# Cities, Buildings and Urban Systems Sectoral Guide

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GREEN CLIMATE FUND

# INTRODUCTION

- The (draft) Sectoral Guide – Executive Summary - provides an overview of GCF's sectoral guidance for partners in the urban sector
- The document identifies key opportunities for high impact and transformational investment in the urban context
- Two sessions of this webinar will be conducted in English with French and Spanish interpretation available.

The discussion today will

- Set the context for urban climate investment – the contribution of urban areas to climate change and their vulnerability to it;
- Review the opportunities for GCF to foster transformational change in the sector; and
- Set out key activities needed to implement paradigm shifting pathways to change in the sector and potential GCF support to these

# CLIMATE CHANGE REALITIES

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- In 2015, the United Nations stipulated in the Paris agreement that it would try to keep global warming below 1.5 °C owing to the potentially huge economic and social costs of higher levels of warming.
- Climate impacts of GHG emissions can be calculated in various ways, with the outcomes, as determined by climate models, delineated in how many degrees the global temperature will increase over time.
- The first calculations of warming, carried out in 1979 under the direction of the American meteorologist **Jules Charney**, showed a projected warming of between 1.5 and 4.5 °C. This outcome is now confirmed.
- To stabilize concentrations of CO2 in the atmosphere, the world needs to reach net-zero emissions. This requires large and fast reductions in emissions.

# THE NEED TO REVERSE ALARMING CARBON TRENDS

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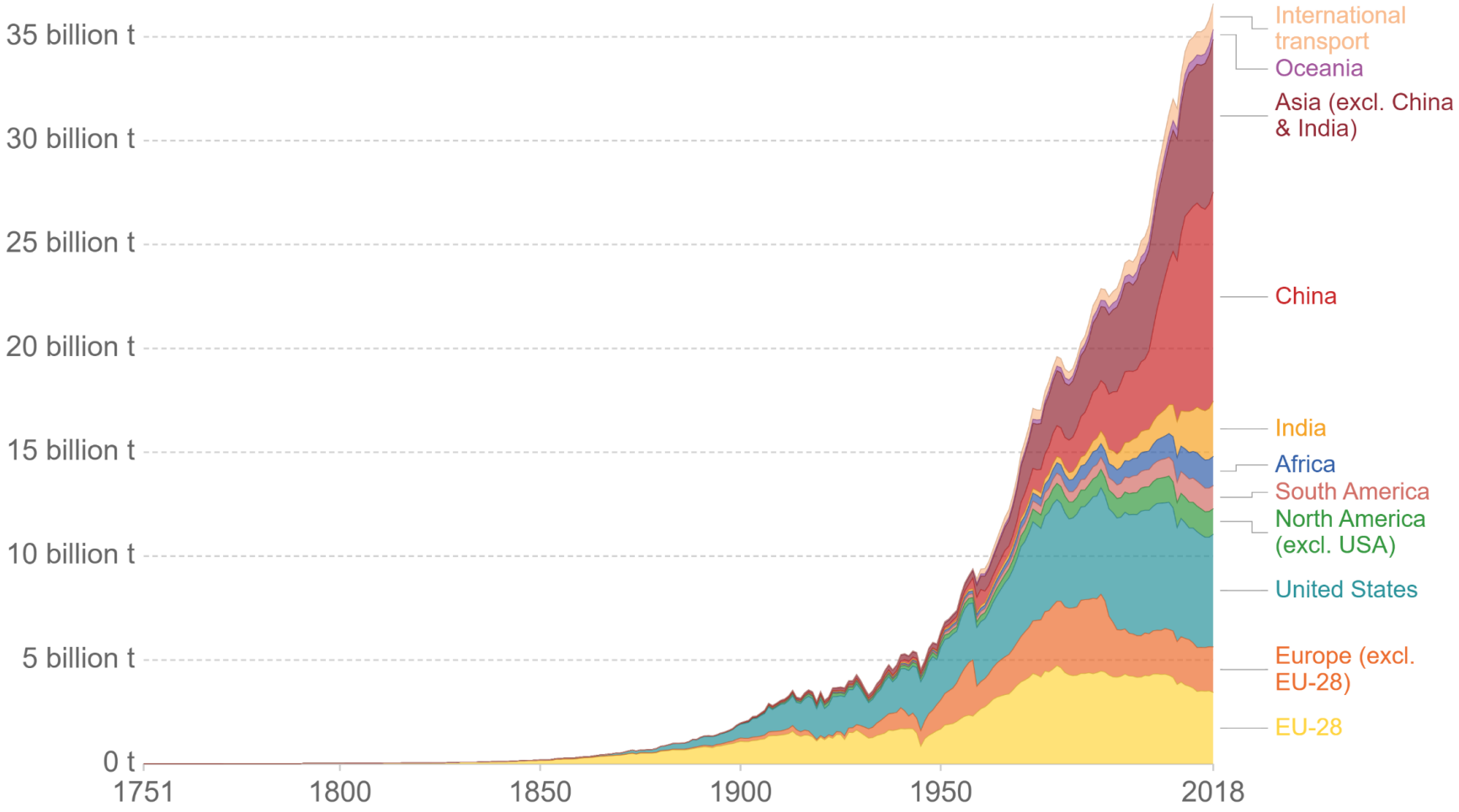
## Annual total $CO_2$ emissions, by world region

This measures $CO_2$ emissions from fossil fuels and cement production only – land use change is not included.

Our World in Data




Source: Carbon Dioxide Information Analysis Center (CDIAC); Global Carbon Project (GCP)
Note: 'Statitistical differences' included in the GCP dataset is not included here.
OurWorldInData.org/co2-and-other-greenhouse-gas-emissions • CC BY

**CORE ROLE OF THE URBAN SECTOR**

# NEW IPCC REPORT & PREVIOUSLY KNOWN DATA

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- **1.5 degrees Scenario**
  - Available global carbon budget is only about **750 Gt of Co2 equivalent until 2030**;
  - Great risk of disruptive path dependencies, not only in the urban sector, as most of the world continues to model economic growth according to past methods;
  - 85% of demand for new housing in emerging economies, 50% of which is in China and the rest mostly across Asia and Africa
- **2 degrees Scenario**:
  - Available global carbon budget is about 1,050 Gt of CO2 equivalent until 2030;
  - Only existing urbanization trend – CO2 footprint of construction of new infrastructures in developing countries and emerging economies could lead **to 350 Gt of CO2 emissions;**
  - Resource intensive and high-carbon urbanization process need to be stopped at all costs

# BUT…CLIMATE REALITY CONTINUES TO UNFOLD – REFINEMENT OF CLIMATE SENSITIVITY

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- **Towards 2.6 to 4.1 degrees Scenario**
- If the $CO_2$ concentration in the air doubles from the pre-industrial level, the earth will warm to between 2.6 and 4.1 degrees Celsius.
- **At the current rate at which humans emit $CO_2$, this doubling will be achieved within 50 to 60 years.** A new, comprehensive analysis, recently published in Review of Geophysics, concludes.
- Source: An Assessment of Earth's Climate Sensitivity Using Multiple Lines of Evidence, Review of Geophysics, Volume 58, issue 4, 2020.

- The researchers hereby provide **an important refinement of climate sensitivity**, a central concept in climate science.
- That sensitivity is a measure of the response of the Earth's climate when it is unbalanced, as has happened over the last 150 years with human emissions of $CO_2$ and other greenhouse gases.
- According to **Steven Sherwood**, the analysis clearly shows that people must reduce their $CO_2$ emissions, as well as other greenhouse gases, "very drastically".
- Within 50 to 60 years we will already be bound to a warming of about 3 ° C, he says, unless we start using massive techniques to get $CO_2$ out of the air again.

'As humanity, we can no longer hope for a low climate sensitivity' says Steven Sherwood, lead researcher of this new climate study (the University of New South Wales).

# CITIES AND GHG EMISSIONS: INDICATIVE 80% BURDEN OF BLAME

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**Average per capita GFG emissions in cities:**
Rotterdam 29.8 $tCO_2eq$.
Sydney 15 $tCO_2eq$.
Shanghai 12$tCO_2eq$.
Mexico City 4.25 $tCO_2eq$.
Amman 3.4 $tCO_2eq$.
Colombo 1.54 $tCO_2eq$.
Kathmandu 0.12 $tCO_2eq$.

**Caveat:**
Close interaction between urban form, service access and per capita GHG emissions;
Low and high neighborhoods in the same city vary by a factor of 10. Density play

**The IEA estimates:**
While currently 71% of GHG emissions;
76% of energy related GHG by 2030 will come from the cities.

**Caveat:**
Scope 1: production-based emissions
Scope 2: consumption-based emissions
Scope 3: consumption-based emissions embodied in fuel, food, building materials and water

**Importance of urban economies:**
Both **Tokyo** and **New York** gave a greater GDP than Canada;
by 2030 **New Delhi** will have a greater GDP than Malaysia.

**Caveat:**
Focus on urban form and integrated Transportation system;
Greater material, products and activities efficiency; low carbon energy / lower energy intensity

# BUT CITIES ARE GETTING EVER BIGGER AND EMIT EVER MORE

## - NEW CLIMATE ECONOMY REPORT

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| Urban group | Projected base GDP growth from 2012-2030, usd trillions | Projected base case emissions growth[1] from 2012-2030, megatonnes of $co_2$ | Projected population in 2030, bns | Per capita in 2030, tonnes of $co_2$ per person |
|---|---|---|---|---|
| **Emerging Cities** e.g. Bangalore, Kunming, Pune, Puebla | 16 | 3230 | ~1.3 | ~7 |
| **Small Urban Areas** Inc. villages, small towns, peripheral industrial areas pop. < 0.5 million | 16 | 1220 | ~2.2 | ~4.6 |
| **Established Cities** e.g. Stuttgart, Minneapolis, Stockholm, Hiroshima | 11 | 390 | ~0.4 | ~12.1 |
| **Global Megacities** e.g. Beijing, New York, London, Rio de Janeiro | 10 | 1050 | ~0.6 | ~7.1 |
| **Total growth** | ~ 52 | ~ 5,890 | **Total population in 2030** ~ 4.5 | |
| **Share of world growth** | ~ 87% | ~ 65% | **Share of world pop. in 2030** ~ 55% | |

*1: Energy assumptions consistent with IEA's Current Policies scenario* *2: At 2012 prices and exchange rates*

*3: Small urban areas are a highly diverse segment covering cities in both developed and developing countries. Estimates for this segment, especially for per capita emissions, are subject to significant levels of uncertainty and should be treated as indicative.*

***Source:** Analysis by LSE Cities and Oxford Economics; data from the Oxford Economics Global 750 Cities database. Small Urban Areas include 26 cities in the Oxford Economics database with populations under 500,000 and those areas classified as urban in the UN World Urbanization Prospects database.*

# WHY CITIES AND CLIMATE CHANGE: CHALLENGES

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- Cities produce 71% of all GHG today (6.856 out of 9.795 Gt Co2eq, 2014 data)
- 50 cities with largest populations generate 2.6 billion $tCO_2$ annually
- Only 4% of the largest 500 cities by population in developing countries have access to international, and only 20% in local, financial markets
- Within cities, 40% to 65% of total GHG emissions are from buildings and transport and
- Often city administrations have a limited mandate, and financial capacity, to intervene in the critical sectors (as with industry)

Cities deliver **economic outputs and employment: 80% GDP**

Cities **pollute and are a major contributor to climate change: 71% - 76%**

# WHY CITIES AND CLIMATE CHANGE: OPPORTUNITIES

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- Cities and urban areas are identified in SR1.5 IPCC as one of the four critical global systems transitions **that can accelerate ambition and upscale climate action.**
- Significant **gap** between
  - conceptualizing climate action plans in cities;
  - and implementing dedicated hard-core infrastructure interventions;
  - backed by policy, regulatory reforms and cost recovery measures.
- A lot of actors in helping cities conduct studies, but limited actors and TA instruments helping with making projects viable and enabling proper access to long term finance.

**Structural change** is about the transformation of the economy by **transferring resources** to **higher productivity** activities:

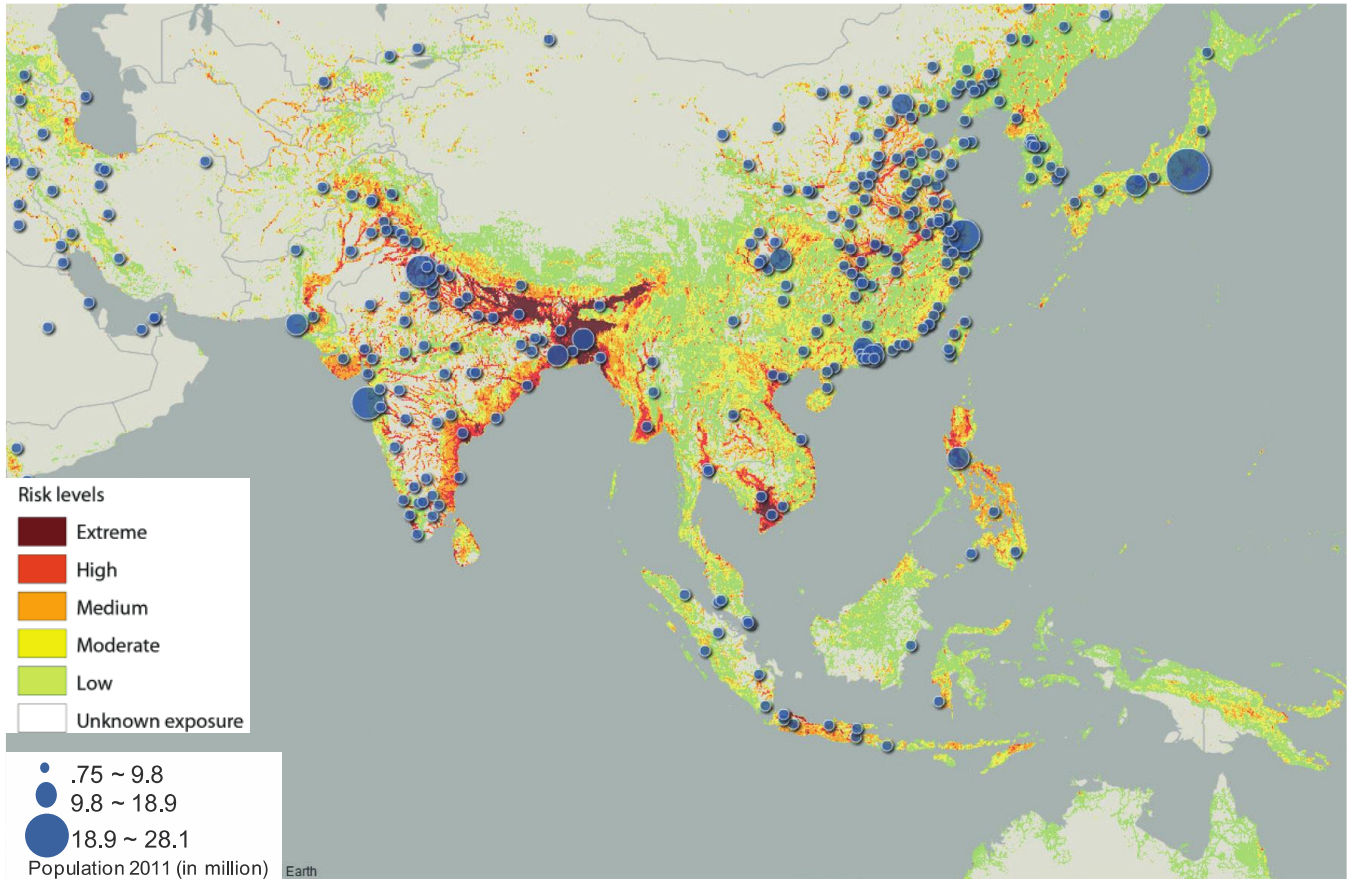
- Diversifying production
- Upgrading exports & production
- Increasing labor productivity

The extent of "decoupling" economic growth and emissions **depends entirely on reductions in energy and carbon intensity.**

# INVESTING IN URBAN RESILIENCE


- World Bank predicts the need to invest up to $ 400 billion on a global scale to urban resilience, with at least 77 million of poor people at increasing risk;
- If cities fail to build their resilience to disasters, shocks, and ongoing stresses, climate change and natural disasters will cost cities worldwide $314 billion every year by 2030.

# ...WITH MANY URBAN LOCATIONS IN HIGH RISK AREAS




**Of the 305 urban agglomerations in Asia, 119 are situated along coastlines**

# CHALLENGES TO STRUCTURING URBAN RESILIENCE INTERVENTIONS

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- Lack of government capacity
  - Political uncertainty, poor regulatory systems, difficulties in planning, financing, and implementing projects.
- Lack of private sector confidence
  - Weak currency, currency risks, limited investor confidence
  - Uncertain revenue streams
- Challenges in project preparation
  - High up-front costs to prepare projects
- Financing challenges for subnational governments
  - Lack of creditworthiness and limited sources of local revenue

# URBAN CLIMATE CHANGE REALITIES AND TRANSFORMATIONAL IMPACT - UNFCCC

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The rationale for (climate change transformative) urban investment is based on the **UNFCCC Technical Paper 13 (2014) …**referring to integrated, cross-sectoral mitigation activities in urban areas, that illustrates **the transformational impact:**

"… through strong mitigation actions aimed at low-carbon, climate-resilient development at the local level across the key sectors such as buildings, transport and waste, cities in aggregate could reduce their GHG emissions in these core sectors by an estimated 24 per cent by 2030 and by 47 per cent by 2050 (Erickson et al., 2014)".

# BUT NDCS DO NOT HAVE WELL SPECIFIED ACTION IN CITIES

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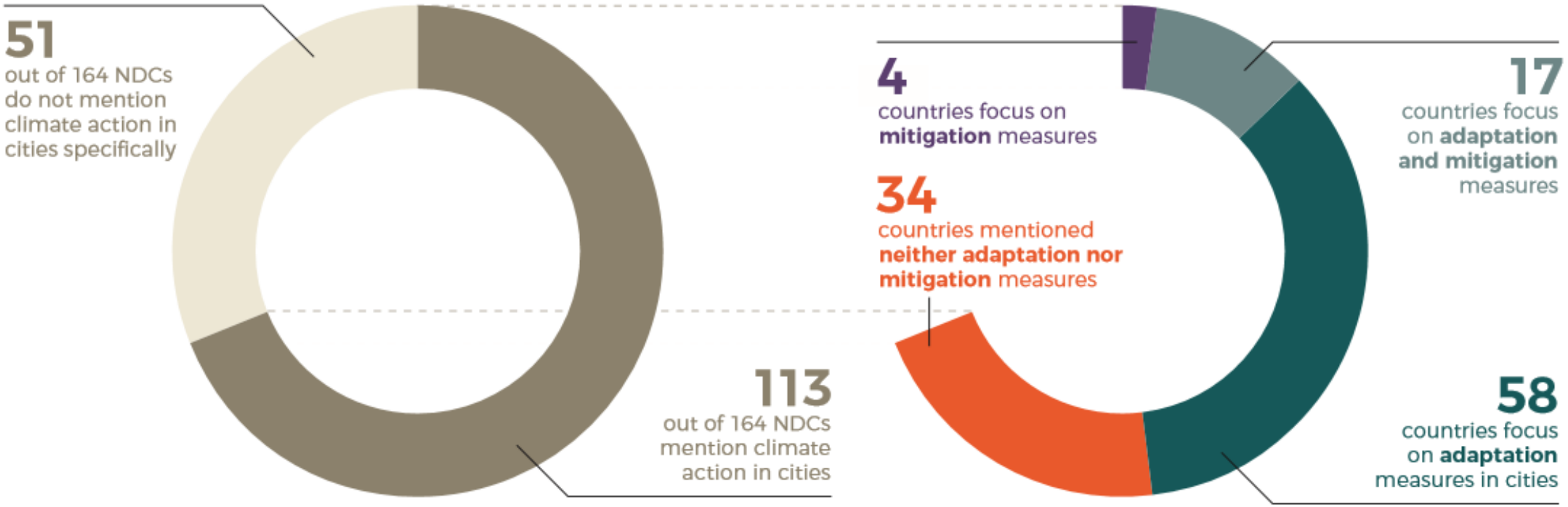


Low Carbon Cities (2018)

# ESTIMATING THE URBAN CLIMATE FINANCE

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1. OECD: **USD$6.9 trillion** will be needed for investment in energy, transportation, and water and sanitation and telecoms over the next 15 years to be consistent with a 2°C scenario (with a 66% probability) (OECD, 2017).

2. World Bank: Up to **USD$400 billion** needs to be invested on a global scale to urban resilience. Failing to respond to climate change and natural disasters will cities worldwide will be **USD$314 billion** every year by 2030 (World Bank, 2017).

3. Coalition for Urban Transition: A total of **US$5 to US$6 trillion** is required each year to meet human and economic development needs over coming decades. Therefore, the annual deficit in infrastructure investment is above **US$1 trillion a year.** (Coalition for Urban Transition, 2018)

# ESTIMATING THE URBAN CLIMATE FINANCE OPPORTUNITY

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1. IFC: Estimates a cumulative climate investment opportunity of **USD 29.4 trillion in six urban sectors*** in emerging markets cities by 2030. The bulk, **USD 24.7 trillion**, rests with green buildings, which covers both new construction and retrofits (IFC, 2018).

2. Coalition for Urban Transitions: Low-carbon cities are a **$24 trillion opportunity**, equivalent to nearly one-third of the global GDP in 2018 (Coalition for Urban Transitions, 2019).

# CITIES: ECONOMIC GIANTS WITH POTENTIAL FOR FINANCE – BUT WITH MANY VULNERABLE

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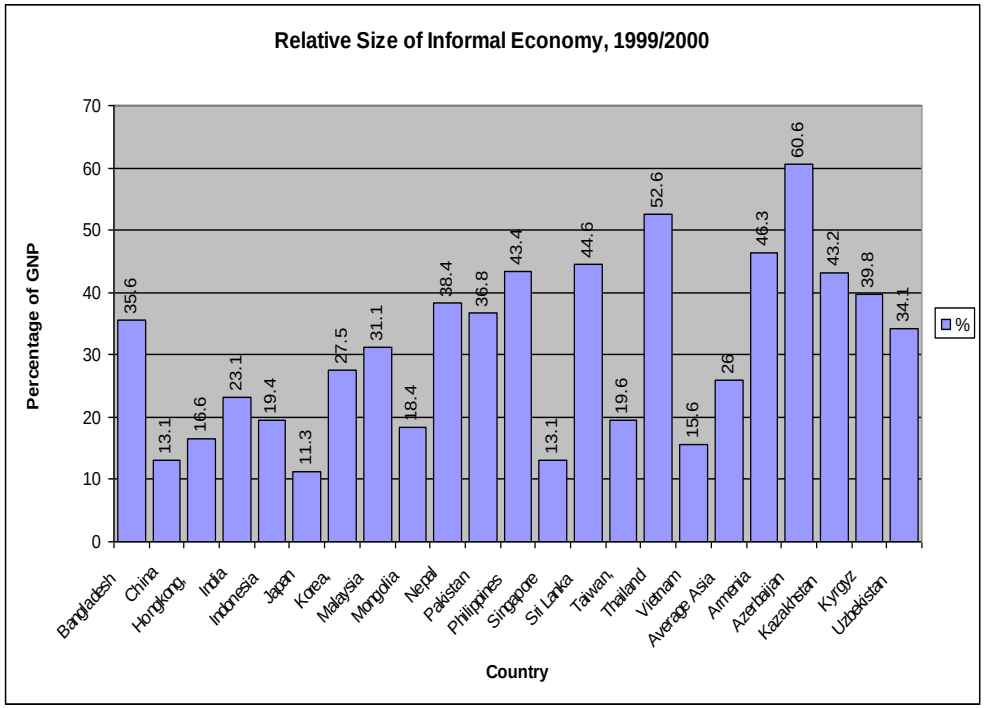
| City | Country | National Population - mill 2012 | National GDP - $b 2012 | City Population - mill 2012 | Economic Product - $b 2012 | Percentage National GDP |
|---|---|---|---|---|---|---|
| **Shanghai** | China | 1360.8 | 8358.4 | 18.6 | 516.5 | 6.18% |
| **Mumbai** | India | 1239.8 | 1841.7 | 21.9 | 227.0 | 12.33% |
| **Jakarta** | Indonesia | 249.9 | 878.0 | 19.2 | 224.7 | 25.59% |
| **Manila** | Philippines | 99.1 | 250.3 | 20.7 | 153.7 | 61.41% |
| **Bangkok** | Thailand | 65.9 | 365.6 | 10.1 | 262.4 | 71.77% |
| **Tokyo** | Japan | 127.2 | 5959.7 | 37.7 | 1520.0 | 25.50% |
| **Sydney** | Australia | 23.4 | 1520.6 | 4.0 | 203.0 | 13.35% |
| | Denmark | 5.6 | 314.2 | | | |
| | Bangladesh | 152.5 | 115.6 | | | |




**The resources to finance climate mitigation and resilience investments exist – if they can be tapped.**
**Further, this is good business – the 'Investing in Climate, Investing in Growth' report shows that bringing together the growth and climate agendas could add 1% to average economic output in G20 countries by 2021 and lift 2050 output by up to 2.8%.**

**But urban areas also contain many poor and vulnerable people that must be included in both the resilience building measures and the benefits of growth**

# THE GREEN CLIMATE FUND THEORY OF CHANGE

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**GCF promotes paradigm shift in developing countries toward low-emission climate-resilient (LECR) development pathways, in line with the goals of the UNFCCC & Paris Agreement**

**IF** the GCF rapidly builds an investment environment and mobilizes resources to enable developing countries to identify, design and implement **transformational climate interventions**

**THEN** developing countries will **demonstrably shift by 2030** toward LECR development pathways consistent with the well below 2 or 1.5˚C and global adaptation goals

**BECAUSE** an increasing share of climate-compatible investment will be catalyzed to deliver **systemic change** across the following four critical transition areas:

**PARADIGM SHIFTING PATHWAYS**

**DRIVERS OF CHANGE**

- Transformational Planning & Programming
- Catalysing Climate Innovation
- Mobilisation of Finance as Scale
- Expansion & Replication of Knowledge

**BUILT ENVIRONMENT**
Resilient Infrastructure
Low Emission Buildings
Cities and Transport

**ENERGY AND INDUSTRIES**
Low emission & resilient power generation / energy access & Low emission industries & appliances

**HUMAN SECURITY, LIVELIHOODS & WELLBEING**
Climate aware/ EWS Health, wellbeing, livelihoods & water security/ Sustainable agriculture

**LAND USE, FORESTS & ECOSYSTEMS**
Ecosystems and ecosystem services
Forests and land-use

# PARADIGM SHIFTING PATHWAYS – TAPING THE POTENTIAL OF CITIES

| Pathways | 2030 GHG emissions reduction | 2050 GHG emissions reduction |
|---|---|---|
| **Low Carbon Energy** | | |
| Decarbonization of energy sector | 50% to 70% renewables, saving 35% - 45% of GHG At cost $40-$80 per MW | Up to 90% reduction on the basis of the same trend |
| **Energy Efficiency** | | |
| Improving building energy efficiency | Buildings: 32% reduction in primary material consumption & associated GHG | Buildings: 53% reduction in primary material consumption & associated GHG |
| Mobility & transport | 20% to 45% emissions reduction | Same trend |
| **Compact & Resilient Urban Form** | | |
| Urban form | 20% emissions reduction | 40% emission reduction combined with transportation strategies |
| Urban resilience | DRR / Optimizing value for money through resilience enablers | DRR / Optimizing value for money through resilience enablers |
| **Circular Urban Economy** | | |
| Materials and material flow | 32% reduction in primary material consumption and associated GHG | 53% reduction in primary material consumption and associated GHG |
| Waste management | 20 % reduction in related GHG emission | 40% reduction in related GHG emissions |

# Overall rationale of the guidance: linking impact potential across the sector to programming pathways and financing structures

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| Global context | Paradigm-shifting pathways (Transformative Action Fields) | Financing |
|---|---|---|
| Over 2/3 of global population expected to reside in cities by 2050 | **Decarbonization of energy systems:** distributed renewable energy. Generation of energy from renewable sources at the community and household levels and the utilization of sustainable micro-grids | ▪Deploying GCF's financial instruments to foster implementation of NDCs based on needs of mega and secondary cities<br>▪GCF fostering blended finance solutions:<br>○Appropriate for the depth, breadth & sophistication of the national capital markets<br>○That tap new sources of capital<br>○That match concessionality to non-monetized climate benefits<br>▪Supporting decentralized finance, enabling subnational entities access to climate finance and viable long-term funding mechanisms<br>▪Catalysing and resourcing structures that leverage private sector financing<br>▪Building both the number of direct access AEs and their capacity to pipeline and finance climate investments in cities and urban institutions |
| 58% of global emissions and 21% of global emissions reduction potential from urban areas by 2050 | **Energy efficiency in building stocks:** retrofits of existing buildings and green standards in new buildings including more efficient and green procurement of inputs | |
| 75% of infrastructure expected by 2050 has yet to be built & 85% of cities have experienced major climate impacts | **Compact & resilient cities**: improved integration of multi-sectoral investment to mitigate impact of heat waves, sea level rise and to bolstering ecosystems, and in land development and low carbon transport in compact cities to improve energy efficiency and resilience of urban areas – focusing on ensuring benefits accrue to the most vulnerable | |
| Generate over 70% of GDP but only 10% of climate financed disbursed at the local level | **Circular urban economy:** reducing emissions from methane from landfills and incentivizing the adoption of circular production models based on the full life cycle of materials | |

# Linkage of the urban guide to other guidance

| | **Some cross-sectoral topics in Urban Management**<br>Contribution by Urban Management/ Contribution by other sectors |
|---|---|
| **In this Sectoral Guideline:** | Reduced emissions and vulnerability in developing country cities by advancing paradigm-shifting pathways in the urban sector in 5 Transformative Action Field (TAF) investments across both mega/ large and secondary cities |
| In Forest and Land Use | Forest protection at the urban boundary (TAF 3)/ energy efficiency of cities bolstered by sustainable construction materials and biofuel for renewable energy |
| In Agriculture and Food Security | Pollution control & reduction of pressure on agriculture (urban agriculture in green spaces – TAF 3 & 4)/ resilience of cities bolstered by sustainable food supply and energy efficiency supported by shorter supply chains |
| In Ecosystem Services | Using urban governance systems to link ecosystem services to urban management and funding systems (TAF 3)/ resilience of cities fostered by access to green and blue infrastructure and by supply of water and other essential inputs |
| In Energy | Supplementing generation with support to distributed generation and urban micro-grids (TAF 1)/ low carbon energy for cities by grid renewable energy |
| In Energy Efficiency | Using urban governance systems to implement new and retrofit building energy efficiency (TAF 2)/ energy efficiency of cities bolstered by industry/ producer regulation and incentives |
| In Transport | Fostering integration and thus synergies between transport and energy efficient development (TAF 3)/ low carbon transition for cities supported by greening transport modalities (low carbon vehicles, NMT etc) |
| In Infrastructure | Using urban governance systems to link resilience investments (sponge cities etc) to urban management and funding systems (TAF 3)/ low carbon cities supported by national and regional energy efficient infrastructure and incentive systems |
| In Water | Minimising pollution & pressure on water resources through water recycling, capture, & waste water treatment investments (TAFs 3 & 4)/ resilience of cities supported by sustainable water resource management at regional and national levels |
| In Health | City greening reduces heat island effects reducing pressure on health systems and provides recreational spaces, again providing an accessible healthy environment and increased resilience reduces casualties during an incident (TAF 3)/ health infrastructure strongly supports resilience of cities |

# SELECTED GCF PORTFOLIO IN CITIES / URBAN SECTOR

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| Title, Country and AE | Total Financing | GCF financing |
|---|---|---|
| ADB Ulaanbaatar Green Affordable Housing and Resilient Urban Renewal Project (AHURP) | $544 million | $95 M concessional loan and $50 M grant |
| World Bank Viet Nam: Scaling Up Energy Efficiency for Industrial Enterprises in Vietnam | $ 497 million | $75 M guarantee and $11.3 M grant |
| IDB Promoting private sector investments in energy efficiency in the industrial sector in Paraguay | $ 43 million | $20 million loan<br>$3 million grant |
| UNDP Scaling-up Investment in Low-Carbon Public Buildings, Bosnia-Herzegovina | $122 million | $17.3 million grant |
| EBRD Green Cities Facility | Euro 598.6 million | 1st tranche: Euro 65 million concessional loan and Euro 22 million grant |

# LESSONS & EMERGING GCF IMPACT AREAS – WHAT AND HOW

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## MEGACITIES

- Present Threat: needs large scale integrated energy efficient land use / transport combined intervention;
- requires non-BAU project development and implementation with 30% GHG reduction potential alongside the key economic corridors

## SECONDARY CITIES

- Need to break path dependence: One of the key transformational area for cities identified by the SR1.5, addressing massive surge of urbanization need to follow the principles of sustainability and green growth
- Intervention would include municipal planning, climate friendly cooling / heating / energy technologies, construction standards and green deliveries.

## ACCESS TO FINANCE

Critical need for project development support and financing structured to facilitate access by a range of cities: utilize guarantee instrument, MoU with Cities Financing Facility, guidance and support to the Cities Financing Gap TA Fund; promising RfP potential if programmatic approaches can be developed

## Drivers of change across pathways

**Paradigm - shift pathways (Transformative Action Fields)**

- Decarbonised & distributed Energy
- Energy efficient buildings
- Circular urban economy
- Compact & resilient urban form

## Four drivers of paradigm-shift

### Transformational planning & programming

- Strengthen mechanisms to implement NDCs and urban climate targets through planning and programming process
- Foster integrated urban, transport, energy and infrastructure development
- Institutional strengthening for pipelining and project development
- Develop and apply new technical standards (MES etc) and performance standards in support of the above

### Catalyzing climate Innovation

- New business models that reduce upfront capital cost requirements and tap new revenue sources ( ex: pay-as-you-go schemes; land value capture, etc.)
- Support to integrated implementation of new technologies
- New institutions (ESCOs, etc.)
- New urban development models (TOD, etc.)
- New legislation (producer responsibility)

### Mobilization of finance at scale

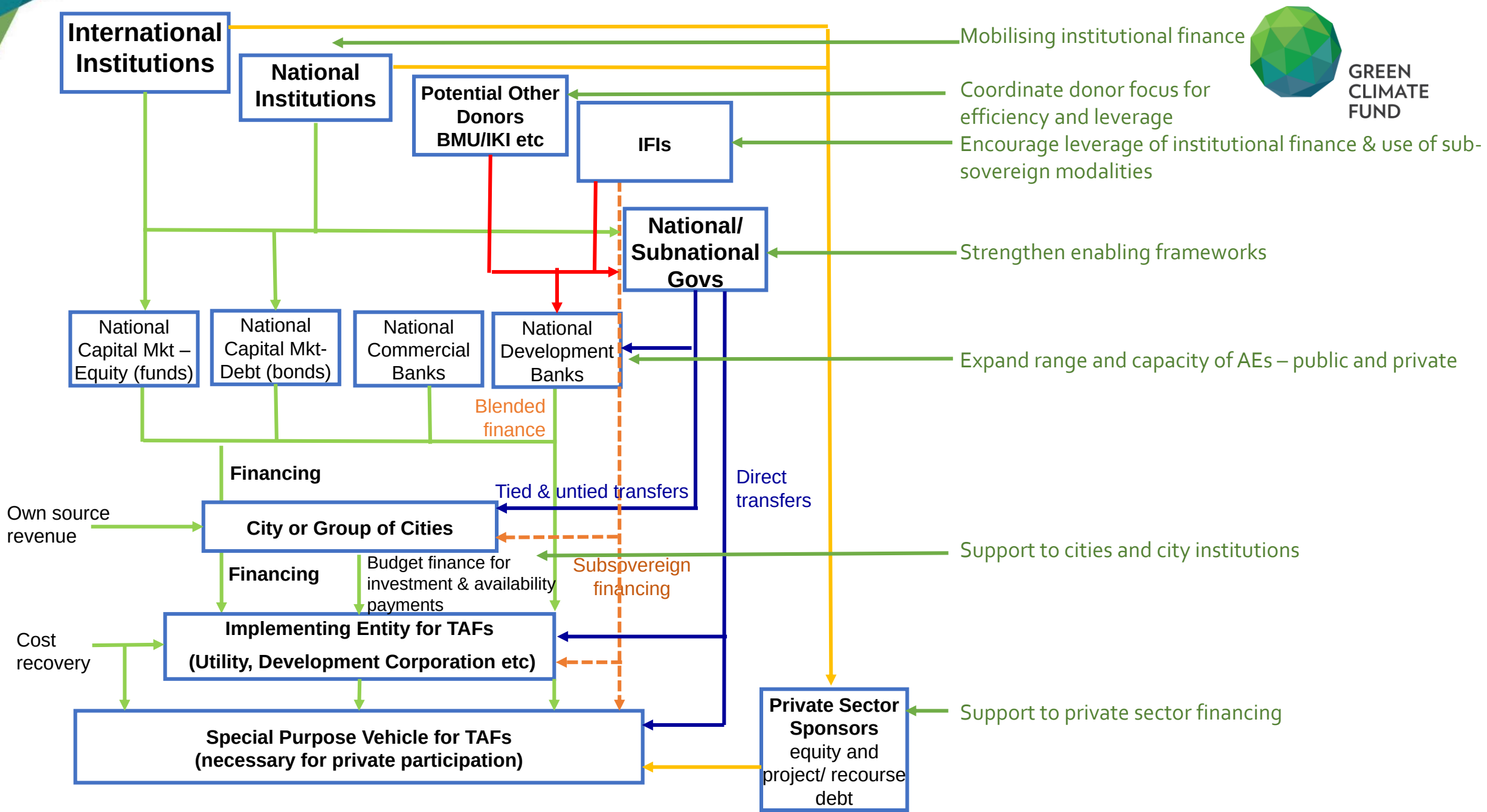
Increased access to of cities and city institutions to domestic and international capital markets through

- Support to pipeline development at scale
- Catalyse and participate in private sector funding vehicles eg SPVs for PPPs
- Targeted investments in catalytic funds, city raisings and PPP structures
- Support to direct access AEs (especially NDBs) in subnational climate financing
- Mechanisms to enhance the use of blended finance, subsovereign finance and mechanisms to leverage the private sector to work for cities – especially in SIDS and LDCs
- Mobilisation of national and global PIC funds through capital markets
- Incentivise IFIs to leverage resources and to incentivize efficiency and innovation

### Expansion and replication of knowledge

- Developing knowledge products on business models through the Community of Practice for each TAF
- Utilise partnerships within CCFLA to upscale action on project development, PIC financing and NDBs
- Partner with other agencies & networks to maximise knowledge feedback / learning loops in each TAF sector
- Effectively disseminate knowledge through GCF knowledge repository and networking events

# URBAN FINANCE ECOSYSTEM

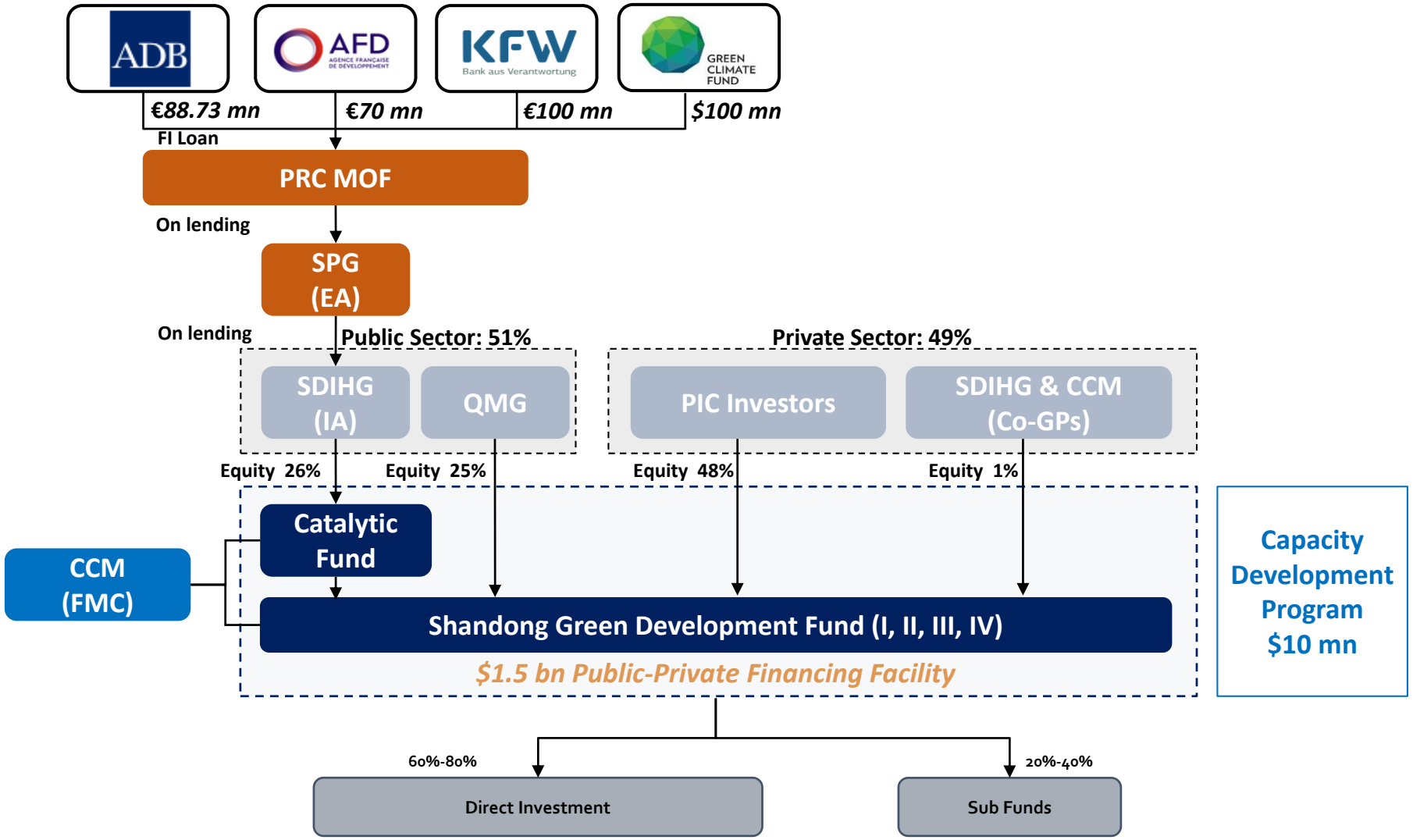


# GCF Urban Action Areas

| |
|---|
| ***Mobilizing Institutional Finance*** |
| Addressing credit quality and foreign exchange issues for international institutions (guarantees)/ Building consciousness of alternatives |
| For national institutions as above plus strengthening national enabling framework (Readiness) |
| ***Coordinate with donors for efficiency and leverage*** |
| Use convening power to coordinate donor focus on using resources at maximum efficiency and for leverage |
| ***Encourage IFIs to leverage institutional finance & use of sub-sovereign modalities*** |
| Encourage leverage of institutional finance & use of sub-sovereign modalities (guarantees, loans, possible grants)/ Ensuring value add of GCF finance – concessionality corresponding to external climate benefits |
| ***Strengthen national enabling frameworks*** |
| Enabling frameworks for climate-focused, performance-based transfers (Readiness)/ Targeted grant support for demonstration projects in performance-based transfers (LDCs/ SIDs) |
| ***Expand range and capacity of AEs – public and private*** |
| Strengthen project development capacity (PPF)/ Structure for leverage (guarantees, loans and possible grants) |
| Expand range of AEs/ Build capacity of AEs as above/ Engage with regulators to build “green finance” systems – green bonds etc. (Readiness). |
| ***Support to cities and city institutions*** |
| Targeted support to innovative raisings if catalytic (guarantees, equity participation) |
| Build capacity for: a) managing implementing entities (SPVs & PPPs); and b) project development particularly in respect of those using PPP structures/ Strengthen enabling framework, and capacity, for raising own source revenue (PPF) |
| Build capacity for: a) initiating and managing SPVs & PPPs); and b) project development particularly in respect of those using PPP structures/ Strengthen enabling framework, and capacity, for cost recovery (PPF) |
| ***Support to private sector financing*** |
| Targeted support to catalytic/ large scale investment (guarantees, equity, loans and possibly grants) |

GREEN CLIMATE FUND

# SHANDONG GREEN DEVELOPMENT FUND




CCM = CICC Capital Management Co., Ltd.; EA = Executing Agency; FI = Financial Intermediation; FMC = Fund Management Company; GP = General Partner; IA = Implementing Agency; MoF = Ministry of Finance; PIC = Private, Institutional and Commercial; PRC = People's Republic of China; QMG = Qingdao Municipal Government; SDIHG = Shangdong Development & Investment Holding Group; SPG = Shandong Provincial Government.

# Decarbonised and Distributed Energy

| Drivers of Paradigm Shift | | | |
|---|---|---|---|
| **Key Interventions by Driver** | | | |
| **Transformational Planning & Programming** | **Catalysing Climate Innovation through New Business Models** | **Mobilisation of Financing** | **Expansion and replication of knowledge** |
| Fostering improvements in enabling frameworks & planning for new & retrofit clean energy. For example, through Feed in Tariffs (FiT), carbon pricing and other mechanisms that incentivize distributed, resilient and low emission energy sources for urban development | Use of business models that derive revenue from large scope 2[1] emission reductions in urban development (Scope 1 is discussed below). For example, through mechanisms that reduce the up-front cost of capital investment eg pay-as-you save schemes such US PACE | Given that such installations can range from individual houses to large scale urban development projects, financing mechanisms need to be capable of financing both large- and small-scale projects | Partner with networks focused on financing such as the Cities Climate Leadership Alliance (CCFLA) and energy sector networks, to:<br>> Develop knowledge products on business models through the Community of Practice<br>> Utilise partnerships of organisations with networks to upgrade & upscale project development systems in National Development Banks (NDBs) and International Financial Institutions (IFIs) in order to structure programs of investment which maximise the leverage of PIC financing<br>> Partner with other development assistance agencies, local government networks & energy networks to maximise knowledge feedback / learning loops in each pathway sector<br>> Effectively disseminate knowledge using the GCF knowledge repository and networking events |

# Energy Efficient Buildings

| Drivers of Paradigm Shift | | | |
|---|---|---|---|
| **Key Interventions by Driver** | | | |
| **Transformational Planning & Programming** | **Catalysing Climate Innovation through New Business Models** | **Mobilisation of Financing** | **Expansion and replication of knowledge** |
| Improving enabling frameworks & planning systems to incentivise both maximum energy efficiency in new development & retrofit energy efficiency programs. In respect of the former Floor Space Ratio (FSR). In respect of retrofit other incentives can be used and including effective carbon pricing and recovery of a larger proportion of the real cost of energy from user (lower subsidies) | Promote large scale programs for low emission construction (reduced scope 1 emissions) through promotion and mandating of energy ratings and performance standards (appropriate to both cold and tropical climates) incentivising net zero building, and in operation through facilitating the operation of Energy Saving Companies (ESCOs) and other arrangements that derive revenue from saving energy. | The same range in investment scale applies as set out above with the same implications for the financing system but large scale energy efficiency (EE) retrofit is particularly difficult and will require demand-side institutional forms such as development corporations to structure and contract such investment. | Partner with networks focused on financing such as the Cities Climate Leadership Alliance (CCFLA) and energy & green building sector networks, to:<br>> Develop knowledge products on business models through the Community of Practice<br>> Utilise partnerships of organisations with networks to upgrade & upscale project development systems in National Development Banks (NDBs) and International Financial Institutions (IFIs) in order to structure programs of investment which maximise the leverage of PIC financing<br>> Partner with other development assistance agencies, local government networks, green building networks & energy networks to maximise knowledge feedback / learning loops in each pathway sector<br>> Effectively disseminate knowledge using the GCF knowledge repository and networking events |

# Compact and Resilient Cities

| Drivers of Paradigm Shift | | | |
|---|---|---|---|
| **Key Interventions by Driver** | | | |
| **Transformational Planning & Programming** | **Catalysing Climate Innovation through New Business Models** | **Mobilisation of Financing** | **Expansion and replication of knowledge** |
| Better incentives & network planning for integrated low emission transport; avoiding and intervening against forced mobility effects. Coordinated investments in a number of sub-sectors, for example in Non-Motorised Transport (NMT) and in low emission fleet capacity (eg. eBuses) are needed. The latter in turn, require incentive structures that promote reduction in scope 1, 2 and 3 emissions. Planning & incentives for inclusive resilient development & redevelopment need to be provided which will involve improving climate impact and vulnerability data for cities and, in turn, improving the "green design" process that will take this context into account when formulating urban plans and mitigation and adaptation/ ecosystem services projects. | Foster fiscally viable urban development models such as Transit Oriented Development (TOD) and the provision and/or upgrading of infrastructure to increase resilience funded through such structures as Land Value Capture (LVC) systems. Specific models are needed for the 3 categories of adaptation investment: (1) reducing exposure to hazards through the provision of basic infrastructure and services; (2) managing new risks by retrofitting existing infrastructure; and (3) building new infrastructure specifically to respond to climate hazards, such as sea level rise. | Given the need for large scale redevelopment of cities to put them on a low emission footing, the capacity of NDBs, IFIs and other financing systems to provide large-scale, long-term finance for urban development corporations and such vehicles needs to be developed. Such mechanisms need to be able to finance both green & brownfield development.<br>Financing instruments will need to be adapted to the needs of mega- and large cities/ projects vs secondary cities/ smaller projects through the such mechanisms as fostering capital markets access in the former case and using aggregated financing instruments in the latter case. | Partner with networks focused on financing such as the Cities Climate Leadership Alliance (CCFLA) and urban planning, engineering, transportation and city networks, to:<br>> Develop knowledge products on business models through the Community of Practice<br>> Utilise partnerships of organisations with networks to upgrade & upscale project development systems in National Development Banks (NDBs) and International Financial Institutions (IFIs) in order to structure programs of investment which maximise the leverage of PIC financing<br>> Partner with other development assistance agencies, and local government, urban planning and transport networks to maximise knowledge feedback / learning loops in each pathway sector<br>> Effectively disseminate knowledge using the GCF knowledge repository and networking events |

# Circular Urban Economy

| Drivers of Paradigm Shift | | | |
|---|---|---|---|
| **Key Interventions by Driver** | | | |
| **Transformational Planning & Programming** | **Catalysing Climate Innovation through New Business Models** | **Mobilisation of Financing** | **Expansion and replication of knowledge** |
| Foster appropriate standards & incentives for all forms of recycling. For example, providing structures for Waste to Energy (WTE) investments; reducing waste, such as tipping fees and deposits; and for recycling such as legislating producer responsibility for products. | Structure markets for Reduce, Reuse and Recycle (3R) so that companies can derive a viable revenue stream from sharing the use of products, recycling products and/or ensuring that products do not reach a disposal site (promoting circular economy and resource recovery). | Financing has to be available for each step in the supply and logistics chain of recycling industries & recycled products. If investment falls short in any step in the process the circle will be broken. | Partner with networks focused on financing such as the Cities Climate Leadership Alliance (CCFLA) and waste & energy sector networks, to:<br>> Develop knowledge products on business models through the Community of Practice<br>> Utilise partnerships of organisations with networks to upgrade & upscale project development systems in National Development Banks (NDBs) and International Financial Institutions (IFIs) in order to structure programs of investment which maximise the leverage of PIC financing<br>> Partner with other development assistance agencies, local government, waste and energy networks to maximise knowledge feedback / learning loops in each pathway sector<br>> Effectively disseminate knowledge using the GCF knowledge repository and networking events |

# GCF – MEETING THE DEMAND AND SCALING UP TRANSFORMATIVE CLIMATE ACTION IN CITIES

GREEN CLIMATE FUND

***Compact, connected, and coordinated cities could deliver up to 3.7 GtCO2e/year of savings over the next 15 years and reduce infrastructure capital requirements by over US$3 trillion***

1. GCF can offer financing opportunities for urban projects which can **de-risk investments and attract private investors.**

2. GCF can support a **range of finance mechanisms** that will leverage institutional change and linkages .

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