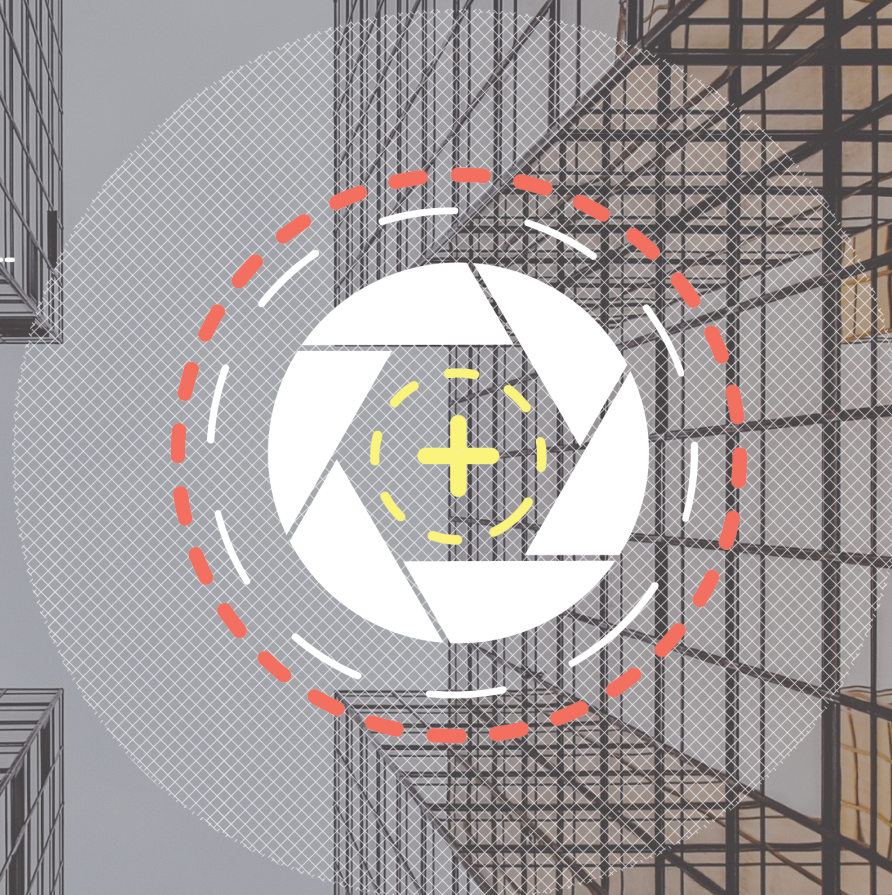


ROADMAP

# INCLUSIVE PLANNING

Policy Recommendations

C40  
CITIES



## **C40 CITIES CLIMATE LEADERSHIP GROUP**

The C40 Cities Climate Leadership Group, now in its 13th year, connects 90+ of the world's greatest cities which have committed to tackling climate change. We bring mayors from around the world together to learn from each other in reducing greenhouse gas emissions and creating

Resilient, sustainable and inclusive cities. C40 cities represent more than 700 million urban citizens and their economies account for 25% of global GDP. Our 'deadline 2020' report sets out the critical role that the world's major cities have to play in delivering the historic Paris agreement to prevent catastrophic climate change.

## **WORLD RESOURCES INSTITUTE – WRI**

### **ROSS CENTER FOR SUSTAINABLE CITIES**

Ross Center for Sustainable Cities works to make urban sustainability a reality. Global research and on-the-ground experience in Brazil, China, India, Mexico, Turkey, and the United States combine to spur action that improves life for millions of people. Based on long-standing global and local experience in urban planning and mobility, WRI Sustainable Cities uses proven solutions and action-oriented tools to increase building and energy efficiency, manage water risk, encourage effective governance, and make the fast-growing urban environment more resilient to new challenges. Aiming to influence 200 cities with unique research and tools, WRI Sustainable Cities focuses on a deep cross-sector approach in four megacities on two continents, and targeted assistance to 30 more urban areas, bringing economic, environmental, and social benefits to people in cities around the globe.

## **ACKNOWLEDGMENTS**

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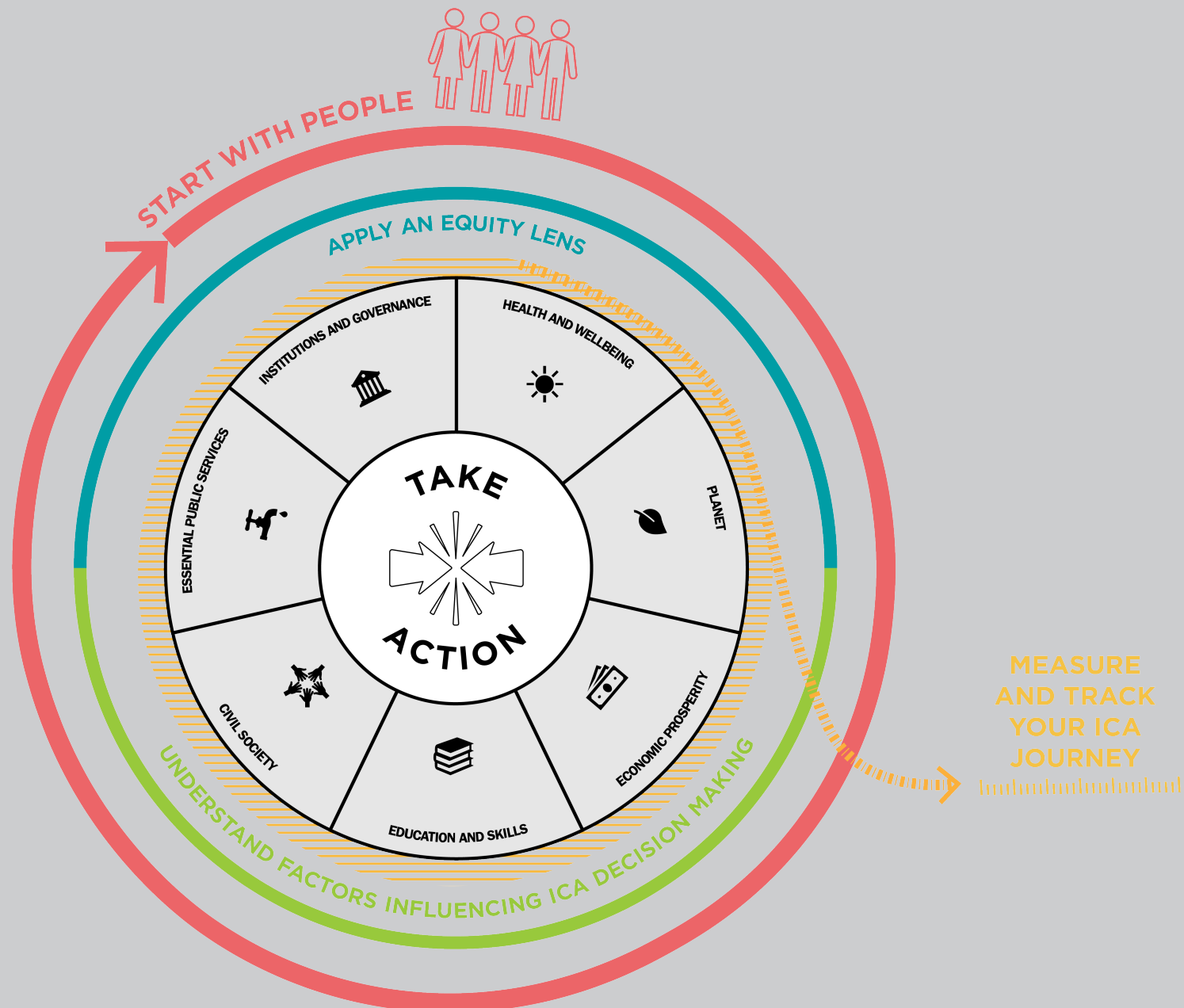
## TERMINOLOGY

Term	Definition
Age	Chronological grouping based on years lived.
Community	Any individual or group who has a vested interest/influence in, or is impacted by, the project.
Disability	Persons with disabilities include those who have long-term physical, mental, intellectual or sensory impairments which, in interaction with various barriers, may hinder their full and effective participation in society on an equal basis with others.
Equity	The absence of avoidable or remediable differences among groups of people, whether those groups are defined socially, economically, demographically, or geographically.
Gender and sexuality	The socially constructed characteristics of women and men – such as norms, roles and relationships of and between groups of women and men. Categories can include lesbian, gay, bisexual, transsexual and intersex.
Hard-to-reach	Those groups or individuals within society that are typically under-represented in the engagement process or have limited capacity to be involved
Impact	Effects of climate change and/or climate action on lives, livelihoods, health, ecosystems, economies, societies, cultures, services and infrastructure.
Inclusivity	The practice of including relevant stakeholders and communities, particularly marginalised groups, in the policy-making and urban governance process, in order to ensure a fair policy process with equitable outcomes.
Income level	Grouping or thresholds connected to earnings of labour and/or capital. Categories typically are defined in relation to the local/national economy.
Informality status	Relationship of individuals, households, activities or firms to the formal or informal economy, typically with respect to production, employment, consumption, housing or other services.
Intersectionality	How different aspects of an individual or group's social and political identities overlap and intersect
Migrant status	Refers to the legal and immigration status of a person who changes their place of residence. Categories include locals, expatriates, documented or undocumented migrants, refugees and asylum seekers.
Race and ethnicity	Race is defined as a category of humankind that shares certain distinctive physical traits. The term ethnicity is more broadly defined as large groups of people classed according to common racial, national, tribal, religious, linguistic, or cultural origin or background.
Religion	Religious or spiritual belief or preference, regardless of whether or not this belief is represented by an organised group, or affiliation with an organised group having specific religious or spiritual tenets.
Sex	Sex refers to the biological characteristics that define humans as female or male. While these sets of biological characteristics are not mutually exclusive, as there are individuals who possess both.

# INTRODUCTION

Cities can drive ambitious climate action and be at the forefront of the fight against climate change. Making a strong case for action, by highlighting its multiple benefits, is instrumental in getting the job done.

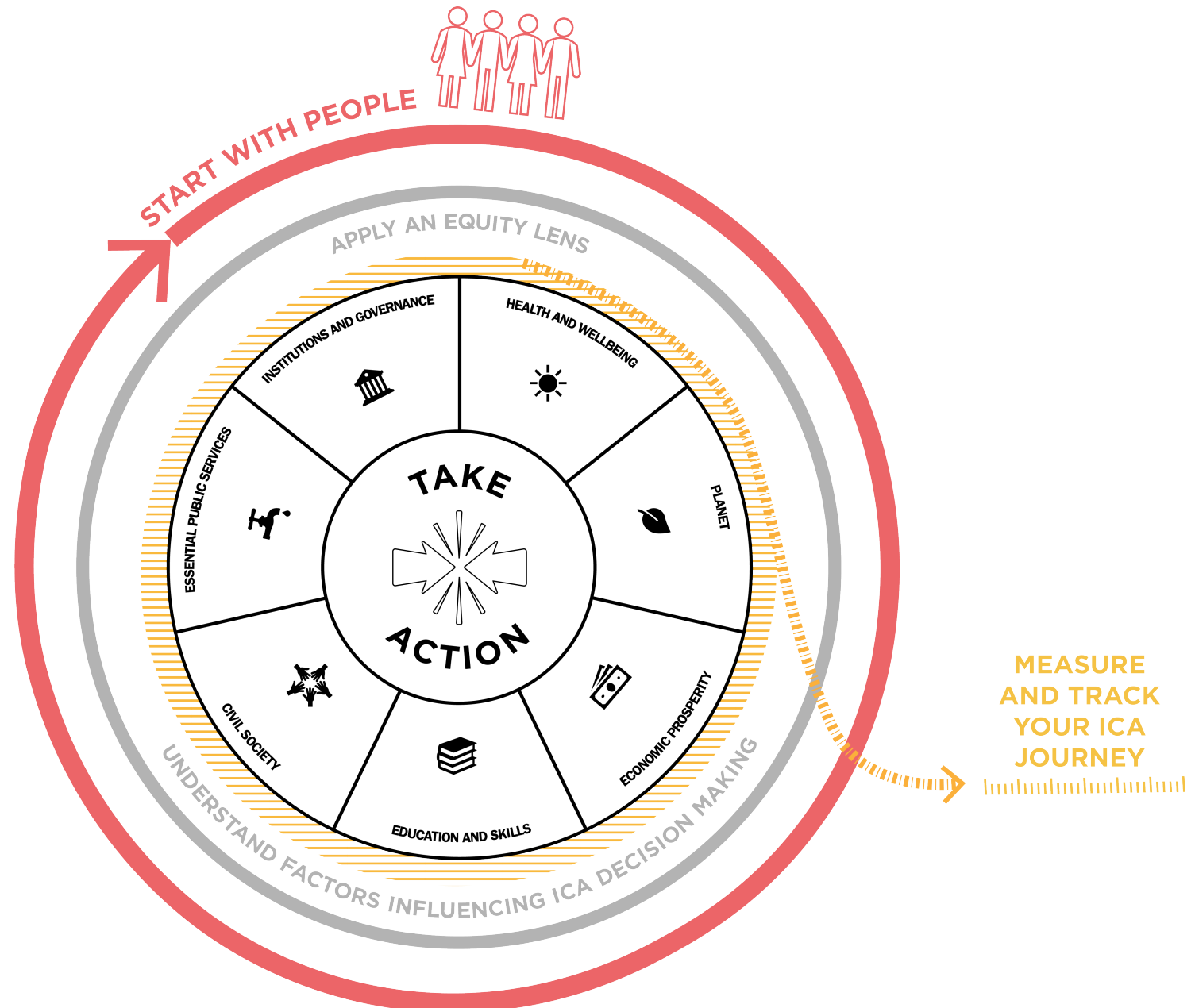
Based on the experience of working with the cities, C40 has gathered insights on the most important elements to be considered throughout the design and implementation of inclusive climate actions plans. There are five key elements and recommendations to help drive bold and ambitious action, tackling climate change while harnessing the maximum benefits for their people.



## PUT PEOPLE AT THE HEART OF CLIMATE ACTIONS

Creating inclusive climate action plans involves developing co-created solutions and prioritizing local knowledge and experiences of communities on the frontline of climate change. In order to do this, urban decision makers must put people at the heart of the climate action planning process—from vision setting, to policy design and further implementation.

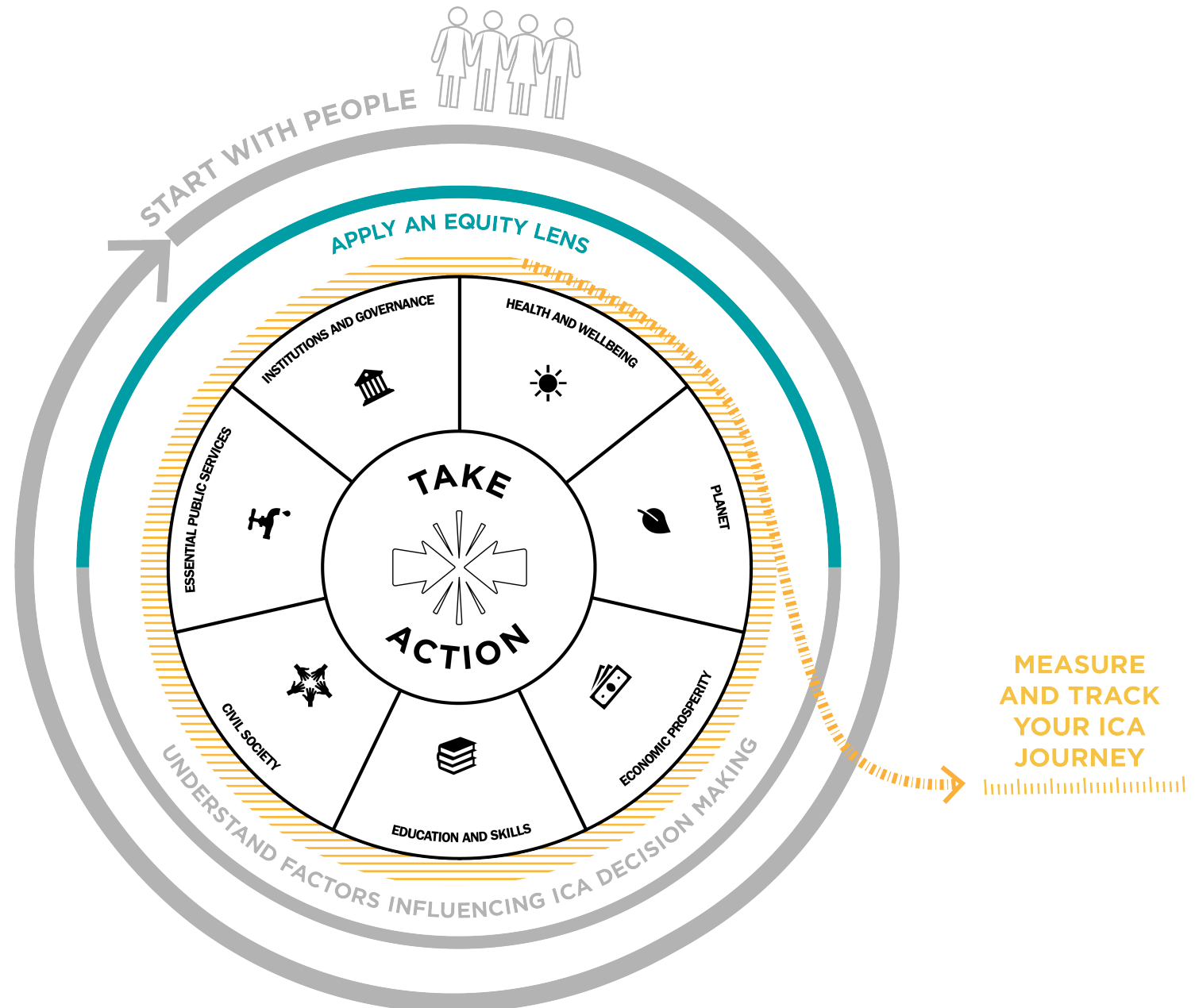
By engaging with various communities in the design and implementation process of climate actions, cities can ensure an equitable distribution of benefits and protect groups most affected by climate change.



## APPLY AN EQUITY LENS

In order to put people first, cities must understand how certain communities are impacted by climate change. Cities should apply an equity lens fit for their local context, to identify the most at-risk communities. Applying an equity lens allows cities to understand what existing social and economic barriers some communities might face, and how this impacts their ability to benefit from climate actions.

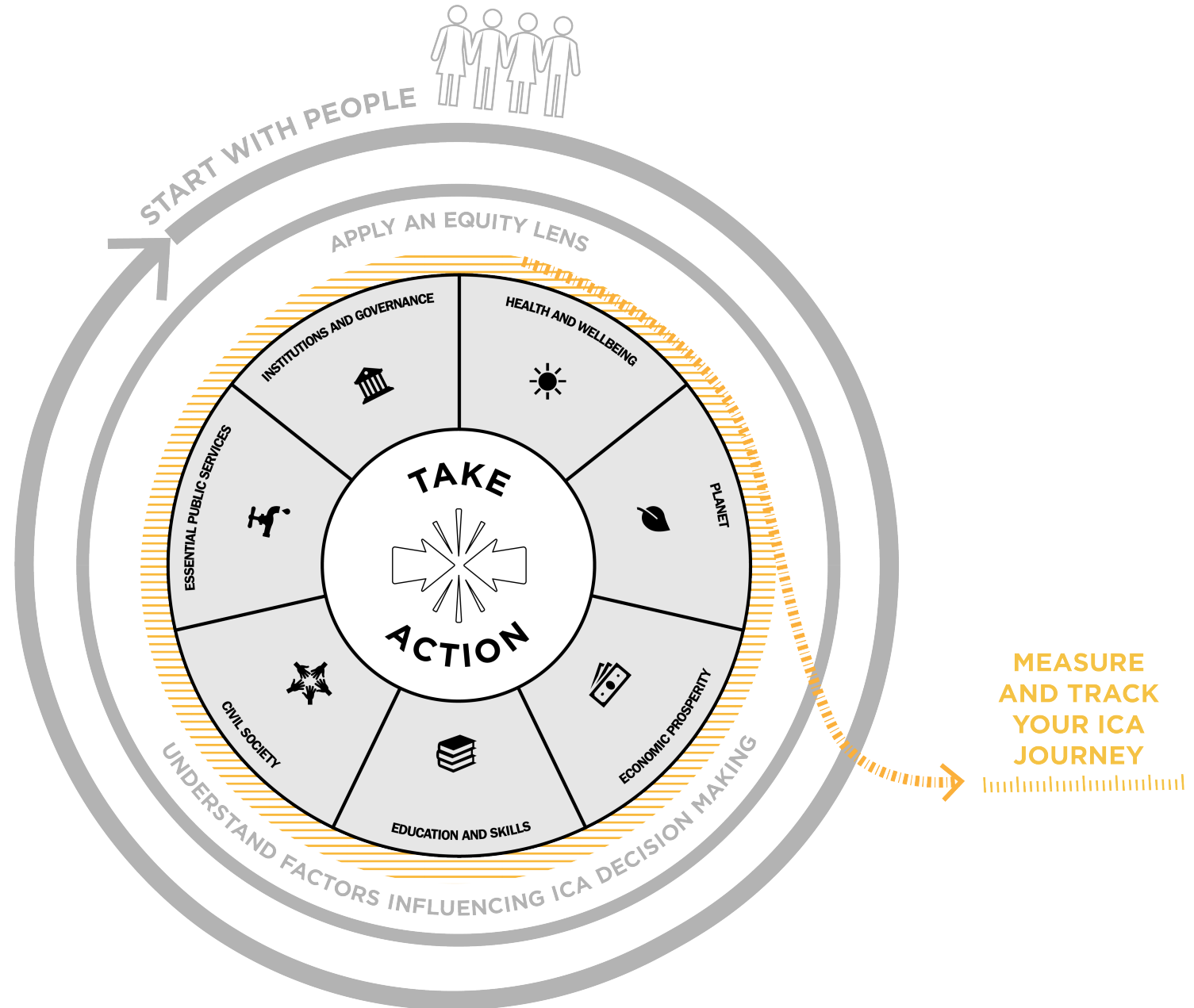
Cities must understand how access to services and policies differs amongst parts of the urban population in order to design climate policies that reach the maximum number of people. This includes: assessing the root causes of marginalisation (or social exclusion) and the lack or absence of access for certain groups in the city; deciphering key challenges around economic mobility and affordability; and finally, analysing how services and policies are distributed spatially and whether any spatial inequalities exist. By applying this equity lens while planning and designing, cities can ensure that climate actions have fair and equitable outcomes.



## CONDUCT A DIAGNOSIS OF EXISTING CITY NEEDS

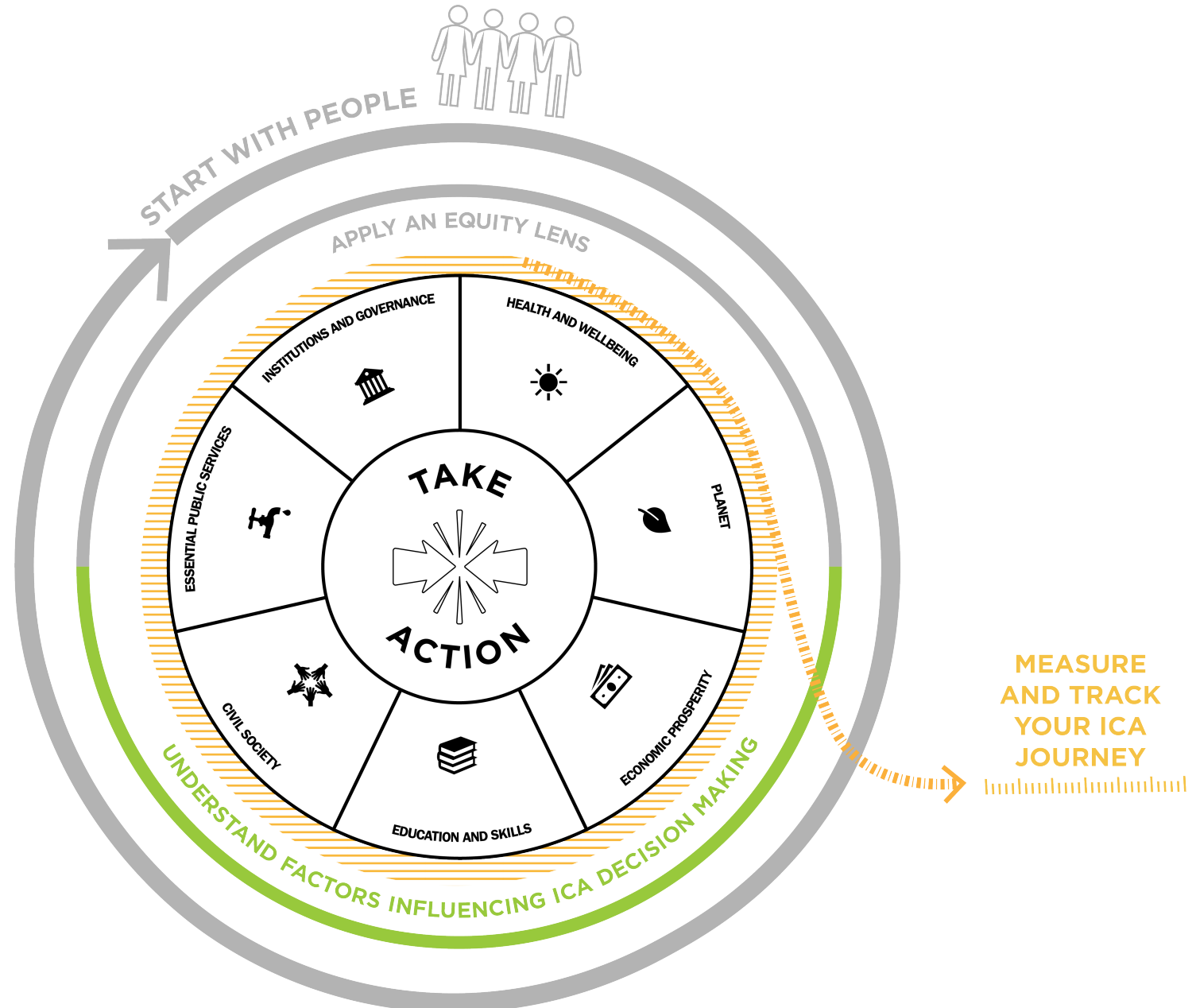
Based on this understanding, cities should seek to design climate actions that meet existing needs of residents, such as improving urban health and well-being, increasing economic prosperity, and promoting education and skill development.

By diagnosing the broad areas where the city is doing well—and not so well—urban planners and policy-makers can design climate policies that target specific needs.



## UNDERSTAND THE POLITICAL ECONOMY FOR ACTION PLANNING

Understanding the key influencing factors for a set of climate actions is crucial to designing and implementing them in an inclusive way. Cities should consider their existing governance and decision-making structures, as well as the constraints or opportunities these structures create. Those working on climate action must understand the political economy drivers responsible for existing conditions which may potentially impact the implementation of actions. This understanding will allow city decision makers and practitioners to effectively navigate the institutional, political, and administrative powers in place to implement an inclusive climate action plan that has broad impact.



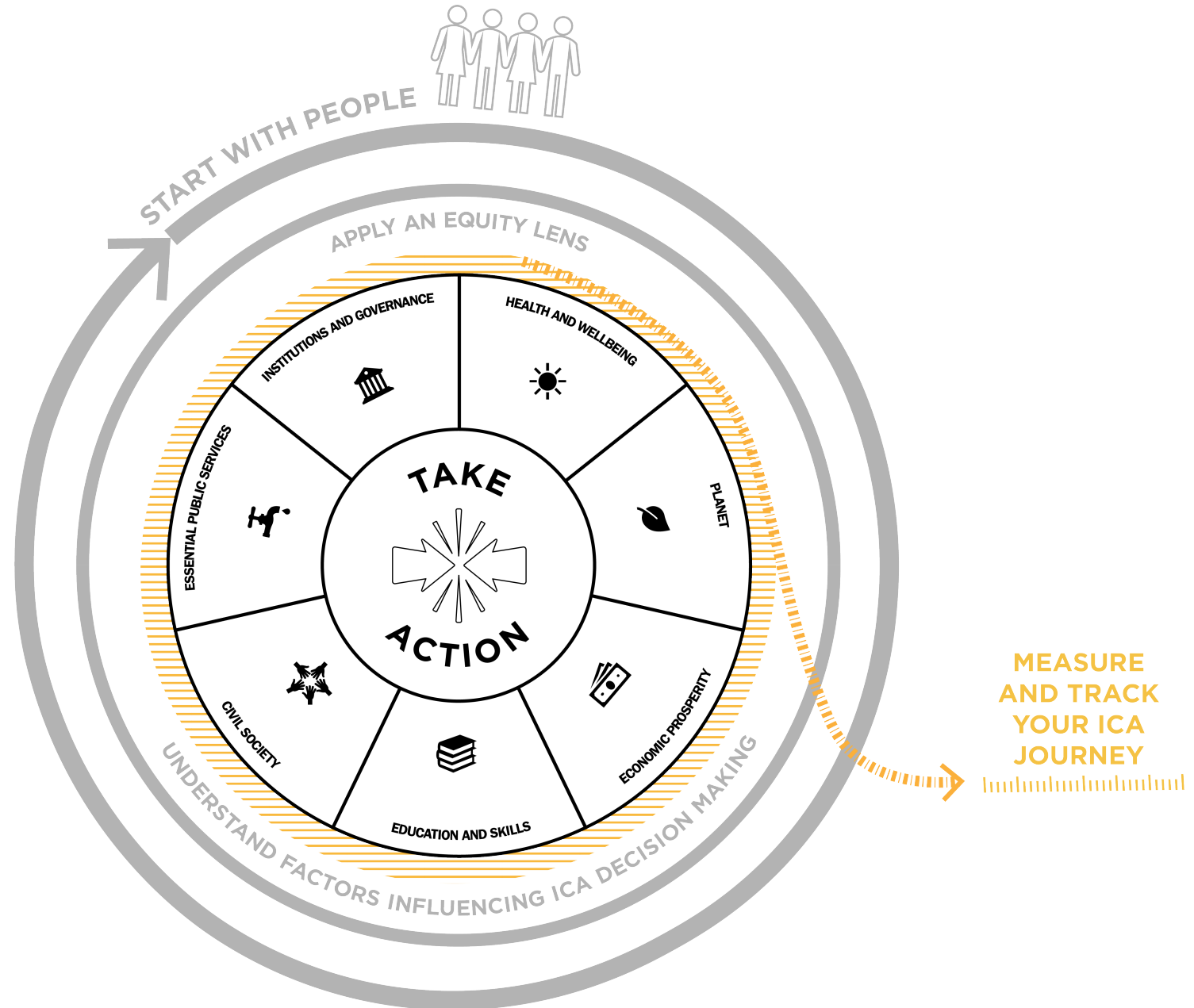


## USE EVIDENCE TO TRACK THE JOURNEY

Cities should set benchmarks for their climate action plans to track progress towards their intended outcomes. This can also build momentum and ensure that a city has realistic and achievable goals for its inclusive climate action plans. Without continuous monitoring and evaluation of climate actions, cities will be ill-equipped to ensure that policies are inclusively designed and their impact equitably distributed.

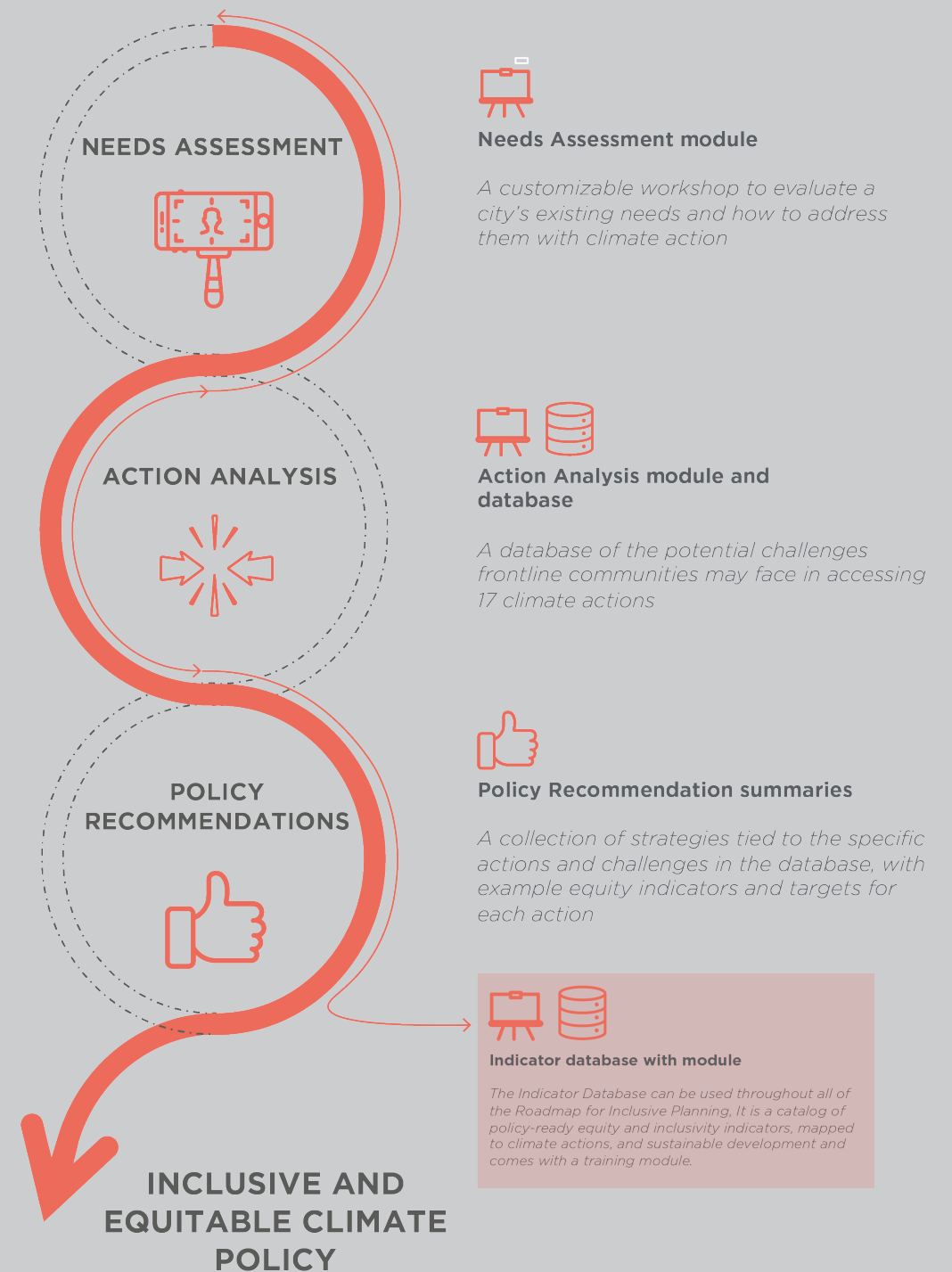
In order to understand the needs of frontline communities and track whether climate actions are delivering benefits to them, cities must gather data that is disaggregated by population group and spatial distribution.

This detailed information will allow the city to understand which communities and areas are benefitting from improved air and which are currently suffering most from existing pollution. Collecting disaggregated data can take place in parallel with community engagement efforts.



# SIMULTANEOUSLY TACKLING CLIMATE CHANGE AND GROWING INEQUALITIES NEEDS CAREFUL PLANNING

Our research shows that while some cities and communities are testing and implementing transformational initiatives that engage and deliver benefits to a diverse group of residents, for many others, the lack of available case studies and tested techniques is a key barrier to delivering climate action in an inclusive and equitable way.



# KEY STEPS TO INCLUSIVE PLANNING

## 1 NEEDS ASSESSMENT

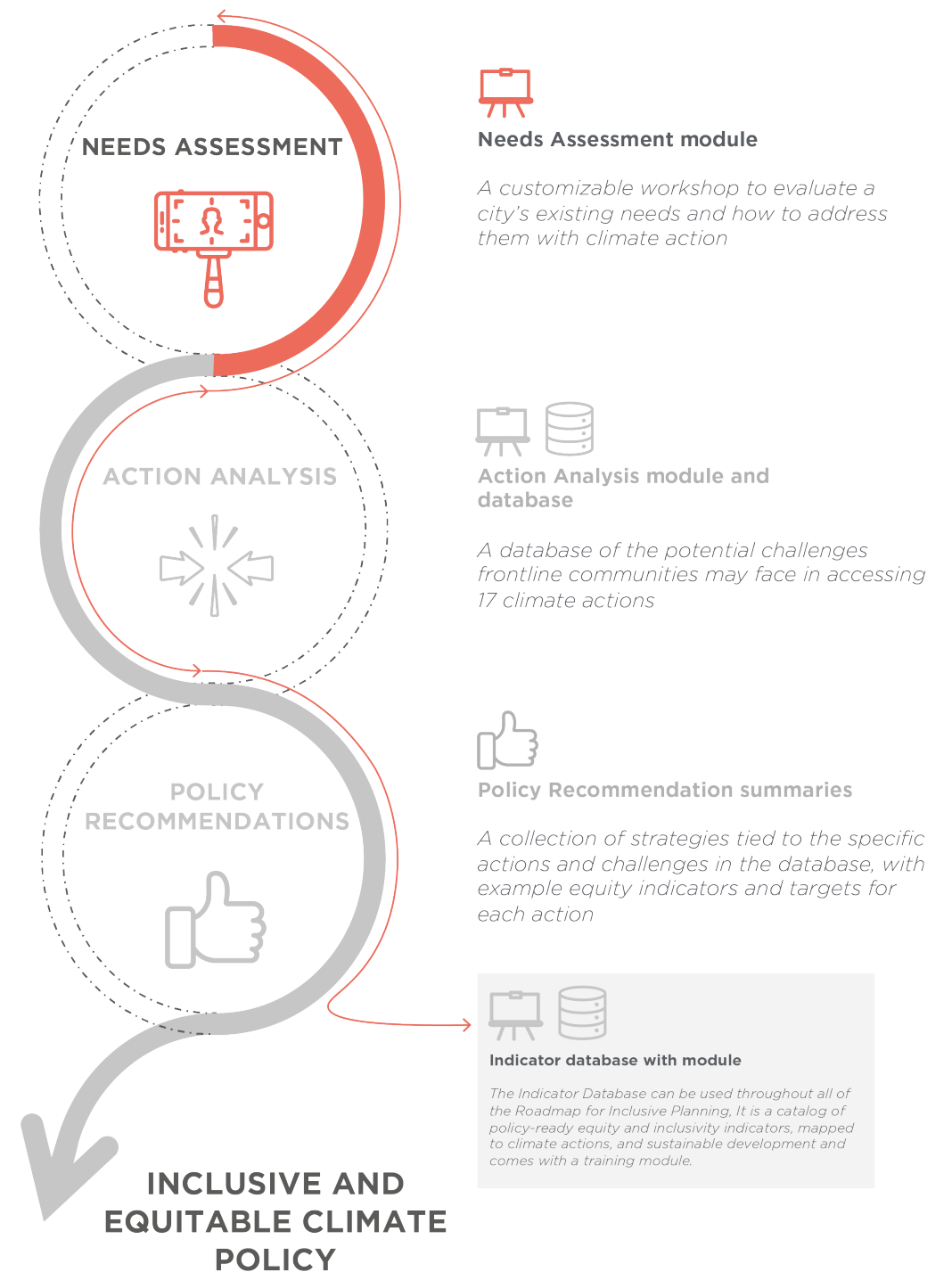
The first step of inclusive climate action planning is to conduct a Needs Assessment. The Needs Assessment helps to answer the question, “how might we tackle climate action based on the needs of our cities and citizens?”. Through this assessment, cities can identify both the communities that are most vulnerable to climate change and those that are the most sensitive to climate actions. Contextualising climate actions in terms of who will be most impacted helps the city ensure that selected climate actions have the widest economic, environmental, and social impact.

The Needs Assessment walks through a series of questions relevant to understanding the needs of various frontline communities (e.g. women, informal workers, children, people with disabilities, etc.). These questions are framed around three elements of equity—access, prosperity, and place.

Health checks throughout this guidance ensure progress towards intended outcomes of conducting the Needs Assessment (e.g., ‘we can propose methods to gather data through proxies and address data gaps’).

Relevant indicators have been imbedded throughout the Needs Assessment to help cities identify the impact of their inclusive climate action planning. These indicators can be selected from the Indicators Database and should be relevant to the climate action that the city is pursuing and for which the city has some spatially disaggregated data.

The final stage of the Needs Assessment is to understand the different factors influencing decision-making in the city. This includes identifying key governance mechanisms and political economy drivers of change that can inform how the city goes about passing and implementing inclusive climate actions.



# KEY STEPS TO INCLUSIVE PLANNING

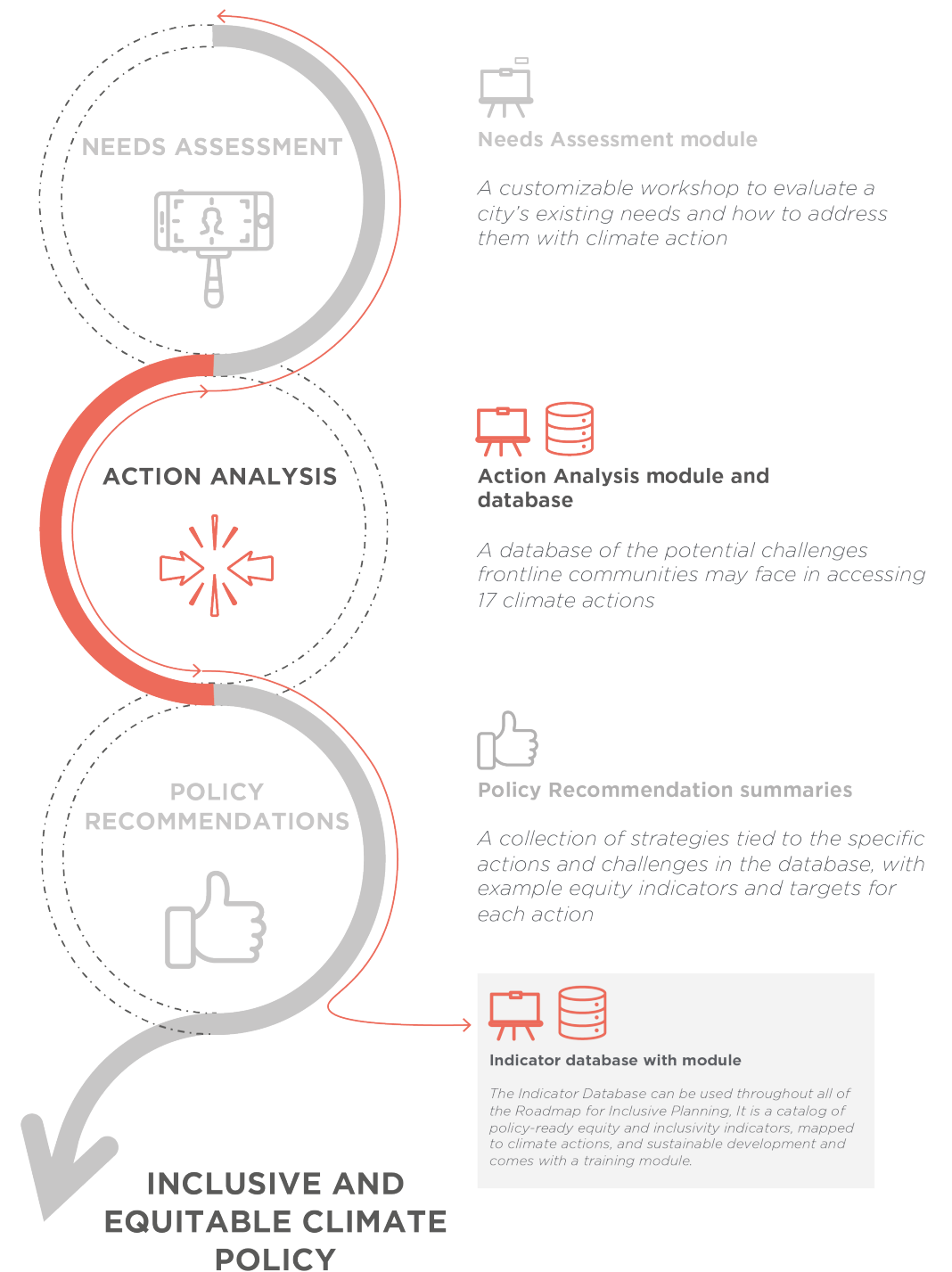
## 2 ACTION ANALYSIS

Next, cities can analyse the inclusivity and equity implications of potential climate actions using the Action Analysis database. This database explores the benefits and potential barriers that cities might face in implementing 17 climate policies, from creating new low-carbon building standards to improving emergency management and early warning systems for climate hazards. The benefits of each climate action are mapped to the following domains or outcome areas: health and wellbeing, planet, education and skills, economic prosperity, essential public services, civil society, and institutions and governance.

Like the Needs Assessment, the Action Analysis focuses on people. The goal of this analysis is to understand who typically accesses and benefits from potential climate actions and who may not, given existing inequities.

This analysis looks at the benefits of potential climate actions through the lenses of access and availability, prosperity and affordability and spatial inclusion and place.

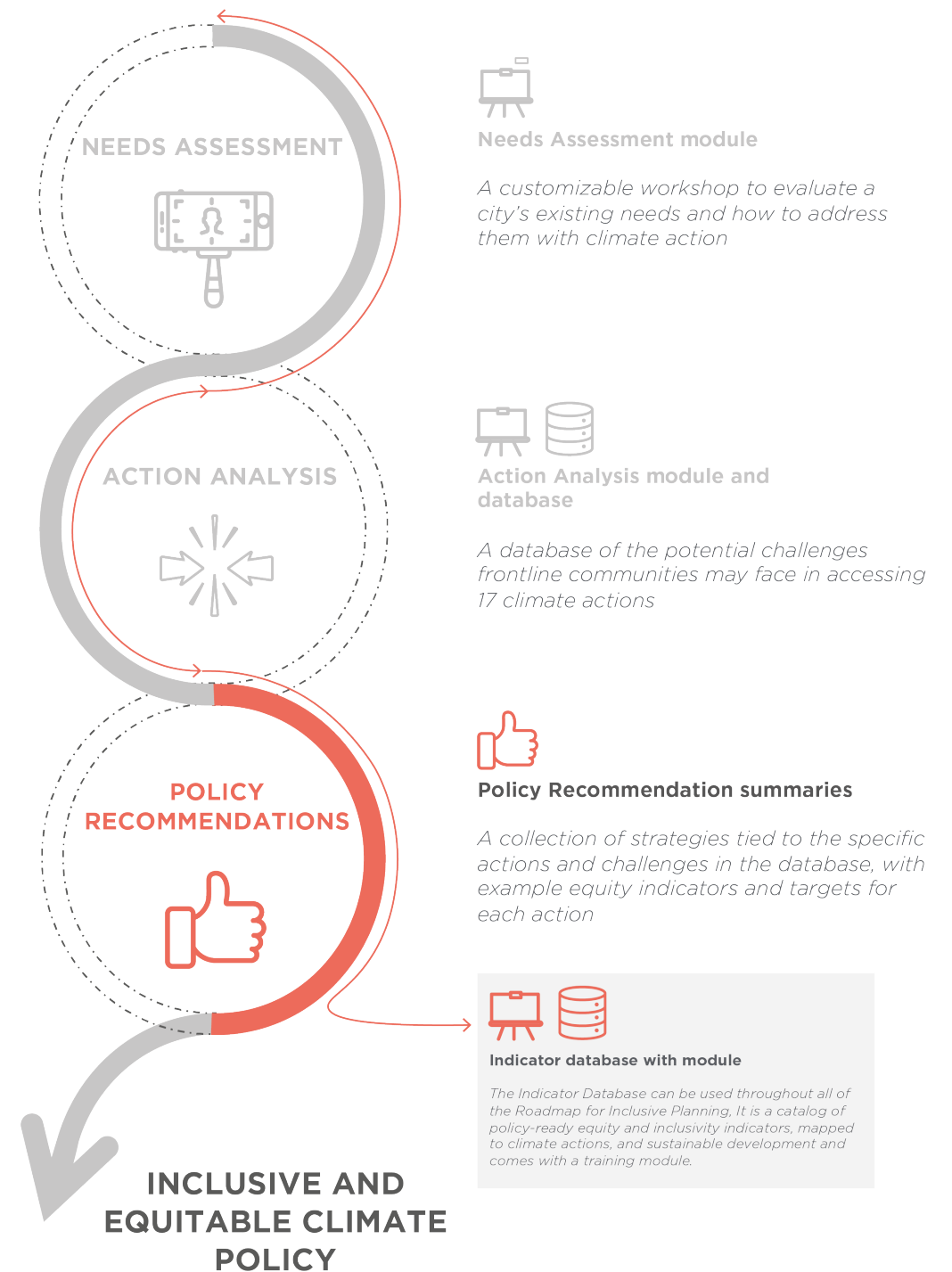
The Indicators database complements the Action Analysis, providing several indicators to measure the inclusivity and equity considerations of each climate action. Each indicator is also mapped to the city's primary domains or outcome areas. Finally, a list of priority indicators, selected for their applicability across the 17 climate actions, is provided to help cities streamline their monitoring and evaluation efforts for inclusive climate actions.



# KEY STEPS TO INCLUSIVE PLANNING

## 3 POLICY RECOMMENDATIONS

Building on the detailed Action Analysis database, the Policy Recommendations provide clear steps for a city to take in order to implement climate actions in an inclusive way. For each action, key recommendations are provided based on city best practices from around the world. Each headline recommendation is supported by more specific steps; this additional detail helps cities implement inclusivity and equity incrementally in their climate planning. The Policy Recommendations also include the action-specific indicators that the city can use to track its progress, as well as example targets that other cities have adopted.

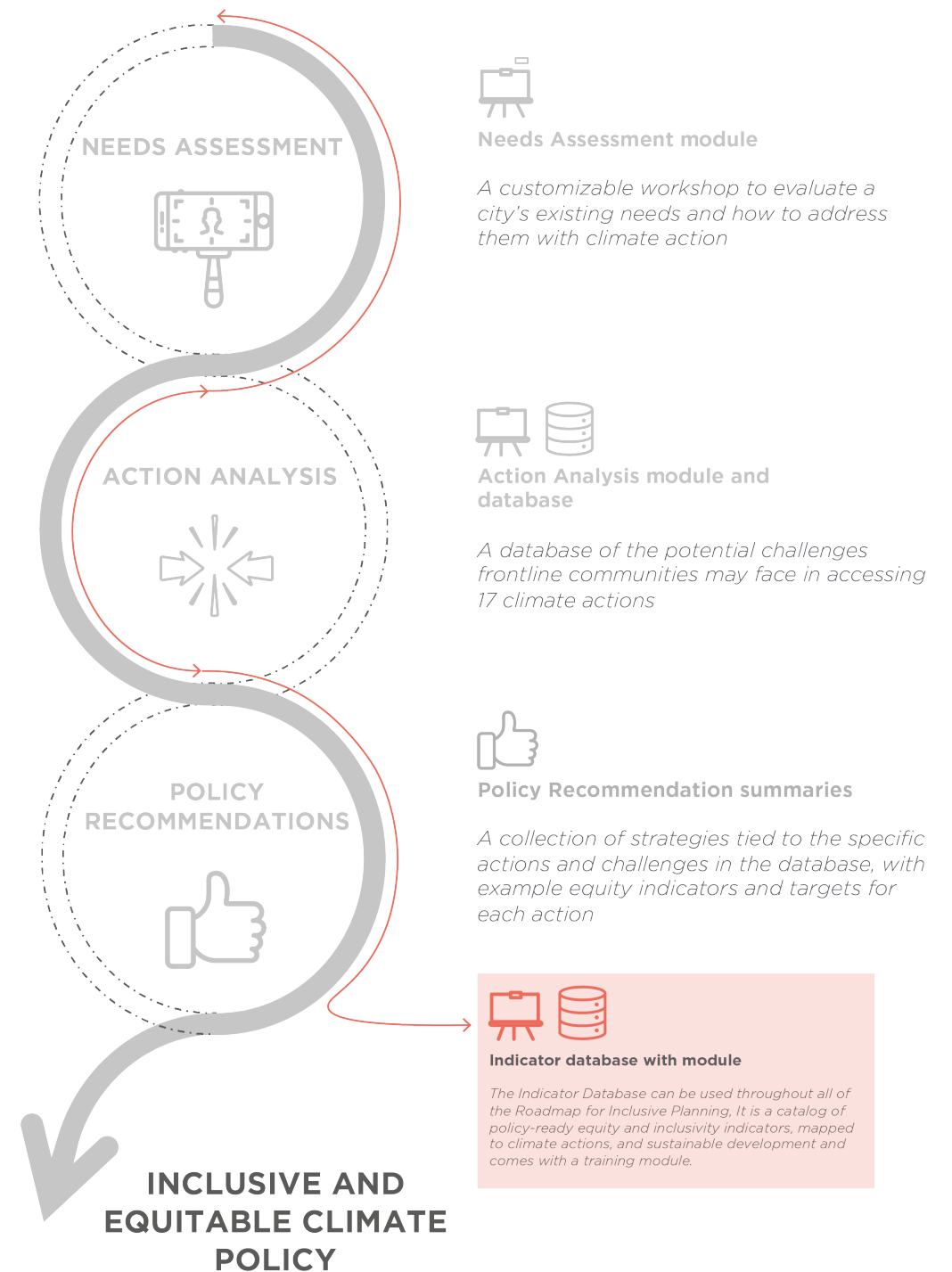


# KEY STEPS TO INCLUSIVE PLANNING

## USE EVIDENCE TO TRACK THE JOURNEY

Without continuous monitoring and evaluation of climate actions, cities will be ill-equipped to ensure that policies are inclusively designed and their impact equitably distributed.

This should be done throughout the three key steps of inclusive planning.



# 1 COLLECTIVE PURCHASE OF RENEWABLE ENERGY

## Action Overview

By aggregating demand for renewable energy, cities have more leverage to negotiate prices and provide renewable energy options for their residents. There are many ways that cities can help to aggregate demand and collectively purchase renewable energy, including community solar projects, power purchasing agreements, virtual power purchasing agreements, on-site municipal solar, and green tariffs, among others.

## RELATED ACTIONS

- 2 Distributed Renewable Energy



## What are the potential wider benefits?

### Planet

- Reduced air pollution from fossil fuel-based energy production and reduction in associated health risks

### Economic prosperity

- New green jobs associated with renewable energy installation
- Enhanced land value capture from investment in renewable energy rather than polluting power plants

### Essential public services (energy)

- Reduced energy bills for end consumers
- Reduced reliance on fossil fuels/reduced GHG emissions
- Reduced energy costs for the city and communities
- Potential formalization of energy access for residents previously underserved by traditional grid
- Increased grid reliability and resilience resulting from diversified energy portfolio
- Lower administrative costs from purchasing large quantities of energy in single transaction

## What are the potential barriers to action?

- Costs associated with infrastructure needed to integrate renewables into traditional systems' energy storage, maintenance, and demand response as cities increase reliance on renewable energy
- Limited ability to enter into collective PPAs at the retail (smaller-scale) level as many collective purchasing agreements are only available at the wholesale level (in bulk, usually greater than 10 Megawatts)
- Difficulty in passing high-level legislation (usually at the state or national level) needed to help all communities participate in collective purchasing programmes

## Inclusivity and equity considerations

### Who may be impacted?



Low-income communities



Migrants



Informal communities (residents, workers)



Racial and ethnic minorities

### How may they be impacted?

For some cities, certain types of renewable energy generation are not yet cost competitive with fossil fuels and require relatively high upfront costs for installation and longer-term costs for maintenance. This can be offset by cities incentivizing or engaging in the collective purchasing of renewables, as the power of aggregated demand can help to lock in fair and affordable prices that last over time, with the costs of installation and maintenance spread across a larger group of actors. The challenge lies in improving access for urban residents who are not currently served by traditional grid infrastructure (e.g. **informal settlements and businesses**) and ensuring that **low-income communities** do not absorb transaction costs or short-term increases in energy costs due to the implementation of renewable energy programs. Such increases in energy costs could lead to higher rates of energy poverty. Additionally, the savings from collective purchasing programs are not always shared with or redistributed back to residents, which means that low-income consumers may have less financial incentive to participate in the programme. For cities with unregulated energy markets or unreliable or informal electricity provision, negotiating collective purchase agreements or instituting green tariffs may not be an option and may not benefit low-income and other marginalized communities, such as **racial and ethnic minorities and migrants**.



### Case studies

Azuri PayGo Energy provides access to solar energy for hundreds of thousands of customers in 11 countries across Sub-Saharan Africa. For a small upfront fee to install the solar panels, customers can top up their account as they go via their mobile phones, giving previously excluded populations access to clean energy. <sup>i</sup>

In 2013, the Denver Housing Authority entered into a 20-year power purchase agreement with a solar energy provider to serve groups of existing multi-family properties and public housing units. The city used federal tax credits, utility rebates, and conservation bonds to finance the project and created 40 new green jobs in the process. <sup>ii</sup>



# 1 COLLECTIVE PURCHASE OF RENEWABLE ENERGY

## Policy design recommendations

*What to do and how to do it?*

01.

Work with utilities to formalise access to renewable energy sources and ensure that underserved customers receive access

- a. Provide financial support and incentives to residents and informal businesses to upgrade buildings and appliances to connect to formal energy supply.
- b. Create a flexible payment structure for people without bank accounts.
- c. Advocate for minimum delivery guarantees as part of contract negotiations for collective purchase agreements.

02.

Create policies and governance structures that allow all communities to participate in collective purchasing programmes

- a. Implement community choice aggregation with 'opt-out' structures to aggregate relatively large customer bases that increase buying power in wholesale renewable markets, making it easier for residents who may not have reliable or formal access to communication around renewable energy purchasing programs to receive benefits.
- b. In regulated markets, consider the use of green tariffs, which allow for individual customers to subscribe to a portion of a large renewable energy project. These smaller customers, including informal settlements and businesses, are then aggregated by the utility or other supplier to make a renewable energy project more cost effective.



## Policy design recommendations

*What to do and how to do it?*

03.

### Put frontline communities at the centre of collective purchasing of renewable energy

- a. Provide a financing mechanism for community solar projects in low-income communities.
- b. Engage all stakeholders – including cities, financing institutions, utilities, manufacturers of renewable energy technologies, and low-income consumers – from the beginning of a collective purchase project to ensure a transparent and inclusive process.
- c. Cities engaging in collective purchase agreements should prioritise low-income communities to improve access to clean energy and local green jobs.

#### Action-specific indicators

1. Percentage of households served by formal electricity grid
2. Percentage of household incomes spent on energy bills
3. Percentage of population with electrical service supported by renewable energy (e.g. by income group, gender, race/ethnicity)
4. Percentage of total energy coming from a renewable source (e.g. in informal households and businesses)

#### Example targets

- Reduce electricity bill of low-income households by 50% (Washington, D.C., U.S.)
- Provide solar energy and its benefits to 100,000 low-income households by 2032 (Washington, D.C., U.S.)

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- ii. HUD. n.d. "Renewables-in-Practice-Case-Study-Denver-Housing-Authority.Pdf." Accessed July 2, 2019. <https://www.hudexchange.info/onecpd/assets/File/Renewables-in-Practice-Case-Study-Denver-Housing-Authority.pdf>.

## Image credits

1. [Photo](#) of men carrying solar panels by [Ricardo Gomez Angel](#) on [Unsplash](#), free use (Unsplash [license](#))
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## Action Overview

Distributed renewables are decentralised forms of renewable energy (RE) generation within a city at the facility or district level. These can include rooftop solar PV, backyard wind, solar hot water heaters, and battery storage.

### RELATED ACTIONS

- 1 Collective Purchase of Renewable Energy



## What are the potential wider benefits?

### Planet

- Reduced air pollution from fossil fuel-based energy production and reduction in associated health risks

### Economic prosperity

- Creation of new low-skill jobs for installation and maintenance of distributed renewable projects

### Essential public services (energy)

- Increased energy access from distributed renewable energy projects installed in areas not served by traditional grid
- Reduced infrastructure cost associated with central generation systems
- Reduced energy bills for consumers
- Reduced reliance on fossil fuels/reduced GHG emissions
- Increased energy reliability and resiliency from diversified energy portfolio

## What are the potential barriers to action?

- High potential upfront costs of installing distributed projects
- Potential need for training for individuals and communities on the proper operations and maintenance of new technologies, posing an additional time commitment
- Need for integration of RE with traditional energy systems as distributed RE may not meet full energy needs of a community
- Objection by community members to visual or noise disturbances caused by the construction or presence of renewable energy projects such as solar panels or wind turbines

## Inclusivity and equity considerations

### Who may be impacted?



Low-income communities



Women



Informal communities (residents, workers)



Racial and ethnic minorities



Religious minorities

### How may they be impacted?

**Low-income communities and religious, racial and ethnic minorities** may be excluded from participating in distributed renewable projects due to potentially high upfront cost of installation and maintenance. Inflexible payment schemes exacerbate this problem. Utilities, developers, and investors may not prioritise distributed projects in more peripheral areas of the city for fear of a low rate of return on their investment, thereby limiting options for secluded communities. **Informal settlements** may lack the physical infrastructure needed for distributed RE systems. When distributed renewables are introduced into a community, **women** may be informally or legally barred from owning or earning profit from operating the technology. The 'split incentive' problem may inhibit residents who rent rather than own property from participating in distributed RE projects. Renters would prefer to reduce energy bills by investing in RE, but they usually do not have power to actually install or invest in these projects. Property owners do not pay the energy bills themselves and are therefore not necessarily incentivized to invest in distributed renewables, creating a 'split incentive' challenge.



### Case study

Grid Renewables, the largest solar installer non-profit in the U.S., offers support to low-income families and communities for solar installation, shared solar project development and solar job training.<sup>1</sup>

## Policy design recommendations

*What to do and how to do it?*

01.

Create institutional processes and financing mechanisms to make distributed renewables accessible and affordable for hard-to-reach households

- a. Shorten project development times by developing and investing in city-owned distributed RE projects, facilitating direct purchasing of renewables, and making municipal land available for projects.
- b. Integrate renewables into urban and economic development strategies by creating planning processes specifically aimed at promoting renewables, establishing shared targets, and coordinating with stakeholders across different levels of government.
- c. Establish regulations that promote the adoption of distributed RE for hard-to-reach households (e.g. building codes, permitting procedures, solar ordinances, grid connection regulations, technical standards, and obligations on energy suppliers).
- d. Provide financial incentives for RE projects, including facilitating low-interest and long-term loans for property owners, project developers, and small-scale purchasers; on-tax financing such as Property Assessed Clean Energy (PACE) programs in the U.S.; and making public space available for renewable energy projects.



02.

Improve women's access, ownership, and employment in distributed renewable projects

- a. Conduct advocacy and engagement on women's involvement in renewables, including awareness raising, knowledge sharing and dissemination to individuals and civil society organizations.
- b. Provide training and skills-development programmes for women that accommodate women's potential childcare responsibilities.
- c. Ensure equal property ownership and, where applicable, distributed renewable ownership rights.

**Policy design recommendations***What to do and how to do it?*

03.

## Combine distributed renewable energy projects with energy efficiency projects

- a. Where RE is not cost-competitive or upfront costs of RE installation are higher than fossil fuel-based energy, cities should bundle energy efficiency efforts with RE to reduce energy poverty, especially in low-income communities. This can lower the cost barrier for low-income groups to invest in RE.

## Action-specific indicators

1. Percentage of the energy mix from clean sources
2. Percentage of energy costs as share of monthly income (e.g. by race/ethnicity, migrant status)
3. Percentage of households and businesses with electrical service supported by distributed RE (e.g. by income level, informality status, gender)
4. Percentage of population participating in RE training programmes and jobs (e.g. by income level, gender, age, race/ethnicity, migrant status)

## Example targets

- Supply 55% renewable energy by 2025; 80% by 2036; and 100% by 2045 (Los Angeles, U.S.)
- Increase share of electricity mix from clean sources by 100% by 2040 (New York City, U.S.)
- Achieve 2 GW of solar PV installations by 2050 (London, UK)

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## Case study citations

i. For more information, see: <https://gridalternatives.org/what-we-do>.

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## Action Overview

This action involves setting efficiency standards and disclosure requirements for energy and water consumption in new construction. This may be accompanied by mandates or incentives specifying performance requirements for energy and water conservation or the use of specific high-efficiency materials or appliances in new buildings.

### RELATED ACTIONS

- ④ Retrofitting Programmes that Improve both Building Efficiency and Resiliency



## What are the potential wider benefits?

### Planet

- Reduced GHG emissions and air pollution from reduced energy consumption in energy efficient buildings

### Essential public services (energy, water)

- Benefits of energy and water cost savings to households
- Higher availability of energy and water for all in the community if consumption standards are followed

## What are the potential barriers to action?

- Increased housing costs, if the costs of more efficient building specifications are passed on by developers to building owners/renters
- Displacement of those who cannot afford housing prices of new buildings
- Delay in formal building projects, including housing and commercial, leading to an increase in overall costs
- Increase in informality if low-income, informal households and businesses cannot build to higher, more expensive standards

## Inclusivity and equity considerations

### Who may be impacted?



Low-income communities



Informal communities (residents, workers)

### How may they be impacted?

The cost of achieving new building code specifications may be passed on by developers to consumers, and these may be unaffordable for **low-income renters, homeowners or small-scale businesses**. If this is the case, developers may have less of an incentive to invest in new buildings if communities will not be able to afford higher housing prices. As a result, there may be fewer new, efficient buildings constructed in low-income neighbourhoods. The cost of achieving building code standards may delay building projects, raise overall costs of housing, and push more households and businesses into informality.

## Case studies

The City of Windhoek, Namibia created a tiered structure for building standards tied to income and development levels, starting with communal services and upgrading as income levels increased. While this code did not include efficiency standards, these could be added as households progress to higher income levels, with an eye to promoting efficiency at all levels. <sup>i</sup>

The Portland Housing Bureau adopted LEED and Earth Advantage standards to highlight multi-family affordable housing that was providing the strongest benefits on energy, water, and indoor air quality to its residents. These contributed to the city's targets on net zero energy consumption in affordable housing projects and water use reduction. <sup>ii</sup>



## Action-specific indicators

1. Percentage of population with access to credit that can be used for efficiency improvements (e.g. by income status, gender, race/ethnicity)
2. Percentage of monthly income spent on rental costs, before and after adoption of efficiency measures
3. Percentage of monthly income spent on energy and water costs, before and after adoption of efficiency measures
4. Value of subsidies provided for efficiency improvements (e.g. by income status)
5. Percentage of new housing units built with improved efficiency measures that are classified as public or affordable housing

## Example targets

- Net zero energy consumption in affordable housing projects by 2050 and 50% water reduction by 2040 (Portland, U.S.)

**Policy design recommendations***What to do and how to do it?*

01.

Create "tiered" building codes, where stringency increases with income and development levels

- a. Introduce flexibility into building codes with higher standards for richer market segments.
- b. Set targets for new public housing and affordable housing that incorporates efficiency measures and practices.
- c. Ensure that incremental improvements are legal and keep to the efficiency standards.

02.

Create financing mechanisms that reduce the cost impact on low-income households and informal communities

- a. Assess the impact of higher efficiency standards and energy/water conservation practices on consumption patterns and cost savings in informal and low-income housing markets.
- b. Consider establishing subsidy programmes for new buildings that accommodate small businesses and low-income households.
- c. Create technology development incentives for efficient communal provision of water and energy services, especially in low-income neighbourhoods, and re-invest cost savings from reduced consumption in the community.
- d. Consider using the proceeds from land value capture in specific neighbourhoods to establish a revolving fund dedicated to building retrofits.
- e. Engage all relevant stakeholders in devising and implementing new standards, including government agencies, developers, informal and low-income community representatives, civil society organizations, entrepreneurs and financiers.



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## Action Overview

Asset-based retrofitting programmes typically include upgrading walls, roofs, windows and doors (e.g. wall insulation, cool/green roofs, high-efficiency windows) to improve energy efficiency, increase the asset value of the building and help adapt to impacts of climate change. Operational retrofitting programs change the way in which the building is managed, including temperature set-points, heating, ventilation and air conditioning (HVAC) and lighting schedules to enhance energy efficiency, with measurement and verification (M&V) mechanisms to calculate energy savings.

### RELATED ACTIONS

- 3 New Building Standards, Codes and Regulations for Energy and Water Conservation
- 13 Improving Conditions in Informal Settlements for Increased Climate Resilience



## What are the potential wider benefits?

### Health and wellbeing

- Increased climate resiliency due to regularised indoor temperatures (better insulated walls and windows) and flood/storm-proofed buildings

### Planet

- Reduced air pollution due to lower consumption of fossil fuel-based energy

### Essential public services (energy)

- Reduced energy costs due to lower energy consumption, with savings available for other household expenditures

## What are the potential barriers to action?

- Increased housing or rental costs as a result of landlords seeking to recoup costs of retrofitting/upgrading
- Displacement of those who cannot afford increased housing costs associated with upgrades
- Increased informal or non-compliant buildings as not all can afford to pay for the retrofits
- Increased inequality as improved assets appreciate in value while others stagnate

## Inclusivity and equity considerations

### Who may be impacted?



Low-income communities



Informal communities (residents, workers)

### How may they be impacted?

Retrofit programs may lead to higher rental costs or other fees for the building upgrades, and **low-income communities** and businesses may be displaced. **Informal communities** may have few incentives to undertake these improvements because of lack of land tenure security, while low-income communities may not be able to finance the upfront costs of such programmes.

## Case studies

Cape Town installed improved retrofit roofs on pilot projects through community, NGO, and state partnerships for over 8,000 homes based on need. <sup>i</sup>

Washington, D.C. is starting to retrofit all public housing on its path to achieving net-zero energy standards for all existing commercial and multi-family buildings. <sup>ii</sup>



## Action-specific indicators

1. Percentage of monthly income spent on rent before retrofit (by income level)
2. Percentage of monthly income spent on energy, before and after retrofit (by income level)
3. Percentage of homes vulnerable to excessive heat, before and after cool/green roof retrofits (by income level, informality status, age)
4. Percentage of homes that have been retained by residents (instead of sold or leased) that have undergone retrofits (by income level, race/ethnicity, age)

## Example targets

- By 2032, retrofit 100% of existing commercial and multi-family buildings to achieve net-zero energy standards, starting with all public housing (Washington, D.C., U.S.)

**Policy design recommendations***What to do and how to do it?*

01.

## Reduce the up-front costs of building retrofits

- a. Dedicate financing to subsidise the upfront cost of retrofits to renters and low-income households and reduce energy rates for low-income households.
- b. When subsidies are not available, allow low-income communities to participate in incremental retrofitting efforts to minimise the potential cost burden and maximise the number of households participating in retrofitting programmes.

02.

## Use energy usage per person rather than energy usage per unit of living area as a fairer energy performance indicator

- a. Conduct a pre-retrofit study that includes indicators of both building stock and socioeconomic data like household income and demographics.
- b. Promote disclosure of energy-consumption data to allow tracking of usage over time.

03.

## Retrofit publicly funded and affordable housing without raising tenants' rents

04.

## Consider use of land value capture instruments so that increased land value arising from higher quality building stock can be used for a revolving fund dedicated to building retrofits

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## Action Overview

Fuel switching refers to when building owners or occupants switch from carbon-intensive fuels (e.g., biomass, coal, wood or other fossil fuels) to cleaner fuels (e.g., electricity from a low-carbon source, LPG/biogas in the short term). The following considerations assume that the electricity provided is or has the potential to be low-carbon. If this is not the case, then city residents may not fully benefit from fuel switching until electricity is sourced from more low-carbon and/or renewable energy.

### RELATED ACTIONS

- 1 Collective Purchase of Renewable Energy
- 2 Distributed Renewable Energy
- 13 Improving Conditions in Informal Settlements for Increased Climate Resilience



## What are the potential wider benefits?

### Health and wellbeing

- Decreased indoor air pollution and premature deaths
- Improved cleanliness, health, safety, efficiency, and convenience
- Reduced time gathering fuel (household work)

### Essential public services (energy)

- Increased cost savings in some cases

## What are the potential barriers to action?

- Conflicts with personal and cultural preferences for household cooking and heating practices
- Increased costs in some cases with limited access to financing options
- Lack of maintenance for new appliances
- Higher time requirements for electric cooking and heating appliances

## Inclusivity and equity considerations

### Who may be impacted?



Low-income communities



Women



Informal communities (residents, workers)



Migrants

### How may they be impacted?

Switching to electric cookstoves and heating appliances, which typically have high one-time installation costs and inflexible payment schemes, may be prohibitively expensive **for low-income communities**. The price of electricity, high upfront costs for power connection charges, and high-power intermittency may be additional barriers for middle- and low-income households. These communities also may not have access to affordable and high-quality appliances or the infrastructure for clean fuel distribution. **Informal settlements** are often not connected to the electricity grid or to cooking gas supply lines, and as such, these communities may not benefit from fuel switching efforts unless there are wider sustainable upgrading initiatives in place. If households are not connected to the electrical grid or experience high power-intermittency, lower-carbon fuels such as liquid petroleum gas (LPG) could be offered in the interim as a more useful alternative for a solid cooking fuel like coal. If modern fuel delivery requires a secure address, fuel switching actions may not be accessible to **migrant communities** and informal residents or businesses. **Women** are typically most impacted by the excessive time and costs to obtain solid fuels; therefore, ensuring their training and acceptance in the use of clean fuels and maintenance of new appliances is important.



### Case study

In Ecuador, to encourage electric cooking, the government offered long-term, low-interest loans for electric stoves and installation kits, and 80 free KWh of electricity per month. <sup>i</sup>

In Thailand, grocery stores distribute LPG canisters without permission procedures. <sup>ii</sup>

**Policy design recommendations***What to do and how to do it?*

01.

## Provide affordable prices and incentives for low-carbon fuels to all consumers

- a. Provide subsidies to lower-income residents on clean fuels and electricity services. This could be through cross-subsidization, means-tested subsidies for low-income households, or with pro-poor payment schemes (e.g. tax break, on-bill repayments, low-interest loans, voucher for the large up-front cost of a clean cookstove or heating appliance and installation kits)
- b. Provide subsidised electricity connection charges, flexible payment schemes for one-time costs of connection charges, electric heating appliances, and clean cookstoves, and/or a scrapping premium scheme where relevant (e.g. rebates for replacing old stoves with electrical stoves).
- c. Reform fossil fuel-subsidies by reducing or eliminating subsidies for kerosene and adopt renewable energy policies at the national or city level to accelerate distributed renewable energy (see Action 2).
- d. Expand finance for clean heating and cooking utilizing dedicated funds.



02.

## Provide the infrastructure for reliable clean fuel and electricity distribution

- a. Advocate for a national or regional infrastructure for clean fuel production and distribution with dedicated government body to set quality and safety standards
- b. Improve electricity network coverage throughout the city with attention to low-income and informal areas
- c. Distribute low-carbon fuels at communal sites (off-site from household) without permission procedures

**Policy design recommendations***What to do and how to do it?*

03.

Raise awareness of low-carbon fuels, clean cookstoves, and their respective benefits, with emphasis on women, migrant, and low-income participation

- a. Encourage and raise awareness on 'fuel stacking' (using a combination of fuels) to accommodate differences in availability, price, and cooking and heating needs
- b. Run a public awareness campaign to clearly communicate the potential benefits of fuel switching, with a particular focus on outreach to female local community leaders
- c. Introduce engagement strategies that involve participation with community groups

**Action-specific indicators**

1. Percentage of households that use solid cooking/heating fuel (by income level, gender, migrant status, informality status)
2. Percentage of households with reliable electrical connections (by income level, gender, migrant status, informality status)
3. Number of city power outages per month/year
4. Percentage of households that switch to clean cookstoves (by income level)
5. Percentage of households within 10-min walk of a modern fuel distribution point (by income level, gender, informality status)
6. Time and costs savings of fuel switching (by income level, gender)
7. Improvement in health (e.g., reduction in illnesses) and quality of life of residents (by gender)

**Example targets**

- The use of fossil fuels for heating shall be phased out in Oslo in 2020 and replaced by renewable sources of energy for heating (Oslo, Norway)
- 100% of new single-family homes, town homes and small apartment buildings in Berkeley, CA must have electric infrastructure and cannot use natural gas starting January 1, 2020 (Berkeley, U.S.)

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## Action Overview

Congestion pricing involves charging drivers for the true costs of operating vehicles on limited road space at congested times and locations. It promotes more balanced road usage by all modes (instead of prioritizing private vehicles) and helps to reduce travel times, improve air quality, and decrease greenhouse gas emissions.

Low Emissions Zones are areas of a city where access by high-emitting vehicles is restricted through outright bans, charges for emissions differentiated by vehicle type (category, weight, fuel type, age, emission level, presence of equipment such as particulate filters or catalytic converters), or restricted access that applies during specific times of the day or year.

### RELATED ACTIONS

- 7 Expansion or Improvement of Public Transportation Options
- 8 Electrification of vehicles, With Focus on Public Transport and Shared Vehicles
- 17 Expanding Walking and Cycling Options and Last-Mile Access to Transit Stations



## What are the potential wider benefits?

### Planet

- Improved air quality from lower usage of private vehicles, especially for low-income and minority communities with higher exposure to pollutants

### Health and wellbeing

- Reduced mortality, increased life expectancy and reduced hospital admissions from improved air quality
- Decreased road accidents and injuries from lower usage of private vehicles

### Essential public services (transport)

- Increased local revenues from congestion charge to fund public transport and walking and cycling infrastructure

### Economic prosperity

- Potential increase in local revenues and overall economic productivity due to increased footfall in areas where congestion charging schemes are implemented and decreased travel delays

## What are the potential barriers to action?

- Increased public resistance to behaviour changes (switching from driving single-occupancy vehicles to other transport alternatives) and political resistance to charging; for LEZs, decreased public acceptability to invest in cleaner vehicles
- Possible increased travel time experienced by some drivers as a result of taking public transport instead of personal vehicles, particularly where the congestion zone includes major job centres, low-income drivers, women and disabled drivers driving from distant locations where housing is more affordable may be particularly impacted
- Improvement of air quality and higher liveability limited to congestion charge or LEZ area, which often coincides with wealthier parts of the city, exacerbating inequalities
- Potentially higher costs and reduced business for service providers (delivery drivers, taxis, small and medium freight enterprises) operating within the congestion zone or LEZ
- Potentially higher costs and relocation of businesses located within the congestion charging zone or LEZ that receive deliveries (e.g., grocery and retail stores), and that receive customers (e.g., retail, restaurants)

## Inclusivity and equity considerations

### Who may be impacted?



Low-income communities



Women



Elderly



Racial and ethnic minorities



People with disabilities



Outdoor workers, temporary workers,  
workers in transitioning industries

### How may they be impacted?

If attractive alternatives to private vehicles in the form of public transport or other paratransit services are not available or accessible, congestion pricing and LEZs may seriously increase transport costs and limit access for **low-income drivers**. Even if alternatives exist, **disabled and elderly residents** may need to use private vehicles and thus may either face higher transport costs or may need to forego trips to the specified zone. **Women** often make multiple trips due to additional burdens of childcare and household needs and may thus face higher charges. **Self-employed workers** providing services to others and small businesses in the specified zone may need to relocate or move to other markets due to higher transport costs. **Minority racial and ethnic groups** residing in distant locations typically under-served by public transit may face higher costs and access challenges if they must drive into the congestion zone or LEZ. This in turn may significantly impact transport affordability for these groups.



### Case studies

London improved bus services significantly before implementing congestion charging and pricing revenues were dedicated to operating the scheme and funding public transit improvements. In London and Singapore, a unified agency operates the pricing system, road network and transit. <sup>i</sup>

London has analysed the health, safety, equality and wellbeing impacts of its proposals to revise the congestion charging scheme, for a range of impacted groups, including women, disabled travellers and those with low incomes. <sup>ii</sup>

London provides discounts to residents of the charging zone and those operating vehicle fleets for transport (e.g., truck and taxi fleets), and exemptions for disabled people, drivers of electric vehicles, and emergency services. <sup>vi</sup>

Barcelona offers discounted public transport tickets for use in its LEZ and free public transport for three years to those who give up and demolish their vehicle without acquiring a new one during the three-year period. <sup>vii</sup>

London began public engagement about the congestion charging zone about 18 months before the scheme was actually implemented and the city has conducted regular impact evaluations shared with the public. <sup>ix</sup>

## Policy design recommendations

*What to do and how to do it?*

01.

Develop explicit plans for use of congestion pricing revenues in a way that benefits groups most negatively impacted

- Clearly articulate the objectives of the congestion pricing or LEZ scheme as part of policy design and ensure transparency, public awareness and understanding about these. For instance, congestion reduction, emissions reduction, and/or raising revenues should fund specific projects and/or incentives with direct benefits to those groups or people negatively impacted.
- Coordinate across the pricing authority and agencies operating transport services to agree on use of revenues to fund transport services used by lower-income people, the disabled, and elderly (e.g., enhanced public transit with disabled access, improved facilities for walking and cycling).
- Ensure enhancements in public transit services and walking and cycling infrastructure before (if possible) or alongside implementing congestion pricing, especially in locations where low-income and ethnic communities reside or areas with limited access to public transit services and walking and cycling infrastructure.



02.

Design and locate congestion zone or LEZ in locations where congestion/pollution issues are most severe, while considering spatial distribution of frontline communities and impacted groups in the city

- Account for the travel patterns of low-income and minority communities in determining the boundaries and fee structure of the congestion zone or LEZ.
- Analyse transport demand data to identify proportion of low-income drivers who may need to drive into congestion zone or LEZ and conduct economic impact analysis of congestion/LEZ charge on low income households (i.e. value of time savings, health benefits, health care spending, etc.).
- Analyse accessibility benefits to low-income households resulting from public transit and walking and cycling infrastructure improvements supported by revenues from the congestion charge.
- Consider peak hour pricing (as opposed to all-day pricing) and limits to amount charged per vehicle per day.



**Policy design recommendations***What to do and how to do it?*

03.

Carefully assess and implement impact alleviation measures for specific user groups, including exemptions, subsidies and discounts

- a. Depending on the location of the congestion zone or LEZ, and location of impacted groups and frontline communities, consider appropriate discounts or exemptions (e.g., London) and free passage for those for whom the priced zone/corridor is the only means of transit (e.g., Stockholm).
- b. Consider targeted support schemes such as vehicle scrappage schemes for low-income drivers and small businesses to switch to alternative modes or cleaner vehicles (e.g., London).
- c. Consider discounts to low-income drivers and small businesses located in the zone that are unable to pass on increased costs to customers, or tax credits to offset the charge

04.

Conduct extensive public engagement much before implementation and consider gradual implementation starting with a pilot/test phase

- a. Conduct extensive public engagement and communication about the congestion charging or LEZ scheme design, its benefits for various communities, specific measures for impacted groups, and how revenues should be used.
- b. Utilise inclusive and responsive planning and outreach processes, evaluate and transparently report results of scheme or pilot
- c. Find local champions to enable political and public support and utilise effective ad campaigns to educate and encourage residents to support congestion pricing or LEZ policies.

### Action-specific indicators

1. Number of jobs accessible by public transit inside and outside the congestion zone or LEZ (e.g. by income group, disability status, gender, etc.)
2. Travel time savings as a result of congestion charging (e.g. by income groups, race/ethnicity, etc.)
3. Reduction in emissions (CO<sub>2</sub>, PM<sub>2.5</sub>, NO<sub>2</sub>) in key areas of the city (e.g. near hospitals, schools, care homes or low-income neighbourhoods)
4. Improved life expectancy, reduction in number of hospital admissions across different population groups (e.g. by age, gender, race/ethnicity, etc.)
5. Reduction in road accidents and injuries
6. Proportion of household income spent on transport (e.g. by income groups, race/ethnicity, etc.)
7. Number of businesses that relocate as a direct result of the congestion zone or LEZ (e.g. small business, temporary workers, self-employed, etc.)

### Example targets

- Decrease drive alone commute trips by 50% by 2030 (Pittsburgh, PA, U.S.)
- Reduce annual traffic fatalities to zero (New York City, U.S.)



### Case studies

Public participation was a central part of Milan's congestion charging scheme, first called Ecopass and then the Area C congestion charge. After its first successful year, residents voted for a referendum to implement an updated congestion charge in the city centre. <sup>viii</sup>

As a part of the Mayor of London's air pollution campaign, posters were put up in public transit cars that showed graphic images of the pollution problem in London (e.g. soot on a baby bottle). These ads were aimed at increasing support for the new congestion charge, the T-Charge, that was about to be launched. <sup>x</sup>

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## Action Overview

This action involves investing in public transport infrastructure to support greater use of alternatives to private vehicles and/or improving operational efficiency of existing public transport modes. This involves ensuring good-quality, affordable, reliable, and safe public transit (buses, rail, informal transport, paratransit) that is easily accessible to all city residents.

### RELATED ACTIONS

- 9 Pursue Transit-Oriented, Dense, and Mixed-Use Development (TOD)
- 15 Climate Resilient Land Use Planning and Infrastructure Development



## What are the potential wider benefits?

### Essential public services (transport)

- Safer and more efficient public transport services promoting improved access to opportunities for all

### Economic prosperity

- Direct, indirect and induced job creation from new infrastructure development
- Land value increase bringing higher property taxes and local revenues
- Decreased congestion and travel delays from reduction of private vehicles

### Planet

- Decreased air pollution from mode shift to cleaner public transport, walking and cycling

### Health and wellbeing

- Reduced mortality, increased life expectancy and reduced hospital admissions from improved air quality
- Decreased road accidents and injuries from reduction of private vehicles

## What are the potential barriers to action?

- Significant cost and land required for public transport infrastructure
- Contested street space causing decreased access or increased congestion for private vehicles
- Potential reduction/elimination of informal sector transport jobs if replaced by formal public transport
- Increased housing prices around new public transport due to better access and connectivity
- Difficulty in maintaining financial sustainability of public transport systems (capital investment, operation, and maintenance costs) over time and difficulty in raising fares to improve services

## Inclusivity and equity considerations

### Who may be impacted?



Low-income communities



Women



Informal communities (residents, workers)



Racial and ethnic minorities



Religious minorities



People with disabilities



Migrants



Elderly, youth, children

### How may they be impacted?

Absence or limited availability of public transport services (bus, rail, paratransit) constrains access to opportunities and amenities. Low frequency and reliability of public transport in locations where **informal, low-income or minority communities** live leads to long waits and increases in travel times. Access for **low-income groups** may be hampered when there is no safe infrastructure such as proper pavements, pedestrian crossings, pick-up/drop-off areas and access ramps for last-mile access to transit stations on modes they typically use (walk, bike, informal and paratransit). Poorly designed infrastructure for pedestrians and cyclists may exclude **people with disabilities** and create safety concerns for those walking and cycling. In terms of affordability, the cost of fares for public transport services may be high for **low-income people** and the lack of fare integration further raises costs for those who transfer across modes. Information about public transport services may not be easily understandable by **migrants and racial, ethnic and religious minority groups**. **Women's** security in public transit stations and vehicles can be a significant challenge and one that deters their use of public transport.



### Case studies

In early 2019, Berlin introduced a 21% reduced fare ticket for women riders of the city's metro system to highlight the significant gender pay gap in Germany. <sup>i</sup>

Cities such as Washington, D.C., Chicago, São Paulo and Recife have introduced inclusionary zoning regulations. In Brazil these are called ZEIS (Zonas Especiais de Interesse Social). <sup>ii</sup>

## Policy design recommendations

*What to do and how to do it?*

01.

### Plan new public transport infrastructure around people's needs

- a. Ensure financing is available from higher levels of government or city's own sources (taxes, user fees, land value capture instruments), allowing investments to shift from road building/widening to public transit and offering more residents equal access to opportunities.
- b. Conduct spatial analysis of where frontline communities live and work in the city and identify gaps in public transport access; make decisions jointly with land use planning and economic development agencies.
- c. Conduct economic analysis of potentially distributive impacts of investments in new transport (changes in jobs, income, externalities, travel time savings and land values).
- d. Hold public engagement workshops for frontline communities during planning and design phases of public transport routes and stations.

### Action-specific indicators

1. Percentage of population with access to opportunities (e.g. jobs or other services) within 30-60 minutes by public transport (e.g. by income groups, race/ethnicity, etc.)
2. Access to public transport within walking distance (within 500 meters) of all residences and major employment centres combined with incentives to use public transit
3. Availability of public transit information real-time, using materials/apps in multiple languages and communication methods used by people with disabilities (e.g. braille)
4. Time taken for public transit users in typical daily commute and number of transfers in daily commute (e.g. by income groups, race/ethnicity, etc.)
5. Trips made using personal mobility devices like e-scooters and bicycles and on foot to reach transit stations (e.g. by location across the city)

### Example targets

- Supply 55% renewable energy by 2025; 80% by 2036; and 100% by 2045 (Los Angeles, U.S.)
- Increase share of electricity mix from clean sources by 100% by 2040 (New York City, U.S.)
- Achieve 2 GW of solar PV installations by 2050 (London, UK)

**Policy design recommendations***What to do and how to do it?*

02.

## Improve integration and last-mile access for public transport between multiple modes and services

- a. Provide quality pedestrian infrastructure around public transport stations, to enable ease, safety and directness for those accessing stations as well as the services in and around the neighbourhood.
- b. Provide connecting bicycle infrastructure to public transport stations, as part of a city-wide network, and consider placing bicycle-share services at transit nodes.
- c. Provide feeder systems that support last-mile access to public transit stations, particularly in locations where frontline communities live and work, with integrated fares to incentivise people to transfer to public transport.
- d. Collaborate with communities, private developers and employers to provide last-mile access options in residential and employment zones.
- e. Introduce integrated fares across modes and integrate schedules and routes across modes – coordinate across modal transport agencies or establish unified multimodal transport agencies to achieve this.
- f. Establish provisions to carry bicycles on public transport vehicles and ensure safe and accessible pedestrian and cycling connectivity to and around stations; ensure provisions to carry large packages (for street vendors and others).

## Action-specific indicators (continued)

6. Availability of safe infrastructure (pavements and dedicated bike lanes) to reach transit stations (e.g. by location across the city)
7. Comfort and quality of public transport service (safety, reliability, frequency, crowding, availability of seats) on services/routes used (e.g. by income groups, race/ethnicity, etc.)
8. Percentage of income spent on public transport costs (e.g. by income groups, race/ethnicity, etc.)
9. Income stability for informal transport operators who get incorporated into city-wide transport schemes
10. Level of engagement with diverse communities in planning
11. Crimes rates in public transport vehicles and stations (e.g. by age, gender, ethnicity, etc.)
12. Percentage of public transport operation and maintenance jobs by (e.g. by gender, ethnicity, etc.)
13. Voter turnout in local elections

## Policy design recommendations

*What to do and how to do it?*

03.

### Ensure that public transport facilities meet the needs of all user groups

- a. Ensure public safety and security at transit stops and stations; extend services to nights and weekends, ensuring safety at these less crowded times.
- b. Require universal, disabled-friendly design at new public transport stations and vehicles, with well-located elevators and ramps; retrofit existing stations.
- c. Disseminate schedules, maps and other public transport information in multiple languages, use universal signage at stations and in vehicles and provide information digitally and in print.
- d. Designate priority seating in vehicles for persons with disabilities, elderly, child-carrying and pregnant passengers and provide baby care facilities, lactation rooms and quiet/prayer rooms in major public transport stations.
- e. Consider targeted subsidies or fare discounts for low-income people or transport-disadvantaged groups (e.g. free or subsidised transit for students, women etc.).
- f. Conduct frequent user perception surveys on aspects such as comfort, travel time and system reliability, especially during night-time, with data broken down by gender, race, income, mode of transport and time of day, to understand concerns of specific impacted groups.



04.

### Ensure affordable housing around public transit hubs

- a. Implement inclusionary zoning regulations that mandate a certain percentage of housing units in a given location to be sold below market rate.
- b. Provide incentives or subsidies to developers to create affordable housing in specific need-based areas.



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## Action Overview

Electrification of vehicles helps reduce tailpipe emissions by replacing vehicles with regular internal combustion engines. The use of electric vehicles (EVs), especially in shared fleets like public transit and informal transport, involves investment in the charging infrastructure and grid upgrades to support EVs, in addition to enabling policies like preferred parking, strict fuel economy standards and subsidies or mandates for zero/low emission vehicles. Different cities are at varying levels of readiness for electrification of vehicles at scale. The ultimate emissions impact of EVs is dependent upon the carbon intensity and fuel mix of the electricity grid they are plugged into. However, EVs can be used to improve grid efficiency and adaptability to EV adoption by acting as mobile energy storage units that export energy back into the grid.

## RELATED ACTIONS

- 6 Congestion Pricing and Low Emission Zones (LEZ)
- 7 Expansion or Improvement of Public Transportation Options
- 17 Expanding Walking and Cycling Options and Last-Mile Access to Transit Stations



## What are the potential wider benefits?

### Planet

- Significant reduction in tailpipe and particulate emissions achievable from conversion of private vehicles, informal and public transit fleets to EVs

### Health and wellbeing

- Reduced mortality, increased life expectancy and reduced hospital admissions from improved air quality
- Increase in healthy life years across the population from reduced noise pollution
- Reduced risk of high blood pressure, heart disease and stroke from reduced noise pollution
- Reduced anxiety, depression from reduced noise pollution

### Essential public services (transportation)

- Higher affordability of EVs as costs of batteries and vehicles continue to fall with greater EV adoption

## What are the potential barriers to action?

- High upfront costs of vehicles especially for lower-income groups
- High upfront costs of charging infrastructure and land requirements
- Potentially higher overall emissions resulting from large scale electrification if carbon intensity of electricity grid is high and opportunities to use EVs as mobile energy storage do not exist
- Limited availability of financing for EVs, especially for lower-income groups and for cities or transit agencies with lower fiscal capacity
- Increase in congestion and traffic fatalities with more vehicles on the road
- Environmental challenge of battery disposal

## Inclusivity and equity considerations

## Who may be impacted?



Low-income communities



Informal communities (residents, workers)

## How may they be impacted?

At an individual level, the upfront costs of EVs are still too high for middle- and lower-income people, even if operational costs are lower in the long run. Loans for vehicle purchase may not be easily available to **low-income drivers** and **small businesses**. In the initial stages of implementation, when coverage of charging infrastructure is not widespread, many residents without access to off-street parking may have limited or no availability to EV charging infrastructure. Lack of information on the long-term costs and benefits of EVs, particularly among less educated or low-income groups may limit the pace of adoption of EVs. At the city level, heavy reliance on central government transfers and lack of financing is a challenge for city authorities or public transit agencies looking to transition to EVs in public vehicle fleets. Public and **informal transport operators** may need training to operate and maintain EVs.



## Case studies

SMV Green is a private company currently operating in four Indian cities (Varanasi, Allahabad, Lucknow and Patna) to upgrade cycle rickshaws to e-rickshaws, with new financing models providing easy access to credit for low-income people, innovative battery swapping models, increased income for drivers, and special training and support for women e-rickshaw drivers to become entrepreneurs. <sup>i</sup>

Los Angeles has an electric vehicle sharing scheme known as BlueLA, covering 40 stations, 200 charging points, and 100 cars in Los Angeles. Members have access to a network of shared electric vehicles 24 hours a day, 7 days a week, at self-service locations in central LA, with subsidised access for low-income people. <sup>ii</sup>

**Policy design recommendations***What to do and how to do it?*

01.

## Electrify fleets with shared vehicle fleets first, such as public and informal transport

- a. Design appropriate financing models for informal transit and public transport operators and consider subsidies to make EVs affordable.
- b. Ensure incentives from higher levels of government for EV adoption in cities.
- c. Plan a structured pilot project before scaling up to gain practical experience in all aspects of EV adoption, including charging infrastructure requirements, distributional effects and affordability.

02.

## Develop a long-term infrastructure plan to support large-scale electrification that benefits all

- a. Coordinate across electricity-consuming sectors (demand side) and electric utilities (supply side) as well as land and urban planning agencies, and ecosystem of private providers (vehicle and battery manufacturers, charging infrastructure providers).
- b. Develop plans to deal with power outages and provide reliable power, smart charging for greater efficiency, land banking and site planning for charging infrastructure, standards and regulations for EV use.
- c. Establish plan for EV end use with battery scrapping or recycling pre-built in.
- d. Coordinate with all stakeholders – including public transport agencies and operators, land use planning agencies, electricity providers and city utilities, energy policy makers, private employers, community groups, and vehicle manufacturers – from the beginning, regarding the technology, infrastructure and procurement plans



**Policy design recommendations***What to do and how to do it?*

03.

## Conduct training and raise awareness regarding EV use and benefits

- a. Conduct skills training for transport operators on operations and maintenance of EVs and electric buses to protect them from job loss.
- b. Conduct and communicate comprehensive cost/benefit analysis for EV or shared vehicle adoption, considering impact on emissions, noise, health, etc.
- c. Engage with lower-income people and minority groups and provide subsidies to access public and informal EV fleets.

## Action-specific indicators

1. Availability of reliable charging infrastructure for EVs in key areas of the city (e.g. near hospitals, schools, care homes or social housing units, etc.)
2. Number of public awareness events on use of EVs, charging infrastructure, and benefits for communities
3. Cost and percentage of income spent on ownership and maintenance of EVs (e.g. by income group, race/ethnicity, etc.)
4. Percentage of EV penetration in low-income communities
5. Reduction in emissions (CO<sub>2</sub>, PM<sub>2.5</sub>, NO<sub>2</sub>) in key areas of the city (e.g. near hospitals, schools, care homes or low-income neighbourhoods)
6. Improved life expectancy, reduction in number of hospital admissions across different population groups (e.g. by age, gender, race/ethnicity, etc.)
7. Proportion of public vs. private EVs and spatial distribution across the city

## Example targets

- Electrify 100% of LA Metro and LADOT buses by 2030, ensuring service in low income and disadvantaged communities of Los Angeles (Los Angeles, U.S.)
- Install 10,000 publicly available EV chargers by 2022 and 28,000 by 2028; ensure that municipally deployed EV chargers are distributed equitably around the city, with a focus on underserved and disadvantaged neighbourhoods (Los Angeles, U.S.)
- Ensure 100% Zero Emission school buses in Los Angeles by 2028 (Los Angeles, U.S.)
- Distribute 1,000 used electric vehicle (EV) rebates, 11,500 Level 2 EV charger rebates, and 75 DC fast charger rebates by 2021 (Los Angeles, U.S.)

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## Action Overview

This action combines dense, mixed-use, walkable development with transit connectivity, which reduces emissions overall by enhancing residents' ability to walk or bike to daily tasks instead of using private vehicles while increasing their usage of low-carbon public transit.

### RELATED ACTIONS

- 7 Expansion or Improvement of Public Transportation Options
- 13 Improving Conditions in Informal Settlements for Increased Climate Resilience
- 15 Climate Resilient Land Use Planning and Infrastructure Development
- 17 Expanding Walking and Cycling Options and Last-Mile Access to Transit Stations



## What are the potential wider benefits?

### Planet

- Improved air quality from lower usage of private vehicles, especially for low-income and minority communities with higher exposure to pollutants

### Health and wellbeing

- Reduced mortality, increased life expectancy and reduced hospital admissions from improved air quality and more active travel
- Decreased road accidents and injuries from lower usage of private vehicles

### Economic prosperity

- Increased economic activity and employment opportunities due to improved transit connections
- Increased tax revenues from higher property values, which can be used to address challenges faced by frontline communities
- Quality of life improved through social cohesion from having neighbours of different income groups as well as more leisure time from shorter commutes and trips

### Civil society

- Increased public participation in urban planning processes due to mixed-use nature of development

### Institutions and governance

- Improved voter turnout due to better transit connectivity

## What are the potential barriers to action?

- Increased land values and decreased affordability resulting from gentrification
- Opposition to increased mixed income and mixed-use development from residents who fear a change in the 'feel' of their neighbourhood (envisaging more congestion, lower property values)
- Complicated and time-consuming bureaucratic process to plan, finance, and build TOD

## Inclusivity and equity considerations

### Who may be impacted?



Low-income communities



Informal communities (residents, workers)



Migrants

### How may they be impacted?

**Low-income areas and informal settlements** may not be well served by public transit to begin with to even benefit from TOD. TOD construction tends to be costlier and usually increases land value, often displacing **low-income residents, small-scale businesses and informal settlements** because the higher rents, taxes, and formal requirements that accompany TOD are unaffordable for them. As a result, these frontline communities might not share in the increased opportunity and prosperity that such developments bring to the city overall. **Migrants** and vendors who move goods from place to place are especially impacted as they typically have no or fewer rights to public space or resettlement benefits compared to more permanent residents or businesses.

## Case Studies

Singapore's cascading plans, with the Master Plan for land use aligned with the long-term strategic Concept Plan, ensure consistency over time and across sectors. <sup>i</sup>

Denver, through a public-private-civil society partnership, has established an affordable housing TOD Acquisition Fund to buy housing and land in current and future transit corridors in order to create and preserve 1000 affordable housing units. <sup>iii</sup>

The state of New Jersey in the U.S. provided tax credits to firms who were locating jobs near transit with bike parking. <sup>v</sup>



## Action-specific indicators

1. Percentage of businesses/commerce in the TOD zone (e.g. by scale small/medium/large, formal/informal, etc.)
2. Demographic profile of residents in the zone before and after TOD intervention (e.g. by ethnicity, income group, age, migration status, etc.)
3. Percentage of renters with short term (under 1 year) contracts (both residential and commercial)
4. Percentage of population displaced as a direct result of TOD (e.g. by formal/informal status, income group, etc.)
5. Percentage or number of affordable and/or social housing set aside in the TOD zone
6. Percentage of population with access to jobs, education and health services within 20 minutes in TOD zone
7. Voter turnout in local elections

## Example targets

- 80% of population in a complete neighbourhood with access to local amenities within a 20-minute walk by 2035 (Portland, U.S.)
- 95% of new housing built within half mile of mass transit stations (New York, U.S.)
- 65% of new housing units within 1500 feet of transit stations by 2035 (Los Angeles, U.S.)



**Policy design recommendations***What to do and how to do it?*

01.

Develop integrated transport and land use vision for area or corridor, with long-term strategy for public-private collaboration and effective inclusion of existing residents and businesses

- a. Ensure coordination between relevant municipal organizations (e.g. transport, land use departments) to ensure consistency with broader city-wide and regional plans.
- b. Engage impacted and frontline communities to create a shared vision for the TOD area or corridor.

02.

Ensure political and financial commitment to address equity challenges

- a. Explore alternative land-based financing schemes appropriate to the local context (e.g. tax increment financing, bonds for infrastructure, community development block grants, TOD development grants, low-income housing tax credits, and joint development schemes with funding set aside to support low-income communities).
- b. Establish dedicated pro-equity funds to support frontline communities.
- c. Structure development process in a way that generates short term gains to keep policymakers, investors, and citizens engaged and supportive of the process.
- d. Promote the establishment of institutional arrangements that enable community ownership of TOD projects, such as community land trusts or cooperatives.



**Policy design recommendations***What to do and how to do it?*

03.

## Establish complete streets and complete neighbourhood policies

- a. Eliminate parking requirements in street design plans, or establish parking maximums, with appropriate exemptions (e.g. parking for people with disabilities), to lower construction costs and rent.
- b. Include well-designed and maintained public spaces (with green infrastructure provisions for water management) for place-making and community cohesion.
- c. Build sufficient, accessible and well-designed pedestrian and bike infrastructure with last-mile access to transit stations that takes into account weather conditions of the city (i.e., shade, drainage, street furniture).

04.

## Make the benefits of TOD and mass transit accessible to all

- a. Emphasise wider social, environmental, and economic benefits of densification and mixed-use development around the public transit system through public communication, beginning at the project's inception.
- b. Ensure affordable transportation tariffs and fares.
- c. Set targets for affordable housing and small-scale businesses in the TOD zone that are in line with broader plans. (This may require different targets for existing versus new and for large versus smaller-scale developments, with consideration of tax incentives as appropriate.)
- d. Introduce 'right of first refusal' laws for tenants to minimise displacement from TOD areas and neighbourhoods.
- e. Establish tax credits for businesses locating jobs near transit who, instead of providing increased parking, promote bike parking and use of shared mobility modes.
- f. Explore zoning and tax incentives to encourage additional affordable housing (e.g. up-zoning, inclusionary housing, density bonuses).

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3. [Photo](#) of TOD project in Plano, Texas by David Wilson/Flickr, licensed under Creative Commons Attribution 2.0 Generic [\(CC BY 2.0\)](#)

## Action Overview

Waste management aims to reduce waste upstream, repurposing as much as possible and recovering materials for reuse. It includes managing waste disposal to minimise emissions from degrading material. Waste separation means dividing waste by category, typically dry for recycling and wet for composting or anaerobic digestion. Recycling refers to processing materials that would otherwise be thrown away as trash and turning them into new products. Composting converts food scraps and other organic waste into material that can be added to soil to help plants grow. Alternatively, wet waste and other non-recyclable materials can be anaerobically digested to produce biogas to generate electricity or fuel for vehicles.

## RELATED ACTIONS

- 13 Improving Conditions in Informal Settlements for Increased Climate Resilience



## What are the potential wider benefits?

### Health and wellbeing

- Reduced flow of waste into the environment, which could prevent contamination and spread of disease

### Planet

- Reduced flow of waste into the environment, which could prevent water contamination

### Economic prosperity

- Creation of new jobs through expanded waste management infrastructure
- Inclusion of informal workers into waste management systems (pick-up, segregation, recycling, composting, and reuse), which could improve both waste management and livelihood possibilities

### Civil society

- Increased integration of waste pickers/recyclers associations and other local organizations

### Institutions and governance

- Improved representation through municipal partnerships

## What are the potential barriers to action?

- Increased mechanisation and formalisation in waste management increases efficiency but may displace informal waste pickers and recyclers if they are not incorporated into the new systems.

## Inclusivity and equity considerations

### Who may be impacted?



Low-income communities



Informal communities (residents, workers)

### How may they be impacted?

The waste sector provides livelihoods for **informal** waste pickers and recyclers who collect recyclable waste in the street or gather waste at open dumps and landfills. These workers' livelihoods may be at risk when more mechanised, formalised waste management systems are put in place that ignore their needs. They are also at risk when space and equipment (including safety equipment and clothing) for collecting, transporting, sorting, and storing recyclable materials are not available.



### Case Studies

Many cities (Pune, Bengaluru, Porto Alegre, São Paulo, Belo Horizonte, Bogotá, Accra) have worked with waste picker organizations to integrate them into official waste management systems, achieving significant results in the improvement of collection and recycling rates with low investment. <sup>i</sup>

In Johannesburg and Pune, waste picker cooperatives are able to bid on contracts. <sup>ii</sup>

SWaCH in Pune and waste segregation in Kolkata and São Paulo are three examples where the city provided space and official sanction to waste segregation centres. <sup>iii</sup>

Dhaka, Bangladesh has established community-based composting locations, employing citizens, especially women, to collect and separate organic waste whose composted output is then sold to fertilizer companies. <sup>iv</sup>

Curitiba, Brazil used creative incentives (payments in bus tickets, school books, and food) to encourage citizens to bring properly segregated waste to the waste station. <sup>v</sup>

Auckland has a shared composting facility for restaurants in a high-density restaurant area. <sup>vi</sup>

Toronto, Canada creatively used communication to inform the community about reducing food waste. <sup>vii</sup>

Curitiba, Brazil used school-based programs to spread awareness of recycling and circular economy approaches. <sup>viii</sup>

SWaCH in Pune provides a well-documented example of waste picker and other civil society organizations working with the city to ensure workers' rights and eliminate harassment that many in this informal sector feel. <sup>ix</sup>

## Policy design recommendations

*What to do and how to do it?*

01.

Establish mandatory waste segregation at source, complemented by incentives, discounts and enforcement

- a. Start by requiring wet/dry separation and move to dry/wet/organic as the program becomes more established.
- b. Establish and enforce fines for those who do not separate waste, whilst ensuring that frontline communities, such as those working and living in the informal sector and low-income communities with less political power have the proper resources and support (e.g. facilities, training) to do so.

02.

Acknowledge, respect and ensure legality of waste picker and recycler organizations, including their incorporation into official waste management systems

- a. Integrate informal waste pickers as paid service providers for collecting, separating, recycling, composting, and transporting solid waste.
- b. Ensure access to waste and allow informal waste picker organizations to bid for waste management contracts.
- c. Allocate space and equipment for collecting, transporting, sorting, and storing recyclable materials, ideally including safety equipment and clothing.
- d. Establish community composting facilities.
- e. In low garbage collection areas, introduce programs to exchange organic compost and non-organic recyclables for city-issued goods/services such as bus tickets, school books, or other needs.
- f. In high garbage production and collection locations, incentivise the minimization of garbage production by charging for garbage collection and disposal or providing a composting facility in areas with large generators, such as food markets.



## Policy design recommendations

*What to do and how to do it?*

03.

### Coordinate among different government agencies to ensure consistency

- a. Encourage circular economy approaches to production and consumption, shifting the burden from consumers to producers.
- b. Ensure freedom from harassment for informal waste pickers and recyclers and prevent confiscation of collected waste and reclaimed materials by city officials.
- c. Ban the use of incineration and open dumping of waste that are harmful to both the environment and waste picker livelihoods.

## Action-specific indicators

1. Percentage of waste generated per person/household
2. Amount of total waste recycled or segregated at source
3. Percentage of waste collection conducted informally
4. Number of permanent jobs in the waste sector before and after implementation of additional waste separation efforts (by income level, gender, race/ethnicity, informality status)
5. Percentage of citizens who changed behaviour based on communication/engagement efforts (by income level, race/ethnicity, age, gender, migrant status)

## Example targets

- Long term zero waste target (2030) to reduce waste generated per person by at least 15% and reduce trash burned or landfilled by 50% (San Francisco, U.S.)
- Divert 70% of waste away from landfill by 2026 and move towards a zero-waste future (Toronto, Canada)
- Reduction by at least 5% of the production of urban solid waste per capita, increase by at least 98% in the coverage of waste collection services, and 20% reduction of the amount of waste destined for sanitary landfills in relation to the projected growth (by 2025, Quito, Ecuador)
- Reduce waste by 15%, reduce landfilling by 15%, and increase diversion to 70% by 2030 (C40 Towards Zero Waste Declaration signed by 19 C40 cities)

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## Image credits

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## Action Overview

Green infrastructure (e.g. rain gardens, bioswales, green roofs, green walls, street trees, urban forests) refers to natural or semi-natural ecosystems that provide water utility services that complement, augment or replace those provided by grey, or built, infrastructure while mimicking the nature and the hydrologic cycle (e.g. infiltration, replenishment of aquifers, evapotranspiration).

### RELATED ACTIONS

- 3 New Building Standards, Codes and Regulations for Energy and Water Conservation
- 12 Water Management Techniques
- 13 Improving Conditions in Informal Settlements for Increased Climate Resilience
- 15 Climate Resilient Land Use Planning and Infrastructure Development



## What are the potential wider benefits?

### Planet

- Improved stormwater retention, water quality, and drainage with decreased water stress
- Creation of carbon storage and local ecosystem development
- Prevention of landslides and property damage
- Provision of shade and cooling effects

### Education and skills

- Provision of training opportunity for local residents to protect green/natural infrastructure

### Economic prosperity

- Potential of livelihood opportunities (urban agriculture, fruiting street trees, etc.) for local residents

### Health and wellbeing

- Improved physical health from increased exposure to green spaces and public health from improved water quality and less sewage overflows (if applicable)

### Civil society

- Increased integration of waste pickers/recyclers associations and other local organizations

## What are the potential barriers to action?

- Reduction in space for new construction and built infrastructure
- Increased property values that outprice low-income and informal households
- Possible training requirements (posing a time commitment) for individuals and communities on the proper operations and maintenance of new technologies
- Possible increase in standing water and subsequent spread of disease if systems not functioning properly

## Inclusivity and equity considerations

### Who may be impacted?



Low-income communities



Informal communities (residents, workers)



Migrants

### How may they be impacted?

Green infrastructure (GI) projects for residential properties, which typically have high one-time installation costs and inflexible payment schemes, may be prohibitively expensive for **low-income communities**. Some GI systems may also require certain existing infrastructure, such as durable roofs for green roofs and open space for rain gardens, that are not prevalent in dense, low-income areas or **informal settlements**. If GI systems require property modification or a secure address, GI actions may not be accessible for tenants, informal communities, and **migrant residents**. There are additional barriers if city-wide incentives for GI systems are tied to the property taxes (e.g. tax rebates or credits). Lastly, information on city GI programs and their incentives may not be easily accessible for **informal** or **low-income communities**.

Effective green infrastructure for public property should be at-scale, well-designed, and informed by climate risk. If a city does not regularly collect census data on **informal, migrant, and low-income communities**, city-wide flooding and heat risk assessments may lack accurate information and fail to capture the magnitude of risk for these communities. These communities not only typically lack basic infrastructures that mitigate flooding or heat (e.g. trees for shade, proper stormwater drainage channels), but they also typically lack political representation. GI on public property, such as more street trees, green roofs, and bioswales, may also raise nearby real estate prices that outprice **low-income residents** and unintentionally usher in “green gentrification.”

### Case Studies

In Japanese cities, land readjustment schemes have helped landowners to receive improved services in exchange for a small parcel of land that the government uses for public space (e.g. green infrastructure).<sup>iv</sup>

Durban established a multi-stakeholder, trans-municipal partnership to improve green infrastructure of the uMngeni River catchment, while the water and sanitation utility extended access to under-served areas.<sup>v</sup>

Cities4Forests brings together city officials and regional planners to invest and connect inner forests, nearby forests, and faraway forests.<sup>vi</sup>



## Policy design recommendations

*What to do and how to do it?*

01.

### Plan new city-level green infrastructure around need

- a. Conduct a spatial analysis of urban flooding and heat risk, existing water and drainage infrastructure, green/open spaces, and tree cover; encourage a participatory approach with frontline communities or crowdsourcing mechanisms (e.g. citizen science) to gather more information.
- b. Hold public engagement workshops and trainings specifically for frontline communities during GI planning and design phases.
- c. Mandate that all design plans consider, evaluate and account for spatial equity.
- d. Identify and quantify the co-benefits of nature-based solutions for flooding, water quality and water drainage services. In addition, consider what combination of green and grey infrastructure is necessary for optimal results.



02.

### Ensure that residential green infrastructure is affordable and available for all

- a. Create strategies for affordability such as direct subsidies, tax breaks/rebates (if applicable), low-interest loans for low-income households, and flexible payment schemes for installation and maintenance fees for frontline communities.
- b. Offer free maintenance trainings at convenient times for household managers.
- c. Where feasible, recommend green infrastructure interventions that offer added value to residents (for example, green roofs or street scale bioswales that could double as food gardens).

## Policy design recommendations

*What to do and how to do it?*

03.

Coordinate with relevant agencies and decision-makers to ensure that frontline communities benefit from GI

- a. Work with housing and land use agencies to develop affordable housing mechanisms (e.g. land readjustment schemes, construction/finance for more affordable housing, rent stabilization) so that GI complements, rather than displaces, lower-income residents.
- b. Establish partnerships across water supply and wastewater management agencies, urban forestry and park management agencies, land use authorities and development agencies so that development stakeholders understand the long-term value of GI and are encouraged to integrate it with grey/built infrastructure, particularly in vulnerable areas.
- c. Work with watershed stakeholders to integrate city and neighbourhood-level green infrastructure with regional watershed planning.

## Action-specific indicators

1. Percentage of residents within 5-minute walk to a park (e.g. by income level, race/ethnicity, migrant status, informality status, age)
2. Percentage of urban area with impervious surfaces
3. Percentage of households accessing city GI programs (e.g. by income level)
4. Number of people who participate in trainings (e.g. by income level, gender, age)
5. Average property cost before and after GI implementation (e.g. on public land, private land, both)
6. Temperature difference between vegetated and non-vegetated areas
7. Number of hospital admissions from heatstroke (e.g. by income level, gender, age, race/ethnicity)
8. Number of urban flooding incidences annually
9. Number of combined sewage overflow incidences annually

## Example targets

- Increase share of New Yorkers who live within walking distance of a park by 85% by 2030 (New York, U.S.)
- Achieve 1m<sup>2</sup> of greenery per resident by 2030, equivalent to 160 hectares of new green spaces (Barcelona, Spain)
- Reduce land surface temperatures 3 degrees by 2035 (Los Angeles, U.S.)

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## Action Overview

Cities can adapt to climate-related water stress and droughts by improving existing water system efficiency and creating incentives and techniques to save/store water (e.g. rainwater harvesting, reclaiming wastewater, water efficiency technologies, etc.).

### RELATED ACTIONS

- ③ New Building Standards, Codes and Regulations for Energy and Water Conservation
- ⑪ Green Infrastructure to Manage Flooding and for Microclimate Control
- ⑬ Improving Conditions in Informal Settlements for Increased Climate Resilience



## What are the potential wider benefits?

### Health and wellbeing

- Increased time, energy and cost savings
- Reduction of water-borne diseases

### Essential public services

- Improved resilience during droughts or utility water rationing
- Improved efficiency of water use
- Decreased water stress

## What are the potential barriers to action?

- Increased resistance to the re-use of greywater (sullage) because of cultural or personal values
- Less political incentive to extend piped water and sewer networks to peripheral areas of the city, where frontline communities may reside
- Lack of awareness, space, equipment and incentives for rainwater harvesting

## Inclusivity and equity considerations

### Who may be impacted?



Low-income communities



Women



Informal communities (residents, workers)



Migrants

### How may they be impacted?

In some cities, inefficient infrastructure for water distribution is a major source of water waste (e.g. in Lagos, as much as 60% of water distributed is lost due to leakages). **Low-income** and **informal communities** tend to use the least amount of water per capita but face the highest levels of water stress, from intermittent service to relying on expensive private vendors.

A city-wide initiative to create incentives and techniques to save and store water on a household level (e.g. water metering) should consider that **low-income, informal** and **migrant communities** may lack household connections to the piped water and sewerage network, making them hard to reach. Further, space to construct water management infrastructure (e.g. rain barrels, storage) may be unavailable in dense **informal settlements**. Some cities may have restrictions on collecting rainwater or there may be a cultural stigma in reclaiming wastewater. On the other hand, households that are not connected to the piped network may already use storage and conservation methods as part of their daily routine, so a city-wide initiative should consider tapping into their adaptive capacity and improving what already exists.

Water management techniques may be unaffordable for these groups because of high one-time costs and costly maintenance over time with inflexible payment schemes. These techniques may be impractical for tenants or residents in temporary housing if they require property modification. Existing city programs providing information on how to install and use water management systems may be inaccessible to these groups and ineffective if they do not target **women**, who typically manage household water use.

### Case Studies

Washington D.C.'s Stormwater Retention Credits program allows homeowners to earn revenue for projects that reduce stormwater runoff and impervious surfaces. <sup>i</sup>

In Denmark, the central government and municipalities agreed to increase adaptation-related investments in wastewater treatment by approximately US\$445 million. Wastewater utilities were also tasked with preparing risk assessments to inform priorities. <sup>ii</sup>





**Policy design recommendations***What to do and how to do it?*

01.

Determine what combination of water management techniques are optimal depending on risk, infrastructure and local context

- a. Conduct a spatial water risk analysis identifying areas that are most vulnerable to water stress and shortages, have the highest water consumption rates, and have reduced access to the piped water and sewerage network.
- b. Differentiate plans between households connected to water utility's network and households who are not connected, based on context (amount of rainfall, presence of wastewater infrastructure).
- c. Conduct a spatial analysis to develop regional water management plans for surface and ground water, with provisions to regulate and protect water sources used by formal and informal water providers.



02.

Improve women's access, ownership and employment in distributed renewable projects

- a. For household- and community-level water techniques (e.g. rainwater barrels, greywater reuse systems), create strategies for affordability, including direct subsidies, tax breaks and rebates, and low-interest loans for low-income households
- b. Promote awareness of relevant water management techniques and make information on city programs accessible to frontline communities. Engage with communities that may already have their own household techniques for water storage and focus on improving and scaling up these systems.
- c. Host gender-sensitive trainings on installation and maintenance of water management systems.

## Policy design recommendations

*What to do and how to do it?*

03.

Collaborate across municipal and regional agencies and decision-makers to improve existing water management

- a. Identify overlapping responsibilities or jurisdiction gaps between water and sanitation authorities and coordinate short-, medium- and long-term plans to address service gaps, decrease non-revenue water and increase reuse.
- b. Work with relevant authorities to co-create dedicated taxes, fees and charges earmarked for water management investments, ecosystem services or corporate stewardship models for replenishment programs.
- c. Align regulatory mechanisms for the informal water sector to improve water management and water quality.
- d. Integrate resilient water management into spatial planning and local development strategies (e.g. including rainwater harvesting and drainage requirements in building codes).

### Action-specific indicators

1. Water consumption per capita or household
2. Average hours per week/month/year of water service interruptions (e.g. by income level)
3. Percentage and spatial distribution of city population connected to the city's piped water network
4. Percentage of households applying household-level water management techniques (e.g. by income level, race/ethnicity, migrant status, gender, age)
5. Percentage of households with adequate stormwater infrastructure (e.g. by income level, informality status)
6. Percentage of utility water loss (leakage)
7. Percentage of households served by wastewater collection, such as piped network and septage collection vehicles (e.g. income level, informality status, migrant status)
8. Average property cost before and after new water management installations

### Example targets

- Use 75% of the landscape to capture rainwater for filtration or reuse (Washington, D.C., U.S.)
- Provide access to 100 litres of water consumption per resident per day (Barcelona, Spain)

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## Action Overview

Improving conditions in informal settlements entails providing access to core urban services such as quality housing, clean water and sanitation, reliable power and communication infrastructure, and safe and affordable transportation options. Programs typically provide financing services and amenities, improved conditions of physical shelter, and more secure occupancy rights. In situ upgrading is typically preferred over relocation programs, except, for example, in communities that face location-based risks (e.g. flood-prone areas) that have a significant impact on the community. Improving conditions in informal settlements should, where possible, avoid displacement of settlement dwellers and businesses from their livelihood and social networks.

### RELATED ACTIONS

- 15 Climate Resilient Land Use Planning and Infrastructure Development



## What are the potential wider benefits?

### Essential public services (water, housing, sanitation, electricity, transport)

- Increased reliability of access and less time wasted in accessing key services
- Safer and more efficient public transport services promoting improved access to opportunities for all

### Economic prosperity

- Direct, indirect and induced job creation from new infrastructure development
- Increased productivity and climate resilience of businesses operating in improved settlements, which in turn contributes to economic empowerment and poverty reduction

### Health and wellbeing

- Reduced mortality, increased life expectancy and reduced hospital admissions from better access to water and sanitation

### Civil society

- Increased public participation in upgrading efforts

### Institutions and governance

- Improved representation and voter turnout

## What are the potential barriers to action?

- Uncertainty about land ownership and tenure once settlements are upgraded
- Outmoded attitudes towards slums, preferring eradication to upgrading
- Displacement caused by an increase in property prices (gentrification) from improved resilience and services that make the land more profitable for uses other than affordable housing (e.g. retail)
- Lower return on investment for the city in terms of tax revenue compared to other public investments
- Challenges associated with relocation of residents during or after improvements made to the settlement

## Inclusivity and equity considerations

### Who may be impacted?



Low-income communities



Women



Informal communities (residents, workers)



Racial and ethnic minorities



Religious minorities



Migrants

### How may they be impacted?

Core urban services are often not available for those living in **informal settlements** (and for subgroups within them – such as **women**, or **ethnic and religious minority groups**). For those that are available, many are not provided reliably, do not meet sufficient quality standards, are priced too high, or have payment schemes that do not work for those in the informal sector. In addition, **women** have fewer tenure rights in some countries, leading to more difficult access to services. For home-based workers, insufficient access to core services means lost livelihood opportunities, and **informal settlements** often have little open/public space, with iron roofs and poor ventilation leading to higher indoor temperatures and poor working conditions.

In the case of **low income or informal settlements** located in risk-prone areas, resettlement to safer locations may be required, but should be seen as a last resort. Such resettlement should only be done for reasons that are publicly agreed upon and with the support and input of the community in question. **Low-income households** may be unable to afford the costs of relocation in terms of time and money and could suffer from loss of livelihood and social networks. **Migrants** and those without formal residency documents may have even more limited rights, and issues of legal process rights and compensation may need addressing if resettlement is deemed necessary for impacted communities.

## Case studies

In Bangkok, the Baan Mankong collective housing programme puts slum dwellers and community at the centre of the process of long-term development (housing, environment, basic services and tenure security) through joint work between residents and local government officials, with financing coming from the national government. <sup>i</sup>

Rosario, Argentina improved conditions for informal settlements as a part of city-wide climate adaptation planning by not only improving services but also acknowledging the need to address social, operational and institutional issues for full integration of the settlements into the city. <sup>iii</sup>

Informal communities in Rio de Janeiro, Surat, and Bandung undertook Urban Climate Resilience Assessments (UCRA) to identify areas of risk and opportunities for improvements in vulnerable communities. The ground-up nature of the UCRA analysis enabled communities to provide inputs into broader urban planning efforts. <sup>vi</sup>



## Policy design recommendations

*What to do and how to do it?*

01.

Create institutional processes and financing mechanisms to make distributed renewables accessible and affordable for hard-to-reach households

- a. Develop trust and collaborate with communities on solutions to improve settlements. Building up a capacity to work together and harness knowledge from those living in settlements helps to ensure that reforms respond to community priorities and improve climate resilience in the long term. Empowered communities can also help with the continuity of certain reforms amid government official turnover. This engagement and communication should be a two-way street.
- b. Include informal workers (based in informal settlements) in participatory policy-making, rule-setting, and monitoring processes, with an eye to increasing adaptive capacity overall.
- c. Establish commitments for service provision, funds and targets to improve access to services and climate resilience.
- d. Evaluate the impacts of existing land use regulations and permitting processes on informality and housing affordability within climate adaptation planning.
- e. Complement physical upgrading with social programs such as education and health to address residents' complex and varied needs.
- f. Take a deliberately inclusive approach to risk assessments to understand potential threats to the most vulnerable communities.
- g. Ensure that future risk is built into investment planning and that proposed changes reduce this risk and increase adaptive capacity.
- h. Ensure consistency across plans by overlaying risk assessment results with development plans to identify and address mismatches in time, scope and priorities; the planning process must incorporate regular updates to the local climate risk profile.
- i. In the case of low-income or informal settlements located in risk-prone areas, resettlement to safer locations may be required, but should be seen as a last resort. Such resettlement should only be done for reasons that are publicly agreed upon and with the support and input of the community in question.



## Policy design recommendations

*What to do and how to do it?*

02.

Ensure that informal settlements are viewed as spaces for solutions, not as part of the problem

- a. Encourage national, state and city strategies to include well-aligned policy frameworks that can be adapted and driven locally through community participation.
- b. Ensure cross-agency coordination within the city government, with all agencies legally acknowledging the right of informal settlement dwellers to access public space and services and by vowing to not punish or outlaw them in each sectoral plan or policy.
- c. Ensure that informal settlements are not excluded from planning processes, implementation priorities and maintenance schedules that apply to formal areas of the city.
- d. Keep planning standards flexible when upgrading informal settlements to cater to a range of income levels. Pilot test standards to evaluate results with respect to equity impacts.
- e. Legalise and allow incremental improvements, which align with how residents can help finance and otherwise contribute to upgrading.
- f. Address tenure issues, keeping in mind that non-eviction assurances (not necessarily full tenure) are often enough to address the challenge of insecurity about housing and can catalyse community participation in upgrading.

03.

Provide financing for upgrading efforts while ensuring that fees, processes and regulations do not drive residents further into informality and economic burden

- a. Ensure sufficient financing for upgrading efforts, not just at the first stage, but through completion.
- b. Set service tariffs at affordable levels, with payment systems that are realistic and easy-to-use for residents of informal settlements.

### Action-specific indicators

1. Percentage of city population in informal settlements (e.g. by age, gender, ethnicity, etc.)
2. Percentage of city population in upgraded informal settlements (e.g. by age, gender, ethnicity, etc.)
3. Percentage (or absolute number) of home-based workers (e.g. by gender, ethnicity, etc.)
4. Cost of basic service (energy, water, transport) as percentage of household income
5. Availability of basic service (hours/day, days/week) on a settlement by settlement basis, and for different times of the year
6. Access to formal public transit across settlements
7. Quality of basic/core service (excellent/good/fair/bad)
8. Percentage of informal settlements for which data on access to services is available
9. Number of community cyclone/flood shelters built for informal settlements
10. Number of cyclone/flood-resistant buildings built in informal settlements
11. Population living in at-risk locations
12. Percentage decrease in poverty, as a proxy for increased adaptive capacity
13. For relocation: distance of new community location from the location of origin
14. For relocation: job availability by skill level in the new area
15. For relocation: population with access to basic services (especially transportation) in new locations



### Example targets

- 100% of population will have access to drinking water with guaranteed supply by 2040 (Quito, Ecuador)
- Comprehensive sewerage system will cover 99% of the city's territory by 2040 (Quito, Ecuador)



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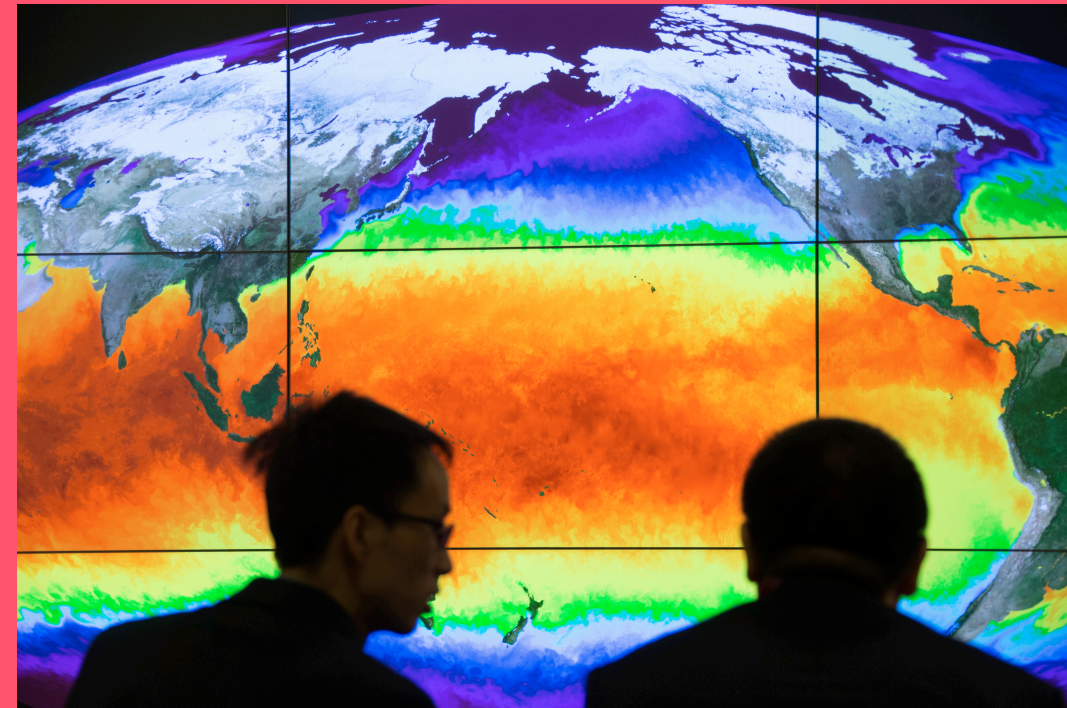
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## Action Overview

Early warning systems (EWS) notify people before a natural disaster, giving them time to prepare and move out of harm's way. They are an important part of building adaptive capacity to withstand climate related disasters. Emergency management actions may aim to optimise city functioning, especially in the face of extreme weather events, and to respond proactively to emergency situations. This involves an improvement in communication, coordination, and collaboration to reduce impacts from climate-related risks and other hazards.



## What are the potential wider benefits?

### Health and wellbeing

- Fewer lives lost due to natural disasters
- Reduced risk for residents and businesses and improved response capacity
- Increased feeling of safety among community members served by EWS

### Economic prosperity

- Increased investment in community based on reduced risk of lives lost/destruction from natural disasters

### Civil society

- Increased participation in emergency management processes by vulnerable residents due to expansion of early warning systems

## What are the potential barriers to action?

- Increased need for training and knowledge dissemination amongst frontline communities
- Increased need for disaggregated data collection illuminating risk profiles of frontline communities

## Inclusivity and equity considerations

### Who may be impacted?



Low-income communities



Women



Informal communities (residents, workers)



People with disabilities



Migrants



Elderly, youth, children

### How may they be impacted?

Early warning systems may not be effective for frontline communities if they have insufficient knowledge of and familiarity with these systems or if there are language or technological barriers to accessing this information. In some cases, **low income and informal communities, women, migrants** and **racial and ethnic minorities** may be excluded from such warning systems either because of their secluded location, lack of access to and familiarity with technology, or lack of formal status as city residents. If early warning systems do not serve peripheral and informal communities or if emergency management processes do not account for the needs of the **elderly, young, or people with disabilities**, natural disasters will disproportionately harm these vulnerable groups.

### Case Study

When Odisha, India was hit hard by cyclone Fani in May 2019, community members had already been informed of rescue procedures, which helped to ensure that there was cooperation between community members and responders during the event – something that can be hard to establish once a disaster hits. <sup>i</sup>



## Policy design recommendations

*What to do and how to do it?*

01.

Establish a standardised process to collect, assess and share demographic data and maps on climate risk at the neighbourhood scale

- a. Gather disaggregated data on frontline groups, considering gender, disability, age, income, race/ethnicity, and migrant and informality status.
- b. Where city data is unavailable, make use of relevant demographically differentiated data and analysis from regional networks, adjacent territories, and international sources to obtain more information on hard-to-reach communities.
- c. Mainstream frontline community perspectives in all processes, roles and responsibilities of the organizations generating and issuing warnings.
- d. Equally involve frontline community members in committees that make decisions around the type of alert sent out for different climate-related disasters and other hazards.



02.

Work with frontline communities to better understand their needs and abilities in relation to climate hazards and emergency warning systems

- a. Document the hazards' frontline communities consider relevant.
- b. Develop data and warning products that can be understood by frontline communities.
- c. Consider traditional knowledge on equal footing with scientific information in forecasting hazards.
- d. Undertake studies to determine how women and men from the different ethnic and religious groups within the community access and interpret early warning messages.

**Policy design recommendations***What to do and how to do it?*

03.

## Disseminate EWS knowledge through a variety of communication platforms

- a. Ensure that warning alerts and messages consider the behaviour patterns of the different groups within frontline communities.
- b. Utilise technology infrastructure already in place (e.g. cell phones and applications like WhatsApp) to disseminate alerts quickly and efficiently among frontline communities.
- c. Build on pre-existing social capital within the community to share knowledge about disaster preparedness measures.
- d. Dedicate funding for translation and sign interpretation, as well as in-person information sharing for illiterate residents.

04.

## Ensure that frontline communities in particular are educated on natural hazard risks and have opportunities to engage directly in disaster preparedness efforts

- a. Develop and implement education and training programs specifically for frontline communities.
- b. Disseminate simple information on hazards, vulnerabilities, risks, and how to reduce impacts to frontline community members in a language they can understand.
- c. Train frontline community members equally to recognise simple hydro-meteorological and geophysical hazard signs to allow immediate response.
- d. Tailor public awareness and education campaigns to the specific needs and concerns of frontline community members, ensuring the varying vulnerabilities of different members are considered, such as people with disabilities and the elderly.
- e. Evaluate public awareness strategies and programs at least once per year to assess if frontline communities are actively involved in the response process.

### Action-specific indicators

1. Number of people involved in planning process or establishment of early warning system (e.g. by income level, gender, age, race/ethnicity)
2. Number of communication mediums used for early warning system
3. Percentage of the population educated about or trained to understand early warning alerts (e.g. by income level, gender, age, migrant status)
4. Percentage of the population that has access to early warning systems, knows evacuation routes or has access to shelters (e.g. by gender, age)
5. Percentage of total communication and training budget targeted towards frontline communities
6. Number of lives saved through early warning systems (e.g. by age, race/ethnicity, migrant status, informality status)

### Example targets

- Ensure that 100% of community members, including those who are non-English speaking, receive key communications from city/local officials before, during and after a disaster event (Alameda, U.S.)
- Have a total of 12 million residents participate in disaster drills (Tokyo, Japan)

### Case Study

When Hurricane Mitch bore down on La Mascia, Honduras, in 1998, the city experienced zero deaths largely because the disaster agency had provided education on the EWS and emergency management and women were in charge of monitoring. <sup>ii</sup>



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## Action Overview

Integrated land use and infrastructure planning informed by climate risks ensures no new development occurs in risk-prone locations, supporting climate adaptation. It incorporates zoning that limits urban sprawl, preserves green and open space, and promotes more compact, mixed-use, well-connected cities, thus also contributing to climate mitigation.

### RELATED ACTIONS

- 9 Pursue Transit-Oriented, Dense, and Mixed-Use Development (TOD)
- 13 Improving Conditions in Informal Settlements for Increased Climate Resilience



## What are the potential wider benefits?

### Health and wellbeing

- Greater security from climate risks with better health and wellbeing for all city communities
- Prevention of formal or informal new development in locations likely to suffer from climate hazards
- Reduced air pollution, emissions, congestion and accidents

### Economic prosperity

- Lower costs of infrastructure provision with more compact development, leading to more affordable user costs of services
- Cost and time savings from reduced commute time

### Essential public services

- Provision of affordable housing in secure and well-serviced locations
- Increased access to transport options and reduced trip lengths and travel in mixed use, denser, and transit-oriented development areas

### Planet

- Creation and preservation of green space

### Civil society

- Increased public participation in land use planning processes due to necessity of community risk assessment

## What are the potential barriers to action?

- Increased housing costs due to improved infrastructure and services, potentially resulting in displacement and gentrification
- Limited new construction in climate-secure and well-serviced locations due to higher land values, especially if land is not previously held/protected by public sector
- Increased land costs and housing pressure due to reduced supply of developable land (by prohibiting development in risk-prone areas)



## Inclusivity and equity considerations

### Who may be impacted?



Low-income communities



Women



Informal communities (residents, workers)



Racial and ethnic minorities



Migrants



Religious minorities



Outdoor workers, temporary workers,  
workers in transitioning industries

### How may they be impacted?

Lack of information on climate risks can lead to new development taking place in environmentally sensitive or risk-prone areas. Cheap land in such unstable locations within a city may spur the growth of informal settlements comprising **migrant and low-income communities** along with **informal businesses**, potentially with dangerous and uncertain working conditions. Unclear land ownership in such settlements means these communities are not included in the city's land use plans and have limited voice to demand land and services. Further, when land use planning is not integrated with infrastructure planning, this leads to poor availability and quality of core city services, which requires costly coping strategies and leaves the poor most under-served. **Women** typically manage the household and often work as home-based workers and are therefore likely to be disproportionately burdened by service and infrastructure disruptions due to climate risks. Low-density urban development also raises the costs of service provision in cities. Unrealistically high standards for lot size, parking space, building type, road space and other services make serviced urban land unaffordable for low-income and other marginalised communities, such as **racial, ethnic and religious minorities**, and affect productivity of **informal businesses (e.g. temporary or outdoor workers)**.

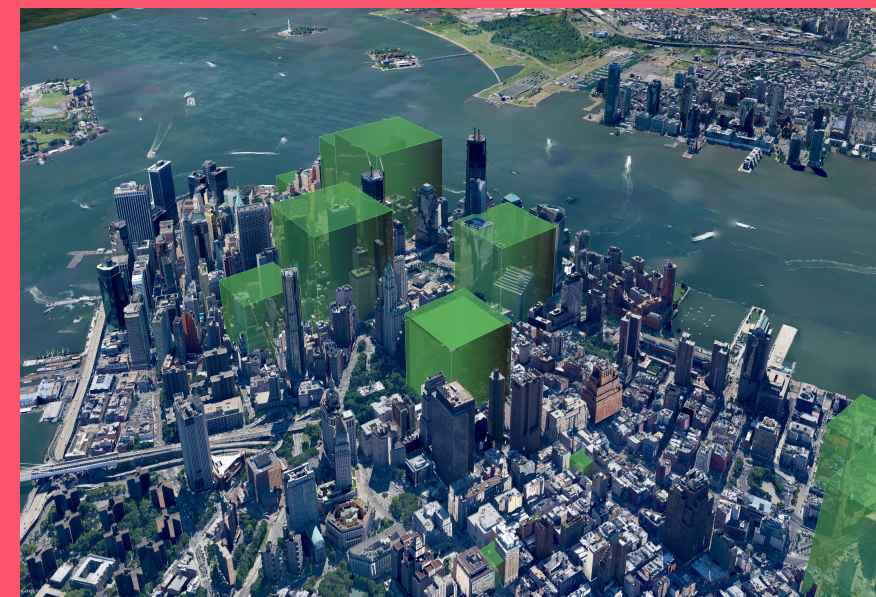
### Case studies

Denmark's national policy mandated 98 municipalities to integrate climate risks into their development planning, with enhanced storm water management infrastructure financed by the utilities. <sup>i</sup>

New York City created a Heat Vulnerability Index to identify neighbourhoods with a higher risk for heat-related deaths during extreme heat events. By identifying these higher risk neighbourhoods, the City can better direct resources to these communities, including outreach efforts to residents and planting of street trees. <sup>ii</sup>

Slum/Shack Dwellers International's 'Know Your City Initiative' promotes community mapping of informal settlements and access to services within them. Several cities, such as Durban, have partnered with SDI federations to co-develop adaptation plans and institutionalise participatory mechanisms. <sup>iii</sup>

Ahmedabad in India has implemented land readjustment through Town Planning Schemes that ensure availability of land for affordable housing within the city. <sup>iv</sup>



## Policy design recommendations

*What to do and how to do it?*

01.

Create integrated data systems for decision-making that include layers of data from a variety of agencies and sources (transport, land use, water/flood risk, air quality, etc.)

- a. Have all local authorities develop a Climate Change Risk Assessment and overlay it with their map (or aerial images) of current development, zoning and strategic plan to identify risks and inconsistencies (e.g. new schools planned in a flood-prone zone).
- b. Make data on climate risk available at all decision-making scales, with mandates for cities to integrate climate proofing investments into development plans (e.g., for storm water management).
- c. Conduct spatial analysis of gaps in access to services across frontline communities; use community-gathered data on informal settlements.



02.

Establish regulations and incentives to ensure affordable development in secure, well connected locations

- a. Ensure local authorities enforce plans and, where appropriate, create incentives for cross-agency coordination and data sharing.
- b. Develop incentive structures for private developers to invest where employment and services exist instead of building in distant locations where land may be cheaper
- c. Tax vacant urban land buildings so that they are brought into the rental or land market and do not create artificial scarcity, as this can inflate prices.

## Policy design recommendations

*What to do and how to do it?*

03.

### Increase supply of land for affordable development

- a. Establish transparent records of land titles and transactions to equitably acquire land and design appropriate land pooling or readjustment schemes.
- b. Use new technologies (remote sensing, drones, etc.) to complete property cadasters and gather data on under-served settlements.
- c. Ensure participation of disadvantaged groups, land tenants (not only land owners), and landless workers in land readjustment and development schemes.
- d. Use land-based financing for infrastructure investment, collaborating with informal settlement dwellers, service-providing agencies, financiers and private developers.

### Action-specific indicators

1. Percentage of households with access to good-quality urban infrastructure and services for electricity, water, transport, waste management and sanitation (e.g. by income group, race and ethnicity, etc.)
2. Percentage of household income spent to access basic infrastructure and urban services like transport and energy (e.g. by income group, race and ethnicity, etc.)
3. Percentage of household income spent on land and housing costs by income group (e.g. by income group, race and ethnicity, etc.)
4. Percentage of households owning vs. renting homes (e.g. by income group, race and ethnicity, etc.)
5. Percentage of informal settlements and low-income people in at-risk locations

### Example targets

- 98% of informal settlements (of a total of 64, with 1.3 million population) have been profiled by the SDI Know Your City campaign (Kampala, Uganda)
- Implement multi-hazard climate risk assessment and mapping for the city and integrate it with city- and state-level development plans (Surat, India)
- Ensure 57% of new housing units are built within 1,500 feet of transit by 2025; and 75% by 2035 (Los Angeles, U.S.)

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## Action Overview

Using sustainable food procurement for public facilities (school canteens, hospitals, elderly homes, civic buildings, etc.) can foster more sustainable and healthy diets, along with regulations on food marketing and accessibility.



## What are the potential wider benefits?

### Health and wellbeing

- Improved health of citizens through more sustainable diets that include more fruits and vegetables and less meat
- Reduced flow of waste into the environment which could prevent contamination and spread of disease
- Less air pollution from reduced freight transport due to an increase in local food use (though transport is a small percentage of food-related emissions)

### Economic prosperity

- Stimulated local economies and lower transport costs due to increased local and in-season food production

## What are the potential barriers to action?

- Potential increase in costs for lower carbon food production techniques and products

## Inclusivity and equity considerations

### Who may be impacted?



Low-income communities



Elderly, youth, children



Racial and ethnic minorities



Religious minorities

### How may they be impacted?

While more sustainable diets will produce positive health co-benefits as well as carbon reductions, additional regulations may lead to higher prices that create a cost barrier for **low-income groups**. New regulations may make traditional food preparation processes more expensive or make them inconsistent with new rules for **ethnic and religious minorities**. **Older people** may be more set in their ways and find it difficult to adapt to new food options.



### Case Studies

Quezon City banned junk food in schools, replacing it with healthier natural options to shift the diets of students and to improve both health and sustainability. <sup>i</sup>

Washington, D.C. is working with doctors, health insurers, retail food stores, and local food producers in a pilot program to promote the use of prescriptions for healthy food that have both environmental and health benefits. <sup>ii</sup>

Copenhagen was able to keep within its city budget by encouraging cooking from scratch, buying goods in season, reducing food waste and using less meat. <sup>iii</sup>

**Policy design recommendations***What to do and how to do it?*

01.

Change procurement rules to promote more sustainable diets without increasing prices

- a. Ban junk food in schools to improve health and sustainability.
- b. Allow healthy food expenditures to count as valid healthcare expenses for food-insecure groups.
- c. Maximise the use of local foods, in-season foods and plants, and minimise meat consumption.

02.

Undertake educational and awareness-raising approaches to inform citizens about the climate costs of their food choices at all income levels while displaying sensitivity and awareness to how new regulations might affect religious minorities and older citizens

- a. Ensure that consumer awareness campaigns take into account traditions of frontline community groups and that information is provided with images that look like them and in languages they speak.

03.

Introduce fiscal interventions to discourage unsustainable (and unhealthy) consumption and promote sustainable practices

- a. Provide subsidies for vegetables and tax meat purchases.
- b. Provide tax deduction for food donations to food banks and shelters who provide services to low-income groups.

### Action-specific indicators

1. Percentage change in specific groups of food prices under new regulations
2. Percentage of foods no longer available that are important for specific groups (e.g. religious minorities)
3. Percentage decrease in food-related GHG emissions
4. Percentage increase in food procured that is fruit, vegetables and/or whole grains

### Example targets

- 40% food-GHG reduction by 2030 (Paris, France)
- Produce or obtain 25% of food within a 100-mile radius while minimizing food deserts (Washington, D.C., U.S.)



### Case Studies

Toronto's Food Strategy has multiple education programs to ensure that all strata of the population have access to information about healthy foods, with creative strategies and outreach techniques used to reach minority groups and recent migrants. <sup>iv</sup>

Some US states provide tax deductions for retailers, restaurants and local farmers who donate food to food banks and shelters that provide food and food-related services to low income or food-insecure groups. <sup>v</sup>



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## Action Overview

Cities can expand walking and cycling options for urban residents by investing in bike lanes and pedestrian infrastructure, implementing bikeshare systems, and integrating bicycle infrastructure into existing public transit networks. All of these options can improve last-mile access for travellers, connecting transport hubs with final destinations. This is especially important for under-served residents who live on the periphery of a city or do not have easy access to existing transportation networks.

### RELATED ACTIONS

- 7 Expansion or Improvement of Public Transportation Options
- 9 Pursue Transit-Oriented, Dense, and Mixed-Use Development (TOD)



## What are the potential wider benefits?

### Essential public services (transport)

- Safer and healthier transport services with improved access to opportunities for all

### Health and wellbeing

- Reduced mortality, increased life expectancy and reduced hospital admissions from increased physical activity
- Increase in healthy life years across the population from reduced noise pollution and increased physical activity
- Reduced risk of high blood pressure, heart disease and stroke from reduced noise pollution and increased physical activity
- Reduced anxiety, depression from reduced noise pollution

### Economic prosperity

- Improved access to jobs and services for the under-served
- Potential increase in local revenues and overall economic productivity due to increased footfall in areas where congestion charging schemes are implemented and decreased travel delays
- Land value increase bringing higher property taxes and local revenues

### Planet

- Improved air quality from mode shift to walking and cycling

### Civil society

- Increased public participation in planning processes due to improved transit connectivity

### Institutions and governance

- Improved voter turnout due to better transit connectivity

## What are the potential barriers to action?

- Cost of implementation and land required for walking and cycling infrastructure
- Use of contested street space for dedicated bicycle lanes, causing decreased access or congestion for private vehicles
- Perception by rider that s/he will be financially liable for shared bike or scooter if something goes wrong
- Limited access to bike or scooter share programmes for low-income residents who typically do not have smartphone apps, credit cards, or bank accounts
- Lack of provision of shared bicycles in low-income communities or those with high concentrations of particular racial and ethnic groups as an act of discrimination by private bikesharing companies

## Inclusivity and equity considerations

## Who may be impacted?



Low-income communities



Women



Informal communities (residents, workers)



Racial and ethnic minorities



Migrants



Religious minorities



People with disabilities



Elderly

## How may they be impacted?

Poorly designed infrastructure for pedestrians and cyclists may exclude **people with disabilities and the elderly**. The lack of safe and efficient infrastructure for cycling and walking (pavements, pedestrian crossings and refuge spaces, and bicycle parking) limits access to city-wide opportunities and services for groups like **low-income and racial, ethnic and religious minority communities** that primarily rely on these modes. Additionally, **informal and migrant communities** that are typically located on the periphery of the city may not benefit from new bikeshare systems and safe infrastructure projects that are focused in the city centre. **Women** may face barriers to using a bikeshare system due to fear of unsafe areas in the city or preference for routes away from roadways and busy intersections.



## Case studies

Chicago has implemented a discount programme for its bikeshare called “divvy for everyone” and Philadelphia has both a discount fare programme and a cash payment option. <sup>i</sup>

Philadelphia has instituted a bike ambassador programme to promote awareness of its bikeshare system. <sup>ii</sup>

The city of Bogotá and multiple Indian cities are using an app called SafetiPin – which crowdsources data from women about their perceptions of safety in different locations around the city to create a map of safety levels. This helps the city improve safety measures for walking and biking in these locations. <sup>iii</sup>

In 2009, the city of Bellevue, Washington, conducted an in-depth self-evaluation to determine if sidewalk and curb ramps met federal standards for accessibility. <sup>iv</sup> Portland, Oregon, has similarly prioritised accessible mobility with its Adaptive Biketown programme that rents subsidised, adaptive bikes to seniors and people with disabilities. <sup>v</sup>

**Policy design recommendations***What to do and how to do it?*

## 01.

## Plan new walking and cycling infrastructure around community needs

- a. Ensure financing is available from higher levels of government or city's own sources (taxes, user fees, land value capture instruments) and is shifted from investments that only benefit private vehicles to walking and cycling.
- b. Conduct spatial analysis of where frontline communities live and work in the city and identify gaps in public transport access.
- c. Make decisions jointly with land use planning and economic development agencies.
- d. Conduct analysis of full social, economic and environmental benefits of investing in walking and cycling infrastructure, accounting for increase in land values, business, physical activity benefits, improved access, and reduced emissions.
- e. Hold public engagement workshops with frontline communities during planning and design phases of bicycle network planning, engaging on location of safe routes, rest stops and bike parking facilities.
- f. Different locations around the city to create a map of safety levels. This helps the city improve safety measures for walking and biking in these locations. <sup>iii</sup>
- g. Consider the needs of people with disabilities in designing street space and bikeshare programmes.

**Policy design recommendations***What to do and how to do it?*

02.

**Integrate safe and well-designed bicycle and pedestrian facilities with public transit to improve last-mile access by walking and cycling**

- a. Provide quality pedestrian infrastructure around public transport stations, to enable ease, safety and directness for those accessing stations as well as the services in and around the neighbourhood.
- b. Connect bicycle infrastructure to public transport stations as part of a city-wide network, with safe bicycle parking facilities, and bicycle-share services at transit nodes.
- c. Collaborate with communities, private developers and employers, to provide safe last-mile access options in residential and employment zones for those who walk and cycle.
- d. Establish provisions to carry bicycles on public transport vehicles.
- e. Provide maps and real-time access to information on safe bicycle routes throughout the city and key public spaces, ensuring that information is shared in other relevant languages.
- f. Consider programmes that close the streets to vehicles at particular times of day or days of the week (e.g. Sundays).
- g. Work with city transport (street management) agencies to design an appropriate route where vehicles will be prohibited during designated days/hours so that pedestrians and cyclists can travel safely and freely; design appropriate diversion routes for vehicles.
- h. Engage extensively with communities, starting early in the design of the program, and ensure collaboration across all actors who must be involved for successful implementation (e.g. traffic police, local transport agencies, businesses, schools, etc.).
- i. Ensure dedicated funding for programme continuity and raise additional funds from local businesses to support events, as they too benefit from such programmes.

## Action-specific indicators

1. Percentage of population with access to opportunities (e.g. jobs or other services) within 30-60 minutes through walking and cycling (e.g. by income groups, gender, age, etc.)
2. Level of engagement with diverse communities in planning bicycle networks and routes
3. Number of people attending programmes that close streets to vehicles at particular times of day or days of the week (e.g. by income groups, gender, age, etc.)
4. Percentage of people relying on walking and cycling for daily travel (e.g. by income groups, gender, race and ethnicity, etc.)
5. Reduction in traffic congestion from increased walking/cycling
6. Reduction in emissions (CO<sub>2</sub>, PM<sub>2.5</sub>, NO<sub>2</sub>) in key areas of the city (e.g. near hospitals, schools, care homes or low-income neighbourhoods)
7. Improved life expectancy, reduction in number of hospital admissions across different population groups (e.g. by age, gender, race/ethnicity, etc.)
8. Injury and fatality rate for pedestrians and cyclists (by e.g. gender, age, etc.)
9. Voter turnout in local elections

## Example targets

- Increase bicycle mode share from 3.5% to 8-10% between 2013 and 2018 and walking mode share from 17.5% to 21% (San Francisco, U.S.)
- Increase of bicycle infrastructure installation by 19% city-wide (San Francisco, U.S.)
- Increase city-wide network of bicycle lanes and shared use paths to 215 miles (San Francisco, U.S.)
- Reduce vehicle miles travelled per capita by at least 13% by 2025, 39% by 2035, and 45% by 2050 (Los Angeles, U.S.)



## Case studies

The Los Angeles metro provides online and printable pocket guides in 10 languages<sup>vi</sup> and a cycling grants program in London has provided Bengali language instruction to female cyclists.<sup>vii</sup>

Raahgiri Day in Gurgaon and Delhi in India has closed the streets to vehicular traffic every Sunday morning since 2013, allowing city residents to enjoy streets as a public space, engage in physical and social activity, and enjoy public events. Similar programmes have been implemented in other cities, such as the Ciclovía in Bogotá, La Via RecreActiva in Guadalajara and Sunday Streets in San Francisco.<sup>viii</sup>

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- viii. For more information, see: <https://wriroscities.org/media/photo-essay/raahgiri-day-gurgaon-india>, <http://www.viareactiva.org/>, and <http://www.sundaystreetssf.com/>

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