



Champions of Change

How Cities and Regions are Designing
a Low Carbon, Climate-Resilient Future

THE
EARTHSHOT
PRIZE

ARUP

Acknowledgements

This report was made possible through the insights, expertise, and collaboration of a core group of partners committed to advancing climate action, urban sustainability and public sector innovation. We gratefully acknowledge their contributions.

Written by

ARUP

Arup

Arup advises on, plans and designs the future of the built environment. As a global consultancy with technical and advisory expertise across more than 150 disciplines, we bring a Total Design approach to our work with our clients. This is how we shape a better world.

As lead author of this report, Arup brings extensive global expertise on how public sector organisations can successfully deliver climate action, socio-economic value and resilience providing a blueprint on how to overcome typical challenges from concept through to scaling.

Arup co-convened a working group of public sector experts who identified and advised on exemplar solutions led by local public sector leaders for Earthshot Prize recognition.

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THE EARTHSHOT PRIZE

The Earthshot Prize

Inspired by President John F. Kennedy's moonshot challenge, The Earthshot Prize is the world's most impactful and prestigious environmental award, designed to mobilise a decisive decade of action for the planet. At the heart of its mission is a simple equation: urgency plus optimism equals action.

Launched in 2020, The Earthshot Prize identifies, celebrates, and backs ambitious climate leadership from every corner of the globe, including Indigenous communities, entrepreneurs, city leaders, and governments, all working to solve the planet's most urgent environmental challenges.

The Prize focuses on five critical Earthshots: Protect and Restore Nature, Clean Our Air, Revive Our Oceans, Build a Waste-Free World, and Fix Our Climate. Each year, 15 finalists are selected, with five receiving £1 million each to help accelerate, scale or replicate their solutions, recognising both their achievements and their potential for global impact.

More than an award, The Earthshot Prize is a global platform and network that connects innovators, funders, businesses, and communities to back climate leaders and restore confidence that solutions to our greatest environmental challenges are not only possible, but already underway. This report draws on insights from Earthshot's growing global portfolio of high impact innovations.

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Earthshot Finalists and Innovators:

City of Bogotá (Winner), The State of Gujarat (Finalist), City of Guangzhou and the Guangzhou Public Transport Group (Finalist), City of Phoenix, Welsh Government, City of Cape Town and GreenCape, eThekweni Municipality, City of Malmö, City of Oslo, Tamil Nadu Green Climate Company.

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Forewords

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Foreword

The Earthshot Prize



A decade after the Paris Agreement, the gap between global climate commitments and real-world delivery remains stark. While national progress has been uneven, cities and regions across the world are showing that progress is possible when ambition is matched with practical leadership and sustained commitment. Local governments are on the frontline of climate impacts, but they are also among the most effective drivers of real-world solutions that deliver today while safeguarding the future.

This is why the role of cities and regions matters so profoundly. They manage infrastructure, shape markets, convene partners and deliver services that directly affect people's day-to-day lives, all whilst operating at scale. They do so under real constraints: limited resources, fragmented mandates and short political cycles. The cities and regions featured in this report demonstrate that these challenges do not prevent progress or leadership. With clear priorities, strong institutions and the willingness to innovate, they are becoming powerful drivers of climate progress.

The Earthshot Prize was created to identify, celebrate and back ambitious climate leadership from every corner of the globe that meets the urgency of the moment. Inspired by the Moonshot, it exists not simply to recognise excellence, but to help the most promising ideas grow, adapt and be replicated. From the outset, The Earthshot Prize has understood that many of the most impactful climate solutions are being developed and delivered by the public sector. Cities and regions are not only implementers of policy; they are innovators in their own right.

Through its global search and its public sector working group, The Earthshot Prize has helped surface initiatives that are practical, credible and already delivering impact. The solutions highlighted here reflect a wide diversity of contexts, geographies and governance models. What unites them is not a single approach, but a shared set of principles: leadership that is prepared to act, institutions that learn and adapt, partnerships that cut across silos, and a focus on outcomes that last beyond individual projects or political terms.

This report captures those lessons. It shows how cities and regions have navigated complexity, built coalitions and embedded climate action into core systems such as budgeting, planning and public service delivery. It also demonstrates that successful innovation is rarely about copying a model wholesale. Instead, it is about adapting proven ideas to local realities while holding firm to clear principles. That balance is what enables scale.

The Earthshot Prize's role is to support that progress. By sharing evidence, convening leaders and amplifying what works, the Prize helps ensure that innovation does not remain isolated. The examples in these pages are not endpoints; they are starting points for others to learn from and to build upon.

The challenge ahead is to move faster and with greater confidence. Cities and regions cannot act alone, but they do not need to start from scratch. The solutions presented here show what is already possible. Applying these lessons widely and decisively is the next step. The time to act is now, and the opportunity to shape a more resilient, low-carbon future is firmly within reach.

Jason Knauf,
CEO, The Earthshot Prize

Foreword

Arup



In a world where climate change threatens our communities, the role of local leadership and public sector innovation has never been more critical. This report is a testament to the power of collaboration, pragmatic action, and the steady evolution of ideas into lasting change.

I have always believed that real progress emerges not from isolated breakthroughs, but from harnessing our collective strengths, building coalitions, and bravely navigating complexity with transparency and trust.

The stories and insights shared here reflect what I see as the pillars of effective climate leadership: breaking down silos, championing a shared vision, and embedding innovation into the very fabric of our institutions and cultures. Whether it is London's incremental approach to clean air, Oslo's commitment to climate budgeting, or Durban's coalition-driven river management, these examples demonstrate how local ambition and ingenuity can reshape policy, deliver practical results, and inspire global change.

I am particularly struck by the importance of dialogue and partnership, from engaging communities and industry, to forging new paths with academia and civil society. It is through these relationships that we unlock new resources, challenge our assumptions, and build the resilience needed to weather future storms. As we look to scale and replicate these successes, let us remember that our greatest asset is our willingness to learn from one another and to adapt with honesty and humility.

The blueprint set out in this report is not a prescription, but an invitation. It calls on all of us – mayors, city officers, partners – to use what we have, to lead with courage, and to share our journeys so that climate leadership becomes not the exception but the expectation. The next chapter of climate innovation will be written by those who choose to act now, together.

I hope these key insights inspire you to step forward, experiment boldly, and join a growing movement of changemakers shaping the future for cities, regions and generations to come.

Jerome Frost
CEO, Arup

An aerial view of a dense city skyline, likely Guangzhou, China, featuring numerous skyscrapers and greenery in the foreground. The text "Executive summary" is overlaid in white on the left side of the image.

Executive summary

02

Executive summary

Authored by Arup and The Earthshot Prize, this report demonstrates how cities and regions are already delivering credible, scalable climate innovation, and seeks to inspire others to take action. Drawing on eleven case studies across four Earthshots from around the world, it extracts practical moves local leaders use to go from idea to delivery to scale, and distils them into a blueprint that any city or region can adapt to its context.



The evidence is clear: communities across the world are already living with the impacts of our climate and environmental crises intimately – extreme heat, floods, polluted air – and these costs are reshaping daily life.

City and regional governments, the institutions closest to communities and often times responsible for essential services and infrastructure, carry the greatest responsibility to respond. Urban areas account for more than 70% of global CO₂ emissions and ~75% of energy use; they are also where climate impacts are felt most acutely. The risks are greatest in many Global South cities and regions which contributed least to the crisis yet have the fewest resources for resilience. With rapid urbanisation and a \$94 trillion infrastructure need to 2040, avoiding lock-in to high-carbon, climate-vulnerable systems requires a fundamental shift in how places are planned, delivered and governed.

Therefore, cities and regions must prioritise:

- **In high emitting cities and regions,** decarbonise and strengthen existing systems.
- **In rapidly growing and emerging regions,** build climate-resilient, low carbon systems from the start.

Even with growing recognition of their role, cities and regions face persistent barriers: fragmented governance, funding gaps, limited human and technical capacity, and challenges in scaling successful initiatives. These are all common challenges that are shared across the world.

Cities and Regions can lead on ambitious and innovative climate action: Eleven solutions from around the world

Despite these challenges, local leaders are demonstrating that change is possible. Faced with limited funding, constrained human and technical capacity, and lack of political will, local leaders across the world are delivering through agility, resourcefulness and resilience. They are using existing powers, building coalitions, and aligning day-to-day decisions with climate ambitions.

The eleven solutions featured in this report demonstrate just that. They span multi-system policies and targeted programmes at different maturities. They are:

Solution name	Earthshot Category	Location	Solution description
Bogotá Urban Mobility Plans 2025 Winner	• Clean Our Air	Bogotá, Colombia	A citywide mobility transformation that prioritises active, equitable transport for Bogotá's 9 million residents, anchored in integrated policies that address cycling, walking, clean air zones, land use, climate action, governance, and a culture of participation.
Guangzhou Bus Electrification Project 2025 Finalist	• Clean Our Air	Guangzhou, China	The world's largest and fastest citywide transition to a fully electric bus fleet, positioning Guangzhou as a global leader in zero emission public transport. The Chinese City of Guangzhou has transformed its transport system and improved air quality for its 24 million citizens.
Surat Emissions Trading Scheme 2025 Finalist	• Clean Our Air	Surat, Gujarat, India	The world's first emissions trading scheme for particulate matter, incentivising industries to reduce pollution through a market-based "cap-and-trade" system that provides economic incentives for industries across the region to reduce their emissions.
London's Ultra Low Emission Zone (ULEZ)	• Clean Our Air	London, United Kingdom	London's ULEZ is the world's largest clean air zone of its kind, charging a daily fee to high-emission vehicles to drive within the zone, reducing nitrogen dioxide and particulate matter.
Wales Wellbeing of Future Generations Act (2015)	• Fix Our Climate	Wales, United Kingdom	The Well-being of Future Generations (Wales) Act is a landmark piece of legislation that provides public sector organisations with the ambition, permission and legal obligation to improve the social, cultural, environmental and economic wellbeing of the people of Wales.
HeatReady Phoenix (Office of Heat Response and Mitigation)	• Fix Our Climate	Phoenix, Arizona, United States of America	The Office of Heat Response and Mitigation is the first publicly funded 'heat office' in the United States. Its job is to ensure a fulltime focus on heat issues: helping local populations to deal with the effects of heat, implementing citywide heat mitigations and enabling cross-departmental coordination on this growing issue.
Climate Neutral Malmö 2030	• Fix Our Climate	Malmö, Sweden	In one of Europe's most ambitious citywide climate transition plans, Malmö is aiming to achieve climate neutrality by 2030. The city's integrated approach targets emissions across the whole city embedding climate action within a broader agenda of social inclusion, innovation and sustainable growth.
Oslo's Climate Budget	• Fix Our Climate	Oslo, Norway	A world-first citywide climate budget, making every municipal agency accountable for annual emissions reductions through the city's core financial processes.
Durban Transformative Riverine Management Programme (TRMP)	• Build a Waste-Free World	Durban, South Africa	The Durban Transformative Riverine Management Programme is one of Africa's most ambitious river restoration efforts, uniting communities, city government and partners to rehabilitate and more effectively manage Durban's river systems.
Western Cape Industrial Symbiosis Programme (WISP)	• Build a Waste-Free World	Cape Town, South Africa	WISP is a free service that reduces waste at source and enables reuse and repurposing, by matching one business's byproducts to another's needs, also supporting recycling by converting waste into new raw materials.
Tamil Nadu Climate Action for Resilient Ecosystems and Societies (CARES)	• Protect & Restore Nature	Tamil Nadu State, India	India's first government-backed, cross-sector climate company, unites over 30 departments to deliver climate action at scale, through a unique Section 8, not-for-profit model.

Principles for public sector-led climate innovation

Drawing on the common findings and key lessons from the case studies, this report presents a practical blueprint for local climate innovation, structured around three key stages of a solution's life cycle: preparing for change, implementing effectively and scaling up and out.

Preparing for change

- **Be nimble and incremental:** real progress comes from adapting existing instruments and programmes, using what is already in place to introduce new solutions.
- **Champions make the difference:** visible and committed leaders are critical for setting the agenda and building support across partners.
- **Pursue integration within and beyond public sector:** effective action requires strong vision alignment across tiers of government and with industry, academia, and communities through frequent, neutral forums and clear mandates.
- **Communicate early and proactively:** open, relatable, and evidence-based communication can make the difference between success and failure.
- **Signal through targeted spending:** directing municipal funding towards climate action demonstrates intent, builds legitimacy, and encourages wider support from other funders.

Implementing effectively

- **Pilot with purpose:** pilot schemes are essential for proving concepts and unlocking delivery, but they must be conceived as part of a broader rollout plan.
- **Define clear ownership for implementation:** the success of solutions relies on skilled, empowered teams who keep projects on track.
- **Strong ecosystems are built by design, not by default:** ecosystems are sustained through mutual benefit and transparency among all partners, with clear processes for working together.
- **Put data to work to learn, adapt and improve:** regular monitoring and evaluation helps cities and regions adapt their solutions, make better decisions and show what works.
- **Make a robust financial and economic case:** securing funding means demonstrating benefits and tailoring the case for investment around funders' priorities.

Scaling up and out

- **Make innovations routine, not exceptional:** embedding solutions into the right parts of government and the policy framework ensures that they thrive beyond individual leaders.
- **Aspire to a cultural shift:** lasting institutionalisation happens when solutions become part of everyday life and shape citizens' identities.
- **Join forces with partners to go further and multiply impact:** partnerships and networks expand what is possible for cities and regions, scaling solutions and influencing change beyond their own borders.
- **Transition to financial sustainability:** lasting action often requires creative and innovative funding approaches to keep solutions going.
- **Share values over blueprints:** the best replication comes from sharing core values behind solutions, so others can adapt them to their own context.

Conclusion

Cities and regions are proving that ambitious climate action is possible, regardless of context or constraints. By acting now, by experimenting, collaborating, and sharing, local leaders can shape a resilient, low-carbon future. This report is both a celebration of progress and a call to action for all stakeholders to step forward and join a global movement of climate leadership.

Introduction

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Cities and regions are at the forefront of climate action

The evidence is resoundingly clear: communities across the world are already living with the impacts of our climate and environmental crises intimately.

Extreme heat, flooding, polluted air, rising energy costs and climate-driven displacement are no longer abstract warnings. They are reshaping daily life; homes repeatedly flooded, energy bills spiking after heatwaves strain energy grids, and children breathing air that is unsafe to play in. These impacts are felt most acutely in densely populated and economically vulnerable places, where people have the least protection against climate shocks and the fewest resources to recover. City and regional governments – the institutions closest to communities and responsible for essential services and infrastructure – carry the greatest responsibility to respond.

Urban centres often provide the clearest window into what is at risk and at the same time, reveal opportunities for local leadership. Estimates suggest that urban centres are responsible for more than 70% of global carbon dioxide emissions and consume approximately 75% of the world's energy.¹ Yet the challenge extends far beyond carbon. Water pollution, plastic waste, biodiversity loss and other environmental crises are also largely driven by current patterns of urban development.

At the same time, cities are on the frontline of experiencing climate impacts. Extreme weather events – from severe flooding to prolonged heatwaves – are placing immense pressure on urban systems, exposing their vulnerabilities. For the 1.1 billion people living in low-income and informal settlements, the risks are severe.² These communities, often in the Global South, have contributed the least to the crisis yet are also the least resilient to its impacts. Inadequate housing, drainage and public services leave them disproportionately exposed to flooding and extreme heat.³ The consequences go beyond physical risks, encompassing poorer health, economic insecurity and displacement.

The stakes are high. Global infrastructure need is projected to reach a staggering \$94 trillion by 2040, \$15 trillion of which is unaccounted for⁴ and primarily concentrated in the Global South. Without a radical shift in how infrastructure is planned, delivered and governed, the world risks locking generations into high-carbon, climate-vulnerable systems.

Yet this moment presents a historic opportunity. As the world continues to urbanise, with around seven in 10 people globally projected to live in cities by 2050⁵, cities and regions have the power to shape a more resilient, low carbon future, particularly in emerging, secondary cities in Asia and Africa. These new urban centres have the potential to embrace innovative models of development, if given the right tools and support.

Therefore, cities and regions must prioritise:

- **In high-emitting cities and regions**, decarbonise and strengthen existing systems.
- **In rapidly growing and emerging regions**, build climate-resilient, low carbon systems from the start.



“Our success will [...] be measured in towns, cities, regions and States everywhere. The very places that local leaders serve. Local leaders are often going further and faster than their national governments to tackle the climate crisis. But I must ask you to do more.”

General António Guterres
UN Secretary-General

Yet, the public sector faces complex challenges in adopting and scaling solutions

The global agenda is increasingly recognising the central role of cities and regions, reflected in global climate forums such as United Nations Conference of the Parties (COP) summits, global urban forums, and the anticipated Intergovernmental Panel on Climate Change (IPCC) Special Report on Cities and Climate Change in 2027.

This shift was reinforced at the recently concluded COP30, held in Belém, Brazil, which centred local climate action and emphasised the increasingly central role that urban and regional actors play in accelerating climate action, even in the absence of full national commitments. Key outcomes included growing commitment to the Coalition for High Ambition Multilevel Partnerships (CHAMP) launched in 2023 and the launch of Plan to Accelerate Solutions (PAS) to serve as the operational arm of CHAMP, both designed to enhance multi-level cooperation. COP30 also saw the expansion of urban adaptation and resilience programmes such as “Beat the Heat”, with 200 cities and 72 countries pledging to localise the Global Cooling Pledge.

Yet, cities and regions still face a common set of barriers that limit delivery.

Local and regional authorities often operate within fragmented governments, with unclear mandates and limited powers over systems with the highest potential for impact. Coordinating action across complex networks of local stakeholders adds further difficulty.

Cities and regions also face persistent funding gaps that stall high-potential projects. Public sector capacity is often stretched – small teams, limited technical expertise and competing demands across other departments – further slow progress, while gaps in data and measurement make it hard to prioritise action. Even where cities and regions do succeed, their achievements are rarely amplified, limiting opportunities for replication and scale.

Ultimately, the challenge is not the urgency of environmental risk, which is well understood, but the lack of practical guidance on how to unlock the enabling conditions for delivery, or how to navigate around the barriers that stand in the way.



Despite these barriers, delivery is happening

Even with these obstacles, cities and regions are already proving that change is possible. The same factors that make them global economic powerhouses, attracting investment, talent, and population growth, also position them uniquely to lead on climate action.

Their proximity to citizens gives them unparalleled insight into local needs, enabling policies that resonate and build trust. In addition to their hard power – budgets, procurement, and regulatory authority – cities wield soft power: convening diverse stakeholders, shaping narratives and creating coalitions that drive systemic change.

Beyond championing ambition, cities and regions are uniquely placed to deliver climate action. They manage significant budgets, covering day-to-day operations, procurement of goods and services, and large capital investments. This spending can be purposefully directed towards impactful and innovative action, while influencing supply chains through regulation. They can also act as testbeds, by piloting solutions in real-world settings, and create the enabling conditions for a wider rollout.

Few other actors have the power to build local coalitions across sectors, levels of government, and communities, and at the same time be active members of global networks, sharing knowledge and building capacity across regions.

Several cities have already been recognised by The Earthshot Prize for their ability to leverage these strengths for impact at scale. The city of Bogotá, awarded an Earthshot Prize in 2025, has reduced fine particulate matter by 24% since 2018 through bold urban mobility and clean air policies, reshaping how eight million people move and live. The State of Gujarat, recognised as a 2025 Finalist, pioneered the world's first particulate trading scheme – enabling economic growth while improving air quality. The city of Guangzhou, also a 2025 Finalist, has electrified tens of thousands of buses and taxis, transforming transport for 24 million citizens.

Past honourees reinforce this momentum. Freetown's Treetown initiative empowers residents to plant and digitally track trees, restoring ecosystems, boosting climate resilience and creating green jobs. Milan's Food Waste Hubs transform food systems, recovering and redistributing surplus food, cutting waste and emissions, while supporting vulnerable communities. Amsterdam pioneered a circular economy by rethinking waste in food, fashion, and construction, setting a global example for sustainable urban living.

This report aims to inspire local leaders by celebrating 11 innovative city- and regional authority-led solutions – including 2025 Finalists and Winners – and highlighting the factors that have enabled their success.⁶

Selected from more than 130 public-sector innovations considered for The Earthshot Prize, these case studies trace the journey from idea to implementation, scaling and replication. Together, they demonstrate that, regardless of context, any city and region can deliver climate innovation when ambition meets action. And this report offers practical guidance on how to do so.

Selection criteria

The 11 solutions highlighted in this report have been selected for their impact, innovation, and ambition aligned with The Earthshot Prize Assessment Criteria.

In addition, when identifying city- and region-led solutions, the following attributes were considered particularly important:

- **Policy innovation:** harnessing the unique levers available to public authorities and showcasing solutions where policy itself can drive transformation, rather than relying solely on technological advances.
- **Scale of change:** demonstrating that significant, positive progress is possible within cities and regions, thereby raising the ambition of city and regional authorities.
- **Daring leadership:** valuing solutions that go beyond conventional boundaries of public-sector leadership, challenging typical norms and expectations to spark urgency and action.
- **Clear principles:** embedding clear, transferable principles that enable replication. Other authorities can adopt these principles and adapt them to their unique contexts, ensuring solutions remain effective across diverse geographies.
- **Continuity of action:** showcasing solutions that endure across political cycles, signalling long-term commitment and stability in the face of climate challenges.

The role of the Working Group

The solutions presented in this report were identified and selected by The Earthshot Public Sector Working Group, co-convened by Arup and The Earthshot Prize.

This panel brings together 16 global leaders and organisations driving transformative change in cities and regions. The group intentionally reflects diverse voices from across a range of geographies, disciplines and sectors, including those less often heard in global climate discussions. Their collective expertise ensures that the solutions selected demonstrate not only impact, innovation and ambition, but also relevance across all contexts. This is vital, as climate innovation must be embedded into the development pathways of every city and region, no matter its scale or stage of growth.

Why this report

This report wants to inspire and enable public sector leaders and senior officers, both of which are central to delivering locally led climate innovation.

To mayors, governors, senior leaders and public sector decision-makers: you will gain insight into how leaders in cities and regions can cultivate the political and institutional mandate needed for climate ambition to thrive. The report also highlights the value of sharing success stories, not just amongst constituents but across the world, and encourages local leaders to do the same.

To public sector officers and managers delivering projects: this report presents examples of how officers on the ground have connected ecosystems, overcome delivery barriers, and worked to scale impactful solutions. By drawing on the lessons of the solutions in this report, you will be equipped with the know-how for how you can deliver similar outcomes in your own contexts.

Other audiences: successful public-sector-led climate initiatives are built on coalitions that extend beyond the public sector:

- Universities and research institutions will see how partnerships with cities and regions can ground research in practice and elevates the role of high-quality evidence for decision-making.
- Private sector partners will see how collaboration with cities and regions can open new markets, de-risk innovation, and amplify shared impact.
- Funders, donors, and insurers will discover that cities and regions are delivering credible, tested solutions that are ready to evolve, scale, and replicate with the right investment.
- Citizens will see their role in delivering climate innovation, particularly how civic participation makes solutions more impactful and resilient.

This report consists of two key parts:

1 - Case studies

If you are looking for detailed examples of climate innovation in action, read the in-depth case studies of the eleven solutions featured.

Here you will find the context, challenges, and journey from idea to implementation for each innovation. Each case study provides technical and operational insights, alongside key learnings about what worked (and what did not). The diversity of approaches shows how the solutions tackled challenges in their own ways. These case studies are designed to provide the evidence base and practical examples that underpin the rest of the report.

2 - Key insights

If you are looking for an actionable 'blueprint' of what enables climate innovation, read the key insights section. This distils the experiences of the featured solutions into practical lessons for senior leaders and public sector officers. It can be read as a standalone section, offering clear guidance that can be applied directly to your own context. The key insights are structured under three sections:

Chapter 1 – Preparing for change

Fostering ideation, acceleration and building strong ecosystems.

Chapter 2 – Implementing effectively

Overcoming barriers to delivery.

Chapter 3 – Scaling up and out

Scaling solutions and inspiring replication.

Eleven solutions from around the world

04

Eleven solutions from around the world

The working group selected 11 exemplar solutions being delivered by cities and regions worldwide. The solutions span four out of five Earthshots: **Protect and Restore Nature; Clean Our Air; Build a Waste-Free World; and Fix Our Climate.**

Solutions also vary widely by instrument, level of government, and maturity:

- **Instruments:** some solutions are multi-system policies or plans, more commonly seen in regions of the Global North; others are sector-specific programmes, often emerging from the Global South.
- **Tier of government:** delivery operates across multiple levels of authority, from mayoral offices to state administrations – and, in one case, through a national mandate.

- **Maturity of solution:** solutions range from early-stage initiatives moving towards institutionalisation, to established models scaling across state and national geographies.
- **Impact:** all solutions demonstrate measurable social, economic and environmental benefits. While delivering various co-benefits, they each have a different focus – whether emissions reduction, avoided damages from ecological events, biodiversity gains and land restoration, or the creation of green jobs and wider economic value.

The throughline? Despite their diversity, these solutions collectively demonstrate how public-sector leadership can both champion environmental sustainability and innovate to deliver tangible climate action, whatever the conditions or constraints.

Locations of the eleven solutions



1	Bogotá Urban Mobility Plans	A mobility strategy prioritising walking, cycling and public transport to reduce emissions and improve equity.
2	Guangzhou Bus Electrification Project	A large-scale transition to electric buses and taxis, supported by smart energy platforms and battery reuse.
3	Surat Emissions Trading Scheme	The world's first cap-and-trade system for particulate matter and India's first pollution trading market
4	London's Ultra Low Emission Zone	A pioneering clean air scheme that charges high-emitting vehicles a charge for driving within the ULEZ.
5	Wales Well-being of Future Generations Act (2015)	A policy that influences government policies from transport, waste, agriculture, energy, education, nature and climate action.
6	HeatReady Phoenix (Office of Heat Response and Mitigation)	A city-wide governance and investment model to mitigate extreme heat through infrastructure, shade and public health initiatives.
7	Climate Neutral Malmö 2030	An ambitious city-wide drive to be a climate neutral city by 2030.
8	Oslo's Climate Budget	Funding mechanism to direct public investment into climate action.
9	Durban Transformative Riverine Management Programme	A community-driven programme rehabilitating degraded rivers to restore ecosystem services and reduce flood risks.
10	Western Cape Industrial Symbiosis Programme (WISP)	A matchmaking service connecting businesses to reuse each other's waste, fostering a circular economy.
11	Tamil Nadu CARES	A state-wide climate governance model integrating wetlands, forests, coastal ecosystems, and district-level missions to build resilience and restore biodiversity.



• Clean Our Air

Bogotá Urban Mobility Plans

2025 Winner

→



• Clean Our Air

Guangzhou Bus Electrification Project

2025 Finalist

→



• Clean Our Air

Surat Emissions Trading Scheme

2025 Finalist

→



• Clean Our Air

London's Ultra Low Emission Zone (ULEZ)

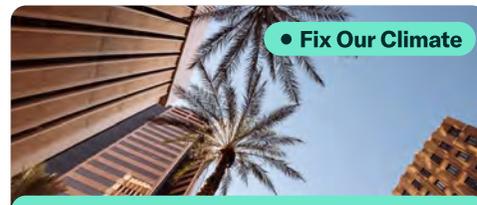
→



• Fix Our Climate

Wales Well-being of Future Generations Act (2015)

→



• Fix Our Climate

HeatReady Phoenix (Office of Heat Response and Mitigation)

→



• Fix Our Climate

Climate Neutral Malmö 2030

→



• Fix Our Climate

Oslo's Climate Budget

→



• Build a Waste-Free World

Durban Transformative Riverine Management Programme

→



• Build a Waste-Free World

Western Cape Industrial Symbiosis Programme (WISP)

→



• Protect & Restore Nature

Tamil Nadu CARES (Climate Action for Resilient Ecosystems and Societies)

→

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• Clean Our Air

Bogotá Urban Mobility Plans

2025 Winner

City: Bogotá

Country: Colombia

Website: bogota.gov.co

Year of implementation: 2021

Key players: Bogotá's Secretariat of Mobility



The solution

A citywide transformation that prioritises active, equitable transport for Bogotá's 9 million residents, anchored in integrated policies that encompass cycling, walking, clean air zones, land use, climate action, governance and a culture of participation.

By embedding health, inclusion, and sustainability into urban planning, Bogotá has shifted the balance from private vehicles to people-centred mobility, setting a new standard for Latin American cities.

The challenge

By the 1990s, Bogotá's transport system was dominated by private cars and unregulated public transport provision. The city struggled with increasing vehicle numbers, insufficient road infrastructure and imbalanced land uses. These factors led to high levels of air pollution, traffic congestion and road accidents, disproportionately affecting pedestrians and cyclists. Between 1998 and 2005, air pollution reached critical levels: citywide average PM10 concentrations were 65 µg/m³, exceeding the U.S.EPA standards of that time (50 µg/m³) and were well above today's WHO recommended limit. The rising use of private vehicles and the lack of safe, accessible infrastructure for active travel urgently demanded a new approach to reclaim public space, improve air quality and promote equitable access to sustainable transport.

Beyond the world-renowned Sunday Ciclovía – the first major step in promoting recreational bicycle use in Bogotá – other key early milestones in the transformation of the city's mobility system included the introduction of the TransMilenio Bus Rapid Transit (BRT) system and the development of the bike lanes in the early 2000s. Despite these significant efforts, the city still lacked a cohesive, long-term strategy to integrate mobility, environmental sustainability, and public well-being.

From idea to agenda

In response, Bogotá developed its Bicycle (2021) and Pedestrian (2023) Public Policies, supported by the Safe and Sustainable Mobility Plan (2023). Their vision was to institutionalise long-term, cross-sectoral policies that would transcend political transitions and deliver lasting improvements. Collectively, these policies have created a citywide, institutionalised transformation for cycling, walking, clean air zones, land use, climate action, governance, and a culture of participation.

These mobility plans and policies are fully integrated with Bogotá's land use master plan known as the Plan de Ordenamiento Territorial (POT). The POT prioritises compact urban development, limiting sprawl and encouraging higher densities within the existing urban footprint. It creates the conditions for sustainable mobility - the focus on density has allowed for concentrated growth along major public transport corridors and around stations. Other plans and policies that support sustainable mobility include the city government's development plan (Bogotá Camina Segura), and the city's climate action and air quality strategies.

These policies and plans are not static documents, but a living framework that coordinates action, aligns budgets and ensures continuity across political cycles.

Ecosystem building: each policy has its own process, tailored to the specific goals, stakeholders, and challenges involved. The team maps stakeholders for each plan, identifies which relationships need to be built or strengthened, and adapt their engagement strategies accordingly. They work with different sectors, including representatives from the Mobility Secretariat, Environment Secretariat, Planning Secretariat, public transport management entities such as TransMilenio and Metro, and international partners. Advisory councils and inter-agency committees ensured joint ownership, oversight and accountability. Interdepartmental engagement is maintained through regular commissions and meetings, with responsibilities and progress openly shared.

From the outset, citizens, stakeholders, and public sector partners have been actively engaged, with the Mobility Secretariat spearheading efforts in participatory engagement and stakeholder mapping. Key international partnerships also play a role, including C40 Cities through the Programme UCAP-CAI, Bloomberg Philanthropies through the Children First and the Bicycle Infrastructure Initiative (BICI) projects, the Inter-American Development Bank with the Regional Public Good: Safe, Sustainable, and Inclusive School Mobility, the Development Bank of Latin America and the Caribbean (CAF) with the project 'Bogotá al Derecho', and the city of Copenhagen Sectoral Strategic Cooperation programme for sustainable urban development.

The impact

936,184

tonnes of CO₂e reduction between 2019 and 2021.

20%

reduction in average travel time.

3,300

bicycles deployed in Bogotá's public bike sharing system since 2022.

Delivery and funding

Delivery: this is a combination of large-scale infrastructure investment and key community engagement. Infrastructure investments, like expanding cycling networks, improving pedestrian spaces, and integrating active mobility with public transport, are matched by civic culture campaigns and educational programmes. Initiatives such as “Al Colegio en Bici” (to school by bike) and “Ciempiés Caminos Seguros” (walking safe routes to school) target children and youth, aim to embed sustainable transport habits from an early age. Policy implementation is managed by the Secretariat of Mobility, with the Bicycle and Pedestrian Sub-directorate responsible for monitoring and evaluating their delivery and incorporating input from advisory committees and local citizen groups. The city’s approach is pragmatic as policies are supported by robust diagnostics and data, with interventions targeted at critical areas such as road safety for vulnerable groups.

Monitoring and evaluation: regular monitoring, evaluation, and feedback loops ensure that the plan remains responsive to emerging challenges and opportunities. The city has also invested in capacity building for local officials and technical staff. Monitoring and evaluation systems, including a public data observatory, provide transparency and accountability, allowing for course correction and public scrutiny. They harness real-time data exchange platforms to monitor progress, identify areas for improvement, and ensure accountability, both internally and to the public. The city’s mobility observatory centralises data, making progress visible and fostering a culture of accountability. Ultimately, the success of active mobility policies is measured not just in kilometres of infrastructure, but in cultural shifts – the growing respect for cyclists and pedestrians and increased preference for active mobility.

Funding: Bogotá’s mobility plans are primarily financed through local taxes, complemented by targeted support from international partners and technical assistance programmes. Although the city has increased its budget allocation for active mobility and public space, resources remain insufficient for the scale of ambition. To bridge this gap, Bogotá has expanded the use of alternative revenue measures – such as regulated on-street parking, traffic-fine enforcement, and a congestion-charge-type scheme – with all proceeds reinvested into sustainable transport, including public transport operations.

Another key element of Bogotá’s funding approach has been the development of its public bikeshare system, which combines private investment through a public-private partnership (PPP) with technical and financial structuring support from the C40 Cities Finance Facility (CFF). CFF helped the city understand and navigate institutional and legal barriers, most notably that bicycles were not recognised as public transport under Colombian law, which restricted access to some national funding streams. Recognising this constraint allowed the project to be structured in a way that relied on private investment and alternative financing sources rather than public-transport funds. CFF then strengthened Bogotá’s ability to mobilise this private capital by preparing a finance-ready project and designing the PPP model.

Impact and legacy

Scaling up: guided by a comprehensive policy framework, Bogotá is undergoing a bold transformation to become the most connected city in the region. The transformation is embedded in city governance, with regular monitoring, evaluation, and adaptation. Scaling up is not limited to infrastructure. The city also invests in civic culture, education and public engagement, recognising that sustainable mobility requires a shift in public attitudes and behaviours, a challenge that won’t be overcome overnight. The city’s iconic

car-free initiative ‘Ciclovía’ was recently expanded to 138 km of streets deployed for walking and cycling every Sunday and holiday and has become both a symbol and a practical demonstration of the city’s commitment to sustainable mobility.

Scaling out: the Bicycle and Pedestrian Public Policies, as well as the Safe and Sustainable Mobility Plan, have become a model for other cities in Colombia and Latin America, such as Lima, Quito, Trujillo and Santiago de Chile. The city actively shares its experiences and best practices through networks such as the Cities Active Mobility Network. It also has an International Cooperation team within the Mobility Secretariat that manages relationships and networks globally. The city hosts and participates in international events, such as the Bicycle Week, and Road Safety Week, providing forums for dialogue and dissemination of lessons learned. Bogotá also welcomes delegations from other cities, offering site visits and direct knowledge sharing. For example, Bogotá hosted the World Cities Day 2025, drawing dozens of urban planning experts and decision-makers to address the challenge of promoting smart, resilient, and inclusive cities, where citizens are the main protagonists.

Building on this experience, Bogotá’s progress has also influenced national replication in Colombia. Through the C40 Cities Finance Facility, Bogotá’s pedestrian and cycling approaches — including its bikeshare model — have informed similar projects in Cali and Montería, where CFF has supported the structuring of new public bikeshare systems and shared technical, legal and financial tools.

Its success lies in its adaptability. While the core principles and tools are highly replicable, the city emphasises the need to tailor solutions to local contexts and challenges. Factors such as existing infrastructure, stakeholder networks, and policies will shape what is transferable and what must be locally developed.

Key lessons:

1. **Secure political commitment** from the top administration.
2. **Tailor solutions to local context** and build on existing strengths.
3. **Engage stakeholders** and foster participation from the start.
4. **Combine policy and infrastructure** with culture, education and data.

THE
EARTHSHOT
PRIZE

• Clean Our Air

Guangzhou Bus Electrification Project

2025 Finalist

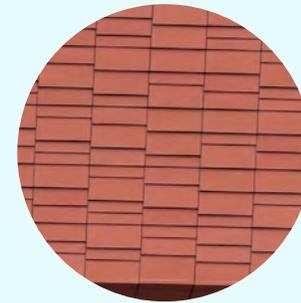
City: Guangzhou

Country: China

Website: www.gzbus.com

Year of implementation: 2017

Key players: Guangzhou Public Transport Group (GPTG)



The solution

The world's largest and fastest citywide transition to a fully electric bus fleet, positioning Guangzhou as a global leader in zero-emission public transport. The Chinese city of Guangzhou has transformed its transport system and improved air quality for its 24 million citizens.

More than a vehicle replacement programme, this is a full e-mobility ecosystem, incorporating smart charging platforms and circular battery management, setting a global benchmark for fleet transition.

The challenge

In 2017, Guangzhou faced a dual challenge; while Guangzhou boasted one of China's most advanced metro systems, over 6 million bus rides and 1.5 million taxi rides were still made using fossil-fuelled vehicles. This undermined the environmental gains of the metro and contributed to high levels of urban air pollution. At the same time, China's national targets for carbon peaking and neutrality were sharpening the focus on rapid, scalable decarbonisation of urban transport. The city needed a solution that would not only reduce emissions, but also create a replicable model for other cities, stimulate green economic growth, and support the transition to new energy vehicles (NEVs) for private owners as well.

From idea to agenda

The Guangzhou Public Transport Group (GPT), backed by strategic guidance from the Municipal Committee and Government, led the electrification programme. Their leadership unified stakeholders across government, industry and energy, breaking silos and building legitimacy. They had clear goals: cleaner air, cost savings, and global leadership in green mobility, supported by compelling data and user stories. The city used its convening power to secure funding, regulatory support, and cross-departmental collaboration, embedding the project into its broader urban strategy.

Pilot and Iteration: Guangzhou's electrification journey drew on lessons from earlier, less successful attempts in other cities. A structured pilot in 2017 replaced fossil-fuelled buses on two key routes and introduced charging infrastructure and smart traffic management. The pilot tested multiple electric bus models under varied conditions, such as peak-hour congestion and extreme weather, allowing GPT to refine vehicle performance, optimise charging strategies, and adjust operational protocols. Clear environmental and operational benefits justified further investment, and the delivery model was iteratively improved using data, feedback, and tools like a bus-on-demand app and satisfaction surveys to keep user needs central.

Ecosystem building: a multi-stakeholder approach was central to the project's success. GPT worked closely with city planners to optimise the siting of charging stations, making electrification practical and convenient. At the regional and national level, the project engaged energy producers, the power grid, battery manufacturers, and recyclers to ensure a robust supply chain and effective battery life-cycle management. International partnerships with leading companies such as ComfortDelGro in Singapore, Star Charge, Guanhua Technology, and Contemporary Amperex Technology Co., Limited (CATL) brought in technical expertise and innovation.

The impact

1,000,000

tonnes of reduced carbon emissions in 8 years.

18.2bn

litres of water saved up to 2024.

23,000+

direct and indirect jobs created with a job multiplier effect through sub-contracting.

Delivery and funding

Delivery: the project's operational phase focused on energy supply, demand management, and resource life-cycle management, including the enhancement of charging infrastructure and the integration of renewable energy. Throughout implementation, GPT encountered and addressed several challenges.

Early deployment featured sparse, fragmented charging infrastructure that hindered scalability. GPT added more charging stations in busy areas and upgraded them so each station can charge several vehicles at once. This made the whole system more efficient and allowed many more vehicles to switch to electric power. However, the introduction of additional high-voltage, fast-charging also strained the existing energy grid, which struggled to maintain stable residential supply. GPT had to collaborate with utility departments to upgrade transformers, deploy smart distribution systems, and implement off-peak charging, ensuring reliable power for both public and residential use.

Ambiguous land classification for charging stations also caused approval delays and limited suitable locations. GPT worked with the municipality to update zoning regulations, introducing designated charging zones and an integrated parking lot with charging station model to minimise land take. These changes streamlined approvals and made infrastructure publicly accessible, supporting individual EV adoption and enabling shared use of urban resources.

Concerns over inadequate route coverage and long charging times prompted GPT to optimise route planning for continuous station access, introduce rapid-charging solutions, and deliver driver training on operations and emergency protocols.

Funding: the electrification project was primarily funded through a blend of self-raised enterprise funds, government subsidies, and green finance, totalling over US\$1.3 billion to date. The consolidation of grants and subsidies into a Special Purpose Vehicle was pivotal in unlocking green financing for capital expenditures. The city provided the use of the electric bus network and associated charging infrastructure free to businesses and the public, reducing risk for participants and making the programme more attractive to funders.

As funding priorities shifted, GPT revised its value proposition, prioritising business resilience and innovation, to maintain the initiative's relevance and attract continued investment. Declining revenues in recent years were offset by effective cost control, resulting in a 24.54% reduction in annual operating costs in 2024 compared to 2021. Consistent relationship management and regular follow-ups helped maintain credible data and adapt to operational changes.

Impact and legacy

Scaling up: Guangzhou scaled rapidly from pilot to full fleet transformation, converting over 11,000 buses to electric within five years. Institutionalising the electrification programme was pivotal to success. A dedicated subsidiary was created to manage electric operations, enabling efficient decision-making and specialised oversight. Electrification targets were also embedded in the city's transport strategy and performance frameworks, securing long-term commitment across departments.

Charging infrastructure was expanded strategically, focusing on high-demand corridors and integrating stations into new developments. Feedback from drivers, passengers, and maintenance teams informed iterative improvements, while data analytics guided investment. Institutionalising the programme through policy, planning, and operations enabled rapid expansion without compromising service quality or sustainability.

Scaling out: Guangzhou's achievements in reducing energy consumption by 50%, cutting carbon emissions by 1,000,000 tons in eight years, and saving 18.2 billion litres of water have been recognised nationally and internationally. The establishment of the New Energy Innovation Research Institute and the regular hosting of international expos have positioned Guangzhou as a leader in green mobility, supporting knowledge exchange and capacity building across China and globally.

The programme's influence now extends beyond Guangzhou. GPT has assisted cities such as ZunYi, ZhangPing and Hong Kong with similar initiatives and is committed to helping set standards and regulatory frameworks for energy management, battery reuse, and EV recycling.

Replication has been enabled through three key mechanisms: municipal partnerships to share operational best practice and co-develop pilots; technology transfer and turnkey solution packages tailored to local contexts; and industry expositions and demonstrations to build confidence among planners and policymakers. Among these, turnkey solutions have proved most effective, enabling rapid and consistent adoption in partner cities. While implementors acknowledge that the model may not be universally applicable, its successful replication is achievable with strong policy alignment, robust infrastructure, and a supportive partner ecosystem. Elements such as the charging layout and vehicle mix can be thoughtfully adapted to suit local geography, demographics, and grid conditions.

Key lessons:

1. **Engage stakeholders** early and secure strong political and financial backing.
2. **Adopt a phased**, data-driven implementation plan.
3. **Invest in** infrastructure, skills, power grid readiness, and innovative business models.
4. **Use large-scale procurement** to cut costs and boost impact.
5. **Engage global partners** and document your approach so others can replicate and adapt it.

• Clean Our Air

Surat Emissions Trading Scheme

2025 Finalist

City: Surat

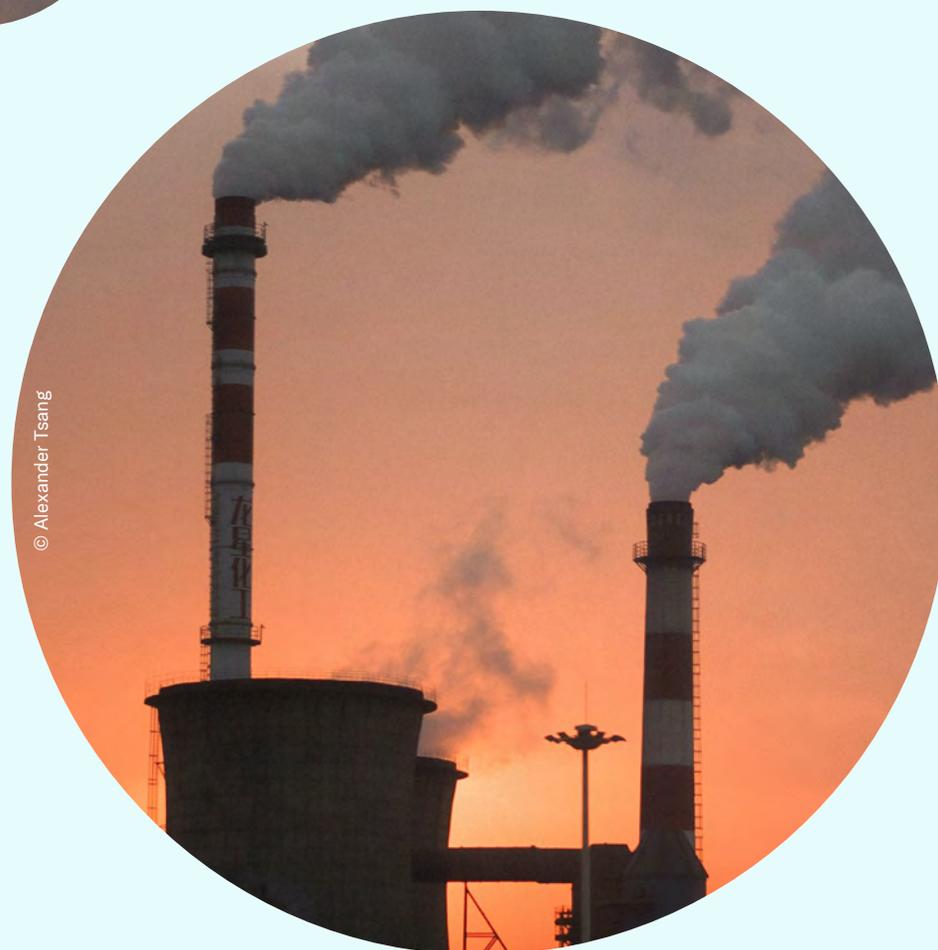
State: Gujarat

Country: India

Website: www.cleanairmarkets.in

Year of implementation: 2019

Key players: Gujarat Pollution Control Board and EPIC-India



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The solution

The world's first emissions trading scheme for particulate matter, piloted in Surat, a major industrial city in Gujarat, India, and now scaling to Ahmedabad. The scheme incentivises industries to reduce pollution through a market-based 'cap-and-trade' system, providing economic incentives for industries across participating cities in Gujarat to reduce their emissions.

The scheme delivers cost-effective compliance while improving air quality in one of India's most industrialised states.

The challenge

Gujarat in India is heavily industrialised and air pollution is endemic across its major cities. Surat is one of those cities that faces dangerously high levels of particulate matter, with air pollution frequently exceeding national standards and threatening public health.

The existing command-and-control regulatory system, based on randomised measurements of air pollution at plants, issued fines for breaching limits. This was inefficient for both the Gujarat Pollution Control Board (GPCB), the state's environmental regulator, and industry owners as non-compliance often resulted in costly, unpredictable plant shutdowns. Ultimately, the public bore the health burden of polluted air. The need for a smarter, scalable and economically viable approach to pollution control became increasingly urgent.

From idea to agenda

Recognising the need for robust evidence and new approaches, GPCB formed a collaborative partnership with researchers from the Emissions Market Accelerator (EMA), a partnership between the Energy Policy Institute at the University of Chicago (EPIC) and the Abdul Latif Jameel Poverty Action Lab (J-PAL). Together, the partners worked to design and evaluate solutions. The idea of a cap-and-trade system, which was predominantly associated with the Global North, was repositioned as a practical, locally grounded solution to a shared problem. EPIC also supported GPCB in building a strong evidence base.

Piloting: GPCB needed a practical location to pilot the new solution, and Surat, with its dense cluster of textile manufacturers and intense industrial activity, was selected as the ideal site for the first implementation of the emissions trading scheme. These industries had long relied on coal boilers for dyeing and processing, making Surat a representative and high impact starting point for the scheme. The Emissions Market Accelerator researchers conducted a randomised control trial involving 300 plants in Surat, half of which were

assigned to the new 'cap-and-trade' model, and the other half retained the traditional model. GPCB led the rollout, including the installation of continuous emissions monitoring systems (CEMS) in the plants, a crucial instrument for the solution. These devices provided second-by-second data on pollution levels, replacing the previous model of brief, infrequent inspections.

Ecosystem building: industry engagement was critical to deliver the solution. The South Gujarat Textile Association played a key role in building buy-in among manufacturers. Firms quickly recognised the economic benefits of the scheme, which included avoiding shutdowns, reducing compliance costs and gaining predictability.

Policy environment: the scheme required approval from India's central government, as it diverged from standard regulatory frameworks. This endorsement was critical, allowing Gujarat to pilot a new approach while remaining within national legal boundaries.

The impact

20-30%

reduction in particulate matter emissions since inception of the scheme.

11%

reduction in abatement costs compared to plants under traditional "command-and-control" regulations.

x25

the monetary value of benefits relative to costs of establishing and running the emissions market.

Funding and delivery

Implementing the trading scheme required coordination across regulation, monitoring infrastructure, industry engagement, and technical support. The EMA team embedded talented professionals in GPCB offices, building day-to-day relationships and solving technical challenges in real time. These staff were jointly managed by GPCB and the research team, helping to bridge bureaucratic gaps and build trust across the organisation.

Iteration: GPCB has also worked with the researchers from the Emissions Market Accelerator to design smart enforcement rules along the way. For example, when firms failed to submit readings collected by their CEMs, GPCB created a rule that automatically inputted the highest possible emissions, which dramatically increased compliance. Similarly, when a number of firms failed to get sufficient permits, GPCB issued and enforced fines directly from pre-posted bonds which are financial guarantees deposited by each participating industry at the start of the scheme. This mechanism allows GPCB to collect penalties immediately and transparently, without the need for lengthy legal proceedings.

Funding: the pilot scheme was funded by different entities, including the MacArthur Foundation, USAID, King Philanthropies, Tata Centre for Development at the University of Chicago and the Yale Economic Growth Centre, with the Emissions Market Accelerator team raising resources globally to fund the scheme with the aim of generating knowledge that could be shared across regions. The deliberate choice of the Emissions Market Accelerator to not receive funding from the State of Gujarat helped maintain independence, avoid perceptions of conflict of interest, and build trust with both regulators and industry. Importantly, revenue from permit trading remains within the system, supporting ongoing monitoring and compliance infrastructure.

Impact and legacy

Scaling up: the Surat Emissions Trading Scheme has delivered measurable improvements in regulatory efficiency, industry compliance and public health outcomes. The success in Surat catalysed expansion to Ahmedabad, where the model is now being implemented in a second industrial cluster.

A digital dashboard system has been developed with a Mumbai-based provider to track emissions, manage permits and support enforcement. This system is now independently maintained and paid for by industry participants.

EMA continues to provide technical support at the design, implementation, and operation stages, but the leadership and adaptation of the scheme remain firmly with local regulators, ensuring each implementation reflects local priorities and realities.

Scaling out: Gujarat's experience now serves as a proof of concept for scalable, locally owned, and economically viable environmental innovation, and the Emissions Market Accelerator team is working to bring this solution both to other states in India and to other countries. Other states, including Maharashtra, are now exploring the adaptation of the model for pollutants such as sulphur dioxide and water effluents. The Government of India has since adopted the monitoring rules co-developed with GPCB, embedding these innovations into national policy.

Key lessons:

1. **Listen to local experts** to gain true insights into the nature of the problem they face.
2. **Build trust with key decision makers** by showing up consistently, being present on the ground, and prioritising face-to-face communication.
3. **Use prices and markets** to drive change and unlock on the ground knowledge and innovation.
4. **There's no substitute for hard evidence** on the efficacy of reforms.
5. **Evidence-based policymaking** delivers outsized benefits.

• Clean Our Air

London's Ultra Low Emission Zone

City: London

Country: United Kingdom

Website: tfl.gov.uk

Year of implementation: 2019

Key players: Greater London Authority; Transport for London



The solution

London's Ultra Low Emission Zone (ULEZ) is the world's largest clean air zone of its kind, charging a daily fee to high-emission vehicles to drive within the zone, reducing nitrogen dioxide and particulate matter.

Since its introduction in 2019, ULEZ has substantially improved air quality and public health, reinforcing London's commitment to climate action and sustainable mobility. The scheme proves pollution pricing can work at scale.

The challenge

London's air pollution had become a public health emergency and road transport was the dominant source of nitrogen dioxide and particulate matter. With thousands of premature deaths linked to toxic air each year, and the landmark case of Ella Adoo-Kissi-Debrah placing air pollution on a death certificate for the first time, the urgency was undeniable.

London had already introduced the Congestion Charge in 2003, which helped reduce vehicle numbers in central London and delivered, among other benefits, a reduction in air pollution in central London.

The Ultra Low Emission Zone (ULEZ), launched in 2008, emerged as London's most effective tool for tackling air pollution through emission-based regulation.

The scheme that charged the most polluting, non-compliant vehicles a daily charge to drive within a designated zone. However, the 2023 expansion from Central and Inner London to the whole of Greater London introduced new challenges – notably, heightened cost-of-living concerns – and triggered a wave of misinformation. Successful delivery required not only infrastructure on an unprecedented scale, but also a robust strategy to build public trust, respond to feedback, and sustain momentum in the face of resistance.

From idea to agenda

Champions: Mayor Sadiq Khan played a key role in making clean air a central public health mandate for London. He positioned the ULEZ expansion not just as a technical intervention, but as a defining political and social commitment, one that became a key issue in the 2021 London mayoral election. He faced strong opposition, especially as the 2023 expansion coincided with heightened cost-of-living concerns and a wave of misinformation, focused on exaggerating costs and misinterpreting who would be affected. Despite these challenges, Mayor Khan maintained a clear message on the health benefits for vulnerable groups, and the city at large. The ULEZ expansion's success is inseparable from the Mayor's willingness to make tough decisions for long-term public benefit.

Policy environment: the solution was crafted around the Mayor of London's powers. The Mayor did not have the power to impose an outright ban on polluting vehicles but could implement a charging scheme. Additionally, the expansion of the ULEZ was not a standalone initiative, but the culmination of over a decade of progressive air quality policy in London. Starting with the Low Emission Zone (limited to heavy vehicles) in 2008, then expanded to cover vans in 2012, and the toxicity charge in 2017, the city built a phased approach that allowed for adaptation and expansion.

The ULEZ was framed as a wider clean air programme, alongside electrification of buses and taxis, investment in walking and cycling and the rollout of the Breathe London sensor network, which is a system of air quality monitors. The city committed to going beyond compliance with national air quality standards, aligning instead with the more ambitious WHO guidelines.

Ecosystem building: stakeholder engagement was central to every phase, with campaign groups like Mums for Lungs and the Healthy Air Coalition helping to build public support and reach communities most affected by pollution. Doctors and trusted local voices were mobilised to communicate the health impacts of toxic air, while misinformation, particularly during the London-wide expansion, was actively countered through targeted messaging and transparent data.

Campaigning and consensus-building: the London-wide expansion required a shift in messaging, focused on children's health, cost-of-living support and the availability of alternatives. Messaging was adapted in real time to counter misinformation, such as inflated claims about the number of vehicles affected. Campaigns highlighted that 9 in 10 cars already met ULEZ standards, and targeted communications were delivered via a range of media. The Greater London Authority (GLA) also worked with Google Maps, Apple Maps and Waze to integrate ULEZ boundaries into navigation tools, helping drivers plan compliant routes and avoid charges. To support residents, a scrappage scheme that provided financial assistance to scrap, donate or retrofit non-compliant vehicles was expanded to all Londoners, and a grace period was given for different categories of drivers including disabled drivers, minibuses for community transport, and older taxis. This financial support helped households, charities, and small businesses transition to cleaner vehicles.

The impact

813,000

tonnes of CO₂ emissions reduced across London since 2019, equivalent to a 2% reduction.

54%

reduction in harmful roadside NO₂ concentrations in Central London due to all phases of the ULEZ.

4.8%

reduction in harmful roadside NO₂ concentrations in outer London in first year of London-wide ULEZ expansion.

Funding and delivery

The GLA oversaw strategic delivery of the London-wide ULEZ expansion, including stakeholder engagement, public messaging, and the scrappage scheme. The GLA also coordinated with Transport for London (TfL) to improve bus routes and launch the Superloop, a new orbital express bus network designed to offer viable alternatives to car travel in less well-served outer boroughs.

TfL led the operational rollout, installing over 3,700 enforcement cameras and 2,600 signs across Greater London. This included advance warning signs outside the city and repeater signs within it which exceeded legal requirements to ensure clarity and compliance. The scale of infrastructure was unprecedented, and TfL faced challenges including vandalism of cameras and signage, requiring coordination with the Metropolitan Police and additional resources for repairs and replacements.

Funding: the scheme was fully funded by the Mayor of London and TfL, without support from national government. Revenue from ULEZ charges is ringfenced and reinvested into London's transport system, including air quality improvements and public transport upgrades. The scrappage scheme was also locally financed through GLA reserves reflecting the city's commitment to equity and accessibility.

Monitoring and evaluation: to build trust and ensure accountability, the GLA established an independent advisory group of six international experts to review the methodology and findings of the one-year impact report after the implementation of the ULEZ expansion in 2023. Their input shaped sensitivity testing, which was included in the report, data presentation through validation and recommending additional analyses, and helped clarify public communications. This transparent, evidence-led approach helped validate the policy and strengthen its credibility.

Impact and legacy

Scaling up: London's approach to the expansion of ULEZ has been rooted in continuous learning, adaptation and proactive knowledge sharing. The city's journey began with targeted interventions in central areas and expanded outward, each phase informed by robust public consultation, evidence-based evaluation, and lessons learned from previous iterations. Today, ULEZ covers every borough, protecting millions of Londoners and demonstrating that citywide clean air zones are both feasible and effective at scale. The expansion of the ULEZ has delivered measurable improvements in air quality across London. Compliance rates for all vehicles eligible to date have risen from 39% in 2017 to 97% by 2025. The policy has helped reduce exposure to toxic air for thousands of Londoners, particularly children, older adults, and low-income communities.

Scaling out: London's experience with ULEZ provides a blueprint for cities around the world seeking to tackle air pollution and accelerate climate action. The GLA actively shares technical guidance, evaluation frameworks and lessons learned through officer exchanges, C40 Cities workshops, and WHO-led summits. London's open data and transparent reporting have enabled other cities to adapt the ULEZ model to their own contexts – whether through Clean Air Zones in the UK, congestion charging in New York, or data-led evaluation frameworks in Brussels and Quezon City. By supporting peer learning and providing practical tools, London has enabled other cities to move faster and more confidently towards their own clean air goals.

Key lessons:

1. **Phase your project** so you can learn and adapt as you go.
2. **Use the legal powers** you already have, then build on them.
3. **Keep messages simple** enough to understand and share, but solid enough to be credible.
4. **Involve stakeholders early**, including the public- and where possible involve academic experts such as convening an advisory group.
5. **Be ready to adapt** your initiative and approach based on feedback.

• Fix Our Climate

Wales Well-being of Future Generations Act (2015)

Country: Wales, United Kingdom

Website: www.futuregenerations.wales

Year of implementation: 2015

Key players: Welsh Government



The solution

The Well-being of Future Generations Act is a landmark piece of legislation that provides public sector organisations with the ambition, permission and legal obligation to improve the social, cultural, environmental and economic well-being of the people of Wales.

The Act provides a governance framework that requires all public bodies in Wales to consider long-term impacts of their decisions, to address and prevent persistent problems such as poverty, health inequalities and climate change. It applies across sectors, from environment and economy to health, culture and food, making it one of the most comprehensive sustainability laws in the world.

The challenge

The Well-being of Future Generations (Wales) Act was born out of Wales's longstanding commitment to sustainable development since devolution in 1999. Early statutory duties required public bodies to promote sustainable development, but these were seen as insufficient. There was growing recognition that a more ambitious, legally binding framework was needed to embed long-term thinking across all public bodies, not just the Welsh Government. The abolition of the UK-wide Sustainable Development Commission in 2010 also created a gap in oversight. At the same time, the urgency of the climate and nature crises underscored the need for legislation that could safeguard the well-being of future generations.

From idea to agenda

The Act was grounded in strong political leadership. Champions such as Jane Davidson, then Welsh Minister for Environment, and Peter Davies, the Sustainable Development Commissioner for Wales, provided the vision and persistence needed to build broad coalitions. They navigated scepticism among colleagues, some of whom struggled to see how such an Act would deliver tangible outcomes, by situating Wales as both a pioneer and a credible contributor to international efforts of sustainable development. Champions of the Act used a vision-driven campaign style, drawing on Wales's history of innovation, and the moral imperative of long-term responsibility. Together, these factors created legitimacy, support and momentum for the legislation.

Ecosystem building: the Act was underpinned by The Wales We Want national conversation, one of the largest public engagement exercises undertaken in the country. This made the law the closest piece of legislation that the country has to being a "people's law." The inclusive approach, alongside strong third sector engagement, created a broad coalition of support and demonstrated proof of public backing for legislative action. The Act aligned Welsh goals with the UN SDGs, further embedding its global relevance. Public involvement is also hard-wired into the legislation and public bodies are required to engage meaningfully with citizens in shaping decisions. Networks such as SDCC Plus and continued third sector involvement have sustained this ecosystem of stakeholders, driving accountability and shared ownership.

Policy environment: devolution was both an enabler and a constraint. It gave the Welsh Parliament the ability to legislate for public bodies in Wales but did not extend to the private and voluntary sectors. As a result, the Act's direct reach was limited.

The impact

38%

carbon emissions reduction compared to the baseline year.

2nd

best country in the world for recycling.

56

number of public bodies involved in delivering the Act.

Funding and delivery

Public bodies typically face practical challenges in delivery. While the commissioner's office supports them with technical aspects of delivery, public bodies can sometimes lack the expertise or tools to identify and implement effective long-term, preventative solutions. There is a need for additional support in understanding how to shift resources toward prevention and how to measure progress against the Act's goals.

Funding: public bodies deliver the requirements of the Well-being of Future Generations Act using their existing annual settlements from the Welsh Government. There is no dedicated or additional funding stream for implementation, and the Act is successfully delivered within standard public sector budgets.

Monitoring and evaluation: measuring progress across the Act's seven well-being goals has been an ongoing test, particularly when goals appear to conflict. For example, a local authority might justify opening a coal mine as supporting the "prosperous Wales" goal (job creation), even if this conflicts with the climate or nature goals. The Act's framework nature means public bodies interpret and prioritise goals differently, leading to varied approaches and potential trade-offs. The Commissioner's Office plays a central role here, offering guidance, technical support, and scrutiny. The Commissioner monitors progress across 56 public bodies, conducts reviews and investigations under a section 20 review power, and acts as a visible advocate for long-term thinking.

The Act itself is being re-examined as part of its 10-year anniversary of its implementation, with significant reflection on achievements and consideration of whether the legislation could be strengthened. The Welsh Parliament, Senedd, is conducting a post-legislative review to advise the government on potential changes for the next administration, especially with the upcoming 2026 election.

Impact and legacy

A decade on, Wales has made progress, from free school meals for primary pupils to being the second-best country in the world for recycling; but it still faces significant challenges. Leaders of public bodies still struggle to balance immediate operational demands, such as immediate health system pressures (i.e. long wait times), with the need to invest in preventative measures required by the Act. This is compounded by challenges with building public support for potentially unpopular measures that have long-term benefits, such as renewable energy infrastructure, particularly when local communities face direct impacts. The Commissioner's office, currently led by Commissioner Derek Walker, emphasises that there is still a need to continue to make the case to public bodies on the importance of a future-focused development approach.

Scaling up: institutionalisation is supported by the Act itself, including its legally mandated requirement for an independent Commissioner, regular reporting, and public involvement. However, the Act's legislative reach is directly limited to public bodies due to devolution constraints, so influencing the private and voluntary sectors has relied on indirect mechanisms such as education and awareness, sustainability-oriented procurement practices that encourage suppliers to align with future generations principles, and voluntary adoption by third sector and private sector organisations.

Mechanisms to culturally embed the spirit of the Act include the Future Generations Leadership Academy, which accepts 30 young people and teaches them to prepare for what society will need in future. The Office of Future Generations works with further education colleges to spread and scale the academy to communities across Wales. The Act has become a widely accepted part of the culture of Welsh policy making. Private sector actors such as the Principality Building Society have adopted the language of "future generations" in their own initiatives like their Future Generations Fund, demonstrating the spread of the Act's values beyond public bodies.

Scaling out: Wales has become an active voice in global conversations on intergenerational governance, using the Act as both a learning tool and soft power asset. Through the Network of Institutions for Future Generations and the Coalition for Future Generations, Wales shares lessons on how to legislate for long-term well-being. The country has also advocated for initiatives like the proposed UN Special Envoy for Future Generations. Partnerships with organisations such as the School of International Futures also allow Wales to contribute practical expertise to governments worldwide.

Bilateral exchanges have further extended Wales's influence. For instance, during the Wales-India 2024 Year of Engagement, a delegation from Maharashtra studied the Act and are now proposing a similar mechanism for their State.

Importantly, Wales does not present the Act as a one-size-fits-all solution. Leaders emphasise that while principles such as long-term vision, measurable indicators, and citizen involvement are transferable, specific features like an independent commissioner may not be suitable in all contexts. This humility – exporting values rather than prescribing models – has strengthened Wales's credibility as a global leader in future generations thinking.

Key lessons:

1. **Start with a national conversation** to build legitimacy and shared ownership.
2. **Use legislation** to embed long-term thinking and accountability.
3. **Work with the powers and levers you already have** – don't wait for perfect conditions.
4. **Institutionalise independent oversight** by establishing roles such as a Future Generations Commissioner and Auditor General to provide impartial advice and scrutiny.
5. **Institutionalise transparency** and continuous learning to keep improving.

• Fix Our Climate

HeatReady Phoenix (Office of Heat Response and Mitigation)

City: Phoenix

State: Arizona

Country: United States of America

Website: www.phoenix.gov

Year of implementation: 2021

Key players: City of Phoenix, Office of Heat Response and Mitigation



The solution

The Office of Heat Response and Mitigation is the first publicly funded ‘heat office’ in the United States. Its job is to ensure a full-time focus on heat issues: helping local populations to deal with the effects of heat, implementing citywide heat mitigations and enabling cross-departmental coordination on this growing issue.

The challenge

Heat is a defining feature of life in Phoenix. Residents are more likely to carry gloves to protect their hands from hot steering wheels in summer than from cold in winter. In 2021, the city experienced 104 days at or above 100°F and 22 days at or above 110°F, with a record high of 118°F. That year, Maricopa County reported 339 heat-associated deaths – the highest on record at the time – highlighting the escalating risks for vulnerable populations, including people experiencing homelessness, low-income households, seniors, and outdoor workers.

In 2025, Phoenix continues to face extreme heat, recording 84 days at or above 110 °F, with the hottest temperature again reaching 118 °F. As of late September 2025, Maricopa County had 156 confirmed heat-related deaths (75 in Phoenix), with 370 additional cases under investigation. While the number of confirmed deaths is lower than in previous years, it is not yet clear to what extent this reflects the impact of expanded mitigation efforts. However, the establishment of the Office of Heat Response and Mitigation in 2021 has enabled a more coordinated, citywide, and equity-focused strategy, integrating data, outreach, and resources to address heat risks at scale.

Earlier efforts, such as cooling centres and hydration stations, were fragmented and insufficient as risks continued to escalate. The need for a holistic approach became clear, and Phoenix’s evolving response now serves as a model for other cities facing similar challenges.

From idea to agenda

Champion: the programme was born under the leadership of Mayor Kate Gallego. From the outset, she emphasised to decision-makers and investors who did not see heat resilience as a city-wide priority, that shade and cooling are not luxuries but critical community resources. Residents’ challenges – struggling to breathe, lack of shade – were shared in public forums and media, building urgency and empathy.

As one of the first steps, City of Phoenix created the Office of Heat Response and Mitigation, centralising leadership and coordination across a previously fragmented landscape. This was the first publicly funded local government office in the United States specifically tasked with improving a city’s strategies on extreme heat. Today, it is looking to deliver 30 programmes and services.

Ecosystem building: the city partnered with Arizona State University (ASU) for research, data and pilot design. The city also built a coalition of over 30 local organisations, from faith groups and nonprofits to neighbourhood associations and business leaders. National and international partners including American Forests, Bloomberg Associates, the Ford Foundation, and C40 Cities, brought additional expertise, funding, and visibility. Community-based organisations played a pivotal role. With connections in neighbourhoods most affected by extreme heat, these groups helped the city reach residents who might otherwise be missed: undocumented families, seniors living alone, homeless people.

Through workshops, listening sessions and participatory design, residents got a chance to co-create solutions, identifying where shade was most needed, suggesting new locations for cooling centres, and in some cases, helping to shape public education campaigns.

Piloting: proof of concept for the HeatReady Phoenix programme was established through a series of rapid pilots. These included misted bus shelters and extended cooling centre hours in the hottest neighbourhoods, with tree planting and urban forestry projects targeting areas with the least shade. The pilots resulted in a 20% reduction in heat-related 911 calls and the first year-on-year decrease in heat-related deaths in a decade.

Policy environment: new federal funding streams increasingly prioritised extreme heat through expanded policies and funding commitments, including new national policy guidance and cross-agency workgroups. This momentum provided Phoenix with valuable opportunities for funding, technical support and peer learning. Given the uncertainties around the long-term availability of these federal initiatives, the city decided to adapt its own standards and frameworks, revising building codes to require shade, updating ordinances to support cooling infrastructure, and embedding heat resilience into every aspect of city planning. This included contractor requirements and the creation of a permanent implementation office.

The impact

400+

fewer heat-related 911 calls for service year-on-year.

3,000+

people connected to social services through city heat relief.

10,000+

trees planted in an arid urban environment with an emphasis on heat vulnerable and disadvantaged communities.

Funding and delivery

The City of Phoenix's heat resilience efforts have shown measurable results. As the programme matures, the city is working with research partners to overcome technical barriers such as understanding how to design and implement nature and physical infrastructure that performs well under extreme heat conditions.

Aside from research, ASU also supports the City of Phoenix with delivery. The university has also trained local residents for green jobs in tree care, landscaping, and water conservation, creating pathways out of poverty, and developed new tools like the Maricopa County Tree Equity Score Analyser to ensure that resources were allocated equitably.

Monitoring and evaluation: monitoring and evaluation have been embedded from the start. A dedicated heat data team meets weekly during the heat season, analysing trends and making real-time recommendations. End-of-season evaluations included both quantitative outcomes (like reductions in emergency calls) and qualitative feedback from partners and residents. Outcomes of evaluations influence the next iteration of the annually published Heat Response Plan. The plan serves as a living document that allows City of Phoenix to remain responsive to the changing needs of the city.

Funding: because dedicated heat-resilience finance markets remain underdeveloped, with newer instruments such as parametric heat-insurance still only slowly emerging, cities must work on both the technical and financing landscape. For Phoenix, coordinated mobilisation of resources across departments and partners has been essential in accessing available funding streams. Cross-departmental coordination has resulted in a portfolio of heat resilience solutions that draw on a mix of local general funds, federal funds, philanthropic support and bond measures totalling \$20 million to date.

Projects enabled by collaborative funding include the Shade Phoenix Plan, the city's core shade and tree-infrastructure programme, as well as the delivery of Phoenix's first Heat Resilience General Obligation Bond project, completed in Spring 2025. This project provided new shade structures and planted 261 trees and 1,616 shrubs at the Phoenix Navigation Centre.

Impact and legacy

Scaling up: the city's continuity plan focuses on embedding new policies and procedures into standard government operations to ensure long-term continuity, including issuing local bonds to deliver community-backed measures. The city continues to run campaigns that raise awareness of heat illness symptoms, available resources, and ways residents can participate in heat preparedness and response programmes. City staff regularly provide expert commentary in media interviews to raise awareness. The Communications Office organises a pre-heat season media event during Arizona Heat Awareness Week, involving city departments and external partners.

Scaling out: Phoenix shares its lessons and best practices through participation in regional, national, and international forums. The city is a key member of the regional Heat Relief Network, which coordinates public, nonprofit, and private cooling centres. Phoenix also participates in the C40 Cool Cities Network and the Cool Cities Accelerator, a global initiative supporting cities to implement ambitious urban heat resilience strategies. At a national level, the city advocates for more federal support, highlighting the need for programs like FEMA's Hazard Mitigation Assistance and Building Resilient Infrastructure in Communities to help cities expand cooling and safety measures, including energy redundancy for cooling centres.

Other American jurisdictions that have implemented similar governance models or programmes for extreme heat include Los Angeles, Miami-Dade County, New York City, Austin, Las Vegas, Charleston, Detroit, and Tempe. The City of Phoenix engages with these and numerous other jurisdictions through regional, national, and international work groups.

Momentum on urban heat resilience is growing globally. At COP30, Ministers and city leaders from around the world committed to the 'Beat the Heat' communique, signalling a new level of international collaboration and ambition on this issue.

Key lessons:

1. **Make heat resilience** a citywide priority, led by top officials.
2. **Heat affects everyone** – so treat it as a public health and social equity issue.
3. **Pilot and scale solutions** using data and grassroots community input.
4. **Build broad partnerships** across sectors and communities.
5. **Continuously monitor**, learn and adapt your approach.

• Fix Our Climate

Climate Neutral Malmö 2030

City: Malmö

Country: Sweden

Website: malmo.se

Year of implementation: 2020

Key players: City of Malmö, citizens, businesses, utilities, civil society organisations, and academic and research institutions



The solution

In one of Europe's most ambitious citywide climate transition plans, Malmö is aiming to achieve climate neutrality by 2030.

The city's integrated approach targets emissions across the whole city – municipal operations, businesses, and citizens – embedding climate action within a broader agenda of social inclusion, innovation, and sustainable growth. The city's progress is setting a benchmark for urban climate leadership across Europe.

The challenge

Malmö's ambition to become climate neutral by 2030 is set against a backdrop of complex governance, a range of ambitious targets, and a shifting national policy landscape. The city has committed to three distinct goals: climate neutrality for the city as a whole, net zero emissions for its municipal organisation, and a 50% reduction in citizen emissions – all by 2030. These goals are embedded in Malmö's environmental programme and budget framework and are driven by political leadership at the highest level.

From idea to agenda

Malmö's climate transition was championed by senior strategist Jonas Kamleh, working directly with the city's directors and the Mayor's Office. Political leadership, particularly from Mayor Katrin Stjernfeldt Jammeh and Deputy Mayor Sofia Hedén, played a critical role in setting the vision and creating the mandate for action. Beyond climate action, Malmö's transition is intentionally framed as a broader societal transformation, integrating climate goals with equity, economic competitiveness and innovation, all underpinned by the UN Sustainable Development Goals. The city recognised it would need to navigate fragmented mandates across 21 departments, coordinate with utilities, infrastructure owners, businesses, and citizens, and align with wider regional, national and European policy.

Ecosystem building: rather than developing its strategy in isolation, Malmö convened a broad coalition of stakeholders from the outset. Early climate talks brought together city departments, utilities, infrastructure owners, SMEs, academia, and civil society to co-create a shared vision for the transition.

The city's climate team played a convening and integrative role, listening to diverse perspectives and translating them into actionable priorities. This collaborative approach was formalised through Malmö's local climate contract, which now includes over 300 signatories. The contract is not just a statement of intent, it is a living agreement that is regularly revisited and revised, ensuring that the city's climate agenda remains responsive to new challenges and opportunities.

Policy environment: Malmö's journey was shaped by both enabling and constraining national policies. Early alignment with national and European goals enabled rapid progress. However, recent national policy shifts such as bans on offshore wind, reduced biofuel mandates, and lower fuel taxes have created headwinds and affected Malmö's progress. In the past year, the city's emissions rose by 1%, a modest increase compared to the national average of 7%, but still a hurdle. In response, Malmö has taken an active stance in shaping the policy environment. The city has submitted policy briefs and mobilised networks of mayors to advocate for smarter, more enabling climate policies at both national and European levels.

The impact

50%

reduction in greenhouse gas emissions since 1990.

€1 billion

annual procurement budget aligned with climate goals.

20%

reduction in transport emissions in the last 5 years.

Delivery and funding

Malmö's delivery model is built around a matrix organisation, 'Climate Transition Malmö', designed to operate across departmental boundaries and governance levels. The team coordinates seven transition areas, each with its own roadmap, covering mobility, energy, circular economy, construction, municipal operations, citizen engagement. These roadmaps are revised twice a year and used to align stakeholders around shared goals, track progress, and identify priority shifts. Their consistent structure allows for easy navigation across sectors and ensures that everyone, from city staff to external partners, is working from the same playbook.

Continuous dialogue is the city's primary tool to foster a shared understanding of Malmö's progress toward its goals, the measures currently in place, and the potential additional actions needed to close the gap. Malmö invests heavily in public education, citizen consultations and targeted workshops, using its municipally-owned housing company and business improvement districts to maintain direct engagement with residents and businesses.

Funding: Malmö's climate transition is funded through a mix of municipal tax revenue, national and European grants. The core transition team is roughly 50% funded by city budget and 50% by external sources, including Horizon Europe and the EU Mission for Climate-Neutral and Smart Cities. Larger investments, such as waste-to-energy upgrades, rely on complex funding packages involving the European Investment Fund and Innovation Fund, fees from customers and negative emissions sales incomes. Malmö emphasises the importance of "directionality" – aligning existing funds with climate goals – over simply seeking new sources of funding. The city's €1 billion annual procurement budget is seen as a key lever, and efforts are underway to ensure it supports climate-aligned outcomes.

Research also shows that, nationally, citizens and SMEs are investing more in climate solutions than utilities, underscoring the need to support and amplify locally led action.

Implementation has not been without friction. Cultural resistance to change, particularly in mobility and transport, has required sustained public engagement. Malmö has invested heavily in communication, from signage explaining biodiversity initiatives to citizen consultations on climate priorities. The city's municipally-owned housing company, which serves over 85,000 residents, plays a key role in maintaining direct dialogue with tenants and delivering infrastructure like EV charging and mobility services. Coordination across 21 departments and 28,000 employees also remains a challenge, but the climate team's role as integrator – listening, aligning, and translating – has been critical to maintaining momentum.

Beyond this, Malmö's climate transition engages the wider city through ongoing citizen consultations, public workshops, and partnerships with over 300 organisations via the Local Climate Contract. These efforts ensure that climate action and engagement extend well beyond municipal tenants, supporting participation across the city's diverse communities.

Impact and legacy

Scaling up: the Climate Transition Malmö team has grown to a group of 20–25 people, supported by embedded staff from other departments. Political leadership has created the mandate and space for this work, while director-level support has ensured operational traction.

The city's transition is not limited to municipal operations; it is a whole-of-society effort involving citizens, SMEs, utilities and academia. Over 300 actors have signed Malmö's local climate contract, and the city continues to invest in public engagement, citizen dialogue, and transparent communication to maintain momentum.

Scaling out: Malmö is actively sharing its model through European and global networks. As a founding member of ClimateKIC and a participant in both Viable Cities (a Swedish strategic innovation program aimed at achieving climate-neutral cities by 2030, promoting sustainable urban development and a good quality of life for all) and NetZeroCities (ICLEI), Malmö contributes to peer learning and policy advocacy. The city has co-authored letters to the European Commission, calling for multi-level governance and integrated policy frameworks. Its mayor has helped convene over 100 European leaders to push for systemic change.

Replication is supported through toolkits, policy briefs, and regular climate talks, which are open to internal staff and external experts. Malmö also learns from others, adapting innovations from peer cities and enhancing them before re-sharing. The city is currently working with Viable Cities to package its transition portfolio in a way that others can easily understand and adapt. While the model is not universally applicable, Malmö's emphasis on shared goals, distributed leadership, and iterative learning offers a compelling blueprint for cities seeking to lead societal transformation.

Key lessons:

1. **Tenacity matters** – real change takes time, sometimes four to five years before lasting organisational transitions are achieved.
2. **Climate transition is dependent** on societal transformation. That means citizens, SMEs, utilities, not just city administrations.
3. **The technical work is easy**; the real challenge is helping people understand and adapt.
4. **Friction is inevitable** – don't give up! Use it as a chance to learn and improve together.
5. **Leadership must create opportunities** and support for innovation and collaboration among those focused on delivery.
6. **There are no quick fixes.** Be honest about the length of the journey and help everyone to keep the long-term goal in mind.

• Fix Our Climate

Oslo's Climate Budget

City: Oslo

Country: Norway

Website: www.c40knowledgehub.org

Year of implementation: 2017

Key players: City of Oslo, Oslo Climate Agency, C40 Cities, Municipal Agencies, Business for Climate Network



The solution

A world-first citywide climate budget, making every municipal agency accountable for annual emissions reductions through the city's core financial processes.

By linking climate action directly to budget decisions, Oslo has transformed how city government plans, funds, and tracks progress on decarbonisation, setting a new global standard for how climate action can be integrated into everyday decision-making.

The challenge

In the past, Oslo had taken a fragmented approach to climate action, with measures scattered across departments, lacking both coordination and accountability. Climate objectives were not embedded in the city's municipal budget, making it difficult to drive cross-sectoral action or ensure sustained progress. The city recognised that to achieve meaningful emissions reductions, climate action needed to be integrated into the annual budget process, making every department responsible and ensuring climate was treated as core business, not a peripheral concern.

From idea to agenda

The Climate Budget was initiated through a strong political mandate, with broad cross-party support from the outset. Both major political groups backed the initiative, and the climate agency's leadership ensured that climate action was embedded within the city's financial system. The climate agency set up governance mechanisms that required each department to identify, plan, and report on their climate measures as part of their core business.

Policy Environment: a key factor in Oslo's success was the broad consensus and sense of ownership across political and administrative leadership. The Climate Budget was not seen as the project of a single party or agency, but as a shared citywide commitment. This consensus enabled Oslo to move quickly from concept to implementation, and to maintain momentum through changes in political leadership.

Pilot and iteration: Oslo used pilot projects to test and refine climate measures before scaling. One standout example was the city's investment in zero-emissions construction, a priority that emerged from the process of developing the Climate Budget. Oslo partnered with manufacturers, like Volvo, to develop and trial electric construction equipment, positioning itself as a global test bed. The pilot's success led the city to set zero-emission criteria for public construction projects, and increasingly for private ones, using procurement to drive market transformation. Today, 89% of public construction in Oslo uses zero-emission machinery.

The impact

30%

reduction in greenhouse gas emissions since 2009.

8,000

parking spaces removed to prioritise walking and cycling.

85%

of public construction projects in Oslo are now zero-emission.

Delivery and funding

Each year, the climate agency analyses emissions, sets priorities, and suggests responsibilities and measures across city departments, which then have the mandate to assign these to their underlying agencies. These measures are integrated into the formal budget. While the climate agency coordinates efforts, implementation is led by individual departments.

A key strength of the model is the level of embedded accountability. Several departments have a designated point of contact who acts as an internal champion, connecting the climate agency and operational teams. These contacts are responsible for quarterly reporting, tracking progress, and flagging delays. The climate agency maintains continuous dialogue with these individuals, ensuring that climate measures are not lost in the complexity of day-to-day operations. This system has helped overcome internal silos and fostered a culture of shared responsibility.

Delivery is also supported by Oslo's proactive engagement with citizens and businesses. Forums for construction, mobility, and adaptation provide regular opportunities for dialogue, while early market signals, such as the announcement of zero-emission construction requirements years in advance, help businesses to prepare and invest. The Climate Agency's communications team frames climate measures around quality of life, emphasising benefits like cleaner air, quieter streets, and improved public spaces. Consultations with vulnerable groups, including the elderly, disabled, and LGBTQ+ communities, ensure that climate action is inclusive and responsive.

Funding: Oslo's Climate Budget is backed by strong municipal finances, including revenue from hydropower and a longstanding road toll system that funds public transport and active mobility infrastructure. While most measures are funded through the city's budget, Oslo also leverages national grants and European programmes for pilot projects and large-scale investments. The city's AA+ credit rating and deep green credentials, as well as their procurement strategy have enabled access to favourable loan conditions, and its procurement strategy is used to de-risk investments for private partners.

In recent years, the climate agency has also begun identifying measures that deliver both emissions reductions and financial savings (such as extending the lifespan of IT equipment), helping to maintain momentum even in tighter fiscal conditions. The city of Oslo found that circular economy initiatives not only reduce emissions and waste but save money simply through reusing, recycling, and maintaining good for reuse.

Impact and legacy

Scaling up: the Oslo Climate Budget is a core part of municipal governance, embedded in the city's annual financial cycle and supported by a dedicated climate agency. It has evolved from a basic emissions tracking tool into a sophisticated mechanism that covers nature, resilience, and scope 3 consumption.

The climate budget has helped reshape Oslo's political culture. Climate action is no longer siloed or partisan, but a mainstream priority across departments and supported by all major parties. Citizens report high levels of satisfaction with the changes, citing quieter streets, cleaner air, and improved mobility. The city continues to refine its approach, identifying measures that deliver both emissions reductions and financial savings, such as investing in electric construction machinery with lower maintenance costs.

Scaling out: Oslo is actively promoting the climate budget model through international networks and partnerships. As a lead city in the C40 Cities climate budgeting programme – a global network of 97 mayors united in action to confront the climate crisis – Oslo has supported 11 other cities globally in adapting the model to their own contexts. C40 Cities has now made climate budgeting a leadership standard for all member cities by 2030, and Oslo continues to contribute to frameworks, toolkits, and training. The city has also collaborated with national organisations to produce a guidebook for Norwegian municipalities, with over 200 cities testing the model. Similar guides are now being developed in Canada and Denmark.

Replication is supported through peer learning, site visits, and regular dialogue with cities, consultancies, and even private sector actors. Oslo's approach has influenced national policy, with the health sector now encouraged to adopt climate budgeting. The city's leadership, both political and technical, has helped position climate budgeting not just as a municipal tool, but as a governance innovation with cross-sector relevance. As more cities adopt the model, Oslo continues to advocate for alignment across levels of government, recognising that local action alone cannot meet national and European climate goals.

Key lessons:

1. **Embed climate measures** in the city's main budget process so every agency is accountable for delivery.
2. **Launch your climate budget** with the best available data and improve it each year – don't wait for perfection.
3. **Establish broad political and departmental** support from the start, to ensure momentum and legitimacy.
4. **Prioritise sectors** with the largest emissions and promote the related benefits like public health, quieter streets and quality of life.
5. **Maintain regular dialogue** with businesses and citizens, giving early notice of new requirements and supporting those most affected.

• Build a Waste-Free World

Durban Transformative Riverine Management Programme

City: Durban

Country: South Africa

Website: strathub.durban.gov.za

Year of implementation: 2022 (initial rollout; scaling ongoing)

Key players: eThekweni Municipality, Community Cooperatives, NGOs, University of KwaZulu-Natal, C40 Cities Finance Facility



The solution

The Durban Transformative Riverine Management Programme (TRMP) is one of Africa's most ambitious river restoration efforts, uniting communities, city government and partners to rehabilitate and more effectively manage Durban's river systems.

Durban TRMP has improved flood resilience, created green jobs and restored biodiversity, demonstrating how nature-based solutions can drive urban climate adaptation and inclusive development.

The challenge

Durban's 18 river systems have experienced severe degradation over the past two decades, driven by rapid urban development (nominally regulated but often unenforced) alongside the growth of informal settlements outside formal planning frameworks and the escalating impacts of climate change. These rivers, which span over 7,400km, had lost an estimated 42% of their ecosystem service delivery capacity, leading to intensified flooding, erosion, sedimentation, and poor water quality. The April 2022 storm alone caused over R80 billion in damages and claimed more than 450 lives, especially affecting those living in informal settlements.

At the same time, community groups and NGOs were already active along many rivers, working independently to clean, restore, and protect their local environments. However, these efforts lacked formal support, integration, funding and visibility. So, the challenge was not only ecological and institutional, it was also about unlocking the potential of community-led action and embedding it within a coherent, citywide river management strategy.

At the same time, community groups and NGOs were already active along many rivers, working independently to clean, restore, and protect their local environments. However, these efforts lacked formal support, integration, and visibility. The challenge was not only ecological and institutional, it was also about unlocking the potential of community-led action and embedding it within a coherent, city-wide strategy.

From idea to agenda

TRMP is built on Durban's long-standing legacy of community ecosystem-based adaptation, first championed by Professor Debra Roberts through the Durban Metropolitan Open Space System. The programme mapped and supported existing efforts, tapping into NGOs, cooperatives, and university partners already active along the rivers.

Pilot and iteration: TRMP's development hinged on early pilot projects. The first, in the Ohlanga River catchment, demonstrated clear benefits in job creation and flood damage reduction, unlocking funding to expand across three more catchments. A cost-benefit analysis supported by the C40 Cities Finance Facility confirmed strong returns in avoided damages, employment, and health outcomes. The city was able to evolve this into a business case for the TRMP. Additional pilots, like Quarry Road, showed how community-led action could mobilise municipal budgets and build political backing for nature-based solutions.

Policy environment: despite the scale of the problem, river management in Durban is fragmented. The national Department of Water and Sanitation (DWS) holds the overarching mandate but lacks operational capacity, leaving the city to manage rivers without formal authority or dedicated funding. Within the municipality, responsibility is split across nine different departments including water, sanitation, parks, and natural resources, with some departments having a budget allocation including the Natural Resources Department and Pollution and Environment Department. However, this is inadequate to cover the entire cost needed for efficient riverine management. This siloed structure, as well as limited resources, makes coordination difficult and limits the city's ability to respond effectively.

The impact

57,678

tons of solid waste removed from rivers.

1,300+

community jobs created through river management.

525km

of river courses managed by 105 established cooperatives.

Delivery and funding

TRMP combines large-scale coordination with community-level delivery. At the heart of the programme is the Sihlanzimvelo River Cleaning Project which employs community cooperatives, each responsible for managing a stretch of river adjacent to their homes. These cooperatives, which generally come from very poor communities where unemployment is high, are trained in safety, invasive species removal, river restoration, and basic business administration. The goal is not just environmental management, but economic empowerment, enabling residents to tender for future work or launch related enterprises such as recycling or tree-felling businesses.

Community Ecosystem-Based Adaptation (CEBA) initiatives involve local residents in managing and restoring ecosystems, providing them with income opportunities while delivering enhanced ecosystem services such as climate protection. Alongside this, TRMP supports NGOs and community groups through Section 67 grants, allowing for flexible, trust-based partnerships. The delivery model varies by catchment: in some areas, formal tenders are issued; in others, grants are used to incubate new initiatives. This adaptability has been key to scaling the programme across river systems.

The TRMP acts as a 'quick link' between communities and city departments, resolving issues like pollution or infrastructure failures in real time. For example, when sewage is reported in a river, the TRMP contacts the pollution unit, who dispatch a team immediately. This responsiveness builds trust, especially in communities that have historically felt disconnected from city services.

TRMP is led from within the DWS's Strategy and Integrated Development Directorate by Russell Stow, supported by Sean O'Donoghue, who is the Senior Manager for Climate Change Adaptation, and developed the implementation approach which is currently being actioned. Russell's relationship-building approach, from informal catchment forums to direct support for community cooperatives, helps unify fragmented efforts and build trust across stakeholders.

Challenges: despite its success, TRMP faces major operational hurdles. River management lacks a formal mandate, and the Municipal Finance Management Act restricts spending to city-owned land, limiting investment. Nature-based solutions like wetland restoration are costly – up to R30 million each – and most funders back planning, not implementation. TRMP has responded by framing restoration as job creation and flood risk reduction in the context of infrastructure damage prevention, potential employment and economic opportunities, as well as a flood risk reduction mechanism, helping unlock municipal budgets and attract external support.

Funding: TRMP has secured funding from a mix of sources, including the C40 Cities Finance Facility, and the CICLIA programme, initiated in 2016 by Agence Française de Développement (AFD) and supported by the European Union and SECO (the Swiss Government), which supports African cities in preparing low-carbon and resilient urban projects, as well as internal city budgets. Political support was unlocked by demonstrating the programme's value in terms of avoided flood damage and green job creation. However, many funders prioritise feasibility studies over delivery, and nature-based solutions often lack direct financial returns which funders seek. Municipal finance managers and funders find it difficult to justify allocation of annual budget for damage avoidance mechanisms even though it has been proven that preventative maintenance costs are significantly lower than repair costs post an event. TRMP is exploring public-private partnerships with industrial precincts and NGOs and has begun engaging with carbon and nature markets to diversify its financial model.

Impact and legacy

Scaling up: TRMP is now a recognised part of the Durban Climate Change Strategy. The programme has grown from two initial pockets in the north and south of the city to new cooperatives in the western region, with plans to expand across all 18 river systems.

The programme has reshaped internal city processes, showing how community-led delivery can cut through fragmented mandates and silos. TRMP has strengthened collaboration across departments and reframed rivers as essential ecological infrastructure. The city is now exploring how to apply the model to challenges like waste management and informal settlement resilience.

Scaling out: TRMP has attracted growing interest from cities across Africa. Peer-to-peer learning exchanges have allowed municipal teams to see the model in action and adapt it to their own contexts. Cities like Mombasa and Johannesburg have begun implementing similar approaches, inspired by TRMP's emphasis on community ownership and flexible delivery. The programme also contributes to regional knowledge-sharing through the EPIC Africa network, which supports transdisciplinary research and action-oriented partnerships.

To support replication, TRMP has developed toolkits, communication materials, and guidance resources, often shared during international exchanges and workshops. However, its implementors are clear that the Durban TRMP model is not universally applicable and needs to be adapted and modified to each city's natural environment and socio-economic and socio-political construct. River management requires institutional flexibility, community trust, and cross-sector coordination. TRMP's success lies in its ability to build on existing efforts, adapt to local realities, and grow outward from what already works.

Key lessons:

1. **Start with community involvement** from the outset, to build trust, relevance, and resilience.
2. **Use small-scale pilots** to prove concepts, attract champions and unlock funding.
3. **Build on what's already working** – support and expand existing efforts to maximise efficiency and impact.
4. **Prioritise internal and external communication;** this will build support and facilitate replication.
5. **Customise the approach** to fit your city's institutional realities, but retain core principles like community-based adaptation and ecosystem restoration.

• Build a Waste-Free World

Western Cape Industrial Symbiosis Programme (WISP)

City: Cape Town

Country: South Africa

Website: www.greencape.co.za

Year of implementation: 2013

Key players: GreenCape, in partnership with City of Cape Town



The solution

WISP is a free service that reduces waste at source and enables reuse and repurposing, by matching one business's by-products to another's needs, also supporting recycling by converting waste into new raw materials.

The programme contributes to mitigating a wide range of environment challenges, including resource depletion, pollution, and landfill capacity constraints. The programme achieves this by connecting businesses to enable efficient resource sharing. In the case of materials, the goal of WISP is to 'matchmake' companies that possess unused materials with other companies who can put these discarded materials into the circular economy.

The challenge

At the time of WISP's inception, the Western Cape was facing a number of pressing economic and operational challenges. While municipal and private landfills were running out of long-term capacity; unemployment remained high in South Africa; there was an urgent need for economic growth, to strengthen commercial competitiveness, to create jobs, and simultaneously mitigate environmental liabilities.

The Western Cape government identified green economic development as a priority within its strategic framework, and enabled the cross-departmental collaboration needed to achieve it. Against this backdrop, WISP was initiated not merely as an industrial waste management programme to extend landfill lifespan, but as a lever to deliver tangible economic outcomes such as cost savings, enhanced competitiveness and job creation. This integrated and collaborative approach to waste, materials, energy and water is called industrial symbiosis and it lies at the heart of WISP.

From idea to agenda

The programme was championed by Ms Jenny Cargill, then the strategic advisor to the Premier of the Western Cape. Her insight was that adoption of the industrial symbiosis approach would be critical to success, also ensuring a dedicated budget within an economic mandate.

GreenCape, a non-profit organisation with the remit to drive investment and jobs in the green economy, was selected as the institutional home for the programme, providing neutrality and reliability that helped facilitate engagements between business and government. Drawing on the expertise of consultants International Synergies Ltd (ISL), WISP adapted the UK model to South African realities by placing job creation and business competitiveness at the heart of its value proposition, alongside environmental goals.

Pilot and iteration: WISP built on lessons from an earlier attempt to introduce industrial symbiosis in South Africa. The programme began as a structured pilot, using modest seed funding and technical input and support from ISL. The pilot's initial success in creating business value and environmental benefits was used to justify further funding and expansion.

Ecosystem building: a steering committee was set up to guide the pilot. The committee consisted of industry representatives, as well as environmental and economic officials from local and provincial government. This cross-sector structure ensured joint ownership, regular oversight, and accountability. Regular meetings, informal gatherings, and collaborative workshops-built trust and goodwill amongst stakeholders.

The impact

435,000

tonnes CO₂e
avoided in 2023.

143,045

tonnes of waste reused /
recycled from inception
to 2023.

R155m

of shared economic
prosperity from
inception to 2023.

Delivery and funding

Delivery: core to WISP's success has been active in-person engagements by enthusiastic facilitators selected for their relationship-building skills and commitment. These engagements take the form of two distinct but equally important formats, which are one-on-one engagements and business opportunity workshops.

For the one-to-one engagements, facilitators proactively arrange site visits with businesses, prioritising processors and manufacturers. These one-on-one engagements help build trust with the business, while also allowing facilitators to better understand operations, resources flows, challenges, and opportunities for efficiency that otherwise may not have been recognised by the business.

WISP also uses highly curated and interactive workshops to gather resource data and facilitate synergies between companies. Bringing together a diverse spectrum of 50-70 organisations in a “speed dating” format, participants share unused resource data and initiative synergy discussions. These workshops also serve as a platform for funders and partners to share information, and network with industry.

Monitoring: WISP collects resource data during engagements, including resource type, quantity, frequency, and location. Resources tracked include materials, water, energy, space, logistics, and labour. This information is captured in a specialised resource management database (Synergy) that allows for quick analysis and matching of companies that have an unused resource with companies that can use or “want” the resource in their production. To monitor success of synergies and align impact with funder expectations, a number of key performance indicators are tracked. These KPIs include landfill diversion, cost savings, additional revenue, direct jobs created, GHG emission reduction, and investment.

Funding: WISP was initially funded through the Western Cape Government's Department of Economic Development and Tourism (DEDAT). In recognition of the economic impact of WISP in the City of Cape Town metropolitan area, and its catalyst potential to strengthen resilience and competitiveness, the City of Cape's Economic Development and Investment department, supported by the City of Cape Town's Urban Waste Management directorate, has subsequently taken over as WISP's core funding partner. Since the City of Cape Town is WISP's core funder, the programme primarily supports businesses operating within the metropolitan area. This focus is well suited to industrial symbiosis, as metropolises offer diversity, density, scale and connectivity needed to unlock resource-sharing opportunities among businesses.

Challenges: WISP continues to face delivery challenges, notably reductions in funding which affects capacity to engage businesses and grow the network. Moreover, seemingly simple synergies, particularly involving hazardous streams, often required years of regulator engagement before viable solutions emerged, as there are currently regulatory barriers on the handling of hazardous waste. Tracking impact can also be difficult, as businesses may stop reporting once synergies become routine, or are unwilling to share financially sensitive data. Additionally, business closures or operational changes can disrupt synergies, and staff turnover at WISP or member businesses require rebuilding trust.

Impact and legacy

Scaling up: the programme's influence now extends beyond the Western Cape. The National Cleaner Production Centre South Africa (NCCPC-SA) has adopted the WISP approach and, with support from GreenCape, have embedded industrial symbiosis into its national mandate, expanding implementation across all nine provinces ((excluding the City of Cape Town). This expansion is guided by South Africa's National Waste Management Strategy, which sets specific targets for the national rollout.

Scaling out: beyond South Africa, WISP has attracted growing international interest. Its model has been shared with government and industry representatives from across Africa through workshops and knowledge exchanges. To support replication, WISP has developed toolkits, policy templates, and guidance resources that enable adaptation in different contexts.

The implementers of WISP emphasise that the model is not universally applicable or replicable. Successful industrial symbiosis requires diverse, dense and thriving industrial activities; direct delivery by city governments, particularly in low-trust contexts, is unlikely to succeed. Most importantly, effective facilitators remain a keystone to success, and priority should be given to appointing facilitators with strong relationship-building skills.

Key lessons:

1. **Be context driven** – understand local challenges and drivers before implementing a model.
2. **Build trust** by convening diverse stakeholders acting as a neutral intermediary.
3. **Invest in human facilitators** over automated platforms and prioritise facilitators with strong relationship-building skills. Build understanding and trust through in-person, on-site, face-to-face engagements.
4. **Simplify the process** for businesses by offering free support and enabling access to government.
5. **Institutionalise learning** by embedding feedback from organisations, and track impact so that financial benefits are clearly recognised. This in turn justifies funding and boosts support and uptake.

• Protect & Restore Nature

Tamil Nadu CARES (Climate Action for Resilient Ecosystems and Societies)

State: Tamil Nadu

Country: India

Website: tngreencompany.com

Year of implementation: 2021

Key players: Tamil Nadu Green Climate Company (TNGCC)



The solution

India's first government-backed, cross-sector climate company, unites over 30 departments to deliver climate action at scale, through a unique Section 8, not-for-profit model.

By coordinating missions on forests, wetlands, coasts, and climate resilience, Tamil Nadu Green Climate Company breaks down silos, mobilises diverse funding, and drives people-centred solutions from state policy to grassroots delivery.

The challenge

Tamil Nadu was facing a complex and urgent set of climate and development challenges. The state's diverse ecosystems, across coastlines, wetlands, forests and urban areas, were under increasing pressure from rapid urbanisation, coastal erosion, wetland loss, plastic pollution, and the growing impacts of climate change. Government departments operated in silos, making it difficult to deliver integrated responses. There was a clear need for a new model that could break down barriers and coordinate action at scale.

Against this backdrop, Tamil Nadu CARES was conceived not just as a climate policy initiative, but as a vehicle for institutional transformation – embedding climate action into the DNA of government, business, and society, and aiming to deliver tangible outcomes such as ecosystem restoration, green job creation and enhanced resilience for vulnerable communities.

From idea to agenda

The solution was championed by Ms Supriya Sahu, Additional Chief Secretary, whose vision and convening power were pivotal in moving the idea from concept to reality. Recognising that climate change demanded an interdisciplinary approach, she led the creation of the Tamil Nadu Green Climate Company (TNGCC), a not-for-profit company registered under Section 8 of the Companies Act of 2013 in India, which are companies formed to promote charitable or socially beneficial objectives. This structure enabled TNGCC to operate with the agility of a private entity while retaining the authority and legitimacy of government. The board, comprising senior officials from water, finance, energy, urban development, forestry, and pollution control, ensured rapid decision-making and cross-sectoral alignment. Narratives focused on resilience, green jobs, and ecosystem restoration helped secure buy-in from funders, partners, and communities alike.

Ecosystem building: a steering council chaired by the Chief Minister and a board of senior officials provided high-level oversight and legitimacy. TNGCC's ecosystem includes local universities (for climate mapping and vulnerability assessments), national research centres, the Indian Institute of Technology (for energy and circularity), and international agencies such as the World Bank, UNDP, and World Resources Institute.

Pilot and iteration: TNGCC's approach builds on lessons from previous, less successful attempts at cross-departmental collaboration. Early efforts focused on district-level capacity building, embedding climate action in feasibility studies, project reports, and day-to-day operations across all 38 districts.

The impact

3.75m

tonnes of CO₂ avoided.

200,000+ 250,000+

hectares of forests, wetlands and coastal ecosystems restored.

person-days of green jobs created.

Delivery and funding

Delivery: TNGCC's ability to overcome the government system and bring departments together has been key to accelerating action and overcoming bureaucratic inertia. The company's four flagship missions – Green Tamil Nadu, Climate Change, Coastal Restoration, and Wetland Mission – are delivered by District Climate Officers in all 38 Districts, in partnerships with SMEs, startups, and community groups.

Regular capacity-building workshops, collaborative planning, and open channels for feedback have built trust and shared purpose across government, business, and civil society. TNGCC's approach is iterative and adaptive, with district-level capacity-building programmes ensuring that climate action is embedded in feasibility studies, project reports, and day-to-day operations across all 38 districts. Feedback from the ground is then used to inform state-level policy, creating a two-way dialogue.

TNGCC addresses challenges such as securing land for restoration, coordinating across departments, and managing complex funding streams through adaptive planning, and a commitment to learning and improving. For instance, practical tools like checklists for site selection and dashboards for monitoring have been developed to improve the implementation process by District Officers.

Funding: TNGCC's core funding comes from the Tamil Nadu State government, supplemented by corporate responsibility funds, international grants, and a recent World Bank loan (with 30% state co-financing) for the 'Strengthening Coastal Resilience and the Economy' programme. Alongside existing funding streams, the company is exploring new mechanisms such as carbon markets, blue bonds, and public-private partnerships to ensure long-term sustainability.

The diversity of existing and emerging funding sources has enabled TNGCC to remain agile and responsive to emerging challenges, while maintaining credibility with funders and partners. The company's robust financial controls, multi-level audits, and digitised reporting systems also ensure transparency and accountability.

Impact and legacy

Scaling up: within Tamil Nadu, TNGCC has institutionalised climate action through district-level capacity building and a strong governance structure with clear ownership of responsibility. The company's ecosystem-based, science-driven approach has enabled the state to rapidly expand green cover, restore wetlands, and launch major coastal resilience programmes, with climate budgeting and policy integration now standard practice from the grassroots to the Chief Minister's Governing Council. The company's work is now fully embedded in the state's climate governance, with high-level political backing and regular oversight.

Scaling out: the TNGCC model is now being studied and adapted by other Indian states and recommended internationally. The company actively shares its learnings through partnerships and technical exchanges, advocating for adaptation, iteration, and a focus on local ownership and grassroots engagement rather than direct duplication. The company has developed toolkits, policy templates, and guidance resources that enable adaptation in different contexts. The company's leaders emphasize that successful replication depends on tailoring governance, missions and ecosystem building to local contexts, while putting people, science and local realities at the heart of the solution.

Key lessons:

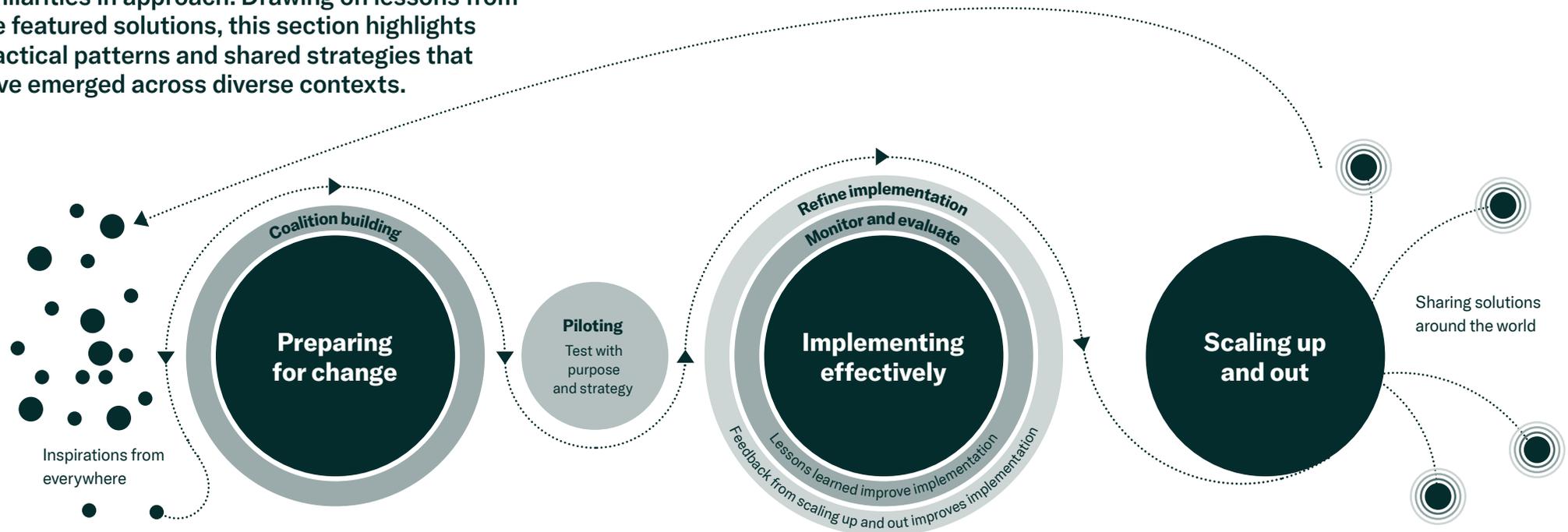
1. **Create** a strong, cross-sector governance team.
2. **Embed climate action** in local government and missions.
3. **Focus on** people-driven implementation.
4. **Blend funding sources** and keep financial controls tight.
5. **Adapt global ideas**, but tailor to local needs and people.

A person is shown from the back, wearing a dark jacket and glasses, looking out over a city skyline at sunset. The sky is a warm, golden-orange color, and the city buildings are silhouetted against it. The overall mood is contemplative and forward-looking.

Principles for public sector-led climate innovation 05

Principles for public sector-led climate innovation

While the path to climate innovation is unique to each city and region's context, there are similarities in approach. Drawing on lessons from the featured solutions, this section highlights practical patterns and shared strategies that have emerged across diverse contexts.



Preparing for change

- Be nimble and incremental**
- Champions make the difference**
- Pursue integration within and beyond public sector**
- Communicate early and proactively**
- Signal through targeted spending**

Implementing effectively

- Pilot with purpose**
- Define clear ownership for implementation**
- Strong ecosystems are built by design, not by default**
- Put data to work to learn, adapt and improve**
- Make a robust financial and economic case**

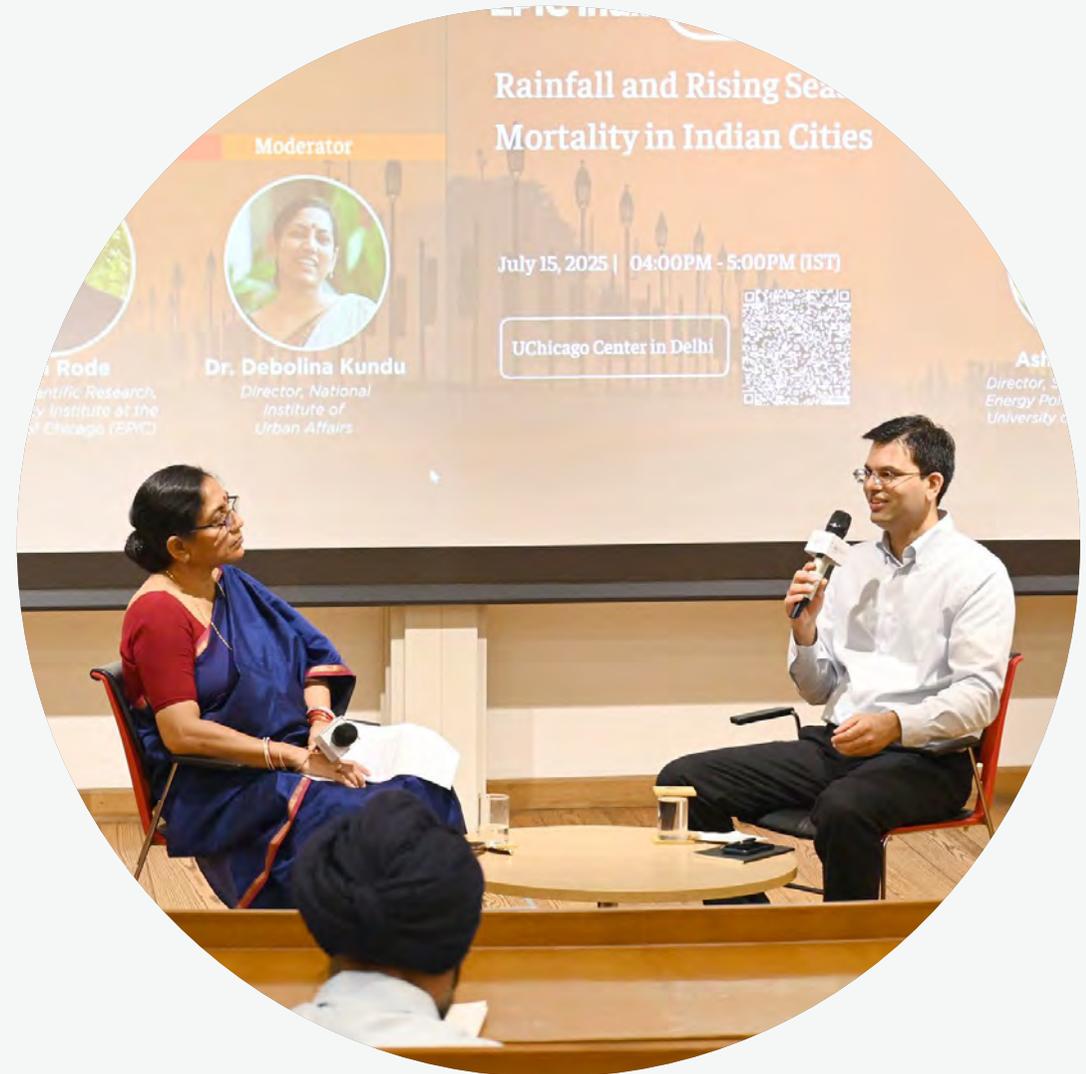
Scaling up and out

- Make innovations routine, not exceptional**
- Aspire to a cultural shift**
- Join forces to go further and multiply impact**
- Transition financial sustainability**
- Share values over blueprints**

Preparing for change

Public sector-led innovation does not succeed on the basis of technical merit alone; local leaders have a critical role to play in making change happen.

Change also requires a favourable environment where solutions can be conceived, refined and tested before being rolled out. This cannot happen without political support and the right policy and regulatory environment. It also means aligning partners across the innovation ecosystem under a unifying vision.



Be nimble and incremental

Real progress comes from adapting existing instruments and programmes, using what already in place to introduce new solutions.

Innovation is often portrayed as sudden or unexpected breakthroughs that bring about change overnight. While this might be true in some cases, more often solutions are a result of gradually adapting existing instruments and initiatives. Successful cities and regions start with the powers they have today – not the ones they wish for – and use existing programmes as springboards for success. By doing this, they are able to deliver within their existing contexts and constraints and rely on tried- and tested delivery or regulatory mechanisms. That means choosing instruments, whether that be statute, budget, pricing, programme, market tools, which fit existing mandates, while documenting trade-offs openly and advocating for change over time.

London's Ultra Low Emission Zone (ULEZ) shows how cities and regions can evolve existing tools to deliver impactful solutions. The charge-based air pollution scheme began as a Low Emission Zone in 2008 targeting the most polluting heavy vehicles, followed by the Toxicity Charge in 2017.

Both were replaced in 2019 by a ULEZ in central London, which expanded to the current city-wide ULEZ in 2023. Prior to the LEZ, London had experience with pricing-based schemes such as the Congestion Charge launched in 2003 that sought to reduce vehicle congestion in central London. Each step tightened standards, strengthened operational readiness and built public legitimacy of the scheme. The same principle applied to how London navigated its policy context. Without the power to ban polluting vehicles outright, the Mayor instead introduced charging mechanisms, a move that still shifted behaviour.

Similarly, Oslo's Climate Budget finance mechanism was integrated into the pre-existing budget setting process, the strongest mechanism for cross-departmental decision making, rather than being set up as a separate system. This evolution of an existing process allowed the Climate Budget to become an established process quickly and successfully.

“The idea that disruptive innovation practises will solve humanity’s problems is false. Innovation is a slow and steady grind of evolutions that can be accelerated substantially through dialogue.”

Jonas Kamleh
Climate Transition Malmö

Champions make the difference

Visible and committed leaders are critical for setting the agenda and building support across partners.

Public sector innovation requires visible and strong leaders: champions. These leaders are often senior politicians or directors with the authority needed to put climate innovation on the agenda, particularly during the early stages. The specific role of the champion varies by governance context, but their behaviours are consistent. Champions act as:

- **Initiator:** champions use their powers to kick-start solutions. In Durban, Debra Roberts, the then Deputy Head of the eThekweni Environmental Planning and Climate Protection Department, was critical in establishing the Durban Metropolitan Open Space System, reframing natural ecosystems as civic infrastructure. Meanwhile, Geoff Tooley, a Senior Catchment Manager within the eThekweni Municipality pushed to quantify ecosystem benefits, triggering the cost-benefit analyses that underpin the Durban Transformative River Management Programme today.
- **Legitimiser:** champions draw on their personal credibility to legitimise ideas. Jenny Cargill, the Delivery Unit Head of the Western Cape Government, endorsed the Western Cape Industrial Symbiosis Programme, bringing political and administrative legitimacy. This helped expand the reach, and eventually membership, of the programme.
- **Campaigner:** champions use their public influence and platform to campaign for change. In London, Mayor Sadiq Khan made clean air a health mandate and an election-defining commitment, sustaining the ULEZ expansion programme through intense media scrutiny and targeted oppositional misinformation.
- **Convenor:** champions can use their agency and powers to align stakeholders and resources. Ms. Supriya Sahu, IAS, Additional Chief Secretary to the Government of Tamil Nadu and Head of the Department of Environment, Climate Change and Forests, led the establishment of the Tamil Nadu Green Climate Company (TNGCC) – a government-backed Section 8 not-for-profit – and facilitated cross-departmental coordination across finance, water, energy, housing, forests and pollution control.

Pursue integration within and beyond public sector

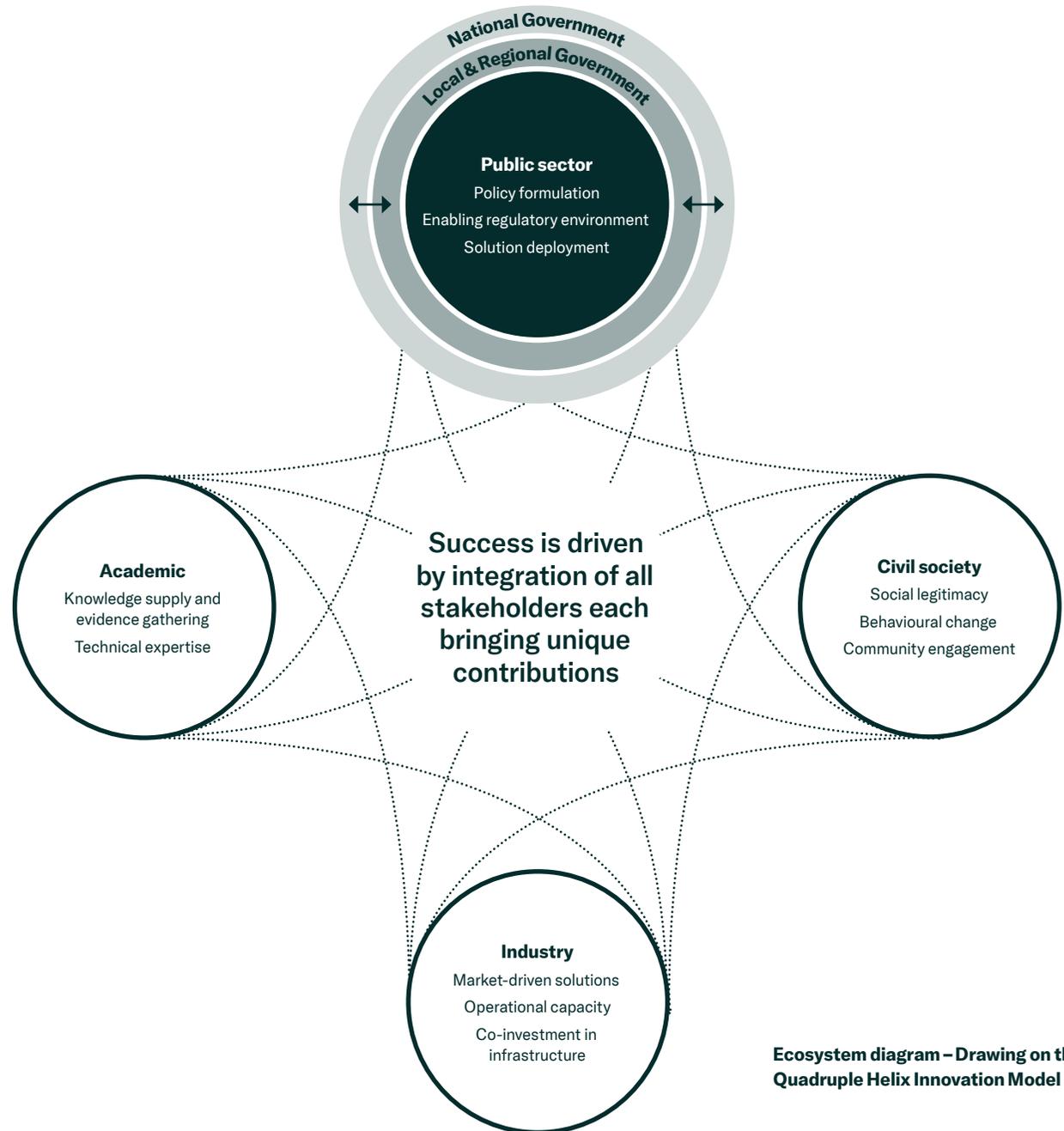
Effective action requires strong vision alignment across the ecosystem and the appropriate governance to achieve this.

For cities and regions, responsibilities for transport, energy, housing, land, water, finance, and the environment often sit in different departments. Add in a misalignment among city, regional, and national governments, and the result is fragmented authority, slow decisions and weak accountability, compounded by poor coordination with stakeholders like the private sector, civil society and academia.

Climate action, which by nature cuts across systems, cannot thrive with this lack of coordination. Intentionally putting structures in place to break silos must therefore be a priority.

“Harmonising the interests and responsibilities of all stakeholders [...] accelerates implementation timelines, mitigates risks (such as infrastructure gaps or regulatory misalignments), and results in more holistically designed solutions that exhibit greater sustainability over long-term operations.”

Guangzhou Public Transport Group



Ecosystem diagram – Drawing on the Quadruple Helix Innovation Model

Vertical integration within the public sector means creating a structure, owned by a department that is naturally cross-cutting by nature (such as an environment or climate department), but from the onset should have a specific mandate and ability to draw and coordinate across departments. In practice, systems might look like:

- A brand new organisation that is inherently set up to be cross-cutting and tasked with delivering the specific ambition. For instance, Tamil Nadu, the state created a publicly owned but operationally agile company, Tamil Nadu Green Climate Company (GCC), under the Companies Act of 2013. Sitting outside the rigid departmental hierarchy, Tamil Nadu GCC is able to coordinate across water, energy, housing, forestry, and finance s by having representatives from these public sector departments on their Board of Directors, while also engaging private and international partners.
- The facilitation of a multi-stakeholder space where different departments can contribute, such as a frequently meeting steering group. For example, GreenCape, the NGO responsible for delivering the Western Cape Industrial Symbiosis Programme on behalf of the Western Cape Government, created and facilitated a steering committee at the outset of the programme. It brought together the Environmental Affairs Department, City of Cape Town, Economic Development Department, Chambers of Commerce, and local industry representatives.

Horizontal integration involves creating regular, purposeful forums where government, industry, academia and communities meet to exchange knowledge, negotiate trade-offs and commit to action. Successful multi-sectoral spaces share some common traits. They are intentionally designed to build trust, whether by hosting in neutral venues or using impartial facilitation. They also occur frequently enough to keep the agenda front of mind, for instance, fortnightly or monthly meetings are more effective than quarterly ones.

Some examples of forums for horizontal integration include:

- A large-scale public conversation for broad legitimacy: For instance, to develop the Wales Well-being of Future Generations Act, Cynnal Cymru led the “Wales We Want” national conversation, which laid the foundations for the Act.
- Network-level conversations for delivery coalitions. For example, the Oslo Climate Agency manages Oslo’s Business for Climate Network, which holds regular topic forums (construction, mobility, circular economy, adaptation) where firms exchange practice and give the city direct feedback.
- One-to-one engagement for decision-making. Facilitators working on the Western Cape Industrial Symbiosis Programme regularly conduct site visits, empowering them with the insight to broker tailored resource matching and troubleshoot operational barriers firm by firm.



Communicate early and proactively

Open, relatable, and evidence-based communication can make the difference between success and failure.

Strong communication is the foundation for successful implementation. Many solutions face either a subdued public response from not understanding the need, or active resistance fuelled by disinformation about likely impacts. A well-considered communication strategy from day one helps overcome these barriers and highlight the value of a solution. Successful communications strategies rely on multiple channels, activating all partners to go deeper into communities, remaining transparent, and engaging with relevant academic partners or expert advisory panels to build credibility.

London's expansion of the Ultra Low Emission Zone (ULEZ) illustrates how an effective communication strategy can help get the message to the people and overcome barriers of misunderstanding and resistance. In response, the city deployed a multi-channel communications strategy using social media, petrol pump signage, and direct mail to inform residents and promote consultation. Messaging was also tailored to different audiences, and trusted voices such as doctors and parent groups, including Mums for Lungs, helped to reach harder-to-engage communities. Transparency was also key – independent experts on an advisory panel validated data, and all findings were published online to build trust and demonstrate accountability.

Signal through targeted spending

Directing municipal funding towards climate action demonstrates intent, builds legitimacy, and encourages wider support from other funders.

You can build legitimacy by using municipal funding as a way to get things going. Even when cities and regions struggled with limited financial and resource constraints and must seek additional funding from other sources, municipal budgets remain one of the strongest levers for catalysing the delivery of solutions. Redirecting municipal budgets, including operational and procurement spending (which cities and regions usually fully control), in line with climate ambitions, signals clear intent and can drive meaningful progress, even for the most resource constrained cities and regions.

Using municipal funding also demonstrates capability and strength of intention to higher tiers of government. It shows that cities and regions can deliver effectively with their own resources, building the case for national governments to support with scaling solutions and improved intergovernmental fiscal transfers.

It also strengthens trust between local government and citizens. The Western Cape Industrial Symbiosis Programme (WISP), for example, is offered free at the point of delivery because it is currently paid for in full by the City of Cape Town. By removing any cost to businesses, the programme has built goodwill and has positioned the city as an enabler of tangible benefits.

“90% of the conversations [around funding] should be about what you are doing with your existing funds. For example, Malmö's procurement budget for goods and services is about €1 billion per year. That's money that we have 100% influence over. We need to make sure it aligns with the goals that we have to deliver on.”

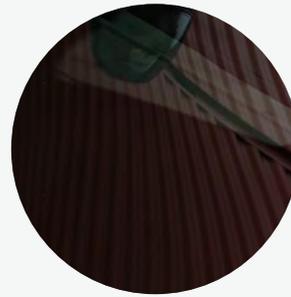
Jonas Kamleh
Malmö Climate Transition Plan



Implementing effectively

Ideally, cities and regions identify and mitigate potential implementation risks long before delivery.

However, some challenges may only surface later in the process. Loss of delivery momentum among the various partners, having to adapt operational plans to changing realities, lacking the right resources to deliver and sustain, a lack of systems for proper risk mitigation and management – success means knowing how to navigate these effectively.



Pilot with purpose

Pilot schemes are essential for proving concepts and unlocking delivery, but they must be conceived as part of a broader rollout plan.

Piloting is the most effective way to test innovation, manage risk and build momentum. By starting small with pilots, local leaders can demonstrate proof-of-concept, generate valuable early evidence, and unlock political and financial support to grow solutions.

However, pilots should be treated as a step towards scaling up, not an end in themselves. Too often, solutions suffer from “death by a thousand pilots” – testing promising ideas without a clear sense of how to scale them if they are successful. Therefore, pilots should be designed with a clear pathway for adoption, mitigating the risk of pilots being a waste of resources.

Nearly all the solutions studied invested in pilot studies. Having established partnerships with vehicle manufacturers, technology firms and research institutions, Guangzhou PT set up a dedicated testing zone and selected representative transit routes for initial pilot projects before expanding coverage. The results were convincing, demonstrating the reliability of electric buses in meeting daily operational demands, co-benefits such as improved rider experience compared to noisy, vibrating diesel buses, and measurable environmental benefits such as reduced emissions, improved air quality and lower noise pollution.

Oslo also invested in piloting zero-emissions construction, which was a priority that emerged out of its Climate Budget. The city became a global test bed for zero-emission construction, working with major manufacturers like Volvo to develop and launch electric construction equipment. The success of the pilot led Oslo to set zero-emission criteria for both public and, increasingly, private construction projects, leveraging procurement power to drive market transformation. Now, 89% of public construction in Oslo uses zero-emission machinery.

Define clear ownership for implementation

The success of solutions relies on skilled, empowered teams who keep projects on track.

If champions set the agenda, implementors make solutions real. They are often middle-management officers within public sector departments who are the daily drivers of progress. Solutions may not require many implementors – cities and regions are frequently constrained and may not have the capacity to do so. What matters is how implementors are deployed. Crucially, implementors succeed only when champions create the space for them to operate with freedom to deliver.

Implementors often act as:

- **Doers:** implementors drive practical delivery on the ground, providing the technical know-how that underpins solutions. For example, the Emissions Market Accelerator – the joint initiative of EPIC and the J-PAL – embedded young professionals from across India within the GPCB offices who were jointly managed by a GPCB-appointed regional officer and the university team. They handled day-to-day technical tasks like installing monitoring devices in plants, troubleshooting data transmission issues, and ensuring plant-level compliance, all of which were critical to the success of the scheme.
- **Connectors:** implementors often act as the “glue” holding diverse actors together, ensuring alignment across government departments, NGOs, and community groups. In Durban, the TRMP’s programme manager plays this role by coordinating fragmented riverine initiatives – from clean-ups to restoration projects – into a joined-up portfolio rather than isolated efforts.

- **Delivery monitors:** implementors monitor progress, acting as reference points for accountability and ensuring programmes remain aligned with their objectives. The Oslo Climate Agency plays this role. Agencies assigned actions through the Oslo Climate Budget report on their implementation status three times a year. The Climate Agency compiles and assesses these reports and provides feedback to the Department of Transport and Environment, which in turn reports to the City Council.
- **Challengers:** some implementors serve as constructive critics, holding actors accountable when actions diverge from agreed commitments. The Welsh Future Generations Commissioner exemplifies this role, providing advice and challenge to Wales’s 56 public bodies to ensure their plans align with long-term goals of the Act. The public bodies are legally required to engage with any investigations that the Commissioner opens about their progress, and they must provide responses to the Commissioner’s recommendations.

In the case of Bogotá, delivery ownership sits with the Secretariat of Mobility, while Advisory & Bicycle Councils provide citizen oversight; the Bicycle & Pedestrian Sub-directorate leads monitoring, and inter-agency commissions (Mobility, Environment, Planning, TransMilenio, Metro) keep actions on track.

Investing in the capacity of implementors strengthens solutions’ delivery. When teams are well-equipped and informed they are better able to manage challenges and sustain progress. The “train the trainer” model in Oslo is particularly effective, enabling rapid scaling of skills and understanding across teams, and ensuring that the purpose and mechanics of the Climate Budget programme are widely understood and implemented.

Strong ecosystems are built by design, not by default

Ecosystems are sustained through mutual benefit and transparency among all partners, with clear processes for working together.

Successful solutions that scale involve an entire ecosystem of players and organisations and these rely on reciprocal relationships and clear decision-making processes. The strength of an ecosystem becomes evident as cities and regions try and deliver solutions, especially when cities and regions are able to build upon existing initiatives instead of starting from scratch.

Durban's TRMP exemplifies this approach. Instead of creating new structures, TRMP support and strengthen their work with community-based organisations and NGOs already active along the rivers. These groups form the wider ecosystem and are deeply familiar with their environments and invested in local riverine restoration.

To fully realise this value and sustain ecosystems, partnerships must be treated as a two-way street. Cities and regions need to view partners not only as contributors to public sector priorities, but as organisations with their own goals and agendas. Many community groups, businesses, and academic institutions are already running initiatives that would benefit from public sector support.

“You can't have development without friction. The question is what you do when you have friction.”

Jonas Kamleh
Climate Transition Malmö

Support can look like:

- **Access and engagement:** create new opportunities for partners to gain access to government departments – to share challenges and ideas. For example, the Oslo's Business for Climate Network, managed by the Oslo Climate Agency, facilitates dialogue between businesses and government.
- **Financial and operational support:** provide partners with the resources that they need to deliver innovations that they are championing. For example, the Durban TRMP operationally supports community groups like the 20 EnviroChamps in Quarry Road West informal settlement, creating jobs and strengthening local capacity for environmental stewardship.

Even when structures for coordination and collaboration are created, diverging interests should be expected between stakeholders. Managing this requires setting up clear processes that support decision-making in moments of conflict. For example, the Guangzhou Public Transport Group plays a coordinating role when diverging opinions arise across their diverse coalition of stakeholders. They organise coordination meetings that allow all parties to voice their concerns, and through open dialogue and negotiation, seek mutually beneficial solutions. For instance, should disagreements emerge between the Group and charging station operators regarding charging fees, they collaboratively analyse cost structures to develop pricing models that balance the interests of both parties.

Put data to work to learn, adapt, and improve

Regular monitoring and evaluation helps cities and regions adapt their solutions, make better decisions and show what works.

Strong evidence-building enables cities and regions to learn, adapt and make a compelling case for climate action. Effective delivery depends on a strong and continuously developing evidence base. Without high-quality data, cities and regions, as well as their ecosystem partners, cannot build a shared understanding what works and what does not.

Robust monitoring and evaluation are the starting point, while iteration – informed by monitoring and evaluation outcomes – ensures that lessons learned inform and shape delivery. Oslo's annual Climate Budget review exemplifies this approach; each new budget reflects lessons from the previous cycle and responds to changing circumstances. 2025's Climate Budget, for instance, identified measures that would provide both economic benefits and climate impact, in addition to the traditional focus on the largest emission sectors. The outcome was the identification of actions that save the City of Oslo money.

Expanding who contributes to the evidence base strengthens this engine further. Bogotá's citizen-led monitoring structures, created through the 2019 decree, give residents a formal role in identifying issues and proposing improvements to infrastructure. This complements the city's mobility survey, which provides quantitative insights into travel behaviour. Together, these mechanisms generate richer data and reinforce the legitimacy of decisions.

Make a robust financial and economic case

Securing funding means demonstrating benefits and tailoring the case for investment around funders' priorities.

Even with municipal funding in place, cities and regions often need to turn to private and blended finance to scale delivery. Securing this support requires understanding the motivations of different funders. Generally, funders respond to well-evidenced business cases built on strong data, transparent governance and realistic delivery plans, particularly when proposals align with their strategic priorities.

Cities and regions should therefore develop credible cases built upon diverse indicators that can speak to multiple agendas. For instance, framing nature-based or climate projects around co-benefits such as public health or economic resilience can unlock alternative funding streams.

Bogotá's approach illustrates this well. The city reinvests revenue from regulated on-street parking, traffic fines, and a congestion charge-type scheme directly into sustainable transport initiatives. It has also attracted private funding for its public bike-sharing system, demonstrating how creative financial mechanisms can help scale climate action beyond traditional municipal budgets.

The Western Cape Industrial Symbiosis Programme tracks four key metrics – jobs, investment, landfill diversion, and greenhouse gas reductions – finding that jobs and investment resonate most with funders and policymakers, while environmental indicators demonstrate broader co-benefits. Evidencing how economic and environmental outcomes can reinforce each other further strengthens the financial case for a particular solution.

The Surat Emissions Trading Scheme shows this clearly. The previous regulatory model exposed plants to unpredictable shutdowns lasting 15–20 days (and sometimes up to 40), costing several thousand dollars per day. The cap-and-trade system instead requires a monitoring device costing around \$2,000–\$3,000, eliminating repeated inspections and reducing operational risk. These results provide a strong evidence base for both environmental compliance and economic stability.



Scaling up and out

Delivering successful solutions is only half the task. Ensuring it endures and spreads is the other half. ‘Scaling up’, or institutionalising, is what transforms solutions into the “new normal.”

It ensures that solutions are not solely dependent on individual champions or implementors but are instead delivered systematically across a city or region. ‘Scaling out’ describes the adaptation and replication of an approach across programmes, departments and geographies. It extends the reach to more people and places, often requiring some degree of translation to suit different contexts across the world.



Make innovations routine, not exceptional

Embedding solutions into the right parts of government and policy framework ensures that they thrive beyond individual leaders.

Incremental institutionalisation is what turns solutions from promising programmes and projects into scaled systems. The most successful cities and regions seek to anchor innovations in the right parts of government, and align them with formal policy frameworks, so that new ways of working feel routine rather than exceptional.

Finding the right institutional home within government, where champions and implementors will work out of, is often the first step to institutionalising. The right institutional home will allow for cross-cutting collaboration with the mandate, reach and budget to act. Some solutions are designed with this in mind from the outset – Malmö’s Transition Plan sits within the dedicated Climate Transition Malmö Team, and the Tamil Nadu GCC was specifically set up to deliver the State’s four missions. In other cases, the right home only emerges through iteration. For example, Durban’s TRMP began in the Chief Operations Office but implementors quickly realised that they were struggling to gain traction. Moving the programme to the Chief Strategy Office has since created greater alignment and momentum.

Formal policy frameworks provide another route to embed solutions. London’s ULEZ, Oslo’s Climate Budget and Wales’s Future Generations Act were conceived as policy tools from day one, making their integration into institutional processes relatively straightforward. However, for standalone programmes, the path for embedding within policy is less direct but still worthwhile. The Western Cape

Industrial Symbiosis Programme began as a regional programme. Through sustained evidence of delivering resource efficiency and industrial collaboration, the programme directly influenced the South African National Cleaner Production Centre. As a result, Industrial Symbiosis was formally written into the National Waste Management Strategy owned by the NCCPC, giving it a recognised mandate at the national level.

“The institutionalisation [lies in] the fact that Industrial Symbiosis is recognised as part of the waste management strategy, and that very much was directly a result of success in the Western Cape – supporting the NCCPC to start a programme in Gauteng and in KwaZulu Natal and ultimately embedding Industrial Symbiosis within both industrial and environmental policy.”

Lauren Basson
GreenCape, Western Industrial Symbiosis Programme

Aspire to a cultural shift

Lasting institutionalisation happens when solutions become part of everyday life and shape citizens’ identities.

Institutionalising is not just about embedding solutions into governance structures and processes. It is also about embedding the principles of solutions culturally, so that they shape behaviours, values and everyday practices of citizens.

Malmö highlights how solutions can be supercharged when they are owned by citizens. Malmö’s Climate Transition Plan, for example, explicitly assigns responsibilities to citizens as part of the city’s collective journey, embedding climate action into social life. By enabling small, cumulative interventions, the City of Malmö reached its projected solar electricity production target for 2030 by 2023, seven years earlier than targeted. This acceleration was driven by citizen mobilisation, particularly among property owners who took initiative to install solar panels in their homes.

Cities and regions are able to shift culture and empower citizens in several ways. Learning and awareness-building is a common entry point. The Welsh Future Generations Act has extended its reach well beyond public bodies, through educational initiatives like the Future Generations Academy, which trains a small but influential group of leaders each year.

Other authorities have used symbolic practices to shift mindsets. Bogotá’s World Car Free Day, once met with indifference, has grown into a point of civic pride and has become a defining feature of the city’s identity. Investing in the next generation accelerates this cultural shift in Bogotá further. Additionally, Bogotá is investing in targeted programmes for children and youth such as school-based cycling initiatives and safe walking routes. So, the city is not only teaching the practicalities of sustainable transport, but also fostering a culture where active, low-carbon mobility is seen as the norm, becoming deeply rooted in the city’s collective identity and daily routines.

“It’s not just about infrastructure. We must invest in culture [...] we can build the best infrastructure but if people don’t feel safety or respect, it will not be fully utilised. We are working hard on our civic culture and pedagogy. That will help us promote this feeling with people.”

Angela Camargo Villalobos
District Secretariat of Mobility, Bogotá

Join forces to go further and multiply impact

Partnerships and networks expand what is possible for cities and regions, scaling solutions and influencing change beyond their own borders.

Scaling a solution requires capabilities distributed across multiple actors; this is why, without partnerships, cities and regions cannot scale. Partnerships give cities and regions the reach, mandate and influence necessary to institutionalise and export solutions around the world.

The Durban River Management Programme (TRMP) illustrates how the value of operational coalitions can support scaling up, despite institutional hurdles. The national water and environmental legislative landscape in South Africa is complex, and eThekweni Municipality lacks a formal mandate over its 18 rivers, limiting its ability to allocate resources and funding for their management. Rather than stalling due to this policy gap, TRMP recognised that community organisations and NGOs in Durban – motivated by the awareness of their strength in the face of recent storm events and other crises – were already actively managing the rivers, each independently funded and pursuing their own initiatives. TRMP therefore acts as a coordination body for these organisations, using their existing mandate and capacity.

Influential coalitions can also support scaling out, particularly when powers of cities and regions are constrained in relation to higher tiers of government. Coalitions of similar sized actors provide stronger platforms to advocate for change, building legitimacy and momentum that a single city cannot achieve alone. Domestic networks like the Big Cities Network (representing Norway's four largest cities) and the National Organisation for Municipalities give Oslo a stronger voice in national debates.

International networks such as C40 Cities and the EU Net Zero Cities initiative provide platforms for joint advocacy and shared demands. Through this combination of local pressure and international alliances, Oslo is able to influence national government. For example, they were granted the authority to develop a local act mandating zero-emission construction sites.

Transition to financial sustainability

Lasting action often requires creative and innovative funding approaches to keep solutions going.

Institutionalisation is not just about embedding the solutions, it is also about finding ways for solutions to be financially sustainable – to support the champions and implementors as they drive delivery, test and pilot innovations, and ultimately scale solutions. What works in one place may not work in another, so funding strategies should match local needs and project types.

The Tamil Nadu Green Climate Company shows how this can work in practice. Financial sustainability is one of the key challenges the company is addressing as it drives large-scale action on climate change through its four missions, recognising that it cannot rely solely on public or donor funding.

In response, Tamil Nadu GCC is laying the groundwork to engage in voluntary carbon markets to generate revenue streams. Mangrove restoration has been selected as an entry point, given its strong potential for carbon sequestration and international precedents under standards such as the Gold Standard and the Verified Carbon Standard (VCS).

The process to engage a qualified carbon portfolio manager with international expertise is currently under way. This partnership will help design and validate a portfolio of high-integrity carbon projects, establishing a proof of concept for future scaling across the state.

Beyond carbon markets, Tamil Nadu GCC is also exploring other innovative instruments such as blue bonds, biodiversity credits, and ecosystem service monetisation to diversify funding streams. These instruments aim to attract and unlock private capital and generate continuous revenue from the benefits of nature-based solutions. For example, community-based ecotourism in restored coastal ecosystems has been identified as a potential inclusive, long-term income stream by Tamil Nadu GCC, ensuring that climate resilience delivers both environmental and social dividends.

Share values over blueprints

The best replication comes from sharing core values behind solutions, so others can adapt them to their own context.

Scaling innovation is not about copying and pasting solutions, but rather about making a strong case for approaches that others can adapt. The most effective replication happens when cities share the principles behind their success, along with the lessons learned from challenges, rather than rigid technical details. Understanding the context is vital too – local politics, institutional capacity, cultural dynamics, regulatory and existing frameworks, and existing mechanisms for delivering all shape what can be achieved.

“If you see someone has done something good and innovative, we need to take that home, enhance that and implement it and then share that again. [...] It’s not just about Malmö sharing what we’ve done, but also about standing on someone else’s shoulders to do something faster and better - and then re-share that so the iterative innovation process keeps flowing.”

Jonas Kamleh
Malmö Climate Transition

Durban’s TRMP illustrates this. A city-to-city exchange event with Mombasa County inspired the adoption of a similar programme along the Mtopanga River. Implementation in Mombasa involved contextualising the approach to address local environmental and cultural factors, and identifying solutions tailored to those specific challenges.

Open, two-way learning between originating and adopting authorities is key. Sharing lessons with peers is just as important as listening to how others have adapted similar approaches. This willingness to exchange knowledge transparently is powerful for two reasons. First, it makes replication more effective – other places are more likely to succeed when they have access to the full story, including how a city or region was able to overcome challenges and navigate missteps. Second, it benefits the originating innovator, which can draw inspiration from how other places have adapted the model and feed those improvements back into its own practice.

Strong relationships between the originating and adopting teams will enable faster and more effective replication. In India, the rapid roll-out of a sulphur dioxide trading market in Maharashtra is being supported by sustained collaboration between the Emissions Market Accelerator team, the Gujarat Pollution Control Board and Maharashtra’s own regulatory board.

Cities can strengthen these relationships and spread ideas through multiple engagement methods. Through their diversified approach to replication and scaling in partnership, cities and regions are able to reach a wider audience, as various methods will resonate differently across audiences.

Methods to explore include:

National-level engagement

Wales Well-being of Future Generations Act (2015)

This Act is featured in the Welsh Government’s international strategy as a form of soft power, promoting Wales’s model globally and attracting interest from other countries. As part of that, a delegation from Maharashtra, India, who visited Wales as part of the Wales and India year and subsequently took inspiration to develop a Future Generations Act in their state.

Networks

Oslo’s Climate Budget

Oslo has used its leadership role in the C40 Cities Climate Budgeting Programme to replicate its approach globally. What began as a pilot with 11 cities has evolved into a formal programme, with C40 now requiring all 97 member cities to implement climate budgeting by 2030. Oslo’s contributions, as lead in the pilot programme includes sharing practical experience and lessons learned, and developing roadmaps with C40 to guide implementation across other cities and regions.

Learning materials

HeatReady Phoenix (Office of Heat Response and Mitigation)

As part of its programme, Phoenix has produced online resources for cities, schools and neighbourhoods, partnering with other government agencies and the Arizona State University. These include guidebooks, tool kits, heat stress recommendations, posters, games, activity books and scorecard tracking, with some available in Spanish to increase accessibility.

Expositions and demonstrations

Guangzhou Bus Electrification Project

GPT has held two expositions in partnership with the Chinese Urban Public Transport Association and Guangzhou Urban Transport Industry. These expositions showcase electrification achievements that bolster confidence among planners and policymakers, as well as serve as a platform for industry dialogue, learning and collaboration. The first exposition resulted in tangible benefits such as strategic cooperation agreements. The second exposition held in 2025, brought together 70 companies from 20 regions and countries, including Waymo auto driving, OC Transport from Canada, BP Powers in the UK, New Express in Singapore.

Peer-to-peer exchange with similar authorities

Durban Transformative Riverine Management Programme

Durban TRMP has found engaging with policy officers in similar cities to be extremely effective. For example, the programme was invited by Johannesburg to meet three municipalities in the Gauteng regions. By sharing its experience. Through the course of that engagement, they found that there were a lot of parallels between the Durban TRMP’s EnviroChamps and Johannesburg, Alexandra Waterway Water Warriors, both community-led riverine management organisations. This exchange has created a mutual learning loop.

A vibrant tropical landscape featuring a wide, calm river in the foreground. The background is dominated by a thick, lush forest of tall palm trees under a clear blue sky. In the middle ground, a group of people is wading through the shallow water, some carrying items on their heads. The overall scene conveys a sense of a healthy, natural environment.

Your moment to act

06

Your moment to act

Every city or region's journey to delivering and scaling impactful climate solutions is unique to its context. As this report shows, there is no prescribed starting point, fail-safe method and no universal end. Solutions take many different paths, shaped by the local environment, ambition and resources.

What is clear, however, is that cities and regions everywhere are showing what is possible. This report offers the essential ingredients that underpin climate action, drawn on diverse examples around the world. The key moves and insights within the report are an invitation for you to do more. Start with what you have. Build coalitions across sectors. Use your budget as a lever. Experiment, iterate and share what you learn.

It's time to turn ambition into action

Whether you are a mayor, city officer, or partner supporting a city or region, this report proves that you have the power to shape a more resilient climate future. The world needs strong leadership, creativity, and commitment from cities and regions. By stepping forward, you join a global community of changemakers who are shaping the future of climate action.

By acting now, by sharing, collaborating, testing and learning, you are building a future where climate leadership is not the exception, but the expectation.

Ready to take the next step?

Your city or region could be the next Milan or Bogotá and introduce innovation that wins the Earthshot Prize. If you are leading, supporting, or witnessing exciting climate innovation in your city, state, or region, share your journey. Nominations must come through The Earthshot Prize's global network of Official Nominators. Connect early and share your solution's potential for scale. Visit earthshotprize.org for full criteria and timelines.



Endnotes

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6. **Selection Bias Caveat:**
The solutions presented are based on a self-selected sample - those that applied or were nominated for the Earthshot Prize.
As such, the findings reflect only participating initiatives and do not represent a comprehensive or unbiased survey of global best practices.



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