



## **Session 2**

### **Climate resilience in cities**

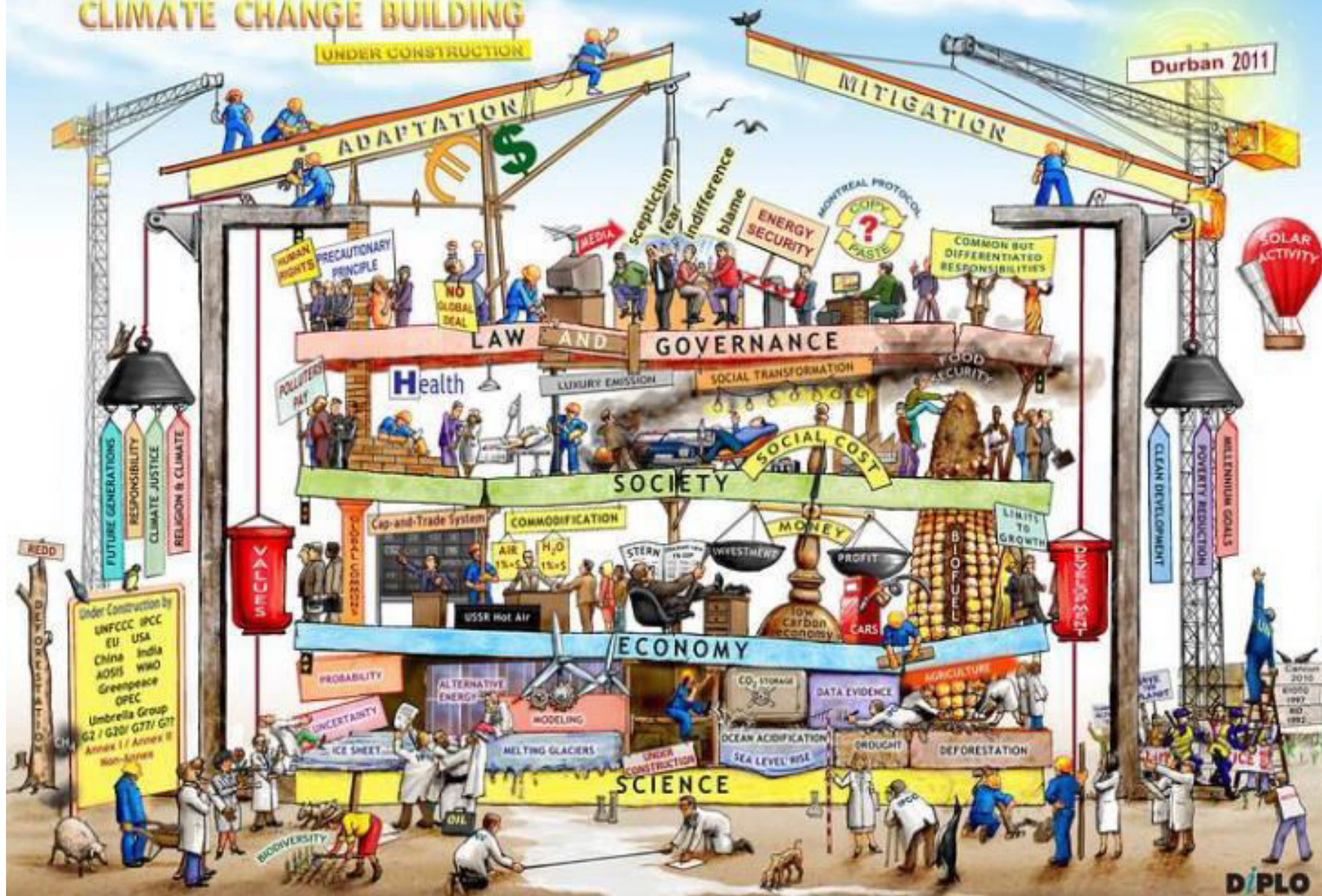
# Outline of Session

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- 1. What can cities do? The practice of climate change adaptation and mitigation in cities**
- 2. Approaches to Climate Change Planning**
- 3. Summary and Conclusions**

# CLIMATE CHANGE BUILDING

UNDER CONSTRUCTION



This drawing illustrates Diplo's approach to training and research on climate change.

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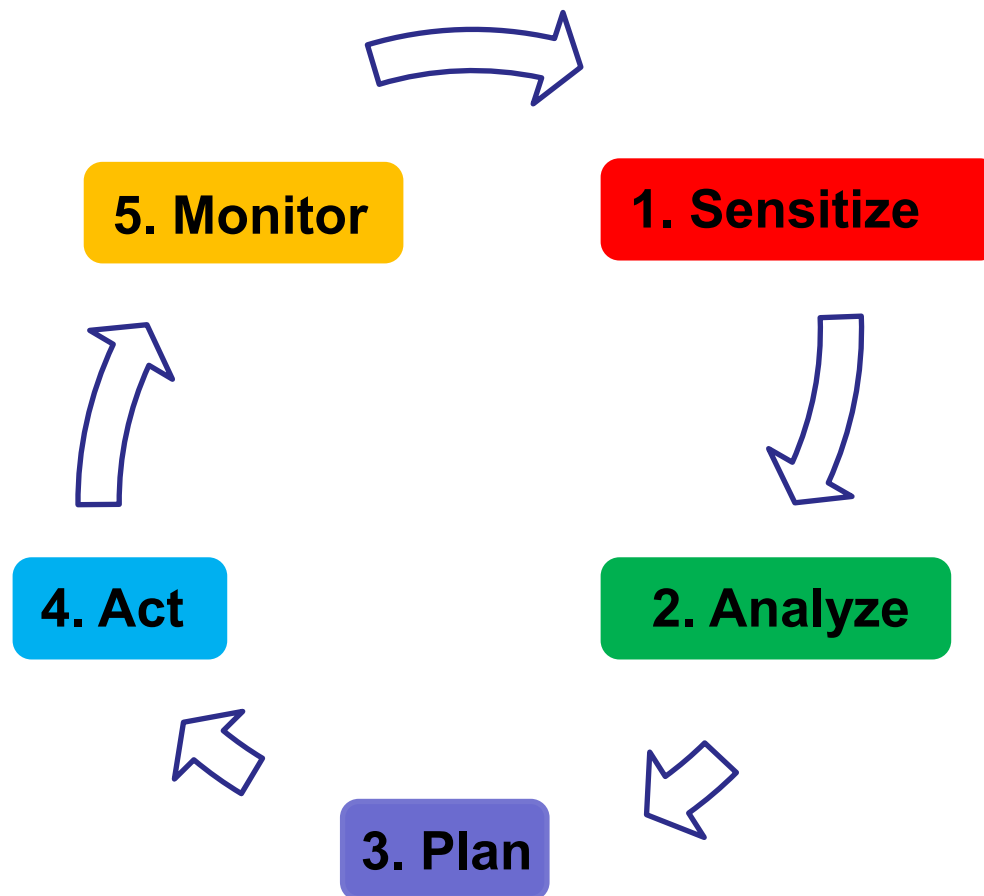
Concept: Kishorika • Illustration: Kishorika

Diplo Foundation (2012)

# **1. What can cities do?**

**The practice of climate change  
adaptation and mitigation in cities**

# Introduction to City Climate Action



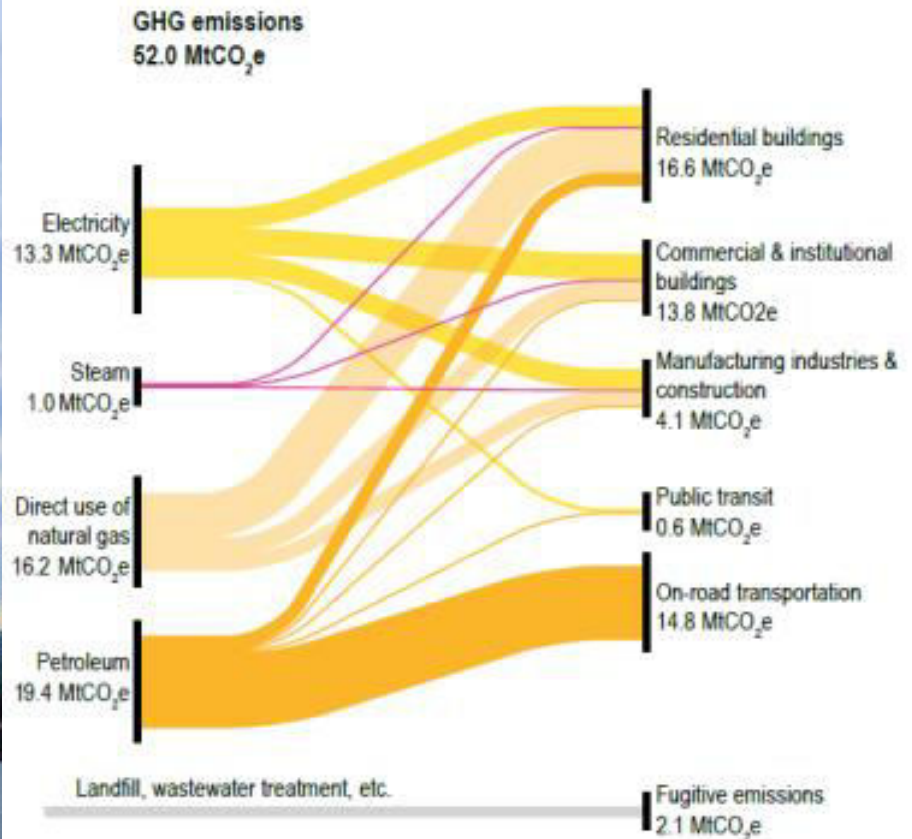
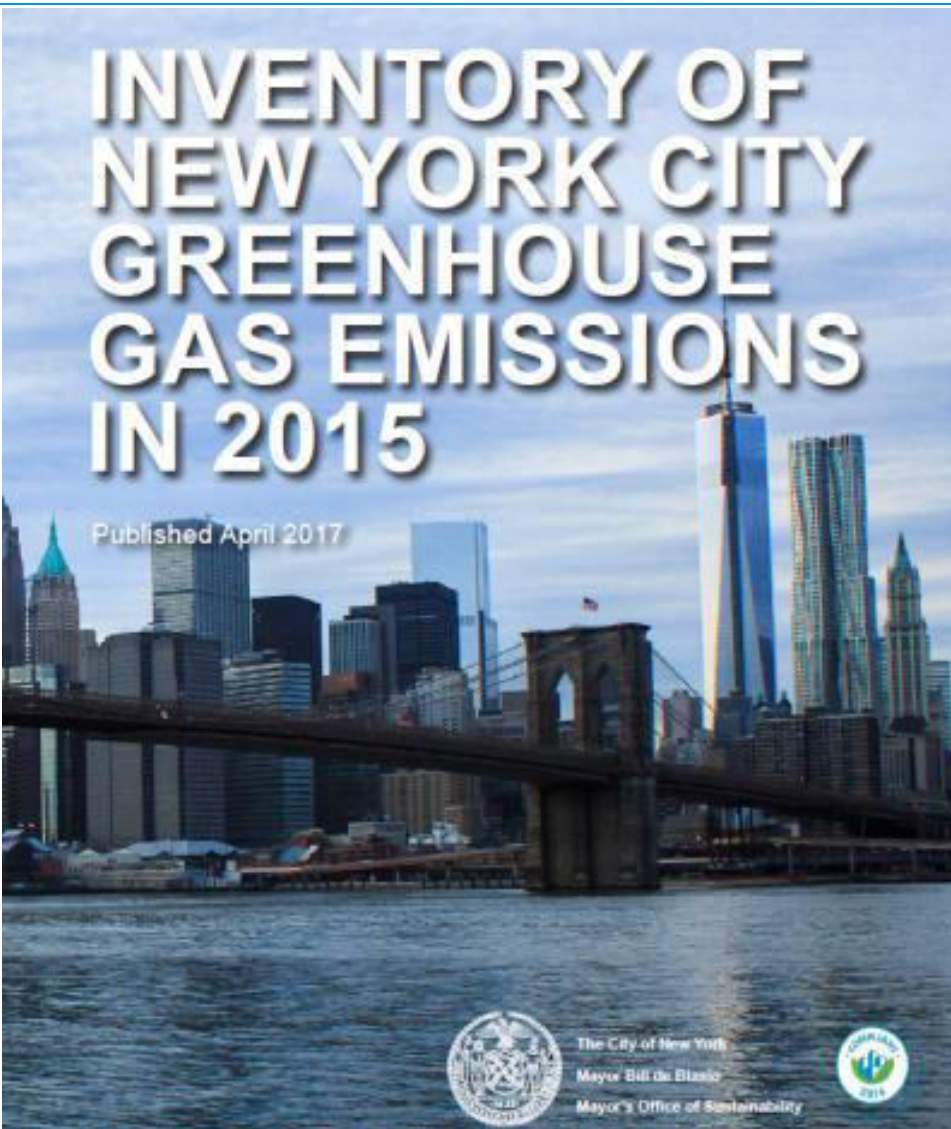


# Sensitize

- Discuss the issues in your Council
- Inform the public and media
- Working with local partners in science and academia
- Engage with neighborhood groups, religious groups, etc.
- Training of staff, internal meetings and exchanges, webinars, etc.
- Join national, regional and international Networks and Initiatives



# Measure and analyze – Know your footprint



Source: NYC Mayor's Office

## Measure and analyze – Emissions

- In order to understand what measures to take, **analyze what is your cities footprint**, and make an GHG inventory
- Lowering Emissions and achieve energy efficiency is crucial in reducing future climate threats. **Help set targets before acting**
- **Emission Inventories** can be conducted relatively inexpensively by a number of consultancies,
- Helps you gain **valuable data** on transport, energy, buildings, resource use, and set **realistic targets** and make **better investments**





New Orleans © <https://i.pinimg.com/originals/c2/40/41/c240418067d9b14b249f989b46d0340e.jpg>

# Measure and analyze – Vulnerabilities

- Extreme weather events are likely to increase in future and become more severe. Millions of urban residents will deteriorate.
- In a given city **CC impacts are different in different locations**, and on different people.
- The impacts of CC combined with other factors increase urban vulnerability, e.g.:
  - Complex **governance** and **institutional** arrangements;
  - **Socio-economic status**;
  - Lack of access to resources and markets;
  - Environmental degradation; and
  - Location (i.e. sea level rise).

# Measure and analyze – Vulnerabilities

- Risk is the combination of a hazard and vulnerability [ $R = H \times V$ ].
- Urban risk is complex – a minor event can have catastrophic consequences.



Hurricane Matthew: Flooding waters of the Tar River cover a local power plant. More than half a million people are still without electricity

# Urban disaster risk

- Risk management:
  - Is increasingly seen as a mechanism for climate change adaptation;
  - Has strong roots in management theory; and
  - Can involve risk avoidance, risk acceptance, risk transfer and risk minimization.

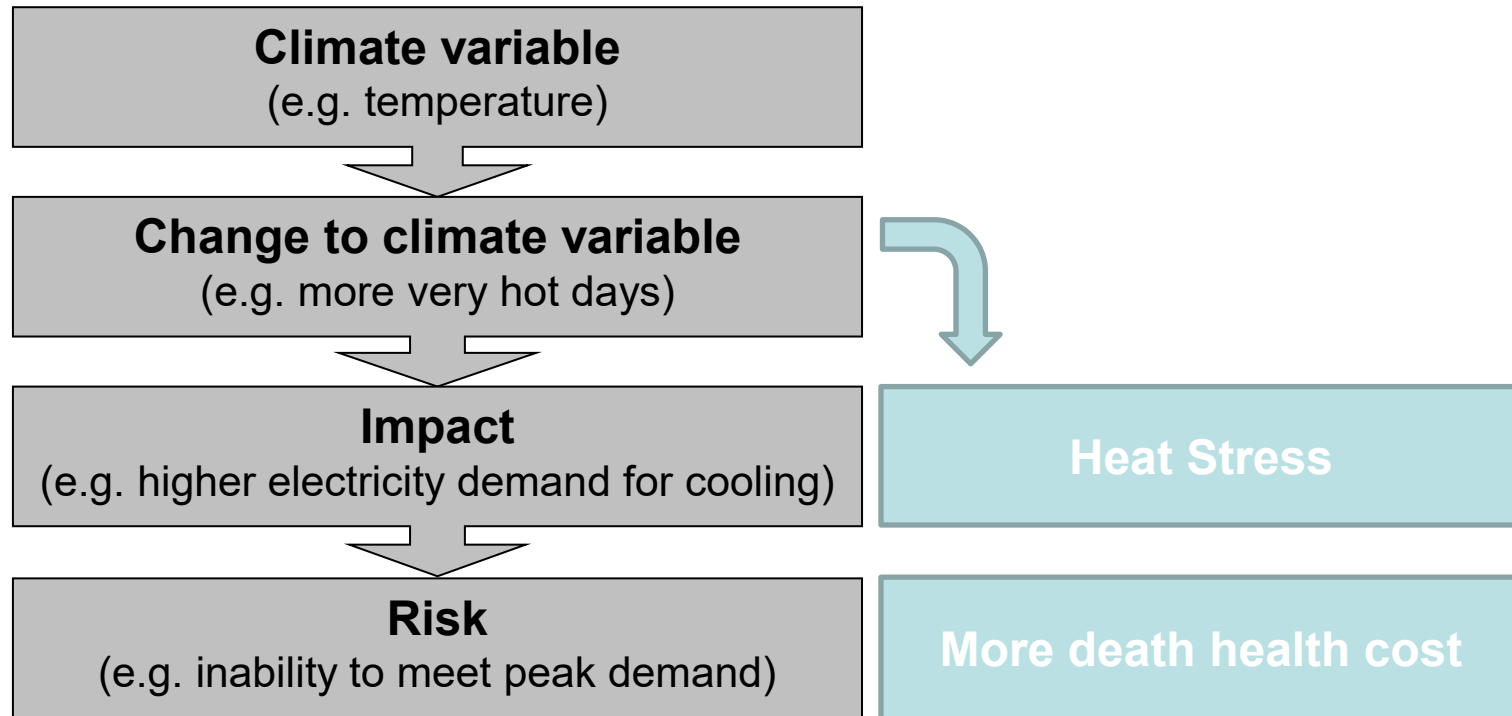
## The vulnerability framework





# Urban disaster risk

## Link between climate change and risk



Source: Australian Government (2006: 16).

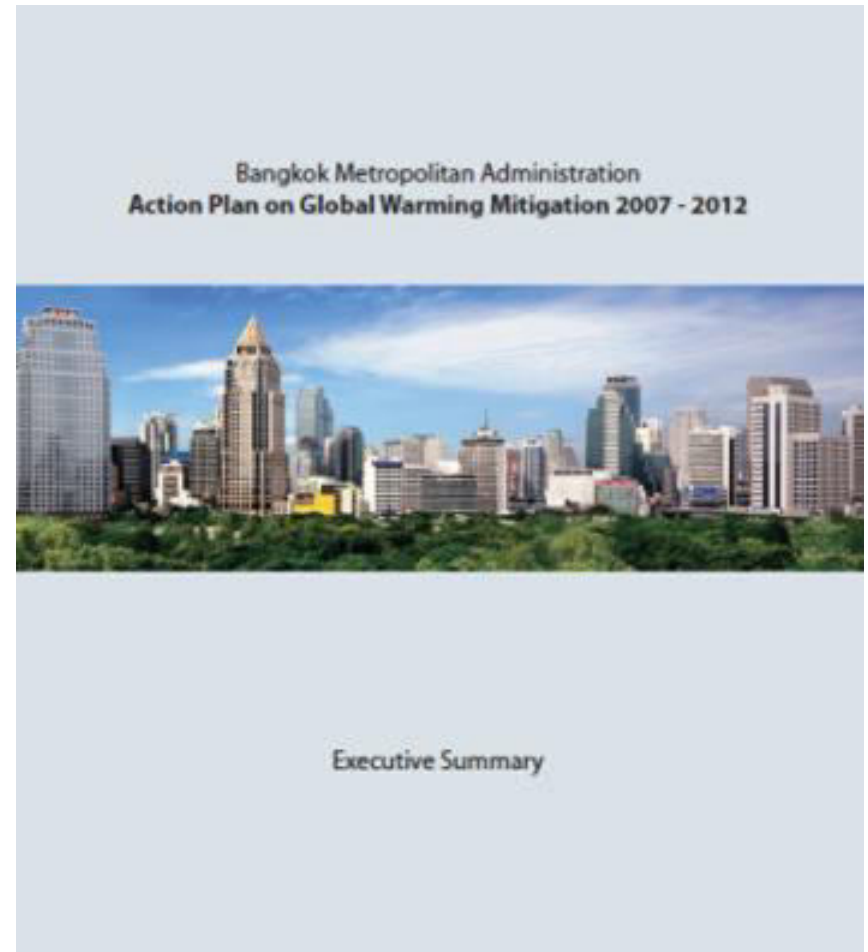


# Urban vulnerability

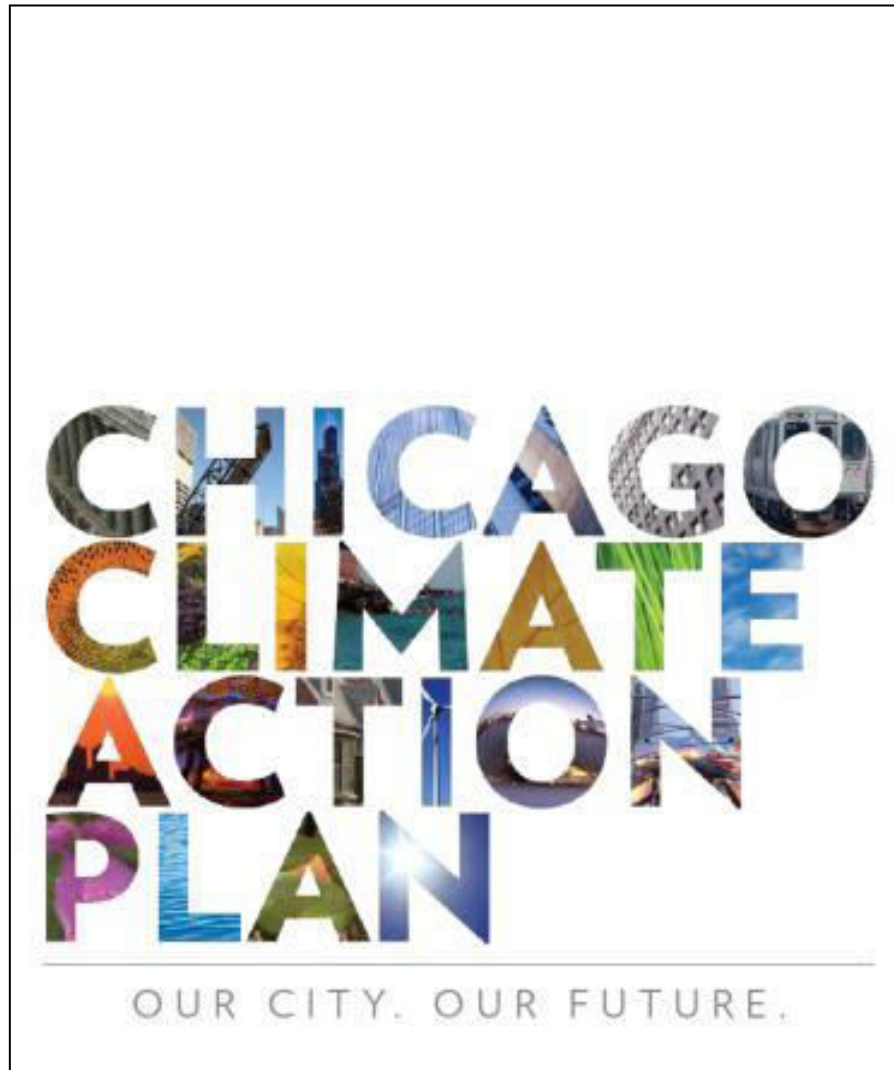
- Vulnerability is the degree to which **urban systems** and their constituent parts (people, buildings, infrastructure) are likely to experience harm due to exposure to a hazard (following Turner II et al. 2003).
- Risk and vulnerability assessments have 6 purposes:
  1. To identify particularly vulnerable people, places or sectors;
  2. To identify risk mitigation measures;
  3. To select local adaptation measures;
  4. To monitor the performance of adaptation policy; and
  5. To conduct scientific research.
- Risk and vulnerability need to be well understood in order to verify the indicators and to take informed decision, value for money.

# Committing to Targets – Why?

- Research suggests that city **governments with targets report three times as many emissions reducing activities** as those without targets (CDP, 2012) and are more resilience
- Targets matter as catalysts for action



# Plan – Why?



# Plan – Why?



Planning helps to achieve long term goals and organize a transformation into achievable concrete actions, programs, projects and goals



# Plan – Why?

- Effective planning should be **evidence-based**: grounded in a scientific understanding and informed by local knowledge.
- **Transparent and verifiable** reporting, city governments should make information available to all concerned stakeholders and report to appropriate platforms.
- Setting **ambitious** goals, taking into account targets and commitments by regional, provincial and national governments.
- **Developing synergies** between various goals, can help **achieve other relevant local objectives** in areas such as health, housing, air quality, local economic development, job creation, etc.



# Urban Planning for Climate Change – Why?

- Urban planners are in ideal position to battle Climate Change
- Urban Design and form are directly related to better withstand shocks, and achieve efficiencies (i.e. compact and connected settlement patterns)
- Immediate short-term development needs can be addressed within long-term strategies (i.e. transport systems witing transit oriented development)
- Planners are bets positioned to mainstream resilience and low-carbon efficient development into **urban planning**.
- **New Urban Agenda** can guide new approaches how to plan, manage and live in cities.



# Taking Action



**Efficient Transportation** – improve public transport and assure homes and businesses develop near transport

Manila, Philippines© Shutterstock



# Taking Action

**Efficient Buildings and neighborhoods** – encourage dense development, eco-friendly buildings



Singapore © Healthcare Facilities Today



Urban growth and the energy sources used to meet growing demand are important factors in urban climate change mitigation

# Taking Action



Singapore © Sunseap



# Taking Action

Urban density and spatial organization influence energy consumption, especially in transportation and building systems.



Birdseye view of Stockholm Image © ArchDaily



# Taking Action

Water and waste management



Modern urban wastewater treatment plant. © [hxdyl](#)

# Climate Change Action

- Adaptation and mitigation are distinct but interlinked processes.
- Both are necessary to avoid impacts of CC.
- Adaptation reduces the negative impacts of CC in the local context.
- Immediate needs still undermine adaptation and mitigation, but development strategies will not be effective without adaptation and mitigation.



# Rationale for climate change adaptation: climate resilient cities

- Resilience is not new concept as cities have always sought to defend themselves against threats.
- In an urban context, resilience can have at least three meanings:
  1. Resilience understood as response to disturbance;
  2. Resilience understood as a system's capacity to self-organise;
  3. Resilience as the capacity to learn and adapt.
- A climate resilient city would be able to continue to function at an acceptable level in the face of an external shocks.
- Resilience is 'the overarching goal achieved through adaptation and mitigation' (Hamin, et al., 2009).



# Taking Action



Singapore's first urban reservoir

Singapore, Malaysia © PUB, Singapore's National Water Agency



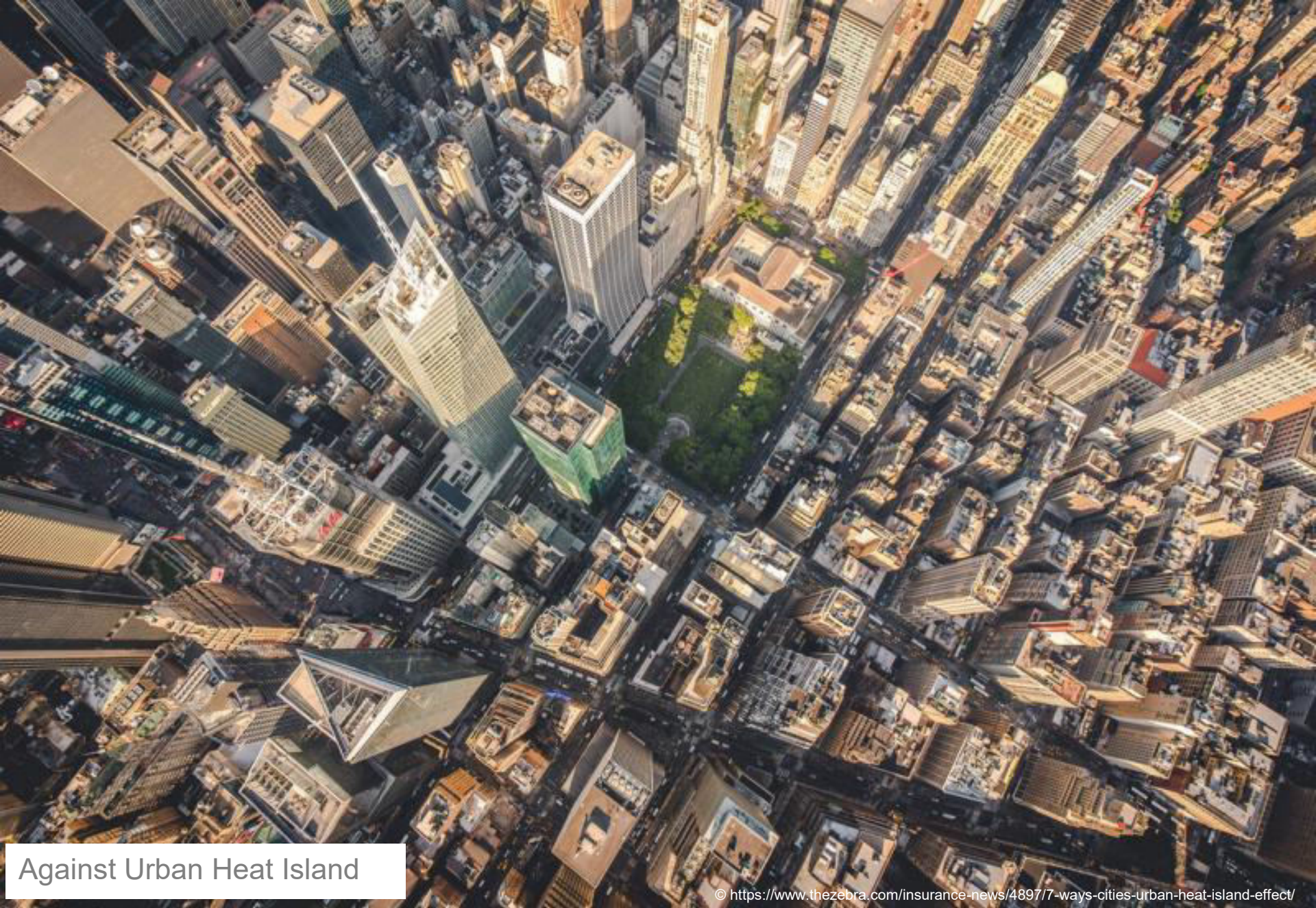
# Taking Action



Sea level barrier

HUD Battery Aerial Image New York City, USA © BIG Bjarke Ingels Group





Against Urban Heat Island

© <https://www.thezebra.com/insurance-news/4897/7-ways-cities-urban-heat-island-effect/>



# Taking Action



Coastal – Garden Island

Sydney, Australia © <https://inhabitat.com/lava-unveils-greenery-infused-garden-island-to-revamp-sydney-harbour/>

# Monitor and evaluation

- Effective monitoring includes the **tracking of process**, as well as **outcomes** (are actions achieving desired **climate targets** and other community goals?):
  - whether the actions were implemented as planned;
  - whether assumptions made during identification of the problem and its context were correct;
  - whether the actions have resulted in risk reductions; and
  - whether new information has emerged that requires a strengthening and/or modification to the risk management plan.

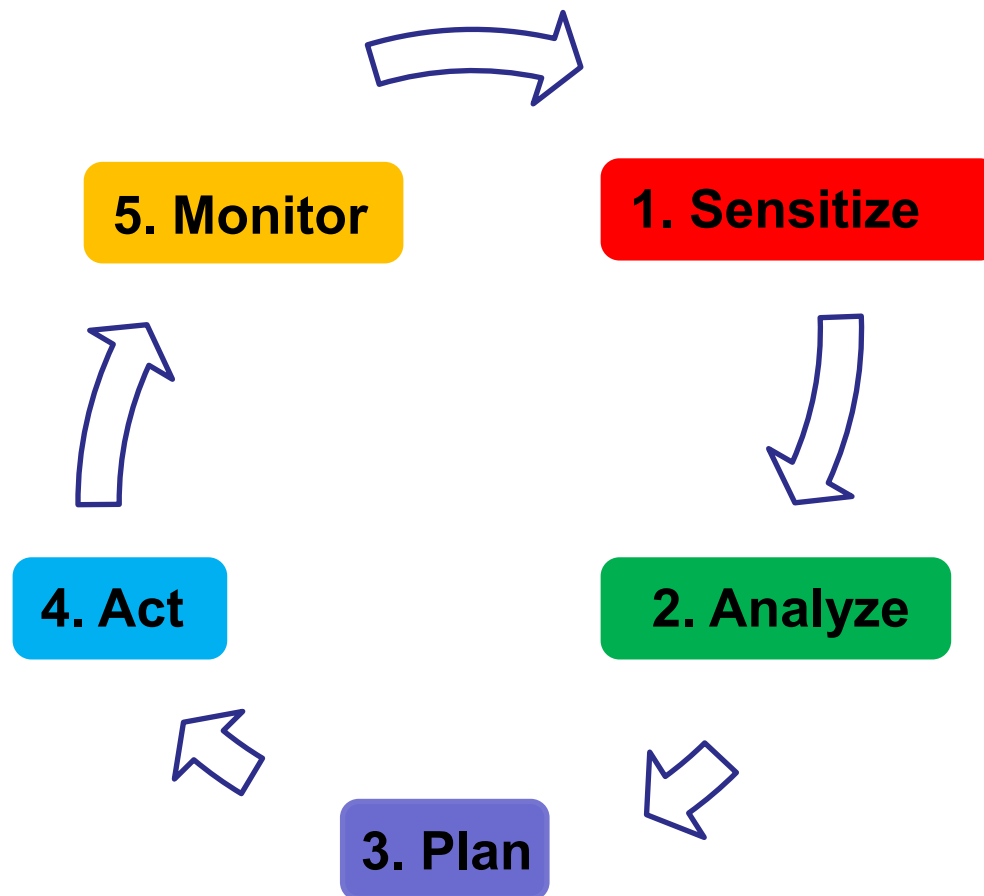
# Monitor and evaluation

- Capturing **community feedback** through **public engagement** in monitoring, reporting and evaluation will ensure that **evolving local knowledge is effectively integrated** into the planning process in a **fair** manner.
- An evaluation programme should **assess successes** and **failures of implementation**, and identify next steps. It should include deadlines for updating the plan based on progress to date, changing circumstances and lessons learned, and the involvement of stakeholders.
- Monitoring and evaluation should lead to updated **strategies** and **actions**.
- Monitoring and Evaluation also prompts **fresh thinking**.

## **2. Approaches to Climate Change Planning**



# Introduction to City Climate Action



# Sensitize

- Provide a **common reference point** for local officials and local planning practitioners, as well as other local stakeholders in cities around the world.
- **Building government capacity and support.**
  - *Comprehensive and integrated* cross-sectoral approach
  - Encourages more *ambitious* action, and confers recognition upon local achievements
- **Involving the public.** *Inclusive* of broad community perspectives and interests including accounting for difference in terms of gender, age and income, and including those populations who are frequently marginalized, in order to ensure *fair* decision-making. Monitored in a *transparent* way.
- **Engaging with key groups of stakeholders.** *Transparent and verifiable.* Inputs into the design and implementation of policies and measures that are *relevant* for key sectors of the local economy.

# Sensitize



CITY CLIMATE PLANNER  
CERTIFICATE PROGRAM



GREENHOUSE  
GAS PROTOCOL

## *Global Protocol for Community-Scale Greenhouse Gas Emission Inventories*

**EXECUTIVE SUMMARY**

*An Accounting and Reporting Standard for Cities*



# Measure and analyze VA - GHG inventory

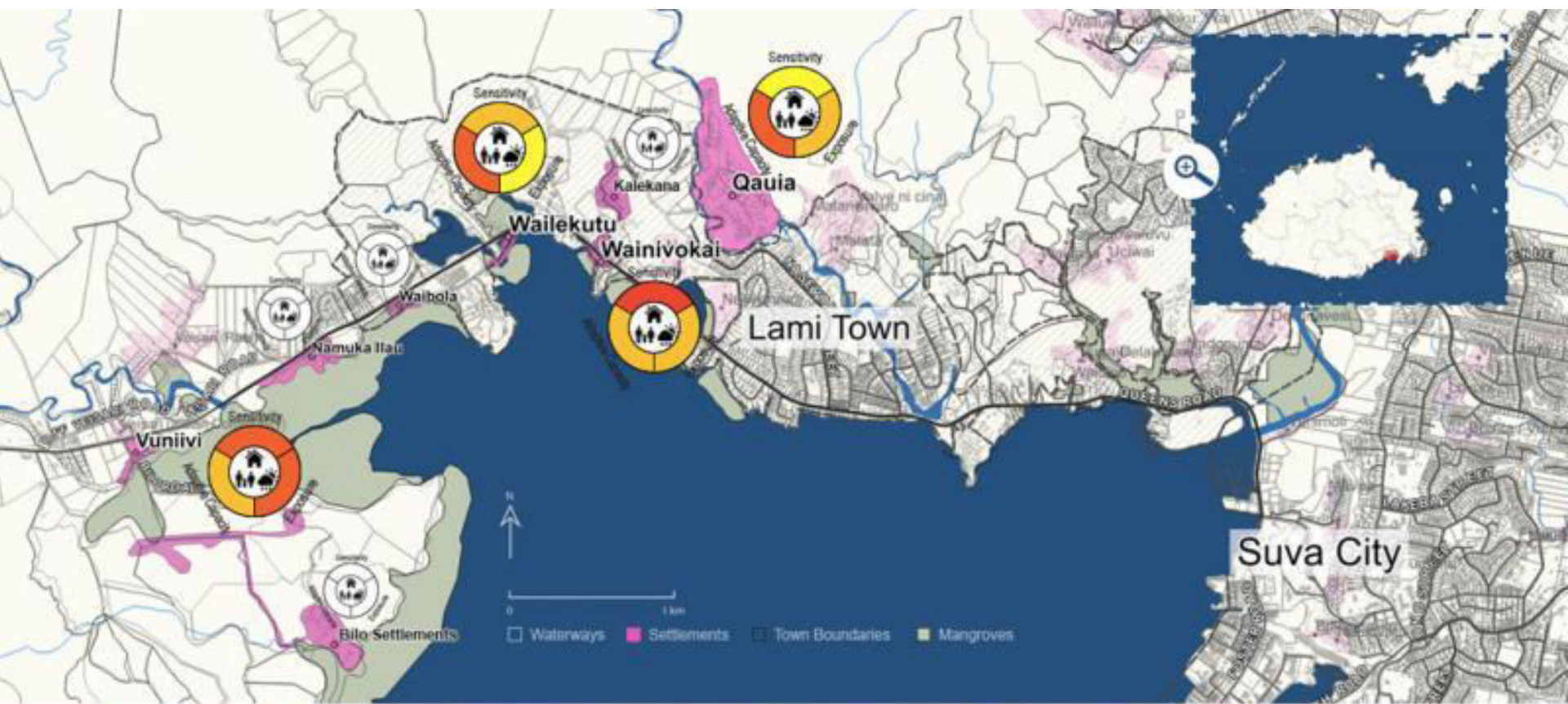


Fig. 1.



Fig. 2.



Fig. 3.



Fig. 4.



Fig. 5.



Fig. 6.



Fig. 7.



Fig. 8.

# Ad-hoc Approaches

- **Focus in on changing the technical specifications of buildings, infrastructure and projects**

**Examples:** Changing building code to raise energy efficiency of buildings; requiring larger coastal area to combat sea level rise, green roof, green project

- **Advantages:**
  - ✓ Goes directly to implementation without a lot of time and effort in process
  - ✓ Engages the decision-makers who are most responsible

Source: Kern and Alber (2008)



# Stand alone

- **Collaborative process with specific CC goal**
- **Advantages:**
  - ✓ Can engage stakeholders in full process
  - ✓ Can consider the inter-relations between policies more effectively
  - ✓ Allows for more publicity, and maybe more follow-through because of more political buy-in
  - ✓ Good when actions will affect a broad public
- **Examples:** Climate Action Plans, Adaptation Plans, Sector Plans

Source: Kern and Alber (2008)

# Mainstreaming – into statutory plans

Defined as “***a process of considering climate risks to development projects, and of adjusting project activities and approaches to address these risks***” (Huxtable & Yen 2009).

**Applying a climate lens** requires investigating current policies for the extent to which:

- a measure might be affected by climate change impacts,
  - these impacts are addressed in existing planning,
  - and further adaptation is required to address future climate challenges and opportunities
- 
- **Policies should:**
    - ✓ Reduce climate risk (climate proofing)
    - ✓ Increase adaptive capacity of local populations

Source: Huxtable and Yen (2009)

# Stand-alone or Mainstream?

## Stand-Alone CC Plans

- May be required by national government
- Provide logical extensions of national plans
- Have flexible timing
- Bring together multi-sectoral team to plan and implement
- Increase visibility of issues and attract funding
- Provide comprehensive monitoring and evaluation
- Can improve coordination and avoid maladaptation

## Mainstreaming

- Fits well into existing planning cycles, budgets, and planning hierarchy
- Clear existing responsibilities for policy implementation increases impact and institutionalization of policy
- May be a legal requirement to integrate CC into development, land use or other plans
- Will ensure that CC is treated as a cross-sectoral issue – prevents ‘CC silo.’

Source: UN Habitat 2012 p. 7



# Mainstreaming Opportunities

- Medium/long-term urban/municipal development and strategic plans;
- Master plans;
- Strategic land-use plans;
- Development orders;
- Strategies and plans for water, solid and sanitary waste, energy;
- Management plans for coastal zones.
- Local implementation of vision 2020.

Source: UN Habitat 2012

# Guiding Principles for City Climate Action Planning



**Ambitious**



**Inclusive**



**Fair**



**Comprehensive and  
integrated**



**Relevant**



**Actionable**



**Evidence-based**



**Transparent and  
verifiable**

<https://unhabitat.org/the-guiding-principles/>

# Typical climate action planning process

## Establish the overall vision for climate change mitigation and adaptation

Cities should consider the challenges faced and their capacity to address them. This will lay the foundation and determine the scope of climate action plans.

## Secure political commitments to achieve their vision

Climate action planning needs strong leadership to succeed. In many cities a strong endorsement from the mayor and senior leadership is essential to catalysing action.

## Develop a communications plan

Cities should have a coordinated strategy to engage with the target audience. A good communication plan includes outreach and participation processes during the planning stage, the release of the plan as well as the subsequent implementation of the plan.

## Secure multi-stakeholder, cross-sectoral support

Effective planning requires a comprehensive and integrated cross-sectoral approach with actors working across administrative boundaries. Some cities may find support from key private sector and non-governmental stakeholders can be vital.

<https://unhabitat.org/the-guiding-principles/>



## Mitigation

### Develop citywide greenhouse gas inventories

Greenhouse gas inventories determine baseline emissions, and identify key emission sources and reduction opportunities. While complying with local requirements, in order to ensure international compatibility cities are encouraged to use an international reporting methodology based on the Greenhouse Gas Protocol standards, e.g., the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories, particularly for cities that wish to comply with the Compact of Mayors.

### Conduct scenario analysis

Cities conduct scenario analysis to identify possible future emission trends based on different socio-economic growth and climate mitigation assumptions or scenarios. The analysis results serve the basis for target setting and identifying actions.

### Assess the local capacity to reduce emissions

Cities assess their capacity to take action and consider how to leverage other existing policies, plans, and actions such as those related to energy, environment, and urban management. This may include policies and programmes that are complimentary to mitigation efforts despite being focused on other issues.

### Set greenhouse gas emission reduction goals

Based on the scenario analysis and capacity assessment results, cities set their short-, medium-, and long-term citywide emission reduction goals, and secure political commitment to the goals. Cities are encouraged to refer to the Greenhouse Gas Protocol Mitigation Goal Standard when designing their goals in order to ensure international compatibility.

## Typical climate action planning process

# Typical climate action planning process

## Adaptation

### Conduct a climate change vulnerability assessment

Cities conduct vulnerability assessments to identify current and future risks/impacts to people, community assets, and community functions. A comprehensive vulnerability assessments address physical, environmental, economic, social vulnerability, and focus on those most vulnerable to impacts.

### Conduct scenario analysis

Scenario analysis identifies risk levels based on different scenarios of climate impacts, which will inform options to adapt to the potential climate impacts.

### Assess the local capacity to address climate impacts

Cities assess their local capacity to adapt to the climate change impacts. The analysis begins with an inventory of existing community policies, programmes, assets, capacities, and wisdom. This may include policies and programmes that are complimentary to adaptation efforts despite being focused on other issues.

### Set adaptation goals

Based on the scenario analysis and capacity assessment results, cities set their short-, medium-, and long-term adaptation goals, and secure political commitment to them. The goals should comprehensively cover the physical, environmental, economic, and social impacts of climate change.

# Typical climate action planning process

## Identify and prioritize actions

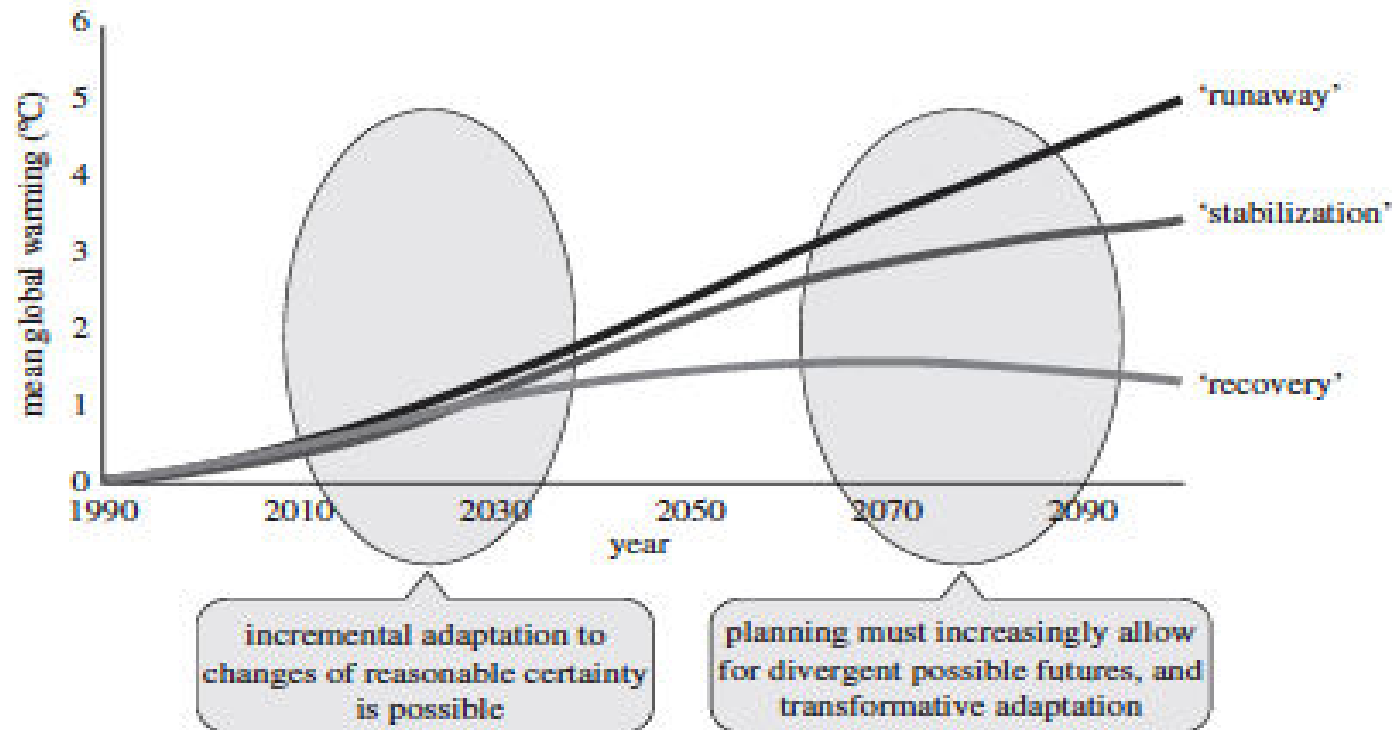
Effective plans identify comprehensive and integrated actions spanning multiple sectors of urban development and involve action at multiple different scales. Actions are prioritized based on a transparent multi-criteria assessment in coordination with other city planning efforts and institutionalized within all municipal processes and functions.

## Develop a plan for implementation

Action plans should include sufficient detail and clearly assign responsibilities so that they are actionable and can be implemented by the appropriate agencies and organizations to achieve the desired goals.



# Reduce uncertainty through timing of policy



Flexibility of policy should increase as lifetime of asset increases

Source: Stafford Smith et al (2011)

# Barriers to implementation of CC measures

- Urban planning in much of the developing world has not yet played a conscious role in reducing vulnerability to climate change, though this is changing.
- Planning decisions may even contribute to risk and vulnerability.
- Discussions around climate change often remain high-level and lack practical guidance on how to reduce exposure and increase resilience.
- Long-term impacts of climate change are also not priority given the immediate demands on planning.
- The uncertainty of climate change makes it difficult to reconcile with immediate priorities.

# Barriers to implementation of CC measures

- Climate change is most likely to exacerbate these immediate development stressors.
- Other barriers and challenges to adaptation and mitigation include:
  - ✓ Insufficient human and capital resources to dedicate to climate change issues;
  - ✓ The inability to adapt technologically;
  - ✓ Political and administrative processes that do not include climate change considerations; and
  - ✓ Lack of people driving the process.
- Planning cannot afford to ignore the warning signals of climate change projections.

Source: UN Habitat 2012 p. 7



# Overcoming barriers to implementation of CC measures

- Leadership (political or grass-roots)
- Resources (money and staff time)
- Communication and information
- Values and Beliefs
- Exchange, International Network



# Act Prioritizing

- Avoid maladaptation
- Achieve no-regrets and co-benefit options first, climate-justified options next
- Can be implemented flexibly or incrementally, as climate changes
- Are pro-poor
- Can be mainstreamed into regular operations



Photo source: grist.org

# No Regrets & Low Regrets

- **No-regrets and low-regrets: actions that provide benefits regardless of climate change**
  - Limiting maladaptation
  - Investments in development that enhance social capacity
  - Actions that reduce local pollution or destruction of habitat, that enhance water conservation or improve public health

Source: IPCC 2012



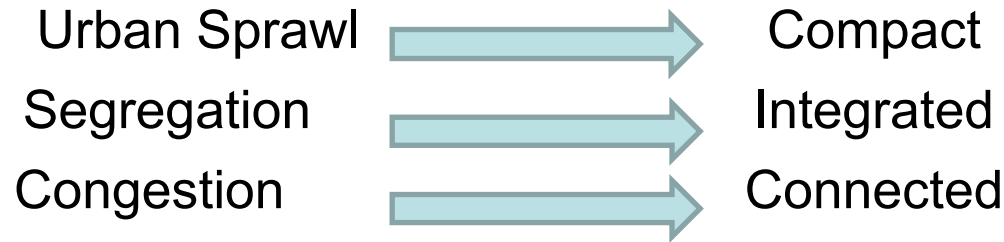
# Avoiding Maladaptation

- Maladaptation is defined as business-as-usual development which, by overlooking climate change impacts, inadvertently increases exposure and/or vulnerability to climate change.
- Maladaptation could also include actions undertaken to adapt to climate impacts that do not succeed in reducing vulnerability but increase it instead
- Maladaptation can also be adaptation that interferes with mitigation, thus increasing the long-term need for more adaptation.



Source: OECD (2009)

# Compact, integrate and connected cities



*“ **City, regional and national** authorities have adopted improved policies, plans and designs for more **compact**, socially **inclusive**, better **integrated** and **connected** cities that foster sustainable urban development and are resilient to climate change”*

Inclusive process involving:

- ✓ Neighborhood level
- ✓ Private sector
- ✓ Interest groups, etc.

# Compact, integrate and connected cities

1. **National Urban Policies:** providing an overarching coordinating framework to address urban challenges to maximize the benefits of urbanization, while mitigating potential adverse externalities
2. **City-region planning:** connecting local and national spatial frameworks with focus on:
  - a) working with nature
  - b) leveraging density
  - c) optimizing infrastructure
  - d) clustering for competitiveness
3. **Planned City Extensions:** pro-active creation of space for urban expansion, with focus on:
  - a) sound legal framework,
  - b) appropriate design parameters
  - c) sustainable financial plan



# Transit Oriented Development

- **Higher quality** of life with better and the same places to live, work, and play, and less stress
- Greater mobility with ease of moving around
- **Reduced** traffic congestion, dependence on driving, car accidents and injuries
- **Reduce** the area's **carbon footprint** or negative impact on the environment
- **Reduced household spending** on transportation, resulting in more affordable housing
- Higher, more stable property values
- Reduced incentive to sprawl, increased incentive for **compact development**
- Enhanced ability to maintain **economic competitiveness**

# Monitor and evaluation

- Should include the core planning team and stakeholder advisory committee where appropriate and feasible
- **Platforms:**
  - carbon Climate Registry (cCR) and CDP (utilized by the Compact of Mayors),
  - observatories associated with the Covenant of Mayors (global initiative),
  - the UNFCCC-sponsored Non-State Actor Zone for Climate Action (NAZCA),
  - mechanisms for monitoring the Sendai Framework for Disaster Risk Reduction;They also include regional and national platforms, and city government open data portals
- Should lead to updated **strategies** and **actions**.

### **3. Summary and Conclusions**

# Characteristics of a Successful Effort

- ✓ Establish clear objectives – why are you undertaking an climate effort, and what will be gained from it?
- ✓ Incorporate climate policies into existing management goals and procedures (mainstream it).
- ✓ Identify co-benefits associated with selected measures.
- ✓ Manage uncertainty.
- ✓ Have strong leadership to guide the process.



# Planning's role in CC adaptation and mitigation

- ✓ Planning is dedicated to the public interest.
- ✓ Local governments are constructive partners address the impacts of climate change.
- ✓ Urban planning in local governments therefore need to play a bigger role in implementing climate change adaptation and mitigation.
- ✓ Liveable, vibrant and more sustainable cities should be the goal of climate change adaptation and mitigation.
- ✓ Planning practices that build resilience and sustainability should be mainstreamed into planning strategies, frameworks and plans.

Source: UN Habitat 2012 p. 7

# Planning's role in CC adaptation and mitigation

- The everyday practices of urban planners should reflect the goals of climate change adaptation and mitigation by:
  - ✓ Participating in community-led risk and vulnerability assessments;
  - ✓ Making stark choices in choosing preferred spatial options and land use management;
  - ✓ Enforcing building codes and standards; and
  - ✓ Raising awareness and providing information.
- In conclusion 'adapting to climate change is at its core a call for planning' and adaptation is the 'type of planning that fits naturally the agenda of urban and regional planning' (Blanco, et al., 2009 p. 158).

# Conclusions

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- Good urban **planning integrates climate change concerns**.
- Planning practices that build climate resilience and sustainability should be mainstreamed into **planning strategies**, frameworks and plans.
- A sound planning process which links to **global** and **national frameworks**, is integrated across sectors, and builds on local development priorities can make a difference for adaptation and mitigation while addressing current and future **needs** of the city and its **citizens**, **including the most vulnerable**.

# Conclusions

A. Regarding **urban climate action**, the major global agendas of 2015 & 2016 are **mutually reinforcing**





# Conclusions

B. Truly effective urban climate policies in a number of sectors –

- ✓ **ecosystem-based adaptation,**
- ✓ **sustainable transportation,**
- ✓ **solid waste management,**
- ✓ **renewable energy,**
- ✓ **urban food chains –**

transcend municipal boundaries & require a **city-regional approach**. This may involve municipal cooperation – “**horizontal integration**”.

In some cases a ‘city-region’ may cross an international boundary.



# Concluding

## C. Effective city-level climate action also requires **"vertical integration"**



**From national to local level – -**  
Empower local action  
- Provide enabling framework, resources, standards, etc.

**From local to national level -**  
- "MRV" reporting of climate results suitable to include in NDC reporting



Marcus Mayr, Climate Change Planning Unit,  
Urban Planning & Design Branch  
United Nations Human Settlements Programme  
(UN-Habitat)

For more information: [marcus.mayr@un.org](mailto:marcus.mayr@un.org)

or visit:

[www.unhabitat.org](http://www.unhabitat.org)