



Financing The Urban Transition

POLICYMAKERS' SUMMARY

COALITION FOR URBAN TRANSITIONS

A New Climate Economy Special Initiative



Photo credit: PebblePicJay/Flickr

Citation

Floater, G., Dowling, D., Chan, D., Ulterino, M., Braunstein, J., McMinn, T. *Financing the Urban Transition: Policymakers' Summary*. Coalition for Urban Transitions. London and Washington, DC. Available at: <http://newclimateeconomy.net/content/cities-working-papers>.

Coalition for Urban Transitions
A New Climate Economy
Special Initiative
c/o World Resources Institute
10 G St NE, Suite 800
Washington, DC 20002, USA
+1 (202) 729-7600

C40 Climate Leaders Group
North West Entrance,
City-Gate House
39-45 Finsbury Square, Level 7
London EC2A 1PX, United Kingdom
+44 (0) 20 7922 0300

WRI Ross Center for Sustainable Cities
10 G St NE
Suite 800
Washington, DC 20002, USA
+1 (202) 729-7600

Cover photo credit: reynermedia / Flickr

About this paper

This paper was prepared for the Coalition for Urban Transitions, a special initiative of the New Climate Economy project. The Coalition is a major international initiative to support decision makers to meet the objective of unlocking the power of cities for enhanced national economic, social, and environmental performance, including reducing the risk of climate change.

Research for this paper was conducted as part of the urban finance case programme which has been co-led by the London School of Economics and PwC with advisory input from a Finance Working Group of experts representing a diverse range of organisations, including: Deutsche Bank, the Organisation for Economic Co-operation and Development (OECD), World Bank, the Urban Land Institute, the Climate Policy Initiative (CPI), C40 (Finance), the London School of Economics (LSE), PwC, and Siemens. The research was directed by Graham Floater and Dan Dowling and was co-authored by Denise Chan, Matthew Ulterino, Juergen Braunstein, and Tim McMinn. Additional inputs were provided by the Principles for Responsible Investment, which represents over 1,600 signatories from the global financial services sector; the UNEP Finance Initiative, in collaboration with 200 financial institutions, including banks, insurers and investors; Findeter; and the Nordic Development Fund.

The authors offer special thanks to technical contributors and reviewers Jeremy Gorelick (independent municipal finance expert), Michael Westphal (World Resources Institute), Roland White (World Bank Group), Sarah Colenbrander (International Institute for Environment and Development), Kirsten Jack (ICED), Andrea Fernandez (C40), Manuel Oliviera (C40), Philipp Rode (LSE) and Katharina Ehrhart (LSE).

The opinions expressed and arguments employed are those of the authors.

This publication represents a scoping exercise to direct future research. It has been prepared for general guidance on matters of interest only, and does not constitute professional advice. You should not act upon the information contained in this publication without obtaining specific professional advice. No representation or warranty (express or implied) is given as to the accuracy or completeness of the information contained in this publication, and, to the extent permitted by law, the authors and distributors do not accept or assume any liability, responsibility or duty of care for any consequences of you or anyone else acting, or refraining to act, in reliance on the information contained in this publication or for any decision based on it. The paper draws on and extends the LSE Cities research and publications including previous New Climate Economy publications by the LSE's Economics of Green Cities programme, and the LSE's publications under RAMSES funded by the European Community's 7th Framework Programme under Grant Agreement No. 308497. This material has been funded by UK aid from the UK government; however, the views expressed do not necessarily reflect the UK government's official policies.

About the Coalition for Urban Transitions

The Coalition for Urban Transitions is a special initiative of the New Climate Economy project, hosted by the **WRI Ross Center for Sustainable Cities**, and jointly managed with the **C40 Climate Leadership Group**. The Coalition partnership comprises over 20 major institutions who share a common purpose: delivering a better urban future for all. The Coalition seeks to support decision makers to meet the objective of unlocking the power of cities for enhanced national economic, social, and environmental performance, including reducing the risk of climate change.

About PwC

At PwC UK, our purpose is to build trust in society and solve important problems. We're a network of firms in 157 countries with more than 223,000 people who are committed to delivering quality in assurance, advisory and tax services. Find out more and tell us what matters to you by visiting us at www.pwc.com/uk.

About LSE

The London School of Economics and Political Science (LSE) is one of the foremost social science universities in the world. LSE Cities is an international centre at the LSE that carries out research, graduate and executive education and outreach activities in London and abroad. Its mission is to study how people and cities interact in a rapidly urbanising world, focusing on how the physical form and design of cities impacts on society, culture and the environment. This research was commissioned via LSE Enterprise.



THE LONDON SCHOOL
OF ECONOMICS AND
POLITICAL SCIENCE ■



LSE**Cities**

Table of Contents



Executive Summary	6
Financing sustainable urbanisation	6
High-potential urban finance mechanisms	7
Delivering a better urban finance system	8



Chapter 1	12
Objectives and methods	



Chapter 2	13
The challenge of financing the urban transition	
2.1 The 3C model of urbanisation	13
2.2 Infrastructure: a widening deficit in global investment	14
2.3 Major barriers to urban infrastructure investment	15



Chapter 3	16
Areas of national and international action	
3.1 Potential sources of urban finance	16
3.2 Raising, steering, and blending urban finance	20
3.3 National strategies: frameworks for supporting the urban transition	21
3.4 Prioritising finance mechanisms with high potential	22



Chapter 4	25
Coordinating governance: a financial maturity framework	
4.1 The importance of financial maturity	25
4.2 Stage 1: Foundation	28
4.3 Stage 2: Transition	30
4.4 Stage 3: Established	32



Chapter 5	34
Recommendations	
5.1 High-potential urban finance mechanisms	34
5.2 Financial maturity and readiness	36



Photo credit: Mike Behnken/Flickr

Executive summary

Financing sustainable urbanisation

Urbanisation is one of the most important potential drivers of productivity and growth in the global economy. Changes in the global urban population suggest that, by 2050, cities will be home to two-thirds of the world's inhabitants. China's urban population alone is expected to be nearly 1 billion by 2030. Large, fast-growing economies, such as India, Nigeria, and Indonesia, will also experience rapid urban population growth. The urban infrastructure that countries and cities construct today will lock in economic and climate benefits – or costs – for decades to come. Well-managed urban growth can enhance productivity and innovation, and reduce the carbon intensity of economic and social activity. However, poorly managed urban growth (and particularly urban sprawl) can increase infrastructure costs, congestion, air pollution, and social exclusion.

If countries and cities are to capture the productivity benefits of urban growth while minimising the costs, cities will need to shift to a more economically and environmentally

sustainable growth pattern. In particular, the management of urban growth will need efficient urban form and infrastructures, effective governance and institutions, and sufficient financing. Avoiding the market failures that result from poorly managed urban growth will require a new urban development model for many cities. For this, three pillars are crucial: compact urban growth, connected infrastructure, and coordinated governance – the 3C model of urban development. These 3C pillars can drive cost and resource efficiencies through the benefits of scale economies and agglomeration, energy efficiency, environmental protection, resilience, productivity, and sustainable urban economic growth.

The three pillars of the 3C model are overlapping and mutually reinforcing:

- **Compact urban growth:** through managed growth and / or urban retrofitting that encourages higher densities, contiguous development, functionally and socially mixed neighbourhoods, walkable and human-scale local urban environments, brownfield site redevelopment, and green space provision.

- **Connected infrastructure:** through investment in innovative urban infrastructure and technology such as bus rapid transit (BRT), cycle superhighways, electric vehicles, smart grids, energy efficient buildings, and essential water, sanitation, and waste services.
- **Coordinated governance:** through effective and accountable institutions to support the coordinated planning and implementation of activities and investment across the public and private sectors.

Delivering the 3C model of urbanisation will require substantial investments in sustainable urban infrastructure. While sustainable infrastructure options and more compact urban forms might entail higher upfront costs, they could generate long-term savings. The Paris Climate Change Accord, the UN Sustainable Development Goals, the Habitat III New Urban Agenda, and the Sendai Framework for Disaster Risk Reduction have all accordingly underscored the need for a more strategic approach to investing in public infrastructure that leverages private and institutional capital more effectively.

However, under current projections, many cities will not be able to raise the finance required to meet the demand for infrastructure.

According to a range of estimates, the deficit in investment for global infrastructure is growing by more than US\$1 trillion annually. This investment gap is particularly acute in developing countries and emerging economies due to their fiscal constraints. Recent estimates for a step change in infrastructure expansion to support growth acceleration and development put the gap in financing needs of developing countries between US\$1.2 trillion and US\$2.3 trillion per year, an increase of around 3–5% of developing country GDP. If operation and maintenance costs are included, then these estimates could be doubled.

There is considerable interest and demand from national and city governments, donors, and the private sector to unlock finance for 3C urban development. At the same time, major governance and market barriers exist that currently prevent access to a wide range of private and public finance. Urban finance is not well understood, and the significant potential of a number of urban finance mechanisms remains unfulfilled. Urban finance deserves greater recognition for its transformative potential as a key enabler of inclusive urban economic development at the national level.

Delivering sustainable models of urban growth will require substantial additional investment in compact, connected, and coordinated urban infrastructure.

This paper focuses on the role of national governments in mobilising and directing urban finance, with the aim of supporting policymakers and practitioners to think systematically about financing 3C urban development.

It reviews the sources of finance that are potentially available, identifies the barriers to investing in sustainable urban infrastructure faced by different investors, and examines the most promising finance policy instruments, mechanisms, and institutional structures. This informs a preliminary financial maturity assessment that central and city governments can use to chart customised policies, practices, and instruments that could enhance their financial capabilities. The research draws on evidence from four main sources: grey literature, expert interviews, databases, and workshops in India, Mexico, and Uganda. This Policymakers' Summary presents the high-level findings from this work, which are available in more detail in the Global Review of Finance for Sustainable Urban Infrastructure.¹ The Global Review is further supported by the three standalone country case studies and three detailed instrument inventories.

High-potential urban finance mechanisms

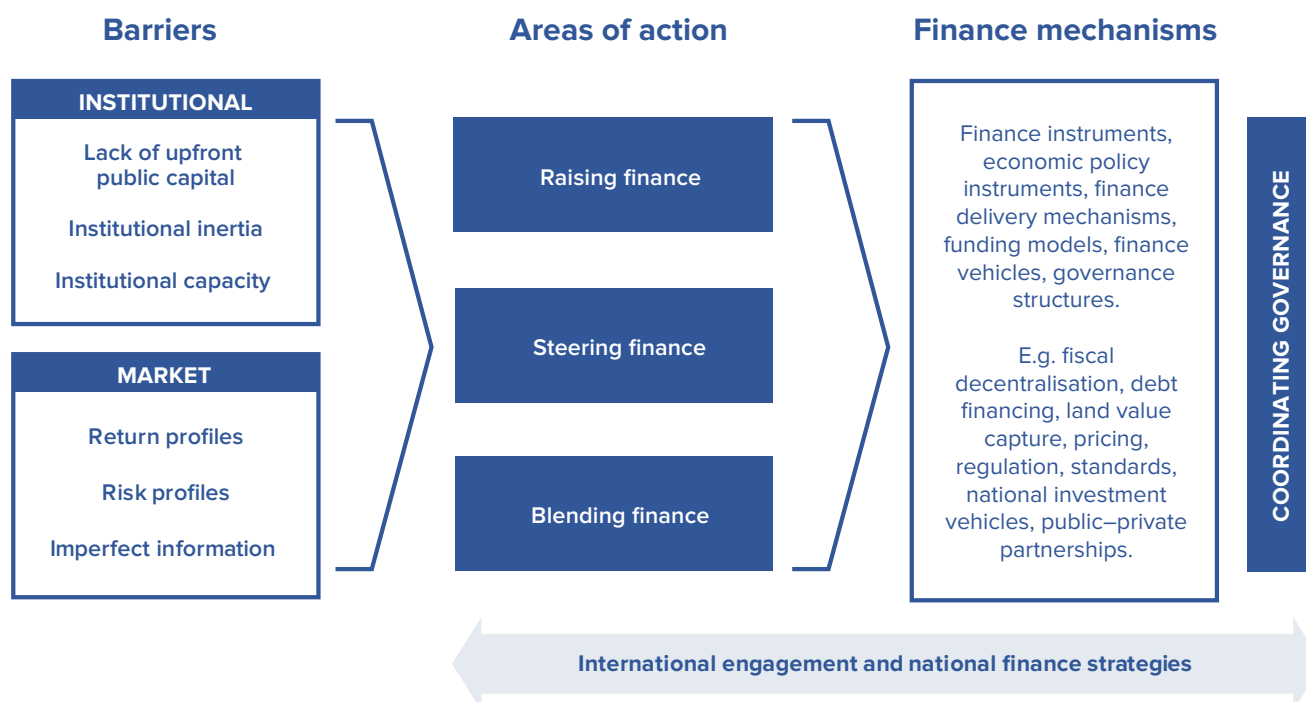
We identified three broad areas of action for national and international policymakers – raising, steering and blending finance:

Raising finance: Funds can be provided by national finance ministries in the form of fiscal transfers or from international financial institutions, such as multilateral development banks. National governments can also support municipal governments to raise finance for investing in urban infrastructure. Examples include increased local revenue-raising powers, such as property taxation, and leveraging private capital through municipal debt financing.

Steering finance: National governments can create enabling conditions to steer private investment into more sustainable urban infrastructure. This can be by shaping the market, for example through tax and other pricing mechanisms. It may also be by regulating investment, for example through zoning ordinances or performance standards; or educating investors about sustainable alternatives, for example through awareness campaigns and labelling systems.

Figure A

Areas of national and international action: raising, steering, and blending finance



Blending finance: National governments can attract private capital finance by using public finances to change risk-return ratios, for example through first loss capital, credit guarantees, and other instruments. Public-private partnerships and national investment vehicles can play an important role in establishing the evidence of, or conditions for, commercial returns.

Seven key finance mechanisms could have significant potential for raising, steering, and blending finance for urban sustainable infrastructure. These finance mechanisms support investment in 3C urban infrastructure, have potential for financing at scale, lie under national government control or influence, and have supporting evidence of previous effectiveness. While these seven finance mechanisms could justifiably be prioritised by central governments, we identified 65 other finance instruments and models, many of which may also be effective in overcoming finance barriers to a 3C urban transition. The relative effectiveness of different mechanisms will depend on country-specific circumstances and, for this reason, any country-level pilots should be open to exploring the full range of potential finance mechanisms.

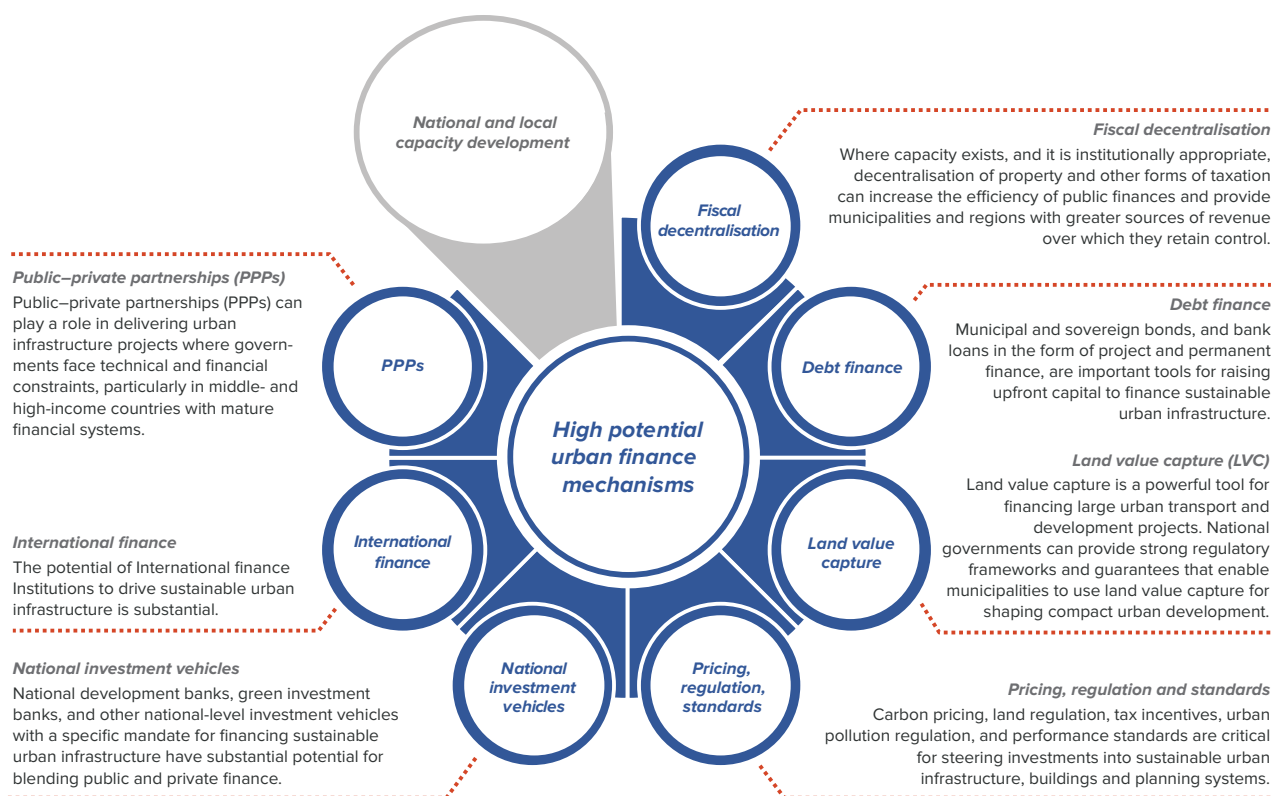
Delivering a better urban finance system

Coordinated national governance is critical to delivering investments in urban infrastructure, and will depend on the levels of economic development and financial maturity of a country and its cities. Low national income levels can limit the pace at which countries can mobilise urban investment, due to both smaller public budgets and the constrained capacity of the national and local institutions tasked with raising, steering, and blending urban finance. National financial maturity constrains the ability of both national and local governments to deploy specific financing mechanisms, or to create the fiscal and policy environment that affects urban investment. It follows that poorer countries with lower levels of financial maturity are less likely to have access to the same range of financing instruments and mechanisms that are available to wealthy nations.

National financial maturity acts as an important determinant of a country's ability to invest in urban infrastructure development at scale. Credit ratings are a useful proxy for

Figure B

Finance mechanisms with potential to raise, steer, and blend finance.



financial maturity, as they are based on diverse factors, including revenue sources, debt levels, and management of public finances. This paper provides evidence of the positive relationship between economic development and national creditworthiness, and on this basis sets out the potential for a national financial maturity framework.

To enhance national financial maturity, central governments will need to employ different sets of policies, institutional reforms, and financing mechanisms at each of these three broad stages of financial maturity:

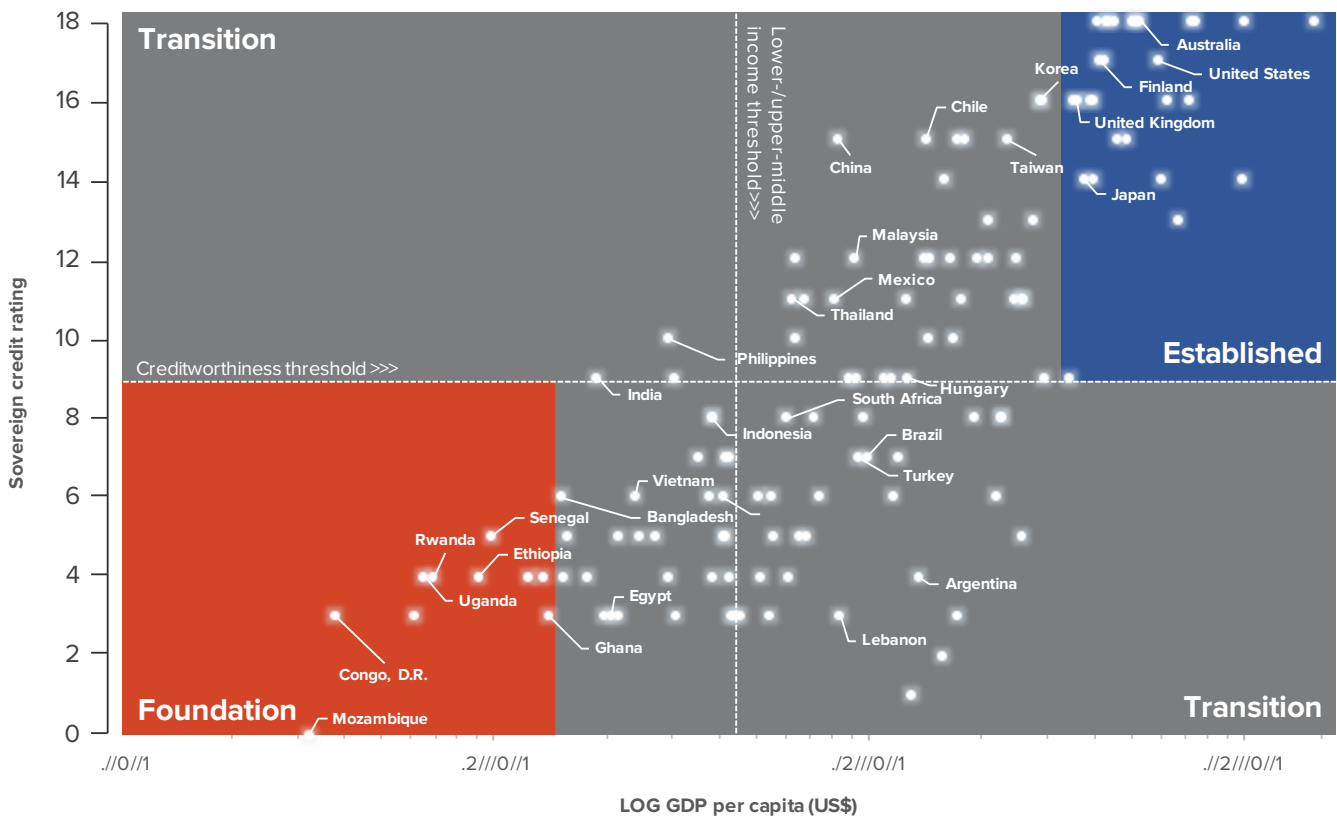
- Foundation:** The most appropriate and relevant actions for governments at the foundation stage are those that build institutional and legal capacity, trust and experience in urban finance. At this stage, important strategies include building sovereign creditworthiness and public revenue-generation capacity, reforming national planning, legal, and regulatory frameworks, and improving the documentation and governance of land markets.
- Transition:** Countries navigating the transition phase must start to introduce more sophisticated instruments to raise, steer, and blend finance for sustainable urban infrastructure. They should evaluate the benefits of land value capture to steer investment towards compact and connected urban forms, while expanding the use of debt finance on the basis of the increased sovereign and municipal creditworthiness and the regulatory and legal certainty built during the foundation stage.
- Established:** Higher-income countries have well-developed institutional capacities and substantial domestic resources, and can therefore deploy a wide range of financial mechanisms. As a result, investment can be more complex and diverse, allowing a range of actors to contribute to sustainable urban development, and where public-private partnerships (PPPs), real estate investment, and advanced forms of value capture hold significant potential.

Figure C illustrates where countries might be situated in terms of their relative financial maturity.

An assessment and planning framework for urban financial maturity could provide a valuable guide for national urban investment reform. Country governments have expressed demand for a framework that they can use with development partners to chart activities and reforms that increase their ability to harness sustainable infrastructure investment. This framework can be an effective strategic planning tool for national policymakers, aiding the navigation of contextually appropriate development of national urban policies, institutions, and financial mechanisms for sustainable urban development and infrastructure provision.

To implement the financial mechanisms and instruments identified, a range of accompanying reform measures are required to progress nations from one financial maturity level to the next. The indicative framework presented below brings together the three phases of maturity with the specific actions that are needed to raise, steer, and blend finance for 3C urban development. Initial testing of these ideas suggests that this form of diagnostic tool could serve as a useful guide and navigation for national governments to plan and implement urban financial reform. Table A shows an indicative progression for financial maturity and how it could be linked to key areas of action.

Figure C
National-level financial maturity



Source: Standard & Poor's global ratings.

Note: The foundation, transition and established stages are defined by three thresholds: the cut-off between investment grade and "junk" credit ratings (BBB-); and the lower and upper bounds of the World Bank middle-income band (US\$1,025 to US\$12,475 GDP per capita).

Table A

The key characteristics of national government urban finance systems at different levels of financial maturity

	FOUNDATION	TRANSITION	ESTABLISHED
Raising	<ul style="list-style-type: none"> • Improve reliability of budgetary planning and processes • Increase own-source revenue generation at the local level • Demonstrate reliable debt servicing • Identify steps to achieving a formal credit rating • Secure and improve sovereign credit rating(s) • Secure accreditation with multilateral climate funds 	<ul style="list-style-type: none"> • Develop municipal borrowing regulatory framework outlining whether cities can borrow and how much, what currencies they can borrow in, the type of collateral that they may pledge to secure borrowing, and events in cases of default • Secure and improve municipal credit rating(s) • Increase and retain larger local revenue share 	<ul style="list-style-type: none"> • Support cities to experiment with diverse debt and equity financing mechanisms • Cities can access diverse sources of finance that are efficient and affordable • Implement environmental taxes on polluting activities • Commit to issuing green or climate municipal bonds to raise finance for sustainable options
Steering	<ul style="list-style-type: none"> • Set clear planning guidelines and regulations such as spatial plans and building codes, coordinated across different scales • Build capacity for more efficient property markets, for example by systematising valuation practices, registration and titling, and introducing transparent transaction registries • Require national investment vehicles to adopt green investment and lending criteria 	<ul style="list-style-type: none"> • Improve land regulation and emerging land market • Develop national land value capture (LVC) regulatory frameworks that outline whether cities can sell and trade development rights, land leasing system and the rules governing rights exchanges • Demonstrate simple LVC instruments in major city transport projects • Create fiscal or regulatory frameworks to promote sustainable investment, such as carbon pricing and mandatory energy performance standards 	<ul style="list-style-type: none"> • LVC standard urban development mechanism, with advanced forms of LVC implemented • Create advanced fiscal or regulatory municipal frameworks to promote sustainable investment, such as congestion pricing and feed-in tariffs • Work with commercial banks, banking regulators, and capital market authorities on voluntary and mandatory practices to green finance systems
Blending	<ul style="list-style-type: none"> • Engage private sector to understand needs and risk appetite • Implement simple, short-term and low-value demonstration projects with private partners • Establish national legal and regulatory framework outlining the ability of cities to enter into PPP transactions, and detailing the appropriate corporate frameworks and oversight processes 	<ul style="list-style-type: none"> • Set up national PPP function supporting local government projects • Support national investment vehicles to tap private finance for pilot or exemplar sustainable urban infrastructure projects • Access credit enhancement, currency, or project risk guarantees 	<ul style="list-style-type: none"> • Develop municipal line ministry PPP capability • Municipal access to capital markets is commonplace • Municipal projects attract competition among lenders to finance project • Support cities to standardise and aggregate small investments (such as energy efficiency and decentralised renewables) through pooled finance mechanisms



Photo credit: Supannika Amaracheewa / Pexels

1. Objectives and methods

This Policymakers' Summary focuses on the role of national governments in mobilising and directing urban finance, with the aim of supporting policymakers and practitioners to think systematically about financing 3C urban development. It builds on a growing body of research that highlights the critical role of central governments in establishing more effective and efficient mechanisms to finance sustainable urban infrastructure. This will be essential to meet the United Nations Sustainable Development Goals.

The main focus of the report is on low- and middle-income countries, where rates of urban population growth and capacity gaps are particularly significant. High-income countries are included to highlight the potential of specific mechanisms and the scope for developing countries to improve their financial maturity.

This research draws on evidence from four main sources: grey literature, expert interviews, databases, and workshops in India, Mexico, and Uganda. The process was overseen by a Finance Working Group, created between September and December 2016, which included experts from a wide range of organisations from the public and private sectors. We completed a literature review of over 50 reports, papers, and articles, using key word searches, references in bibliographies of other key works, and publications recommended by the Coalition for Urban Transitions and the Finance Working Group. This was supplemented with evidence from LSE's databases, including information on credit ratings at national and city levels, urban populations and urban carbon emissions.

This **Policymakers' Summary** presents the high-level findings from **three sets of supporting papers**:

1. ***Global Review of Finance for Sustainable Urban Infrastructure***: The review builds on a growing body of research that highlights both the importance of national sustainable infrastructure and the need to develop more effective and efficient financing mechanisms for delivering compact, connected cities. It focuses specifically on the role of national governments and the international community in unlocking, directing, and facilitating finance flows that can deliver sustainable urban infrastructure.
2. ***Detailed instrument inventories on debt financing, land value capture, and public-private partnerships***: These inventories include details of financing sources for these instruments, the role of national and city governments, and how the inventories can be designed and deployed to provide better urban finance.
3. ***Case studies in Mexico, India, and Uganda***: These provided the opportunity to engage directly with national finance ministry officials, other government officials, and a range of other public and private stakeholders. This enabled us to test our evidence against experience in low- and middle-income countries, and provide rich examples of the challenges faced by countries with different levels of income and financial maturity. These case studies are separately available. Each one outlines the urban governance landscape, with a particular focus on financial and fiscal powers, and highlights specific opportunities to increase the financial maturity of the central and city governments.



Photo credit: Juhasz Imre/Pexels

2. The challenge of financing the urban transition

2.1 The 3C model of urbanisation

Urbanisation is one of the most important potential drivers of productivity and growth in the global economy. Changes in the global urban population suggest that, by 2050, cities will be home to two-thirds of the world's inhabitants. China's urban population alone is expected to be nearly 1 billion by 2030. Large, fast-growing economies, such as India, Nigeria, and Indonesia, will also experience rapid urban population growth.² Well-managed urban growth can potentially bring substantial economic and human development benefits. The economic potential of cities is a result of the productivity gains realised through the concentration of people and economic activities. This in turn creates deep and vibrant markets and a fertile environment for innovation in **ideas, technologies, and processes.**

However, evidence suggests that governance and market failures limit these potential economic benefits, and impact negatively on the environment and on the quality of life of urban citizens. Poorly managed urban growth and associated infrastructure deployment leads to a number of market failures, which can hinder productivity and overall economic growth. Among these market failures are urban sprawl, congestion

and longer travel times, negative externalities of pollution and carbon emissions, inadequate housing and overcrowding, and sub-optimal agglomeration effects on innovation and skills matching.³ Without intervention, these market failures impose significant health and productivity costs on urban citizens.

The urban infrastructure that countries and cities construct today will lock in economic and climate benefits – or costs – for decades to come. Urban infrastructure encompasses the physical and organisational structures or facilities that fall within the boundaries of an urban area, or are designed to meet the needs of city dwellers and industry. This includes buildings, electricity grids, sewers, telecommunications, transport networks, waste disposal, and water supply. The service life of these urban infrastructure systems typically ranges from 30 to 100 years. These long-life assets create urban form and function path dependencies sustained over centuries. Many of the variances in energy consumption and greenhouse gas (GHG) emission rates of cities with similar levels of wealth and climate conditions can be attributed to past policy decisions that have shaped their urban form, transport systems, and building energy efficiencies.

Over the next decades, avoiding negative lock-in will be particularly important for fast-growing cities in emerging economies, which are making the largest investments in urban infrastructure. For example, 70–80% of the urban infrastructure that will exist in India in

2050 has yet to be built.⁴ If left unmanaged, trends in fast-growing cities that favour urban sprawl will lock in long-term economic, climate, and social costs. A global study of 50 cities estimated that almost 60% of growth in expected energy consumption is directly related to urban sprawl – a figure that exceeds energy use increases related to higher GDP and demographic changes.⁵ Globally, cumulative welfare losses attributed to exposure to ambient and household air pollution resulting from building, energy, transport, and land-use factors reached US\$5.1 trillion in 2013. The impact of this is felt most acutely in emerging economies: losses in South Asia and East Asia and the Pacific were equivalent to 7.4% and 7.5% of regional GDP.⁶

In order to capture the productivity benefits of urban growth while minimising the costs, cities will need to shift to a more economically and environmentally sustainable growth pattern.

In particular, the management of urban population and economic growth will need to avoid inefficiencies in urban form and infrastructures, and favour systems that use critical natural resources (such as water) in a sustainable way, produce minimal GHG emissions, and conserve or enhance ecosystem function.

Addressing the market failures that result from poorly managed urban growth will require a new urban development model for many cities.

For this, three pillars are crucial: compact urban growth, connected infrastructure, and coordinated governance – the 3C model of urban development. These 3C pillars can drive cost and resource efficiencies through the benefits of scale economies and agglomeration, energy efficiency, environmental protection, resilience, productivity, and sustainable urban economic growth.⁷

The three pillars of the 3C model of urban development are overlapping and mutually reinforcing:

- **Compact urban growth:** through managed growth and/or urban retrofitting that encourages higher densities, contiguous development, functionally and socially mixed neighbourhoods, walkable and human-scale local urban environments, brownfield site redevelopment, and green space provision.
- **Connected infrastructure:** through investment in innovative urban infrastructure and technology such as bus rapid transit (BRT), cycle superhighways, electric vehicles, smart grids, energy efficient buildings, and essential water, sanitation, and waste services.

- **Coordinated governance:** through effective and accountable institutions to support the coordinated planning and implementation of activities and investment across the public and private sectors.

A range of investments in 3C urban development across multiple sectors is required, much of which will need to be implemented with new business models and urban financing mechanisms.

2.2 Infrastructure: a widening deficit in global investment

Delivering the 3C model of urbanisation will require substantial additional investments in sustainable urban infrastructure. The Paris Climate Change Accord, the UN Sustainable Development Goals, the Habitat III New Urban Agenda, and the Sendai Framework for Disaster Risk Reduction have all underscored the need for a more strategic approach to investing in public infrastructure that leverages private and institutional capital more effectively.

However, even financing business-as-usual urban infrastructure is a huge global challenge.

In an early study, the OECD suggested that around US\$50 trillion would be required for investment in global infrastructure over a 15-year period. This included investments in road, rail, and basic energy and water infrastructure, much of this in cities.⁸ In another study, the annual investment required has been estimated at US\$4 trillion a year in 2015 rising to US\$9 trillion a year by 2025, with total demand reaching US\$78 trillion over the 10-year period.⁹

Under current projections, many cities will not be able to raise the finance required to meet this demand for infrastructure. According to a range of estimates, the deficit in investment for global infrastructure is growing by more than US\$1 trillion annually. This investment gap is particularly acute in low- and middle-income countries due to their fiscal constraints and higher rates of population and economic growth.¹⁰ Recent estimates put the gap in financing needs of developing countries between US\$1.2 trillion and US\$2.3 trillion per year – around 3% of developing country GDP.¹¹ If operation and maintenance costs are included, then these estimates could be doubled.

If this infrastructure gap is not closed, up to 2 billion urban dwellers will face living in informal settlements by 2030. Without basic sanitation, clean drinking water, energy provision, waste collection, shelter, public transport systems,

and job opportunities, their living standards and quality of life will be inhibited.

Some research suggests that delivering sustainable infrastructure would require additional investment. The World Economic Forum projects that an additional US\$0.7 trillion per year would be needed to move from the business-as-usual economy to green growth.¹² This reflects the higher capital costs, technological substitution, and technical risks associated with many sustainable infrastructure options.¹³

However, moving to a 3C urban infrastructure model could result in higher savings and lower long-term costs. One analysis estimated that low-carbon cities could generate a stream of savings equivalent to US\$16.6 trillion by 2050.¹⁴ Compact urban development tends to require less construction material and leads to more efficient operations than sprawling development. If pursued in the United States, compact development could yield more than US\$100 billion in avoided public costs for infrastructure and service delivery.¹⁵ Estimates show that China could save up to US\$1.4 trillion in infrastructure spending – equivalent to 15% of China’s GDP in 2013 – if it pursued a more compact, transit-oriented urban model.¹⁶ Potential changes in technology and infrastructure service delivery models (e.g. shared mobility and autonomous vehicles and distributed energy generation) may result in decentralised infrastructure investments that can be privately funded.

2.3 Major barriers to urban infrastructure investment

The global deficit of investment into sustainable urban infrastructure is the result of direct market failures, institutional failures, and price distortions in the wider economy. Addressing wider price distortions is not within the scope of this study, but it represents an area of necessary policy intervention for shifting investment into more sustainable infrastructure. Putting a price on carbon and implementing regulatory programmes to incentivise the transition to a low-carbon economy provides the impetus for direct responses to market and institutional failures that relate to urban infrastructure.

In addition to market failures in the wider economy, six broad barriers are contributing directly to the investment gap in sustainable urban infrastructure. Some of these barriers are commonly faced by all investors and funders, while other barriers are more specific (see also Table 1). The barriers identified include:

1. **Lack of upfront public capital.** Government lacks the upfront capital to fund its investment priorities.
2. **Institutional inertia.** The difficulty of changing investment patterns due to institutional, governance, and contractual/financial features present in the market.
3. **Institutional capacity.** National, regional, and municipal governments cannot initiate projects or act as bankable counterparties due to legal, regulatory, technical, and skills limitations.
4. **Risk.** Investors perceive a significant risk of losing their investment due to a variety of risk factors.
5. **Low returns.** Investors forecast that an investment will generate insufficient returns, for example through debt repayments, asset appreciation, or other income streams, relative to other sectors and asset classes.
6. **Imperfect information.** Investors possess insufficient information on the opportunities that exist, and how worthwhile an opportunity may be.

A large proportion of finance for 3C urban development will require public funds, as the direct returns on investment are insufficient to offset capital costs. This is particularly the case for low- and middle-income countries where consumer incomes may be too low to recover operational costs, let alone capital investments. Furthermore, in many countries where there is a lack of clarity and stability in the legal and regulatory environment for infrastructure investment, the threshold returns for private investors are raised even higher.

However, political and economic uncertainty, along with increased fragility and conflict, continue to have a major impact on government revenues, infrastructure spending, and investor risk perceptions. For example, in many high-income countries, low economic growth, austerity policies, and ageing populations have contributed to national government spending constraints across all sectors. In many low- to middle-income countries, political unrest, party differences between levels of government, conflicts, trade sanctions, and endemic corruption have all been factors in ineffective intergovernmental transfers that reduce investor confidence. While addressing these barriers is not within this report’s scope, infrastructure investment needs to be understood within this context.



Photo credit: Flo Maderebner/Pexels

3. Areas of national and international action

3.1 Potential sources of urban finance

A range of sources of public and private finance will be required to deliver sustainable urban infrastructure. The scale of the global infrastructure investment gap over the next two decades will challenge governments to find ways to access additional finance needed to deliver the required level of sustainable urban infrastructure. Some municipal governments can draw on funds to finance large infrastructure projects, but even cities with relatively large own-sources of funding will generally require additional finance.

The average level of government infrastructure investment is about 3% of global GDP.¹⁷

Governments have traditionally financed a significant proportion of infrastructure investments through their revenue-raising and budgetary powers. Where revenue and budget powers remain largely centralised (i.e. at the national rather than local level), intergovernmental transfers may be the prime source of finance for local infrastructure.

Many municipal governments are well placed to lead and manage urban infrastructure programmes, though they often have limited powers and institutional capacity to raise finance. Only 42% of countries are recorded as devolving fiscal or legislative powers to subnational

governments, and of these the depth of revenue-raising powers is highly variable.¹⁸ Only 16% of countries sampled were found to grant significant taxation autonomy to their local governments, and 56% of countries forbid any kind of borrowing by local governments. Just 22 countries allow borrowing without any restrictions.¹⁹ While in specific cases these restrictions may be an effective – even necessary – means of maintaining budget discipline, it highlights the challenge that municipal and regional governments face when financing urban infrastructure programmes.

Even in high-income countries, municipal debt financing has not been a panacea to infrastructure investment needs. Many cities have accumulated substantial debts through bond issuances and private loans with the result that ongoing debt repayments prevent investments in future projects. In some extreme cases, cities in the United States, such as Detroit (Michigan), San Bernardino (California), Hillview (Kentucky), and Central Falls (Rhode Island), have filed for bankruptcy.¹⁹ Similarly, some experts interviewed have argued that many of China's cities may become over-leveraged as state banks are obliged to purchase municipal bonds without sufficient own-resources for payback. For these reasons, debt financing should only be considered as one part of a sound financial management approach.

National ministries can play a role by providing more effective fiscal transfers and setting up national development banks (NDBs). NDBs are government-backed, government-sponsored, or

government-supported financial institutions. They have specific public policy mandates, which they support through their capacity to, for example, extend credit on favourable terms or take long-term equity stakes. They tend to be early-stage investors, tolerating more risk than private financiers, and are particularly effective in providing long-term financing in local currency in their local credit markets. In this way, they can play a key role in developing domestic experience and capacities in financing and delivering sustainable infrastructure.

In many cases, domestic public finance will remain insufficient to wholly finance the infrastructure needed across a country's cities. This is particularly the case in low- to middle-income countries. Consequently, the involvement of international public funds and private finance will be required to close the global investment gap.

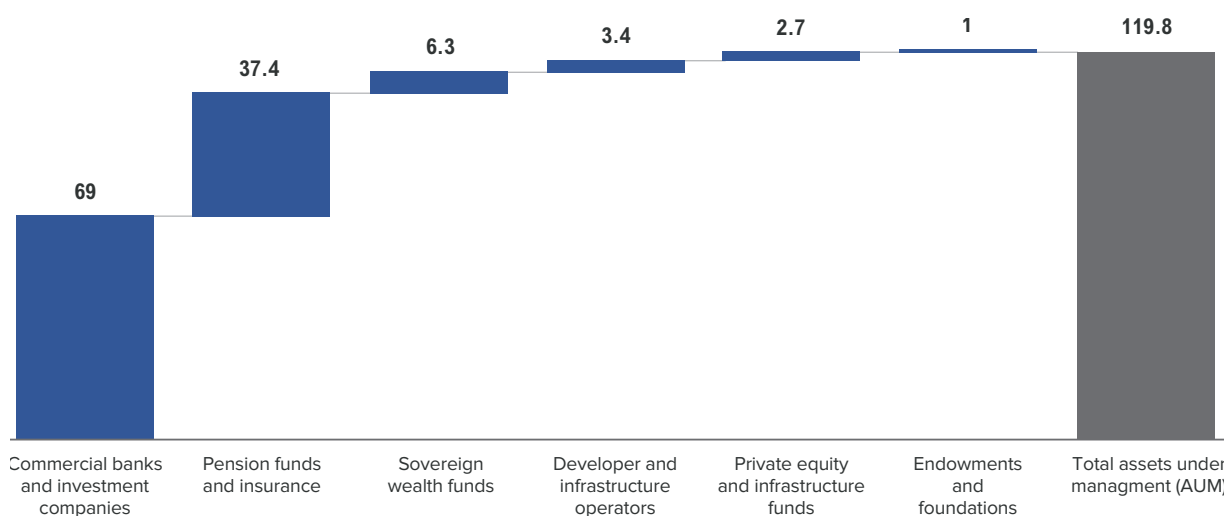
Multilateral development banks (MDBs) and bilateral donor funds are important sources of infrastructure capital but tend to have small or narrowly focused urban portfolios. MDBs can provide a unique range of project preparation technical assistance, direct investments, wholesale capital, and credit guarantees. However, most MDBs do not focus on urban areas or subnational governments; instead, they typically lend to national governments for trunk infrastructure, which may not be aligned with local urban plans. Finance commitments for sustainable urban infrastructure can also be hindered by risk aversion, low leverage ratios, a lack of eligible

counterparties to finance agreement, and internal capacity limitation.

Climate finance, such as the Green Climate Fund (GCF) and Clean Development Mechanism (CDM), does not strongly target 3C urban infrastructure, and the transaction costs of accessing the sources can be high. Challenges such as the effective structuring of carbon markets and difficulties translating donor pledges to well-capitalised funds has resulted in limited impact from these sources. The Programme of Activities structure for CDM projects, designed to reduce transaction costs for small projects, has had limited success due to information barriers. The multilateral Climate Investment Funds struggled to attract private capital and, although the GCF is still in its early stages, some studies suggest that funding approvals to date have not fulfilled the fund's objectives for transformational impact and leveraging private sector participation at scale.

Substantial sources of private and institutional finance exist that could be directed into financing sustainable infrastructure in cities. Nearly US\$120 trillion of assets are currently under management by a range of commercial and institutional investors (Figure 1). The majority of assets are managed by commercial banks and investment companies (representing 57.6%), with pension funds, insurance, and sovereign wealth funds (which often tend to have a longer-term investment horizon) representing a further 36.5%.²¹

Figure 1
Comparison of assets under management of private and institutional investors in 2015 (US\$ trillions).



Source: McKinsey, 2016; based on data from Prequin, 2015.

Bankability and creditworthiness are prerequisites to attracting private finance into sustainable urban infrastructure. Private investors will be drawn to public infrastructure investments where a sufficient return on investment is forecast, based on project income flows or low-risk government debt repayments based on other fiscal revenues. A range of finance instruments and mechanisms are available to suit either case, with different instruments being attractive to different types of investor. Unpacking the constituent elements within these pools of public, private and institutional capital is important, given the differing factors such as risk-return expectations and investment horizons of various investor groups.

Public capital sources and private investor profiles will suit different types and life-cycle stages of public infrastructure projects, and the largest capital pool in terms of assets under management may not necessarily be the most promising source of finance. For example, private equity and infrastructure funds seek the greatest return and will make equity investments in projects with strong growth potential. These funds are often willing to invest in relatively new or unproven markets and technologies. In contrast, pension funds and insurance companies search for investments that provide predictable income streams to meet long-term obligations such as pensions or insurance claims. A deeper understanding of how the available finance sources can suit various project stages, market and governance conditions and investor appetites can create better targeting between investment need and capital resource. Impact investors have diverse financial return expectations but could represent untapped sources of finance with more flexible risk appetites and at a lower cost of capital.

Commercial banks operating in tightening regulatory environments (e.g. Basel III) are disincentivised from long-term financing in urban infrastructure due to increasing capital reserve requirements. In the wake of the global financial crisis in 2008, commercial banks are required to maintain increased liquidity in order to meet short-term customer obligations, whereas investments are long term and relatively illiquid. This mismatch is especially pronounced in countries with shallow capital raising and / or secondary markets. In addition, commercial banks with project finance expertise are often more heavily vested than other institutional investors in the higher-risk project stages – construction and early operations.²² This may explain

lending caps in countries such as India which limit exposure to any one sector at 15% of total net worth, in spite of the huge infrastructure financing gap in the country.²³

Developers and infrastructure operators are increasingly taking revenue growth opportunities in low-risk asset operation services, rather than investing in new infrastructure projects. Companies expand into services that span the whole infrastructure cycle to take advantages of synergies between different activities. The slowdown in OECD economies generally and public infrastructure spending specifically has necessitated a shift to seeking projects in emerging markets. With limited projects that meet investor risk-return criteria, infrastructure developers are generating increasing revenue shares from existing business.

While private equity firms are more risk tolerant than many institutional investors, the returns on typical public infrastructure projects are often too low. Private equity investment return target rates are relatively high to offset the higher risk that investors are willing to take. Lack of local familiarity is also a major barrier for private equity investors who tend to prefer projects that they can thoroughly assess for risk.

Pension funds, sovereign wealth funds (SWFs) and insurance funds share long-term investment horizons, but have different risk appetites and liquidity requirements. While pension funds favour lower-risk investments, liquidity mandates reduce the incentive to invest in infrastructure projects. The transaction costs of investing in fragmented projects are also a major barrier. Asset allocation to infrastructure generally is very low within these institutions' overall portfolios, and some funds lack the mandate to invest in the class altogether, or are only permitted to invest in listed infrastructure funds (e.g. Norway's Pension Fund Global). Most have limited expertise and capacity for infrastructure project acquisition, deal structuring, and investment management. SWFs are not constrained by liquidity requirements and are well capitalised, but may be prohibited from investing in infrastructure. Many can apply an investment focus in support of policy objectives, similar to national development banks. Their focus on large-scale investments can limit their interest in certain fragmented markets, such as distributed utilities and energy efficiency.

Table 1

Potential sources of sustainable urban finance, and barriers faced by public, private, and institutional investors

Finance source	KEY BARRIERS					
	Lack of upfront public capital	Institutional inertia	Institutional capacity	Risk	Low returns	Imperfect information
National public finance	National government	For example, low growth, reduced tax receipts	For example, regulations block new service delivery models	For example, lack of financial management expertise		
	National development banks	For example, limited capital-raising ability	For example, existing NDBs favour investments in Business-as-usual sectors	For example, specialised institutions (e.g. Green Banks) require new skills		
International public finance	Multilateral development banks		For example, internal rules on low leverage ratios, low risk tolerances	For example, limited host government capacity to structure investment		
	Climate finance (e.g. Green Climate Fund)	For example, mismatch between donor pledges and funding committed		For example, lack of technical expertise in low-carbon technologies		For example, difficult to measure additionality, performance requirements
Private finance	Commercial banks and investment companies		For example, national lending caps on banks for infrastructure financing (e.g. in India)	For example, lack of experience with project finance and municipal bond issues	For example, political risks and regulatory changes that impact income flows leading to non-performing loans	For example, high capital requirements constrain long-term investments (e.g. Basel III)
	Developers and infrastructure operators		For example, better profit-making opportunities in servicing existing assets than new asset development		For example, local currency variability in project income against foreign currency denominated debt	For example, high local market interest rates make projects unattractive
	Private equity and infrastructure funds		For example, investors lack trusted relationships with partners and counterparties in 3C infrastructure		For example, risk that government guarantees could be reversed	For example, private equity hurdle rates unsuited to infrastructure investments
						For example, lack of familiarity with operating partners in emerging markets
						For example, lack of information on value potential of new technologies

		KEY BARRIERS				
Finance source	Lack of upfront public capital	Institutional inertia	Institutional capacity	Risk	Low returns	Imperfect information
Institutional finance	Pension funds and insurance	For example, appetite for very large investments may miss smaller urban-scale opportunities			For example, liquidity requirements limit long-term investments (e.g. Solvency II)	For example, lack of knowledge in infrastructure
	Sovereign wealth funds	For example, fund prohibitions from investing in infrastructure		For example, uncertainty with asset performance in new technology	For example, numerous small projects mismatched with large capex strategy	For example, no clear partner strategy in unfamiliar emerging markets

3.2 Raising, steering, and blending urban finance

To address the major barriers to urban finance, we have identified three broad areas of action:

1. **Raising finance:** Funds can be provided by national finance ministries in the form of fiscal transfers or from international financial institutions such as multilateral development banks. National governments can also raise finance from development agencies or the private sector for investing in urban infrastructure, or support municipal authorities to do so. Possible mechanisms include property taxation and debt financing.
2. **Steering finance:** National governments can create enabling conditions to steer private investment into more sustainable urban infrastructure. This can be by shaping the market, for example through tax and other pricing mechanisms. It may also be by

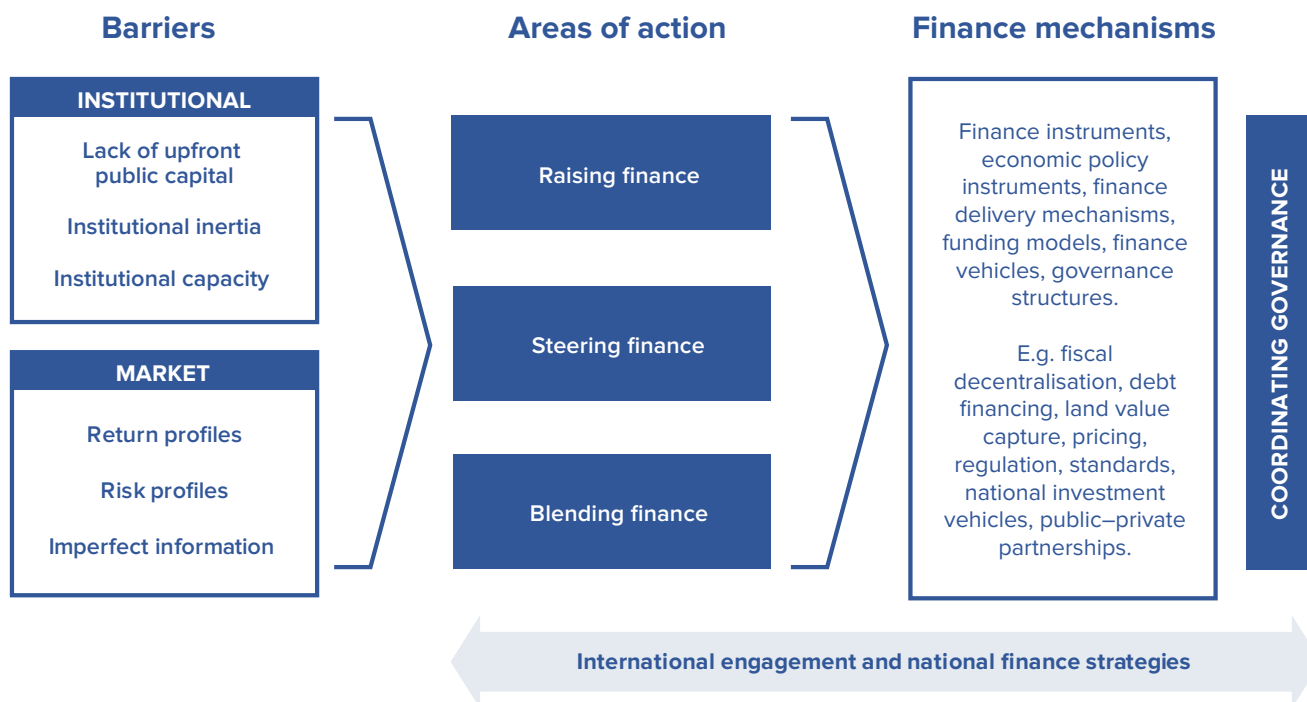
regulating investment, for example through zoning ordinances or performance standards; or educating investors about sustainable alternatives, for example through awareness campaigns and labelling systems.

3. **Blending finance:** National governments and relevant international bodies can attract private capital finance by using public finances to change risk-return ratios, for example through first loss capital, credit guarantees, and other instruments.

Delivering on these three areas of action will require national strategies that support urban infrastructure investment, as well as deployment of a range of national finance instruments and mechanisms to deliver 3C infrastructure both directly and through support to municipalities (see Figure 2). The following sections explore these strategies and mechanisms in more detail.

Figure 2

Areas of national and international action: raising, steering, and blending finance



3.3 National strategies: frameworks for supporting the urban transition

Investment flows can be greatly enhanced where national authorities clearly articulate their development strategies for sustainable urban infrastructure. Yet very few governments, developed and developing, have well-articulated strategies and investment plans for financing sustainable infrastructure in urban development, transport, and energy. Such strategies include better energy pricing, the phasing out of fossil fuel subsidies, and greater regulatory stability.²⁴ The mechanism for producing Nationally Determined Contributions (NDCs) agreed at COP21 in Paris should give more emphasis and weight to national and regional low-carbon infrastructure policy and planning, and may prove central to understanding investment needs and structuring the opportunity for investors.

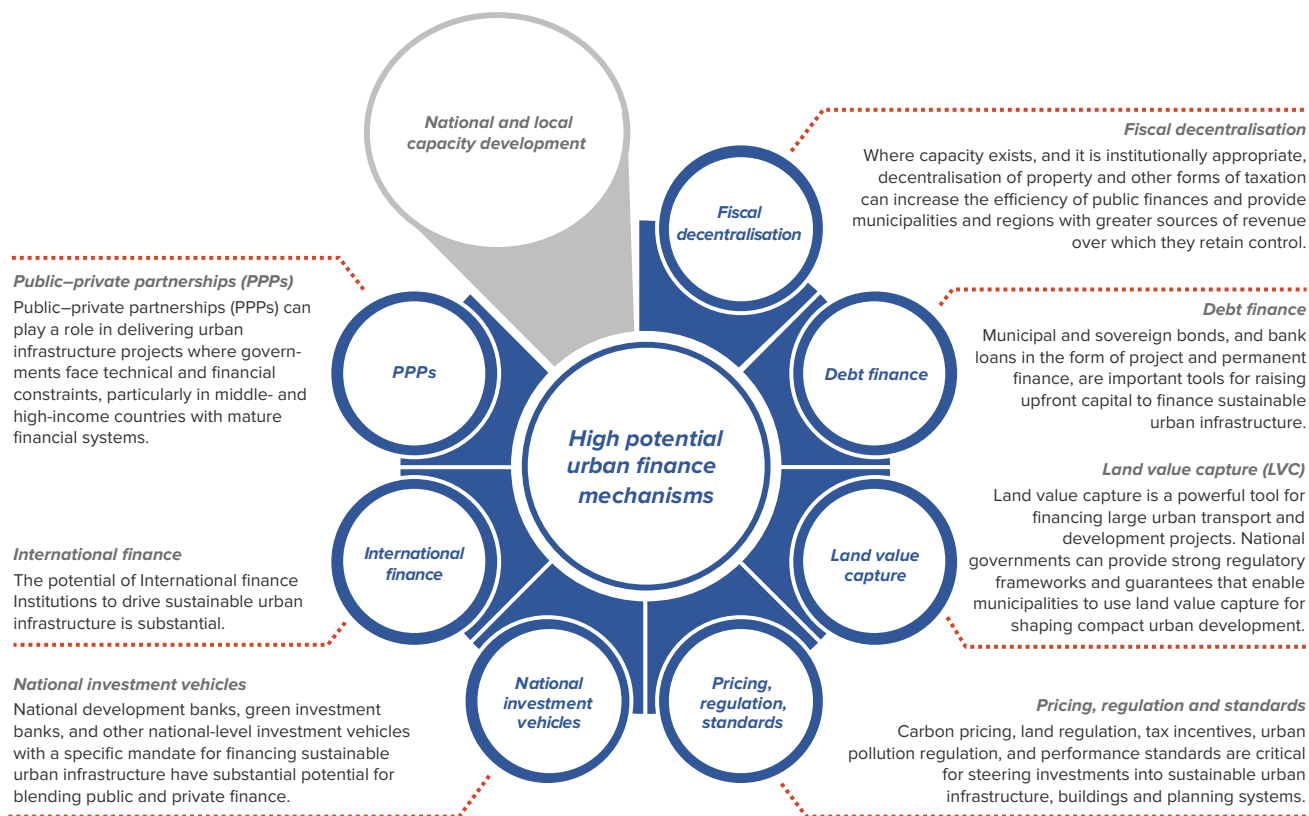
National governments play a strong enabling role in setting market conditions that draw in private sector capital to sustainable infrastructure programmes. Direct government investment can provide a foundation that

demonstrates long-term commitment, builds skills, and provides performance and viability evidence needed to steer towards green growth. But facilitating entry of the far-greater private capital sources requires a mix of non-financial actions beyond direct investment, such as enacting supportive policies, standards, and regulations, providing pricing signals, and improving information flows. Examples include limitations on floor space and building heights, green procurement policies and contracts, congestion charging, energy efficiency standards, and incentives for low-carbon vehicles. With an effective mix of financial and non-financial policy instruments, investment in 3C infrastructure becomes more credible in the long term.

Central banks and financial regulators can make information more accessible and relevant for investors, and use national banking regulations and guidelines to drive sustainable finance. Banks and other lenders/ investors could also be advised or compelled to match environmental standards or certifications to loans originated and/or held in portfolio. Proponents suggest that this would: create better market

Figure 3

Urban finance mechanisms with high potential to raise, steer, and blend finance



transparency on the flows of finance to energy efficient assets and products; provide valuable information on the portfolios of energy efficient loans that could be packaged as asset-backed securities into green bonds; and provide the basis for evaluating the financial performance of energy efficient loans relative to their inefficient alternatives. Several national or subnational governments have mandated building-level energy performance reporting. For example, a regulatory requirement obliges Bangladesh commercial banks to invest a proportion of their lending to “greener projects”, which is supported by financial incentives such as low-cost wholesale loans to help move banks towards new markets. The China Banking Regulatory Commission and the Ministry of Environment and Pollution are implementing a Green Credit Policy and Guidelines to incentivise banks to provide finance for green-related projects, as well as creating disincentives for investment in environmentally polluting projects.²⁵

3.4 Prioritising finance mechanisms with high potential

Alongside national strategies for a comprehensive transition to a green economy, our analysis of the literature highlighted 72 major finance instruments and funding models that have been used or could potentially be used for investing in urban infrastructure projects and programmes. Of these instruments and models, 51 (71%) were found to be public finance or policy instruments, while 21 (29%) were private finance instruments. This reflects the continued importance of public finances and government policy frameworks for delivering urban sustainable infrastructure.

Seven key finance mechanisms could have significant potential for raising, steering, and blending finance for urban sustainable infrastructure. These are presented in Figure 3.

These finance mechanisms can support investment in 3C urban infrastructure, have potential for financing at scale, lie under national government control or influence, and have supporting evidence of previous effectiveness. While these seven finance mechanisms could be a priority for central and city governments, many of the other 72 finance instruments and models are also likely to be effective in overcoming finance barriers to a 3C urban transition. The relative effectiveness of different mechanisms will depend on country-specific circumstances and, for this reason, any country-level pilots should be open to exploring the full range of potential finance mechanisms.

The potential of the seven promising finance mechanisms is explored in the following three sections. Detailed analyses of three of these mechanisms – debt financing, land value capture and public-private partnerships – are available as separate resources.²⁶

Fiscal decentralisation of property taxation and other forms of revenue generation provides municipalities and regions with greater sources of revenue over which they retain control. By linking local revenue generation and allocation, decentralisation enhances accountability and efficiency. At the same time, decentralisation requires substantial capacity at the local level and political will at the national level.²⁷ In the absence of fiscal decentralisation, and during transitional periods of devolution, national governments could use earmarked fiscal transfers to target the provision of sustainable urban infrastructure in primary and secondary urban centres.

Debt financing via municipal bonds and bank loans is an important tool for raising upfront capital to finance sustainable urban infrastructure. In most countries, bank lending tends to predominate early in a city's financial development with bond transactions emerging later (although bank lending will likely persist to cater to different elements of the market). This trend is explained by the generally lower transaction costs and complexity associated with bank lending compared with bonds. As a prerequisite to debt financing, cities need sufficient sources of finance for making repayments along with capacity for budgetary, accounting, and financial management. In the absence of fiscal decentralisation or as a complement to municipal debt financing, creditworthy national governments can collaborate with cities to identify investment priorities and structure national bond issues to support them, or to support and guarantee the creation of municipal financing pools. Labelling and standards can ensure that debt finance is used for

green investments, which are typically cost-effective for the issuer.²⁸

Land value capture (LVC) is a powerful tool for funding large urban transport and development projects. Improvements in transport infrastructure lead to increased land and property values nearby. This uplift in value can be used as a source of revenue. At the same time, LVC can be used to drive more compact urban development.²⁹ National governments can provide strong regulatory frameworks and guarantees that enable municipalities to capture land value uplifts for shaping compact urban development, especially around transit-oriented developments. National governments can also incentivise municipalities to assess and implement LVC under best practice guidance as a condition of allocating national funds to part-finance infrastructure projects. Furthermore, they can be active participants in urban infrastructure and property development in cases where land is controlled by national entities.

Pricing, regulation, and standards on negative externalities, such as pollution, congestion, and overcrowding, is critical for steering investments into sustainable urban infrastructure. Pricing of GHG emissions and other pollutants is most often used as a national-level instrument, although the use of carbon pricing is increasing at city and regional state levels.³⁰ Regulation, such as building codes and mandatory performance standards, may be deployed at any level. At the same time, leakage and unintended behaviours from poorly planned price signals need to be minimised. The delivery of sustainable urban infrastructure at scale also requires regulations and standards that steer private finance into new markets and infrastructure programmes. National regulation is particularly important for incentivising investments in resource-efficient buildings, solar, and other forms of distributed utilities.

National investment vehicles, such as NDBs, green investment banks and other national-level investment vehicles, have substantial potential for blending domestic public finance with international development assistance and private finance. National vehicles can reduce policy risk for investors, leverage private finance, and provide longer-term investment horizons. National investment vehicles can provide leadership for developing and deepening national equity and debt markets while setting strong, long-term market signals for attracting and allocating capital for sustainable infrastructure. They can also have a specific mandate for financing sustainable urban infrastructure, providing early-stage market

support to technologies or local evidence related to asset performance and costs–benefits. This can crowd in private finance.

International finance facilities also have substantial potential to drive sustainable urban infrastructure development, blending different sources of finance particularly when national investment vehicles do not exist or have limited capacity. Established MDBs and bilateral overseas development assistance already play a critical investment role in low- and middle-income countries, while the Asia Infrastructure Investment Bank (AIIB), the BRICS New Development Bank, and multilateral climate funds are increasingly a source of infrastructure finance in emerging economies. Many of these institutions have committed to mainstream sustainability considerations into their investment portfolios. On the other hand, many have small urban portfolios: one study suggests that just over 1 in every US\$10 of climate finance is spent on explicitly urban projects.³¹ The annual infrastructure lending of MDBs may need to increase fivefold over the next decade, from around US\$30–40 billion to over US\$200 billion.³²

Public–private partnerships (PPPs) are contracts that allocate risks between public and private entities, and often play a role where governments face technical and financial constraints.³³ PPPs are particularly important in middle- and high-income countries with mature financial systems, as the effectiveness of PPPs depends heavily on appropriate project identification, structuring, contractual arrangements, and government capacity. There are many forms of PPP, but their potential is typically limited to projects that involve commercial returns on revenue-generating assets. Energy and road infrastructure projects have attracted the vast majority of global PPP finance, given energy market rules (allowance for private/merchant generators) and income streams (tolling) of these assets.³⁴

All of these seven mechanisms have the potential for raising finance, while two could support steering finance and five could be used for blending finance (Figure 4). In all cases, central and local governments could introduce additional criteria or regulation to ensure that additional resources are effectively directed into more sustainable urban forms and infrastructure options.

Figure 4
High potential urban finance mechanisms 72 financing instruments and funding models

High Potential Urban Finance Mechanisms		Raising	Steering	Blending
72 Financing Instruments and Funding Models	Fiscal decentralisation			
	Debt financing			
	Land value capture			
	Pricing, regulation and standards			
	National investment vehicles			
	International finance vehicles			
	Public–private partnerships			



Photo credit: Deven Dadbhawal/Flickr

4. Coordinating governance: a financial maturity framework

4.1 The importance of financial maturity

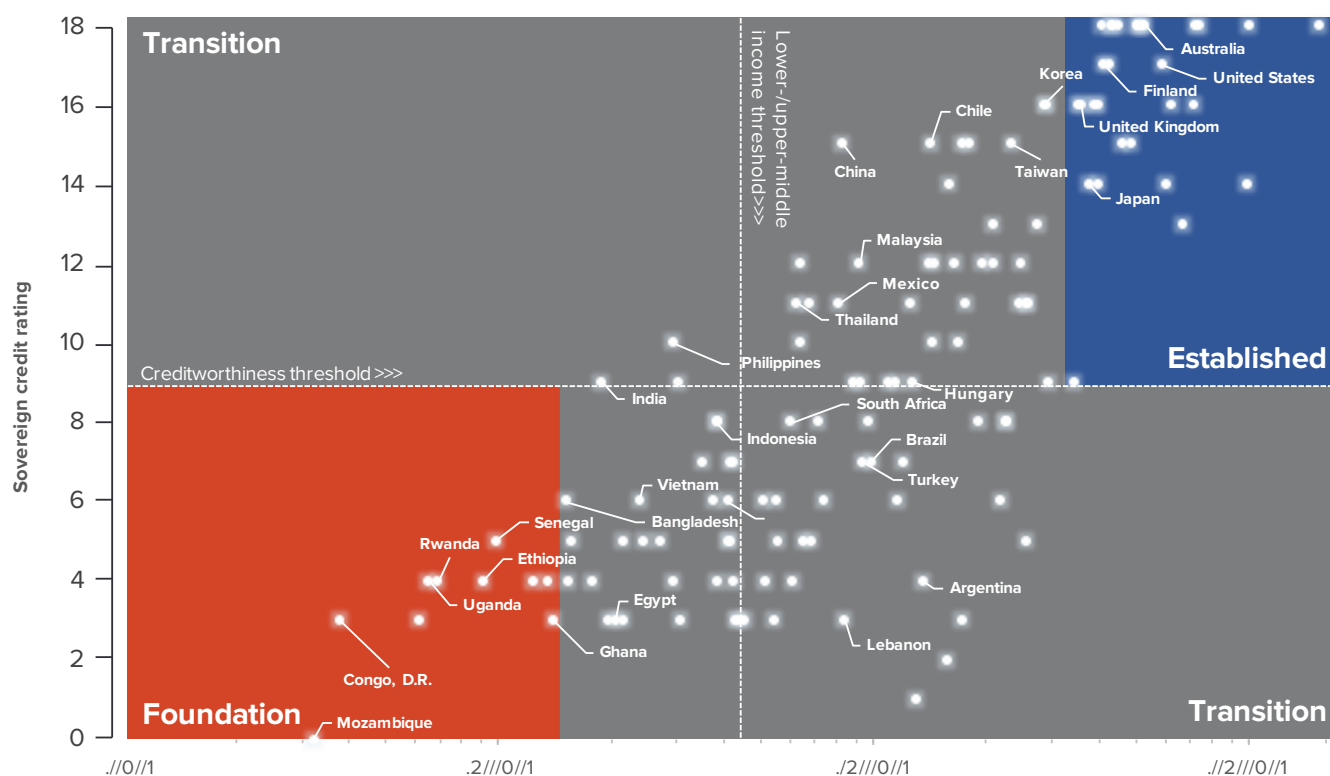
National financial maturity is an important determinant of a country's readiness to invest in urban infrastructure development at scale. Countries at different levels of development and financial maturity face different financing challenges.

High-income countries are likely to have access to a range of financing instruments and mechanisms, and to have an enabling regulatory and legal environment for private investors. Given high levels of income per capita, infrastructure such as renewable energy production and distribution, water networks, and building developments can generate consumer revenue streams that incentivise private investors to purchase equity as a long-term investment. High-income countries and even many cities within them will have investment-grade credit ratings, enabling them to issue

bonds and raise debt finance in the financial markets.

In contrast, many low- and middle-income countries face severe constraints to accessing finance. Low national income levels can limit the pace at which government can mobilise urban investment, due to both smaller public budgets and the constrained capacity of the national and local institutions tasked with raising, steering, and blending finance for urban development. In terms of debt financing, our analysis shows that 93% of low-income and lower-middle-income countries have sovereign credit ratings that are below international investment grade. The risk of infrastructure projects is often perceived to be too high for commercial and institutional investors in terms of equity financing, while the returns from user fees and revenue-generating assets are too low to provide a sufficient profit margin from an investment. It follows that poorer countries are therefore less likely to have access to the same range of financing instruments and mechanisms that are available to wealthy nations.

Figure 5
National-level financial maturity



Source: Standard & Poor's global ratings.

Note: The foundation, transition and established stages are defined by three thresholds: the cut-off between investment grade and "junk" credit ratings (BBB-); and the lower and upper bounds of the World Bank middle-income band (US\$1,025 to US\$12,475 per capita).

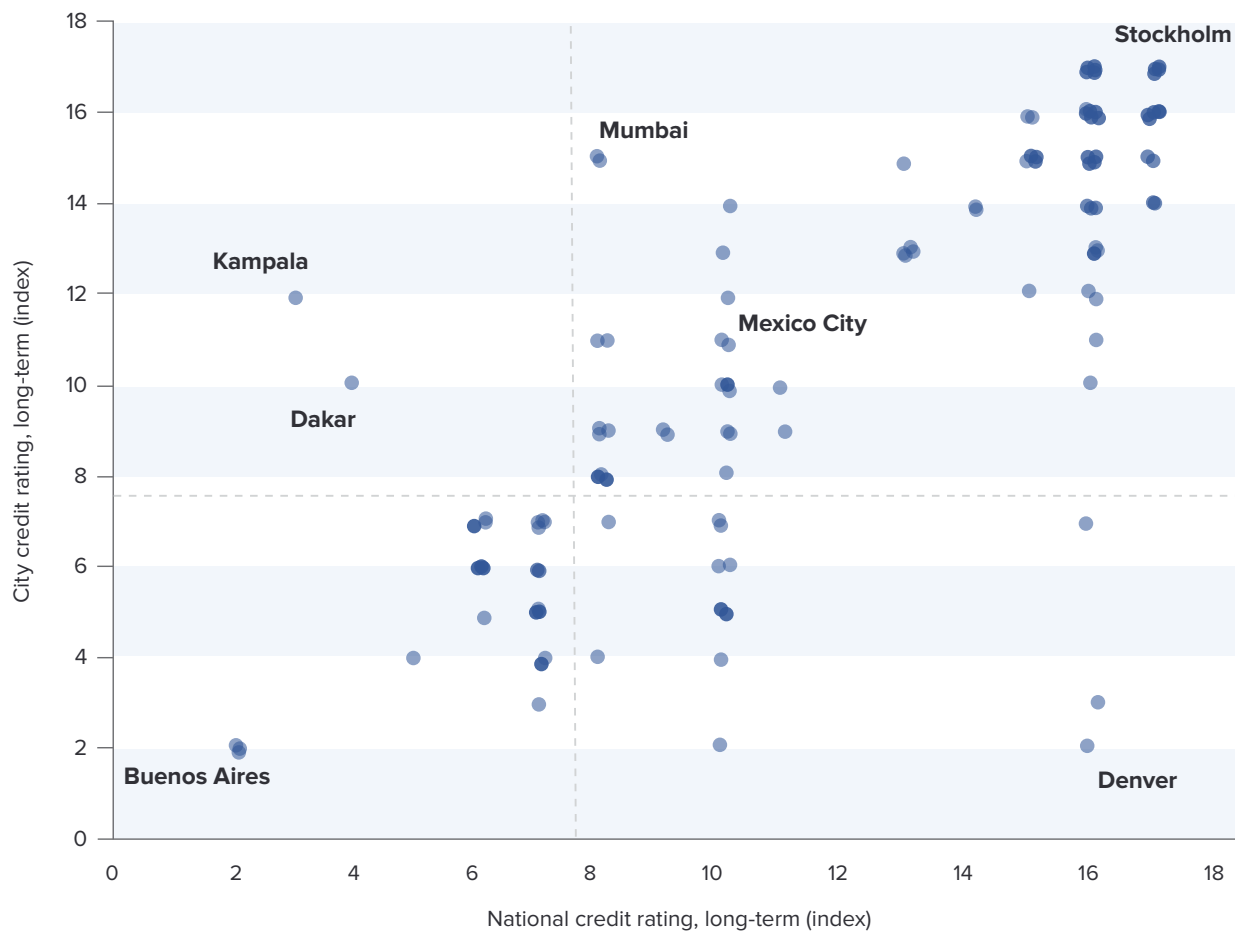
The maturity of national urban financial systems is closely associated with overall economic development status, but policymakers also need to take account of local government readiness. Interventions to overcome infrastructure investment barriers will need to be tailored not only to different levels of national development and financial maturity, but also to the specific circumstances of individual cities. This is evident from considering city creditworthiness. City credit ratings exhibit a positive correlation with sovereign credit ratings (see Figure 6). This reflects the critical role that national governments typically play in financing municipal administrations. In particular, national creditworthiness can act as a "credit ceiling" for cities, even constraining those that have taken active steps to progress their creditworthiness beyond national benchmarks. The experience of both Dakar, Senegal, and Kampala, Uganda, has been that securing a municipal credit

rating may not in itself be sufficient to allow cities to raise urban finance, where national factors such as currency risks and high domestic interest rates prevail as deterrents of local and international investment.

Despite this clear overall trend, there is a large variance in the creditworthiness of individual cities with similar sovereign ratings. Some cities, and particularly capital cities such as Kampala and Dakar, have realised their potential to substantially increase their financial maturity and achieve investment-grade credit ratings in local debt markets. Although this has not allowed these cities to issue municipal bonds, it has improved local revenue generation and scope for bank lending. This indicates that there is a wide range of either autonomous or centrally enabled actions that municipal governments can take to improve their readiness for scaling urban financing approaches and instruments.

Figure 6

Relationship between city- and national-level credit ratings.



Note: For national credit ratings, indices of 1 to 17 represent indexed ratings from the major international ratings agencies, with 1 being the lowest rating and 17 being the equivalent of AAA. A credit rating of 8 or above (dotted line) indicates an investment grade rating. For city credit ratings, indices of 1 to 17 represent local ratings, some of which correspond to international ratings.

Cities will benefit from different strategies for increasing and leveraging their financial maturity, depending on their starting position.

The credit ratings in Figure 6 can be used as proxies for financial maturity, as these ratings are based on various factors including debt levels and sound management of public finances by municipalities.

- Cities in the upper-right quadrant (e.g. Stockholm, Mexico City, Mumbai) are relatively financially mature with sound municipal finances combined with highly rated sovereign debt of their respective countries. These cities can use their high ratings to leverage substantial debt finance where appropriate.
- Cities in the bottom-right quadrant (e.g. Denver) have the advantage of being in a highly rated

country but are themselves underperforming in their reputation for municipal financial management. These cities have the greatest potential to shift their financial maturity upwards – even on international scales – through management capacity-building at the municipal level.

- Cities in the top-left quadrant (e.g. Dakar, Kampala) have increased their financial maturity despite being located in countries that are below investment grade internationally. These cities will need to coordinate with their national governments to ensure that the municipality can access local debt markets where appropriate, and to increase the creditworthiness of the sovereign.

- Cities in the bottom-left quadrant (e.g. Buenos Aires) have low financial maturity and are located in countries that are below investment grade. These cities may need to look to international and national public funding for investments rather than seeking debt finance. At the same time, these cities can follow the lead of Dakar and Kampala by increasing their own creditworthiness over time.

In all cases, national governments will need to play a critical role in enhancing sovereign financial maturity, as well as supporting cities to raise, blend, and steer the finance required to deliver their development strategies. Financing and delivering sustainable urban infrastructure at scale will require central governments to establish an enabling regulatory and legal environment that clearly outlines the scope and conditions for cities to deploy different financing mechanisms and that safeguards the rights of diverse private investors. National governments will need to employ different sets of policies, institutional reforms, and financing mechanisms at different stages of financial maturity. Accompanying planning and capacity improvements are also required to progress from one maturity level to the next.

We present a preliminary financial maturity assessment that could guide national urban investment reforms. This can be used by central governments, in conjunction with development partners, to chart specific actions that increase their ability to harness finance for 3C urban development. This assessment and planning framework is structured according to three indicative levels of financial maturity: foundation, transition, and established states.

4.2 Stage 1: Foundation

Characteristics of foundation states

Countries at the foundation stage lack many of the fundamental building blocks of an urban finance system. Countries at the foundation stage are typically pre-urbanised (less than 25% of the population living in cities), low-income countries with sovereign credit ratings below investment grades. They typically also face the greatest deficits in urban infrastructure service levels. Examples of foundation states include Ethiopia, Uganda, and Nepal.

These countries often lack public and private sector implementation capability, financial depth, effective formal land markets,

effective public revenue-raising and financial management systems, and experience attracting private investment into cities.

At this stage, countries are often facing rapid urbanisation and economic growth from low bases, with increasing needs for urban infrastructure services for their growing urban populations. While the historical infrastructure deficits carry significant human costs, the low levels of path dependency also create a window of opportunity to shape a 3C urban development pattern.

The constrained capacity, authority, and resource levels of local urban institutions limit municipal government effectiveness and place a greater burden on central government and development partners to assess and allocate resources into urban development. These centralised arrangements are frequently encoded in the constitution, barring or significantly limiting the autonomy of local governments to undertake economic development planning and revenue collection. As a result, own-source revenue generation at the local government level is usually a very small proportion of municipal budgets, with cities relying on fiscal transfers. For example, in Uganda, municipalities receive around 80% of their budgets from central government, while own-source revenue accounts for less than 10% of local government funds.³⁵ The recent experience of the Kampala Capital City Authority in doubling own-source revenue collection shows how cities in foundation states can reduce their dependence on transfers, and improve their access to debt financing in the process.

The lack of functioning and efficient land markets and registration systems is also a key constraint to urban development in foundation states. Land and urban infrastructure development are inextricably linked, both in terms of planning for land use and corridor reservation, and as a source of funding for urban infrastructure projects via the land value uplifts created from economic agglomerations. Yet foundation states often lack the comprehensive land records that enable markets to operate smoothly, and the status of ownership can be unclear due to overlapping forms of tenure. For example, Uganda's local governments are unable to effectively administer property taxation to the complex nature of land registration, and it is estimated that only around 18% of Ugandan land is registered.

Finally, foundation countries often lack developed capital markets for urban infrastructure financing, and poor national and municipal creditworthiness inhibits access to global capital markets.

In many low-income countries, the private sector is thin and less developed, and as a result very few domestic companies have the capacity to provide capital for urban investment. High domestic borrowing rates, which reflect national macroeconomic conditions, are also a disincentive for project developers.

Strategies for progress: foundation to transition

Building institutional capabilities in urban planning, financing, and regulation is fundamental to managing urban development.

Foundation countries are seeking pathways to reduce or graduate from a heavy reliance on their constrained public financial resources and donor support. Capability gaps in foundation stage countries are inherently context specific. It is increasingly widely recognised that transplanting “best practice” approaches from established contexts is not always an effective approach to building state capability in complex areas, such as urban finance, which involve many individuals and institutions, with specialised expertise and experience. In these contexts, it is important to take a problem-driven and politically sensitive approach that builds capability iteratively through pilots, and scales successful approaches with local political ownership.

Developing systems of land registration and titling is key to setting the foundation for 3C urban planning and harnessing the value of land to fund urban infrastructure development. For example, it was clear in the case of Uganda that overlapping land tenures and low rates of registration serve as major barriers to investment. Empowering the relevant government ministries to tackle this challenge, while establishing processes that safeguard the rights of vulnerable urban residents, will enable the use of land-based urban infrastructure financing instruments in the future. It was highlighted in the Uganda country workshop that strong regulation and well-trained planners at the local level would play a key part in supporting sustainable growth.

Improving the financial management systems of national and city governments can establish the building blocks needed to access new forms

Box 1
Rwanda: Land titling programme

Rwanda’s programme to regulate land tenure in 2010 – following a two-year pilot study – shows how foundation states can move towards the transition stage. The programme took a community-based participatory approach, employing locally trained para-surveyors and satellite imagery. By 2015, virtually all land in Rwanda had been demarcated – at a cost of US\$60 million (75% of the programme was donor funded). By charging land owners to collect land titles, the programme recouped US\$7 million – although 36% of titles were not collected (in part due to the cost for owners). Overall, the programme rapidly achieved land tenure security for owners – increasing land market activities, and making land and/or property taxation a viable option in Rwanda.

of finance in future. Central government transfers can often act as a constraint to municipalities, as the funds are not sufficient for urban development or are earmarked for centrally determined activities. Reforms to reduce the conditionality attached to transfers can empower local government to allocate financing more efficiently to the areas with the greatest need for investment. The collection of local taxes and basic user fees such as parking charges should be made more comprehensive and efficient in order to maximise the potential of existing revenue sources. In the longer term, once the right governance and institutional structures are in place, municipalities and national governments can then explore additional and more complex revenue-raising options to capture economic growth and land value. Perhaps the most appropriate and relevant instrument for governments at foundation level are those that build capacity, trust, and experience in urban finance, such as municipal development funds and national development banks. Finally, it is important to ensure that government borrowing and domestic transfers are not crowding out the private sector. There is some evidence that government activity is already hindering economic development in Uganda by crowding out private sector companies seeking investment for growth.

4.3 Stage 2: Transition

Characteristics of transition states

Transition countries have built on their foundations to develop broader capacity for mobilising urban finance. But these countries also find themselves facing greater demands for infrastructure to service their urban populations (transition countries typically have a higher proportion of their population living in urban areas, in the range of 30–60%³⁶) and to keep their economies growing. Transition countries are typically middle-income level, such as Vietnam, India, Mexico, and Ghana, where a diversified range of sectors are driving economic growth and public sector incomes.

Some of these countries have made progress improving their national and local taxation recoveries and with supportive planning, regulatory, financial regimes developed. Cities at transition stage can look to increase their tax base and coverage by diversifying the mandatory revenue base to include land, property, and business taxes. This means that transition countries are able to diversify urban finance sources from national government transfers and MDB and donor support. In the case of Mexico, for example, decentralised tax collection is relatively well established at the state level providing a stable revenue base. Mexico City metropolitan area (which has the constitutional status of a state) raises around 40% of its own revenues. In addition to this, commercial banks and pension funds play an active

role in investing in urban development, and these countries also receive increased international interest in investing in green infrastructure.

Many transition states have established sufficient creditworthiness to begin to experiment with other options for subnational government borrowing, broadening out from central government grants and loans, including loans from commercial banks, bonds on local and international securities exchanges, and trust funds. For example, while the loans from Banobras (the national development bank) still make up the majority of Mexican subnational government borrowing, there is an increasing amount of private investment in infrastructure, as well as direct borrowing by states and cities from the capital markets. Transition nations are therefore well placed to experiment, replicate, and build trust with investors based upon a track record built from the foundation stage.

The improved administrative and regulatory capability of transition countries also enables the expanded use of private financing instruments, such as subnational debt instruments and PPPs. Blending public funds with private investment is key for transition states to meet the demand for urban infrastructure finance. PPPs can play a key role in leveraging private sector investment – particularly at the national level. However, where PPPs are not suitable (for example, at more local levels of government), other models such as pooled finance mechanisms can play a role. For example, Mexico has an established PPP landscape with 247 PPP projects having reached financial closure since 1990. Over US\$8.2 billion is currently actively invested in PPPs, and US\$67.6 billion has been mobilised in the past 25 years. PPPs are likely to continue playing an important role in financing Mexico's future infrastructure – its current national infrastructure plan emphasises the role of private investment in rail, road, port, airport, and logistic corridor projects. Mexico has also been able to increasingly leverage international private sector sponsors for their PPPs, including major investors from commercial banks in Europe, the United States, Japan, and South Korea.

Strategies for progress: transition to established

Transition states can deploy an expanded range of urban financing mechanisms. These include:

Box 2

South Africa: National PPP units support urban infrastructure

The South Africa PPP unit within the Ministry of Finance was established as both a regulatory and consulting body to ensure that PPPs were transparent, equitable, and fair. Between 2000 and 2007, the South Africa PPP Unit brought more than 20 PPP deals to financial close, worth more than US\$6 billion. This includes the Gautrain rapid rail link connecting central Johannesburg to the airport.

- **Service charges:** Levied user charges where payment is made at the point of use or where additional benefit is accessed, including parking, waste collection fees, road tolls, congestion charging. These charges can be used to raise funds, but also to create incentives that steer finance into 3C urban development. While foundation states may try to employ these, transition states are likely to be more effective at providing the services to, and collecting the fees from, a larger proportion of the urban population. It is noted, however, that some forms of user charging can be regressive and could have negative distributional effects for the poor, particularly if applied to basic services such as health, security, or water, sanitation, and hygiene services.
- **Municipal bonds:** A debt instrument issued by a city government or one of its agencies, typically to finance specific capital expenditures such as transport or energy generation systems. Repayment of the loans may be either tied to specific streams of revenue or a general obligation of the issuer. A number of transition-stage countries have already launched regional and municipal bond programmes. For example, Belize City, Mumbai, Pune, and Cape Town are all active in the bond market. Cities in the Global North are increasingly issuing green bonds to finance climate-compatible infrastructure. In 2014, Johannesburg became the first sub-Saharan African city to issue a green bond. The 10-year, 10.18% note raised more than US\$125 million for investments in renewable energy (photovoltaic panels and solar water), landfill methane capture, and hybrid-fuel buses.³⁷ In 2016, Mexico City became the first Latin American city to issue a green bond. The five-year note was oversubscribed 2.5 times, and raised MXP2 billion (US\$50 million) for investments in potable water, wastewater, energy efficient public lighting, and metro transport.³⁸

Pooling finance across smaller municipalities can create a larger debt offering with reduced individual risk, improving the creditworthiness of urban infrastructure investments. Where creditworthiness remains an issue, pooling may offer a pragmatic approach to diversifying risk. Many of India's larger municipalities have historically benefited from funding infrastructure projects through borrowing from domestic banks and capital markets.

Box 3 Hyderabad metro system in India

The Hyderabad (India) metro was developed through a public-private partnership based on land value capture. The state government and the municipality provided the contractor (L&T) with the right-of-way for metro construction and land for property development (109 hectares) close to the metro stations. L&T will finance most of the metro construction costs (US\$2.7 billion) and expects to recover them over a 35-year concession, extendable for 25 years. Main revenue sources include fare revenues (50% of the total), property development (45% of total revenues from leasing the 109 hectares). A viability gap fund (VGF) was created by the national government to fill finance gaps if needed (Suzuki et al., 2015).

However, smaller municipalities have not had the credit ratings required to access these markets. Building on the United States' history of "bond banks" (which have raised over US\$40 billion in financing for American municipalities), USAID supported the Water and Sanitation Pooled Fund (WSPF) to develop a pooled funding mechanism and issue a bond to finance water and sanitation projects in 14 small and medium-sized towns. The WSPF structured a US\$6.4 million bond, which received a rating of AA (SO) by Fitch, with subscription largely coming from domestic commercial banks. The WSPF enabled smaller municipalities to finance water and sanitation projects, as well as to re-finance existing, more expensive, debts. A key aspect of the success of the pooled fund was the opportunity it gave municipalities to demonstrate the collection of user charges, and therefore a method of repayment. USAID and state government guarantees were important in ensuring the attractiveness of the bonds.

Where the opportunities exist through rapid urban expansion and transit-oriented development, transition countries should harness land value capture (LVC) approaches. LVC uses taxes, improvement fees, construction density options, and regulations to capitalise on the value of land appreciation in fast-growing, urbanising cities. It aims to recover the increase in property value generated by public infrastructure investment to the

state, to cover the costs of that public infrastructure investment. Countries and cities with sound macroeconomic conditions, and high urbanisation rates and/or rising property values are best suited to LVC. Significant urban growth is particularly relevant for creating demand for transportation infrastructure and a resulting increase in value of land proximate to transport nodes and facilities. In this way, LVC can help not only to finance large-scale infrastructure needs, but also through its introduction, to encourage more compact and connected patterns of urban growth. LVC has been used to a limited extent in Mexico, with betterment contributions covering 1.53% of all public works. However, its use has been limited to four states, which account for 86% of total national revenues from land value capture.³⁹ A pilot project in one or two cities can demonstrate to other municipalities within a country the potential and benefits of introducing land value capture.

Transition countries should also consider introducing more sophisticated instruments to steer finance into sustainable urban infrastructure. A range of low- and middle-income countries are already starting to use national regulations and guidelines to steer sustainable finance at national and local levels. For example, a regulatory requirement obliges Bangladesh's commercial banks to invest a proportion of their lending to "greener projects", which is supported by financial incentives such as low-cost wholesale loans to help move banks towards new markets.⁴⁰ This can help to deter private vehicle use in built-up areas while encouraging demand for sustainable public transport and non-motorised transport options. In addition, parking charges to reduce congestion could provide funding for sustainable urban development. Introduction of any such new revenue-generating instruments will require appropriate political economy analysis to assess the feasibility in implementing such measures.

Unlocking the potential of private sector finance is necessary if a country is to move beyond transition to an established urban finance system. The role of the private sector becomes increasingly important for financing sustainable urban development as countries progress from the transition stage. As the regulatory and investment environment improves and the country continues to build investor confidence, improved bankability and creditworthiness is essential for local governments of all sizes seeking debt financing beyond the traditional public sector loans. An important

marker of progress will be the large-scale mobilisation of private finance for sustainable urban infrastructure, leveraging scarce public finance only where it is most needed to improve the returns or reduce the risks of greener options.

4.4 Stage 3: Established

Characteristics of established states

Established states are mostly high-income countries, which typically have strong institutional capacity at multiple levels of government, which enables them to deploy a wide range of financial mechanisms. In these countries, cities and national governments have a range of debt and equity financing options available. Many have strong balance sheets with robust credit histories and investment-grade credit ratings, which enables them to raise low-cost debt in the financial markets. At the same time, high per capita incomes mean that revenue-generating infrastructure such as renewable energy production and distribution, water networks and building development is more attractive, incentivising private investors to purchase equity as a long-term investment or invest in new construction projects.

As a result, urban infrastructure investment can be more complex and diverse, allowing a range of actors to bring and extract value from projects – but rich countries face challenges too. The imperative to leverage private finance via PPPs means that the governance, procurement, regulatory, and oversight roles of institutions become more important. This is key to ensuring that the private sector's interests are met while also safeguarding access to, and the quality and value of, public service infrastructure. Many governments have set up PPP units as a means to rationalise regulatory, project assessment and preparation, and implementation mandates and processes for public-private partnerships. International investment also becomes more important as a source of finance for continued development with projects increasingly focused on real estate, technology, and cultural facilities.

Evidence of leadership in established nations

Financially mature countries have to tackle substantial inertia in their urban financial

systems. These entrenched systems for financing local government and urban infrastructure projects have emerged from highly contextual development pathways resulting in completely different solutions. For example, cities in the US are highly decentralised in terms of their revenue- and debt-raising capabilities, while cities in the UK are historically highly centralised but with new powers to generate and manage local revenues. Historical planning approaches and core utility business models also shape what is possible in terms of the city's ability to act autonomously and the partnerships required for success.

Central governments can establish enabling regulatory and fiscal environments that empower cities to deploy specific financing instruments at scale. This is illustrated by the enormous scale of municipal bond issuances in the United States, where municipal bonds have been used to fund economic and social infrastructure since c.1850. There are more than 1 million bonds in the domestic market, valued at over US\$3.5 trillion, and issued by more than 50,000 individual units of government.⁴¹ One of the key drivers of the market is the “safe haven” nature of the instrument. Defaults for rated municipal issuers averaged 0.01% per year during 1970–2007.⁴² They are attractive and have grown to such scale because the interest income from municipal bonds is exempt from both federal and many state income taxes. In other countries with different tax conditions, bank lending remains more economically attractive. Increasingly, cities and towns in the United States are issuing green bonds (cumulatively valued at around US\$160 billion in 2015),⁴³ which ensure that debt finance is steered towards sustainable urban infrastructure. This trend could be accelerated if national or state governments were to add additional environmental requirements around municipal bond issuance.

Cities within established states can have different levels of financial maturity, which in turn affect their capacity to deploy financing instruments. This is exemplified by the different capabilities of UK cities. London is a pioneer in using financial instruments to promote densification and regeneration, often in partnership

Box 4

The UK Green Investment Bank

The UK government's Green Investment Bank (GIB) was set up to finance a green economic transition on commercial terms and to mobilise private investment. The GIB has backed nearly 100 green infrastructure projects in transactions worth roughly £12 billion. The bank made a major contribution in a range of novel and additional projects, such as producing knowledge products (e.g. the District Heating Finance guide), facilitating low-carbon urban development via the energy efficiency, renewables, and waste sectors. Initially capitalised with public finance, its privatisation completed in April 2017 when it was sold to Australian bank Macquarie in a deal worth £2.3 billion

with central governments. This is evident from the advanced LVC approach being adopted by the £30 billion Crossrail projects, which seek to tap the productivity and connectivity benefits that the transport infrastructure brings to the city through a Business Rate Supplement – a nationally entrusted local variance in the application of business rates. This complements individual user fares, which are only able to mitigate about 20% of the total infrastructure cost.⁴⁴ London was also one of the first cities to adopt the congestion charging system introduced by Singapore in 1975. Few other cities in the UK have either the economic size or the financial capabilities to deploy such sophisticated instruments. This highlights the opportunities for established states to support knowledge transfer among cities within countries, and to build the financial management capacities of smaller urban areas so that they can effectively raise, steer, and blend finance for 3C urban development.



Photo credit: Hans Johnson/Flickr

5. Recommendations

Transforming national urban financial systems is an essential reform opportunity that can enable economic growth and sustainable development. To address the global US\$90 trillion infrastructure financing deficit, national government policymakers must overcome significant investment, regulatory, and institutional barriers. However, the opportunity presented by specific urban finance mechanisms is both poorly understood and largely undervalued at all stages of development. The sustainable urban infrastructure deficit can be closed by directing investment into 3C urban development through high-priority finance mechanisms that enable the raising, steering, and blending of urban finance. This combination of mechanisms has the potential to reduce borrowing costs, leverage land assets, and stimulate private investment in sustainable urban infrastructure.

Enhancing national financial maturity is essential for both national and local governments to implement fiscal and policy reforms that can mobilise and shape urban investment. This paper provides evidence of the positive relationship between economic development and national creditworthiness, and on this basis sets out an indicative national financial maturity assessment. This framework maps specific financing and fiscal instruments onto different stages of financial maturity, while acknowledging the importance of local readiness

and capabilities. With further refinement, this framework can be an effective strategic planning tool for national policymakers, aiding the navigation of contextually appropriate iterations of national urban policies, institutions, and financial mechanisms for sustainable urban development and infrastructure provision.

5.1 High-potential urban finance mechanisms

This paper reveals the particular potential of seven under-utilised urban financing mechanisms. Central governments could support the deployment and scaling of these mechanisms in a number of ways.

Fiscal decentralisation

- National governments could: identify revenue sources most readily transferrable to local governments; create legislative frameworks for such decentralisation; and build up local government collection and budgeting capacity.
- National governments could trial national-to-local loan programmes or revolving funds in lieu of grants, to build local government credit history and experience.
- National governments could develop a framework or protocol for cities to identify possible own-source revenues and self-test for fiscal localisation, based on a range of factors including: national regulations and governance arrangements between central and

local government; local government human and organisational resources for rate/tax setting and collections; likelihood of taxpayer compliance; investments best suited for financing through own-source local revenues for matching against investment gaps/needs.

- In the absence of fiscal decentralisation, and during transitional periods of devolution, national governments could use earmarked fiscal transfers to target sustainable urban infrastructure.

Bonds and debt financing

National governments could address national regulations to allow local borrowing and clarify the conditions for bank lending or bond issuance. This could include whether cities (and/or utilities) can borrow and how much, borrowing procedures, what currencies they can borrow in, the type of collateral that they may pledge to secure borrowing, and events in cases of default.

National governments could provide capacity-building to improve budgetary planning, accounting and financial management in local governments, reducing the costs of borrowing either through bank lending or bond issuance. They could also help to build local governments' experience with borrowing through joint projects or credit guarantees.

National governments could build urban project pipelines, either via national borrowing or with support for project preparation. This could include the use of pooling instruments to aggregate similar small projects – for example, a national fund for energy efficiency, decentralised renewable, and other same-type infrastructure investments across secondary and tertiary cities.

- National governments could collaborate with existing programmes focused on enhancing municipal creditworthiness – for example, those run by Climate KIC and the World Bank. They could also promote standards and labelling to encourage preferential issuance of green bonds at both national and subnational level.

Land value capture

- National governments could develop national land value capture (LVC) regulatory frameworks that outline whether cities can sell and trade development rights, the land leasing system and the rules governing rights exchanges. They could additionally create best practice guidance for local co-investment based on local-level LVC.

- National governments could coordinate transport and spatial planning policies and strategic plans across different scales, and align them with LVC mechanisms.
- National governments could build capacity for more efficient property markets, for example by systematising valuation practices, registration and titling, and introducing transparent transaction registries. This also creates opportunities to improve public land and built asset registries and condition assessments to determine where there is investment potential and uncaptured value in government holdings.
- National governments could work with municipalities to identify projects suited to LVC (recognising that there are several specific LVC instruments available with different finance raising/repayment characteristics) and identify bridge financing sources (e.g. concessional finance from development finance institutions) if needed so that projects can be initiated in advance of LVC revenue flows.

Pricing, regulation, and standards

- National governments could create efficient and effective regulatory frameworks and standards that steer investment into sustainable infrastructure projects and investments. This is particularly important in sectors characterised by small investment sizes and where consumer choices are key investment drivers, such as energy efficiency, distributed energy, non-motorised and electric mobility, shared mobility, and green buildings.
- National governments could work with commercial banks, banking regulators, and capital market authorities on green finance voluntary practices and mandatory measures, including new market and finance product development, environmental impact reporting, and green secondary market rules.
- National governments could establish pricing systems (whether negative pricing such as emission trading schemes or positive pricing such as feed-in tariffs) to steer investment into sustainable infrastructure investments. Again, this is particularly important in sectors where firm and household choices are key investment drivers, or where sustainable infrastructure options have higher costs than conventional options without government intervention.

National investment vehicles

- National governments could create national urban infrastructure funds within existing national development banks and/or stand-alone green investment banks that blend international and national public finance with private finance in local markets.
- In low-income countries, national governments could establish municipal development funds, which help cities to aggregate projects for procurement or debt financing purposes.
- National governments could support cities to standardise and aggregate small investments through pooled finance mechanisms to scale market opportunity and create liquidity through instruments such as securitisation, for example through energy efficiency revolving funds.
- National governments could liaise with institutional investors to understand their investment requirements, and package new green investment facilities or projects accordingly.

International finance vehicles

- Working with national governments, international financial institutions (IFIs) could identify urban infrastructure priorities suited to international public finance, that is, prospective projects that are poorly suited to commercial capital and where there is insufficient domestic public finance to meet investment needs.
- IFIs can create and regularly update an IFI urban investment programme and fund tracker to include information on investment types/assets targeted, geographic reach/limitations, investments made (amounts, borrowers, terms, proceeds), etc. This should also include sustainability criteria to demonstrate that IFIs are allocating their own resources to green options, and crowding in private finance for the same.
- IFIs can create a platform to inform, and shape/generate commitments to increase finance from DFIs to 3C urban investments.
- IFIs can support peer-to-peer learning and build local capacity, involving governments in project planning, financing, and delivery.

Public-private partnerships

- National governments could assess the asset types and prospective investments that are suited to PPPs

and that contribute to 3C urban infrastructure development, and use this to prepare a long list of feasible pilot or exemplar projects.

- National governments can establish regulation and legislation outlining the ability of cities/utilities to enter into PPP transactions, and detailing the corporate framework for entities that may be established to do so, the way in which tariffs are set and the mandate of regulatory oversight processes and agencies.
- National governments can work with IFIs and subnational entities to determine the need for, and optimum structure of, a PPP unit, drawing on lessons from dedicated PPP units in upper-, middle-, and low-income countries.
- National governments can run PPP project preparation and tendering exercises to build capabilities across levels and sectors of government.
- IFIs could create readiness assessment indicators for countries with limited experience of PPP projects. The indicators could relate to market factors, such as cost of finance and capital availability through national markets, depth of pool of indigenous developers and operators, the need for and access to currency hedges.

5.2 Financial maturity and readiness

The challenge of addressing the global US\$90 trillion infrastructure financing deficit can certainly be helped by the high potential instruments identified in this report, but national government policymakers must still tackle and overcome significant investment, regulatory, and institutional barriers. To implement the financial mechanisms and instruments identified above, a range of accompanying reforms and activities are required to progress nations from one financial maturity level to the next.

To guide this progression, country governments expressed demand for a framework that they can use with development partners to chart their reforms and the activities that increase their ability to harness finance for 3C urban development. National policy roadmaps that guide the development of more sophisticated systems of urban finance can offer an excellent point of departure. Table 2 presents an indicative and high-level illustration of how the maturity framework could be developed to identify specific national actions.

Table A

The key characteristics of national government urban finance systems at different levels of financial maturity

	FOUNDATION	TRANSITION	ESTABLISHED
Raising	<ul style="list-style-type: none"> • Improve reliability of budgetary planning and processes • Increase own-source revenue generation at the local level • Demonstrate reliable debt servicing • Identify steps to achieving a formal credit rating • Secure and improve sovereign credit rating(s) • Secure accreditation with multilateral climate funds 	<ul style="list-style-type: none"> • Develop municipal borrowing regulatory framework outlining whether cities can borrow and how much, what currencies they can borrow in, the type of collateral that they may pledge to secure borrowing, and events in cases of default • Secure and improve municipal credit rating(s) • Increase and retain larger local revenue share 	<ul style="list-style-type: none"> • Support cities to experiment with diverse debt and equity financing mechanisms • Cities can access diverse sources of finance that are efficient and affordable • Implement environmental taxes on polluting activities • Commit to issuing green or climate municipal bonds to raise finance for sustainable options
Steering	<ul style="list-style-type: none"> • Set clear planning guidelines and regulations such as spatial plans and building codes, coordinated across different scales • Build capacity for more efficient property markets, for example by systematising valuation practices, registration and titling, and introducing transparent transaction registries • Require national investment vehicles to adopt green investment and lending criteria 	<ul style="list-style-type: none"> • Improve land regulation and emerging land market • Develop national land value capture (LVC) regulatory frameworks that outline whether cities can sell and trade development rights, land leasing system and the rules governing rights exchanges • Demonstrate simple LVC instruments in major city transport projects • Create fiscal or regulatory frameworks to promote sustainable investment, such as carbon pricing and mandatory energy performance standards 	<ul style="list-style-type: none"> • LVC standard urban development mechanism, with advanced forms of LVC implemented • Create advanced fiscal or regulatory municipal frameworks to promote sustainable investment, such as congestion pricing and feed-in tariffs • Work with commercial banks, banking regulators, and capital market authorities on voluntary and mandatory practices to green finance systems
Blending	<ul style="list-style-type: none"> • Engage private sector to understand needs and risk appetite • Implement simple, short-term and low-value demonstration projects with private partners • Establish national legal and regulatory framework outlining the ability of cities to enter into PPP transactions, and detailing the appropriate corporate frameworks and oversight processes 	<ul style="list-style-type: none"> • Set up national PPP function supporting local government projects • Support national investment vehicles to tap private finance for pilot or exemplar sustainable urban infrastructure projects • Access credit enhancement, currency, or project risk guarantees 	<ul style="list-style-type: none"> • Develop municipal line ministry PPP capability • Municipal access to capital markets is commonplace • Municipal projects attract competition among lenders to finance project • Support cities to standardise and aggregate small investments (such as energy efficiency and decentralised renewables) through pooled finance mechanisms

ENDNOTES

- 1 Coalition for Urban Transitions. *Global Review of Finance for Sustainable Urban Infrastructure* (forthcoming, 2017). Available at: <http://newclimateeconomy.net/content/cities-working-papers>.
- 2 UN DESA, 2014. *World Urbanization Prospects: The 2014 Revision, Highlights*. United Nations Department of Economic and Social Affairs.
- 3 Floater, G., Rode, P., Robert, A., Kennedy, C., Hoornweg, D., Slavcheva, R., and Godfrey, N., 2014a. *Cities and the New Climate Economy: the transformative role of global urban growth*. New Climate Economy Cities Paper 01. LSE Cities, London School of Economics and Political Science.
- 4 McKinsey Global Institute, 2010. *India's Urban Awakening: Building Inclusive Cities, Sustaining Economic Growth*. McKinsey and Company.
- 5 Bourdic, L., Salat, S. and Nowacki, C., 2012. Assessing cities: a new system of cross-scale spatial indicators. *Building Research & Information*, 40(5). 592–605.
- 6 World Bank and IHME, 2016. *The Cost of Air Pollution: Strengthening the Economic Case for Action*. World Bank and Institute for Health Metrics and Evaluation. Available at: <http://documents.worldbank.org/curated/en/781521473177013155/pdf/108141-REVISED-Cost-of-PollutionWebCORRECTEDfile.pdf>.
- 7 Floater et al., 2014a. *Cities and the New Climate Economy*.
Floater, G., Rode, P., Friedel, B., and Robert, A., 2014b. *Steering Urban Growth: Governance, Policy and Finance*. New Climate Economy Cities Paper 02. LSE Cities, London School of Economics and Political Science.
- 8 OECD, 2007. *Infrastructure to 2030. Volume 2: Mapping Policy for Electricity, Water and Transport*. Available at: <https://www.oecd.org/futures/infrastructureto2030/40953164.pdf>.
- 9 PwC, 2014. *Capital project and infrastructure spending: Outlook to 2025*. Research by Oxford Economics.
- 10 Fay, M., Toman, M., Benitez, D., and Csordas, S., 2011. Infrastructure and sustainable development. In *Postcrisis Growth and Development: A Development Agenda for the G20*. S. Fardoust, Y. Kim, and C. Sepulveda (eds.). World Bank, Washington DC. 329–382.
- 11 Bhattacharya, A., Romani, M. and Stern, N., 2012. *Infrastructure for development: meeting the challenge*. Policy Paper. Centre for Climate Change Economics and Policy, Grantham Research Institute on Climate Change and the Environment.
- Helm, D., 2010. Infrastructure and infrastructure finance: The role of the government and the private sector in the current world. *EIB Papers*, Vol. 15, No. 2. Public and private financing of infrastructure Policy challenges in mobilizing finance,
- UNCTAD, 2013. *Supporting infrastructure development to promote economic integration: the role of the public and private sectors*. United Nations Conference on Trade and Development. Note by the secretariat.
- 12 WEF, 2013. *The Green Investment Report: The ways and means to unlock private finance for green growth*. World Economic Forum, Geneva.
- 13 Jacobs, M., 2012. Climate policy: deadline 2015. *Nature*, 481(7380). 137–138.
- Schmidt, T. S., 2014. Low-carbon investment risks and de-risking. *Nature Climate Change*, 4. 237–239.
- 14 Gouldson, A., Colenbrander, S., Sudmant, A., Godfrey, N., Millward-Hopkins, J., Fang, W., and Zhao, X., 2015. *Accelerating Low-Carbon Development in the World's Cities*. Contributing paper for Seizing the Global Opportunity: Partnerships for Better Growth and a Better Climate. New Climate Economy, London and Washington, DC. Available at: <http://newclimateeconomy.report/workingpapers/>.
- 15 Litman, T., 2014. *Analysis of Public Policies That Unintentionally Encourage and Subsidize Urban Sprawl*. Supporting paper for the New Climate Economy Cities Program. Victoria Transport Policy Institute.
- Burchell, R. W., Lowenstein, G., Dolphin, W. R., Galley, C. C., Downs, A., Seskin, S., and Moore, T., 2002. Costs of sprawl-2000. TCRP Report 74. Transit Cooperative Research Program, Washington, DC.
- 16 World Bank, 2014. *Urban China: Toward Efficient, Inclusive, and Sustainable Urbanization and Supporting Reports II*. World Bank, Washington, DC. Available at: <http://www.worldbank.org/en/country/china/publication/urban-china-toward-efficient-inclusive-sustainable-urbanization>.
- 17 Standard and Poor's Rating Services, 2014. *Global Infrastructure: How to Fill a \$500 Billion Hole*. Standard and Poor's, New York, NY. Available at: <http://www.engagedinvestor.co.uk/Journals/2014/01/30/n/a/q/How-To-Fill-A.pdf>.
- 18 IADB, 2015. *The Database of Political Institutions*. Inter-American Development Bank, Washington, DC. Available at: http://www.iadb.org/en/research-and-data/publication-details,3169.html?pub_id=IDB-DB-121.
- 19 Ivnayna, M. and Shah, A., 2012. *How Close Is Your Government to Its People? Worldwide Indicators in Localization and Decentralization*. World Bank Policy Research Working Paper 6138. World Bank, Washington, DC.
- 20 Bankrupt Cities, Municipalities List and Map, 2017. Available at: <http://www.governing.com/gov-data/municipal-cities-counties-bankruptcies-and-defaults.html>

- 21 McKinsey, 2016. *Financing Change: How to mobilise private-sector financing for sustainable infrastructure*. McKinsey Centre for Business and Environment.
- 22 Deutsche Bank Research, 2016. Multi-asset Essay: Why you shouldn't invest in infrastructure. *Deutsche Bank Securities Inc*, 26 October.
- 23 *Economic Times*, 2010. RBI won't ease infrastructure lending rules for banks. *Economic Times*, 9 September. Available from: <http://economictimes.indiatimes.com/news/economy/policy/rbi-wont-ease-infrastructure-lending-rules-for-banks/articleshow/6522699.cms>.
- 24 Bhattacharya, A, Oppenheim, J., and Stern, N., 2015. *Driving sustainable development through better infrastructure: Key elements of a transformation program*. Brookings Global Working Paper.
- 25 Green Growth Best Practice, 2014. *Mobilizing long-term investment for scaled-up green development*. Available at: <http://www.ggbp.org/report/best-practice-report/mobilizing-investment/mobilizing-long-term-investment-scaled-green>.
- 26 Coalition for Urban Transitions. Working papers: *Inventory of Finance Instruments: Debt-Financing, Inventory of Finance Instruments: Land Value Capture, Inventory of Finance Instruments: Public-Private Partnerships*. (forthcoming, 2017). Available at: <http://newclimateeconomy.net/content/cities-working-papers>
- 27 Sow, M. N. and Razafimahefa, I. F., 2015. *Fiscal Decentralization and the Efficiency of Public Service Delivery*. IMF Working Paper 15/59 . International Monetary Fund, Washington, DC.
- 28 Ernst & Young, 2016. *Renewable energy country attractiveness index*, Issue 48, October. Available at: <http://www.ey.com/gl/en/industries/power---utilities/renewable-energy-country-attractiveness-index>.
- 29 Floater et al., 2014b. *Steering Urban Growth: Governance, Policy and Finance*.
- 30 World Bank Group and ECOFYS, 2016. *Carbon Pricing Watch 2016*. World Bank, Washington, DC. Available at: <https://openknowledge.worldbank.org/handle/10986/242>.
- 31 Barnard, S., 2015. *Climate finance for cities: How can international climate funds best support low-carbon and climate resilient urban development?* ODI Working Paper 419. Overseas Development Institute, London. Available at: <https://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/9660.pdf>.
- 32 Bhattacharya et al., 2015. *Driving Sustainable Development through Better Infrastructure: Key Elements of a Transformation Programme*. Brookings, Washington, DC. Available at: <https://www.brookings.edu/wp-content/uploads/2016/07/07-sustainable-development-infrastructure-v2.pdf>.
- 33 UNCTAD, 2013. *Supporting infrastructure development to promote economic integration*.
- 34 Ibid.
- 35 World Bank, 2016. *Program-for-Results Information Document: Intergovernmental Fiscal Transfers Program for Results (Uganda)*. Available at: <http://documents.worldbank.org/curated/en/827541467815418755/pdf/PforR-PID-P160250-PCN-stage-Rev.pdf>.
- 36 UN DESA, 2014. *World Urbanization Prospects*.
- 37 Potelwa, Z., 2016. Budget Squeeze Pushing South African Cities Back to Bond Market. *Bloomberg*, 18 February. Available at: <https://www.bloomberg.com/news/articles/2016-02-18/budget-squeeze-pushing-south-african-cities-back-to-bond-market>.
- 38 Climate Bonds Initiative, 2017. *Green City Bonds: financing low carbon urban infrastructure*. Available at: https://www.climatebonds.net/files/files/March17_CBI_Briefing_Green_City_Bonds.pdf.
- 39 Smolka, M. O., 2013. *Implementing Value Capture in Latin America: Policies and Tools for Urban Development*. Lincoln Institute of Land Policy, Policy Focus Report. Available at: https://www.lincolninst.edu/sites/default/files/pubfiles/implementing-value-capture-in-latin-america-full_1.pdf.
- 40 Rai et al., 2016. *Financing inclusive low-carbon resilient development: Role of Central Bank of Bangladesh and Infrastructure Development Company Limited*. Available at: <http://pubs.iied.org/10139IIED/>
- 41 ICMA and GFOA, 2015. *Municipal Bonds and Infrastructure Development – Past, Present, and Future*. International City/County Management Association and Government Finance Officers Association.
- 42 Bergstresser D. and Cohen, R., 2016. *Changing Patterns in Household Ownership of Municipal Debt: Evidence from the 1989-2013 Surveys of Consumer Finances*. Hutchins Center Working Paper No. 20.
- 43 Environmental Finance Green Bond Database, n.d. Available at: <http://www.greenbonddata.org/>.
- 44 PricewaterhouseCoopers, 2014. *Crossrail 2: funding and financing study*. PwC, London. Available at: <https://www.pwc.co.uk/capital-projects-infrastructure/assets/crossrail-2-funding-and-financing-study.pdf>.

COALITION FOR URBAN TRANSITIONS

A New Climate Economy Special Initiative

Coalition for Urban Transitions
A New Climate Economy Special Initiative
c/o World Resources Institute
10 G St NE
Suite 800
Washington, DC 20002, USA
+1 (202) 729-7600
www.newclimateeconomy.net
www.newclimateeconomy.report

978-0-9906845-9-6



Copyright 2017 World Resources Institute. This work is licensed under the Creative Commons Attribution 4.0 International License.
To view a copy of the license, visit <http://creativecommons.org/licenses/by/4.0/>