience strategies.[17] In Bandar Lampung, Indonesia, ACCCRN supported the local government to implement a solid waste management system that helped reduce waste-induced flooding and its related health risks. This initiative was part of a broader effort to raise climate awareness, provide training, and create income-generating opportunities for vulnerable communities.[18] Collaborative procurement, such as pooled solar energy purchasing, has unlocked economies of scale and accelerated clean energy adoption.[19]

To strengthen collaboration, cities can:

- *Share best practices and policy tools through peer-to-peer learning platforms*. For example, apart from networks such as C40 and ACCCRN, municipalities could join companies that are part of the Urban Resilience Technology Approval Group (UR TAG) and collaborate on addressing infrastructure resilience challenges, especially in the use of technology for climate change adaptation. Cities such as Helsinki, Milan, and Antwerp have tapped UR TAG to learn from its members' experience in managing floods and water scarcity issues. They have also shared findings from their pilot projects, accelerating the adoption of proven, scalable interventions.[20,21]
- *Form joint procurement alliances for clean technologies and infrastructure*. Take for instance the Clean Power Alliance (CPA), a coalition of 35 US cities that collaboratively procure clean energy resources. Since 2022, the California-based CPA has issued multiple Requests for Proposals (RFPs) for projects such as solar and battery storage installations, electric vehicle (EV) charging infrastructure, and building electrification services.[22,23]
- *Advocate collectively for supportive national and international frameworks*. COP28 (Conference of the Parties) in 2023 proved to be the launchpad for several of such efforts. The Coalition for High Ambition Multilevel Partnerships (CHAMP) comprises 75 national governments that have articulated their commitment to collaborating with cities, countries, and regions to develop and implement ambitious climate strategies.[24]

Cities do not need to solve challenges alone; together, they can amplify impact, accelerate innovation, and shape global policy agendas. By sharing knowledge gained through real-life successes and setbacks, cities can build collective climate resilience without repeating each other's missteps. This spirit of collaboration not only improves on-the-ground conditions for local communities but also delivers macro-level changes needed for a more sustainable and equitable urban future.



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RETHINKING THE URBAN ENERGY TRANSITION: FROM INFRASTRUCTURE TO JUSTICE

Cities account for over 70 percent of global energy-related carbon dioxide emissions.[25] The urgency of the energy transition is clear, but so is the need for an equitable approach that ensures no one is left behind.

In Asia, cities are leading diverse energy transitions. Tokyo's cap-and-trade system, introduced in 2010, has reduced building emissions while encouraging investment in energy efficiency.[26] In particular, the scheme succeeded in doing so by setting emissions caps that motivated firms to adopt energy-saving practices and technologies that achieved both environmental and financial targets. In India, Ahmedabad's "cool roof" programme generates heat mitigation and energy savings in low-income areas by subsidising reflective roof coatings.[27] Such initiatives demonstrate that energy transition policies can also advance social equity and climate adaptation.

Key actions for cities include:

- *Developing district energy systems powered by renewables or waste heat, as seen in Seoul's district heating networks*.[28] To highlight, the city's resource recovery facilities process approximately 2,850 metric tonnes of solid waste daily, converting it into energy that supplies heating to around 518,000 households. This has led to a reduction of over 60,000 metric tonnes of greenhouse gas emissions annually by replacing liquefied natural gas with energy generated from waste incineration.[29]
- *Installing solar photovoltaics on public buildings such as schools, markets, and community centres to lower bills and model sustainability*.

- *Implementing subsidy reforms and targeted financing to ensure that low-income communities are not excluded from clean energy benefits, such as New York City's "One City: Built to Last" initiative.*[30] While it was a major retrofitting exercise aimed at improving the energy efficiency of the city's ageing infrastructure and cutting emissions, it also restructured energy subsidies and made energy more affordable for low-income residents. In Singapore, the Financing Asia's Transition Partnership (FAST-P) is offering US$500 million in concessional funding to drive clean energy projects across Asia. The Monetary Authority of Singapore (MAS)-backed project is aiming to mobilise some US$5 billion via private-sector investments focussing on renewable energy, energy efficiency, and decarbonisation projects. Like the New York City effort, it is hoped that clean and affordable energy will be made available to lower-income and high-risk communities.

Energy systems must be reimagined not only as technical infrastructure, but also as instruments of social and environmental justice. Marginalised communities rely on ready access to clean and affordable energy to improve livelihoods. Decision-makers who actively seek participation from such communities can ensure a more equitable distribution of decarbonisation's benefits, which helps individuals shape their own sustainable futures while safeguarding both people and the planet.

URBAN WATER RESILIENCE: MANAGING THE FLOW OF RISK

Urban water challenges, whether floods, droughts, or contamination, are intensifying due to climate change, with Asian cities facing some of the greatest risks.[31] Bangkok is one such city, with rising sea levels and land subsidence threatening to inundate vast areas by 2050.[32] Conversely, Chennai's 2019 water crisis, when reservoirs ran dry, underscored the vulnerability of many Indian and other Asian cities to drought.[33]

Resilient water management requires an integrated approach:

- *Nature-based solutions such as green roofs, permeable pavements, and urban wetlands can reduce flood risk while enhancing biodiversity.* Singapore's ABC (Active, Beautiful, Clean) Waters Programme is a leading example, transforming drains and canals into vibrant public spaces that improve water quality and flood resilience.[34]

- *Rainwater harvesting and decentralised water reuse, such as greywater recycling, can ease demand on centralised systems.* Greywater refers to waste water generated from domestic activities such as bathing, washing clothes, and cleaning. It does not include sewage from toilets. According to a case study on Bangalore's apartment complexes, greywater recycling was treated onsite, reusing it for non-potable purposes, such as toilet flushing and gardening.[35] By recycling and reusing greywater within the apartment premises, these complexes can significantly reduce their reliance on centralised water supply and sewage systems, thereby easing the pressure on municipal infrastructure and conserving scarce groundwater resources.
- *Reducing non-revenue water through leak detection and repair is critical, as up to 30 percent of urban water is lost through inefficient distribution.*[36] Non-revenue water refers to water that is produced but not billed due to infrastructural flaws (e.g., pipe leaks), commercial losses (e.g., inaccuracies in records and water theft), and unbilled authorised uses, such as for firefighting. While never fully addressed, high levels of such water reflect a waste of valuable resources and reduce the reliability of water supply systems.

Water is both a source of life and a vector of risk. Managing water wisely is essential for urban resilience and long-term sustainability.

CONCLUSION: A FUTURE OF HOPE, LED BY CITIES

Cities are often portrayed as the problem in global sustainability debates, yet they hold the greatest potential as drivers of decisive change. With bold leadership, collaborative action, and evidence-based policies, cities can build futures that are inclusive, equitable, and resilient. They can become beacons of innovation in affordable housing, stewards of efficient municipal services, champions of clean energy, protectors of water, and collaborators in the global sustainability journey.

The challenges may be formidable but the opportunities are even greater. Mayors and city leaders hold the keys to unlocking these opportunities, and courage, creativity, and commitment will be needed to shape not only the future of cities, but also the future of humanity itself.

The road ahead is challenging but it is also full of hope. Let us move forward together with conviction, compassion, and the knowledge that every step we take builds a better world for generations to come. AMI

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