



Financing Cities of Tomorrow

G20/OECD Report for the G20 Infrastructure Working Group under the Indian Presidency

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Executive Summary

Delivering quality urban infrastructure is one of the most pressing challenges for cities in a rapidly urbanising and changing world. Cities are already home to half of the world's population and continue to attract people. By 2050, the global population living in cities is projected to reach 5 billion, growing from 3.5 billion in 2015. Massive investment in infrastructure will be needed to accommodate this growth, not least given the need to adapt existing, as well as new, infrastructure to climate change and to benefit from the digital transition.

At the first G20 Finance Ministers and Central Bank Governors (FMCBG) meeting under the Indian Presidency in February, in Bengaluru (India), there was recognition of the potential of cities as centres of economic growth and the need to make cities inclusive, resilient, and sustainable. The 'G20 Principles on Financing Cities of Tomorrow' and the "Financing Cities of Tomorrow" report respond to this call by providing guidance and evidence to accelerate quality infrastructure investment in cities.

Cities have strong potential to better meet current and future urban infrastructure challenges and enhance investment. City Governments are at the frontline of delivering local urban services and thus well positioned to identify investment needs for quality urban infrastructure investment over the long term. They can use their power over urban planning and development strategies, local land use decisions and development control to plan the effective use of cities' assets and thus minimise investment costs. City Governments can engage early with key stakeholders, such as potential investors for future infrastructure projects during the renewal of urban plans to stimulate future infrastructure investments.

Better urban planning improves the likelihood of raising private capital for inclusive, resilient and sustainable urban investments. Effective urban planning, namely, the systematic design and organisation of land use and amenities in a city, can play an instrumental role in optimising urban infrastructure financing, by way of maximising investment benefits and creating significant opportunities to attract private investment. To build a conducive environment for further use of urban planning, the followings actions are proposed:

- Shape a new generation of strategic plans that are fit for purpose to address 21st century challenges, such as master plans and national urban policies that accelerate a net zero transition in cities.
- Create a regulatory environment for supporting private investment in cities through transparent and predictable processes, including for zoning regulations, permit procedures and environmental impact assessments.

- Strengthen stakeholder collaboration and engagement between different stakeholders including government agencies, the private sector, academia and civil society through consultations on new urban plans and other knowledge exchange platforms.

Financing of urban infrastructure cannot be achieved without cities leveraging private investment. City Governments have a key role in the planning and provision of urban infrastructure, with subnational governments responsible for almost 60% of total public investments in G20 countries. However, the capacity of cities to invest through own source revenues and capital transfers in a tight fiscal environment, is limited, creating significant funding gaps for meeting current and future infrastructure needs. Private sector investment can play an important role in meeting those needs but significant efforts will be needed to raise the current contribution of the private sector. To further support the leveraging of private investment across a broader range of cities worldwide, the following approaches are proposed:

- Strengthen cities' competences, such as providing legal and institutional grounds for new funding and financing mechanisms as well as partnerships, to be able to deploy innovative instruments to leverage and support private investment.
- Finance emerging and changing infrastructure needs with new instruments such as biodiversity offsetting, land value capture, land pooling and land banks.
- Develop built-in mechanisms to address possible negative impacts of land value increases on vulnerable and marginalised groups when designing instruments.

Improving City Governments' access to sustainable finance for quality infrastructure investments can help create more inclusive, resilient and sustainable cities. Recent growth in the availability of sustainable finance provides an important opportunity for City Governments to borrow to better meet their investment needs. The issuance of green, social and sustainable (GSS) bonds by subnational governments globally grew from USD 17.5 billion in 2017 to USD 54.8 billion in 2022. Subnational governments represent approximately 5.5% of total green bond issuances, 9% of social bond issuances, 8.7% of sustainability bond issuances and 1% of sustainability-linked bond issuances. To better unlock the potential of sustainable finance (and finance more generally) for City Governments the following actions are proposed:

- Create an enabling environment for City Governments to access affordable and sustainable finance through effective fiscal and regulatory frameworks, building institutional capacity, increasing cooperation and coordination, and developing city friendly financial markets, while encouraging fiscal responsibility.
- Ensure that cities have access to sufficient and predictable sources of funding to meet capital, operational and maintenance costs for infrastructure, and to repay financing.
- Enhance the use of sustainable financing instruments for infrastructure investment by City Governments through targeted measures to support each instrument's adoption.

Introduction

The need for financing quality infrastructure investment in cities

Delivering quality urban infrastructure is one of the most pressing challenges for cities in a rapidly urbanising and changing world

1. Cities¹ are already home to half of the world population and continue to attract people. By 2050, the global population living in cities is projected to reach 5 billion people, growing from 3.5 billion in 2015 (OECD/European Commission, 2020^[1]).²
2. Massive investment in infrastructure will be needed to accommodate this growth of cities, not least given the need to adapt existing, as well as new, infrastructure to climate change and to benefit from the digital transition. Indeed, globally, infrastructure investment needs between 2016 and 2040 are forecasted at USD 94 trillion (Global Infrastructure Hub, 2018^[2]). Moreover, for cities in emerging markets to mitigate and adapt to climate change, the International Finance Corporation (IFC) has estimated the cumulative climate investment need at USD 29.4 trillion between 2018 and 2030 (IFC, 2018^[3]). However, the capacities of governments to finance quality infrastructure investments, which were already stretched prior to recent shocks, has become even more challenging in the wake of monetary policy tightening in key markets and fiscal policy challenges worldwide. Against this backdrop, innovative financing and funding mechanisms for cities could have significant potential to fill gaps.

Ensuring that urban infrastructure investments are of a high quality

3. Quality urbanisation provides opportunities not only for economic prosperity and improved well-being of urban residents, but also to address, or at least mitigate, important agglomeration costs faced by cities, such as traffic congestion, crowded public transport, unaffordable housing, air, noise and water pollution, biodiversity loss and exposure to disaster risks (OECD, 2015^[4]). Moreover, as cities continue to manage the consequences of the COVID-19 pandemic and the on-going energy and cost of living crisis, quality urban infrastructure also provides an opportunity to drive recovery and build resilience to future shocks, and, in doing so, deliver longer term savings to the public purse.

The ‘Principles on Financing Cities of Tomorrow’ and the “Financing Cities of Tomorrow” report can provide high-level guidance and supporting evidence on how to accelerate quality infrastructure investment in cities.

¹ Definitions of what a city is vary widely by country. Based on the ‘degree of urbanisation’ methodology developed by the OECD and European Commission to allow for international comparison of urban areas, cities are defined as high-density places of at least 50 000 inhabitants. The methodology was endorsed by the at the 2020 Statistical Commission of the United Nations in March 2020.

² Based on the ‘degree of urbanisation’ methodology.



4. At the first G20 Finance Ministers and Central Bank Governors (FMCBG) under the G20 India Presidency, in Bengaluru, there was recognition of the potential of cities as centres of economic growth and the need to make cities inclusive, resilient, and sustainable. The FMCBG agreed to develop a set of voluntary and non-binding principles that reflect a shared understanding for financing cities of tomorrow (G20 FMCBG, 2023^[5]). They also agreed to share examples on innovative financing models to scale up private sector investment to address the infrastructure financing gap for creating future cities.

5. The '**Principles on Financing Cities of Tomorrow**', prepared during the G20 Indian Presidency in 2023, aims to provide both national and subnational governments with high-level guidance on how to accelerate quality urban infrastructure investment. This report aims to provide the rationale and supporting evidence and innovative examples based on OECD's experience on urban policy and infrastructure finance. It also proposes action-oriented recommendations to enhance the use of diverse funding and financing instruments in urban areas. The report builds on the work of previous G20 Presidencies, including the G20 Quality Infrastructure Investment (QII) Principles and the Roadmap to Infrastructure as an Asset Class, which can help ensure that limited public and private resources are used most effectively to support economic development and improve wellbeing in cities. The report can also inform other ongoing and future activities under the Infrastructure Working Group including its capacity development related activities.

Role of City Governments in financing cities of tomorrow

City Governments have strong potential to meet current and future urban infrastructure challenges and enhance the investment climate.

6. Cities are at the frontline of delivering local urban services and thus well situated to identify investment needs for quality urban infrastructure investment over the long term. They can also use their power over urban development strategies, local land use decisions and development control to plan the effective use of cities' assets and thus minimise investment costs. Cities can also engage early with key stakeholders, such as potential investors for future infrastructure projects, for the renewal of urban plans to stimulate future infrastructure investments. Therefore, effective urban governance and planning is essential to shape clear visions and strategies that can guide urban investments towards long-term development pathways. Moreover, cities, together with upper levels of government, can establish the right incentive for private investors to invest in urban infrastructure and in other urban assets.

7. To establish the right enabling environment to meet urban infrastructure challenges, effective local and urban policy is essential, as are appropriate financing mechanisms for City Governments. The OECD Principles of Urban Policy provide high-level guidance to steer the development of smart, sustainable and inclusive cities, built on three pillars – targeting an effective scale, adopting a coherent, integrated and effective strategy, and engaging



stakeholders – and 11 Principles (OECD, 2019^[6]) (Box 1). Principle 8 calls for harnessing adequate funding and financing for effective implementation of urban policy responsibilities at all levels of government. This includes promoting a diversified, balanced and sustainable basket of resources (grants, taxes, user charges and fees and revenues from assets), providing subnational governments with sufficient leeway to adjust and manage their revenues or “fiscal space” (G20-OECD, 2022^[7]), mobilising innovative financing tools, and leveraging private sector finance. Given fiscal risks that can arise from excessive subnational government borrowing, expanding City Governments’ access to finance must be done in a way that is fiscally responsible. This requires ensuring that appropriate fiscal rules are in place, making sure that there is sufficient institutional capacity, and supporting transparent borrowing practices (G20-OECD, 2022^[7]).

Box 1. Role of cities in financing urban infrastructure investment: OECD Principles on Urban Policy (2019)

Building on 20 years of urban policy work, the OECD Principles on Urban Policy, adopted by all OECD countries in March 2019, offer a framework to guide national and subnational policymakers in building smart, sustainable and inclusive cities in responsibility shared between the public, private and non-profit sectors. The 11 principles are organised around the “3S” framework of Scale, Strategy and Stakeholders:

- Adapt to the **scale** where people live and work in real life, beyond administrative perimeters drawn on a map
- Align all policy sectors that play a key role in cities – from economic development and education to housing, transport and land use – into a coherent **strategy**
- Engage **stakeholders** from all segments of society to put people at the centre of urban policy



Under ‘Strategy’, Principle 8 specifically highlights harnessing adequate funding for effective implementation of responsibilities for urban policy at all levels of government by:

- Promoting a diversified, balanced and sustainable basket of resources
- Using economic instruments such as taxes or fees
- Providing subnational governments with sufficient leeway to adjust and manage their revenues
- Mobilising innovative financing tools; and
- Leveraging private sector funding



Source: (OECD, 2019^[6])

8. As highlighted in the OECD Principles, all levels of government are responsible for implementing urban policy. Subnational governments are responsible for around 60% of public investment in G20 countries and 40% globally (G20-OECD, 2022^[7]). To effectively discharge these responsibilities, subnational governments need to coordinate across levels of government, and, in particular, across jurisdiction boundaries within urban agglomerations. The OECD Principles also call for stakeholder engagement, in particular for investments and developments that can support high-quality and inclusive urban infrastructure.

Key framing conditions and actors to finance the cities of tomorrow

Financing cities of tomorrow requires co-ordinated government action and engagement of diverse actors.

9. All levels of government and other public sector actors, such as multi-lateral development banks and national development banks have an important role to play in financing urban infrastructure. National governments set strategic orientations and frameworks to guide urban development and infrastructure investment. They can also directly fund, finance and provide urban infrastructure, and help catalyse investment from other sources. City Governments³ – a term adopted in this report to refer to the diversity of

³ This document adopts the term ‘City Governments’ to cover the diversity of subnational governments and publicly owned utility companies (e.g., local municipal companies) that are responsible for providing infrastructure in cities. These can include large and small



subnational governments and other organisations owned by these governments who invest in urban infrastructure – are often responsible for providing essential infrastructure in cities (e.g., public buildings, community, culture and recreational spaces, public transit). The private sector also plays an essential role, either by investing directly in urban infrastructure (e.g., private buildings) or by participating in public infrastructure projects. Given the multiplicity of actors involved in providing urban infrastructure, effective co-ordination across levels of governments, jurisdictions and sectors is critical (G20-OECD, 2022^[7]; OECD, 2014^[8]).

10. Vertical co-ordination across levels of government helps to strengthen the efficiency, effectiveness and complementarities of infrastructure investments. Co-ordination can also help ensure that investments achieve their intended benefits and align planning and implementation actions across levels of government. It can also help to identify shared investment opportunities and bottlenecks, manage joint responsibilities and minimise contradictory investments. Vertical co-ordination mechanisms can include city deals or contracts, regional or local development strategies, platforms for inter-governmental dialogue and dedicated regional development agencies.

11. Horizontal co-ordination between jurisdictions is also essential given that many types of infrastructure investments do not neatly fit within one jurisdiction. Horizontal co-ordination across jurisdictions can ensure that investments harness economies of scale, promote efficiencies, and enhance policy synergies among jurisdictions. Given that many urban agglomerations include neighbouring local authorities, inter-municipal co-operation is particularly important. Cross-jurisdiction co-ordination can be encouraged through financial and non-financial incentives, and agreements between jurisdictions, such as inter-municipal cooperation arrangements like in France where they are widespread.

12. Co-ordination is also required across sectors to support the adoption of a holistic and place-based approach that increases the long-term benefits of infrastructure investment. This requires identifying the different types of investment that are needed to support high quality urban development, such as public investment in utilities or roads, and private investments in buildings. It is also required to coordinate the timing of those investments. This process can be supported by engaging private sector and civil society stakeholders in the design and implementation of development strategies.

13. Multi-lateral institutions such as multi-lateral development banks (MDBs) are key financing actors in many emerging market and developing economies. They may directly or indirectly support City Governments. Direct support can be provided through loans, technical assistance, capacity building and credit enhancement instruments (e.g., guarantees), among other mechanisms. Indirectly support for City Government investment

municipal governments, as well as metropolitan and regional governments. The structure and responsibilities of City Governments is often complex and can vary significantly across and within countries (e.g., city-states, capital cities, large cities and medium-sized cities, etc.). Infrastructure in a single city area might be mainly provided by a single large local government, or by multiple levels of government and neighbouring jurisdictions.



may come through MDB loans to national development banks or other financial institutions who then lend to City Governments and other actors who invest in urban infrastructure.

Both funding and financing are essential for supporting urban infrastructure investment

14. Both funding and financing are essential for supporting urban infrastructure investment (Box 2). Financing is essential to help spread the high up-front capital expenditure of infrastructure over time and bridge the gap between the timing of payments for construction and future revenues. Having sufficient and predictable sources of funding is essential to be able to help pay operational expenses, including for maintenance, and to repay financing. Insufficient funding is often a key investment barrier for subnational governments and is essential for accessing finance. Indeed, the availability of sufficient and reliable funding sources is a key factor considered by credit rating agencies when assessing a subnational government’s creditworthiness (G20-OECD, 2022^[7]).

Box 2. ‘Funding’ and ‘financing’

‘Funding’ and ‘financing’ are interlinked but distinct terms used throughout this report to refer to capital infrastructure investment. In this report:

- **Funding** refers to the sources of money raised to pay for an investment. Government funding sources may include taxes, user charges and fees, grants and subsidies (particularly for subnational governments) and property income, among others. Funding for infrastructure may also come from a specific user-charge paid to a private infrastructure operator (for example, under a concession agreement or for privately-owned infrastructure). While funding is not required to pay up-front investment costs, it is required to pay for operations and maintenance, and to repay financing.
- **Financing** refers to money from private or public financial institutions used to pay some or all of the up-front investment cost, which comes with an obligation for future repayment. For subnational governments, a ‘golden rule’ applies in many countries meaning that financing can only be used for investment needs and cannot cover current expenditure (e.g. operating costs). Financing may be debt (loans, bonds) or equity, particularly in the case of a Public Private Partnership. Financing is repaid from funding sources.

Source: Adapted from (G20-OECD, 2022^[7])

15. Given the important role of subnational governments to provide urban infrastructure, these governments have a role to harness sources of funding and financing to fulfil their investment responsibilities. Effective investment can be supported by subnational government having a balanced basket of revenues (i.e., a mix of grants, taxes and user charges) (OECD, 2019^[9]). It can also be supported by having appropriate financing options. While it is often appropriate to have rules in place to manage fiscal risks relating to



subnational government borrowing, subnational government borrowing is usually considered appropriate (IMF, 2020_[10]). Alongside helping to meet investment needs, subnational borrowing can also increase accountability and strengthen financial management practices and in-turn overall capacity. User charges and fees can provide an equitable way of funding infrastructure if the accessibility of low-income users is considered. They provide a direct link between beneficiaries and payment, and for many types of infrastructure it is considered appropriate for users pay for infrastructure costs (OECD, 2021_[11]), although it is crucial to assess ‘willingness and ability to pay’ and match them with ‘willingness and ability to offer services’.

Key areas of action to create the cities of tomorrow

16. This chapter has set out the rationale and overall context for financing cities of tomorrow. It also described the analytical framework used to identify a suitable mix of public and private funding and financing mechanisms to meet local urban infrastructure needs across G20 countries.

17. The next three chapters highlight three areas of action to create cities that are resilient to current and future shocks and transitions (Table 1):

- First, **effective urban planning** is essential (Chapter 2). Outdated and complex urban planning frameworks and building regulations impede private investor decisions. This is why improving planning processes, including through effective inter-municipal cooperation and rural-urban partnerships within metropolitan areas, can help to create a coordinated pipeline of infrastructure projects that maximise the use of public resources and facilitates private sector investment in infrastructure.
- Second, there is scope to better **leverage private investment through a better coordination with potential investors in urban planning processes** in support of high-quality urban developments (Chapter 3). Effective public investment can unlock significant value for the private sector, which can be directed to help create high quality-built environments that are more inclusive, resilient and sustainable for citizens.
- Third, there is significant potential to **improve the ability of City Governments to mobilise sustainable finance** for quality infrastructure investment (Chapter 4). Growing demand for sustainable finance, as well as development of enabling policy frameworks can help these governments to meet their investment needs given that many of their responsibilities are linked to sustainable infrastructure.

18. In the annex, several case studies illustrate how each policy instrument analysed in the three chapters works in practice and draws lessons for replicability.



Table 1. Areas of action to create the cities of tomorrow

Planning the Cities of Tomorrow Chapter 2	Leveraging private investment for the Cities of Tomorrow Chapter 3	Financing City Governments of Tomorrow Chapter 4
Getting planning right to guide urban investment to be more inclusive, resilient and sustainable	Facilitating strategic collaboration between the public and private sectors to finance a high-quality urban built environment	Improving the ability of City Governments to access affordable and sustainable finance for quality infrastructure investments in a fiscally responsible way

Source: Author's elaboration



Getting planning right for more inclusive, resilient and sustainable urban investment

Rationale

Better urban planning improves the likelihood of raising private capital for inclusive, resilient and sustainable urban investments

19. Effective urban planning, namely, the systematic design and organisation of land use and amenities in a city, can play an instrumental role in optimising urban infrastructure financing, by way of maximising investment benefits and creates significant opportunities to attract private investments.

20. First, effective urban planning can foster medium to long term regulatory predictability for public and private investors by providing a longer-term planning framework that outlines the city's plan of action for its future development trajectory. For instance, key strategic planning documents accompanied by a set of adjusted planning instruments in cities, such as Master Plans that are renewed and adapted to contemporary societal, economic, and environmental challenges of the city create a longer-term development vision and stability, thus reducing risks for investors when financing new infrastructure projects.

21. Second, urban planning can help cities better prepare for and cope with a more stringent regulatory environment for new building and construction projects, which include for example complex guidelines, regulations and zoning laws that are not always conducive to private infrastructure projects. Such complexity can lead to long building permit processes and a situation in which not only private investments are deterred but also capital investment projects. Many cities across G20 countries are therefore applying special zoning approaches at a neighbourhood level to customise building regulations in conversation with investors, such as for building heights, densities, and energy efficient designs, facilitating a more transparent, spatially targeted and conducive environment for engagement with investors. Planning at a lower territorial scale, such as for the redevelopment of brownfield areas in a city, allows for a more targeted discussion with investors, e.g., real estate actors, on opportunities.

22. Third, communicating and proactively promoting new urban planning frameworks to key stakeholders in a city creates buy-in and co-financing opportunities. By local governments providing information on new capital investment projects, ongoing planning reforms and their effects on building and construction regulations, this can create clarity and reduce uncertainties for private investors. Proactive, stable, and strategic communication with investors on investment opportunities has proven to be successful in many cities across G20 countries, including through a one-stop shop for investors.

23. Finally, national-level policy decisions, regulations and reforms influence urban planning and have strong impacts on investors’ decisions in cities. It is often at the national level where permit processes and legal protections for investments are legislated. Creating a national regulatory framework in coordination with local governments in which subnational governments can engage in Public Private Partnerships is a critical condition for leveraging private sector investments at the local level. In addition, national governments can provide an overall policy framework to align national development initiatives for cities, promote local investment opportunities and provide incentives for cities to attract private investors. In many G20 countries, national initiatives, such as National Urban Policies, are raising awareness of investment opportunities in cities, encourage cities to seek new partnerships with the private sector and ensuring an orientation towards inclusive, resilient and sustainable urban investments.

24. The way in which infrastructure in cities is planned and governed has a direct influence on the amounts and types of urban infrastructure investment needed, as well as on the ability of governments to attract related financing. This is of particular importance as planning capacities of cities and regions vary considerably across G20 countries, leading often to unbalanced urban growth patterns and unequal access among citizens to key infrastructure and services. Better urban planning can attract financing of key infrastructure, increase inclusive cities and balanced urbanisation. More specifically, the chapter discusses a sample of urban planning instruments and related examples from G20 countries, including city masterplans, approaches to transit-oriented development and green urbanism, as well as zoning at district and neighbourhood levels to create financial incentives for developments as well as control, regulate and/ or stimulate desired development outcomes in a particular area (Table 2). It concludes with suggestions to unlock the contribution of National Urban Policies to foster a conducive national enabling environment for urban infrastructure investments.

Table 2. Possible actions for planning the Cities of Tomorrow

Urban planning instruments	National enabling environment for urban infrastructure investment
The way in which urban planning is exercised plays an important role in how additional financing, including private sector investment, is attracted. Innovative urban planning instruments can establish new ways to make investors aware of new investment opportunities and guide their investment decisions.	A national enabling environment for infrastructure investment in cities can send a strong signal of the overall ambition for urban development and guide private investors.
Featured Tools	
City Master Plans Zoning Transit-oriented development Green Urbanism	National Urban Policies and Initiatives
Case Studies	



<p>Master Planning in Southampton (United Kingdom)</p> <p>Innovative Urban Planning combining transit-oriented development in New York (USA)</p> <p>Planning and leveraging financing for green, urban infrastructure in Punggol Eco-Town (Singapore);</p> <p>Zoning for redevelopment and conservation of cultural heritage, such as in Hamburg (Germany)</p>	<p>National Urban Policies in India</p>
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Source: Author’s elaboration

Main instruments

25. Urban planning often reflects a city’s strategic approach to land use and the built environment and the conditions of private sector engagement in new infrastructure projects. Several instruments are generally used to plan the strategic development of a city, such as through master plans, zoning regulations and development control guidelines. While Master Plans usually provide a long-term vision of the city outlining key priorities and development strategies that ensure that infrastructure projects are aligned with the overall development vision of the city, subsequent zoning policies regulate the spatial organisation of a city including land uses, densities, and urban design. Within this urban planning framework, approaches to transit-oriented development and to green urban infrastructure are embedded, which offer distinct opportunities for cities to leverage private investments.

Master Plans

Using the revision of city master plans to raise the interest of private investors

26. **Master plans** are generally used in urban planning to provide a comprehensive blueprint for decision making and longer-term vision for the physical development of a city with its districts and neighbourhoods. These plans usually cover a 15 to 20-year time period and seek to translate the city’s growth aspirations into concrete goals and actions. These forms of strategic plans touch upon various aspects, such as land use, transportation, infrastructure, housing and environmental sustainability. They are accompanied by detailed studies and assessments, such as on land use, population growth, infrastructure needs and economic performance. As these plans are formulated to cut across different electoral cycles of local governments, the formulation of a city’s master plan by the local administration needs to be based on a broad stakeholder consultation and information sharing process to secure the long-term buy-in from the public and political constituencies, which can secure, in turn, long-term capital investments projects and support for land conversions.

27. The design or renewal of a city’s strategic urban plan, such as a master plan, can provide opportunities to attract private financing for sustainable infrastructure projects. The consultations in developing the plan offer a forum for discussing specialised infrastructure requirements, including those for renewable energy systems, energy efficient buildings, effective transportation systems, and smart city technology. During this process, private



developers have an opportunity to contribute their knowledge and creative ideas to the master plan, ensuring that the proposed infrastructure complies with market expectations and industry standards. Additionally, consultations help to reduce potential risks and uncertainties by enabling private investors to evaluate the viability and financial feasibility of sustainable infrastructure projects. The quality and efficacy of the infrastructure are both improved by this collaborative approach, which also boosts private investors' confidence and interest in funding such projects.

28. **Southampton (United Kingdom)** provides an example of how transparency and consultations on new strategic urban planning frameworks can help increase private investments (Case Study 1). In 2022, the city council set out a participatory process to renew its city vision for the next 20 years, which has contributed to attract and actively seek out investors by carefully plotting the precise developments needed to realise the city's objective. For instance, the current draft master plan identifies key sites for redevelopment, such as its Mayflower Quarter, providing detailed scenarios on how the area could be redeveloped to accommodate new facilities for business, homes, retail and leisure. Indeed, the draft master plan lays out several scenarios for the repurposing of available land in the area, for which investors are invited to suggest modifications and additions. Such a proactive approach had also been used and tested in former strategic plans to raise private investment, thereby securing almost GBP 2 billion of investment for the city centre, plus a further GBP 1 billion in the remainder of the city.

Transit-oriented Development

[Leverage sustainable private investment through inclusion of Transit-Oriented Development approaches in new urban developments](#)

29. **Transit oriented development (TOD)** is a planning concept to promote compact, mixed-use, and pedestrian-friendly development organised around a transit station. TOD embraces the idea that locating amenities, employment, retail and housing around transit hubs promotes transit usage and non-motorised travel (Suzuki et al., 2015^[11]). Since its early stages in the 1970s, TOD has become increasingly popular across G20 countries to realise mixed use, sustainable urban development around public transportation hubs in cities. Infrastructure projects for transportation hubs, especially in metropolitan areas, have leveraged contributions of private investors allowing land-value capture by the city, thus attracting investments into capital infrastructure projects for the public benefit (OECD/Lincoln Institute of Land Policy, PKU-Lincoln Institute Center, 2022^[12]). TOD offers an attractive opportunity for private investments because of a stable revenue stream emanating from a transport system, the potential of higher property values, efficiency gains for future commuters and an overall attractive living environment for property buyers and renters. It can also encourage private developers to invest in the built environment beyond the actual property, such as in parks or other recreational spaces.

30. The redevelopment of **Hudson Yards in New York (United States)** is one illustrative example of a TOD approach leveraging private investment (Case Study 2). The project required a collaboration between the city government, developers, and other stakeholders.



Through a revision of land use guidelines, which changed the parameters for the neighbourhood's vision, such as the permissible building heights, land use categories, and development density, the city government worked closely with developers to clarify the impacts and opportunities of these guidelines to ensure potential investment into projects. Negotiating development contracts and agreements, addressing legal and financial issues, and ensuring compliance with the city's requirements and regulations were areas of engagement with property developers. In addition to securing the buy-in of the real estate sector, this close interaction allowed the government to make use of land value capture to help finance development and infrastructure improvements, such as extending a subway line to serve the area (Lincoln Institute of Land Policy, 2017_[13]).

Green Urbanism

[Apply approaches to green urbanism in urban planning as a catalyst for private investments in sustainable infrastructure and energy-efficient buildings](#)

31. **Green urbanism** is a design approach and model seeking to consciously reduce future emissions in urban development and create a healthier and more liveable environment for citizens. It fosters eco-friendly, urban planning designs, which include low carbon transport modes, such as walking, cycling and the use of public transport, energy-efficient buildings, and wind, solar, and biogas-based energy sources. The concept has found its application in strategic development plans, such as master plans but also in regulations for new building projects. Incorporating green building standards and certifications and renewable energy systems into the planning of resilient infrastructure and construction projects can offer investors lower operating costs in the future, reduced energy consumption, and increased property values, making developments financially attractive for green conscious private investments.

32. The award-winning project of **Punggol Eco-Town (Singapore)** has applied a Green Urbanism approach to create an entire new town aimed at driving sustainability, reducing carbon emissions and promoting a better quality of life for residents (Case Study 3). Based on a master planning exercise in the mid-2000s, Punggol emerged as Singapore's first eco-town acknowledging the importance of key green infrastructure, such as cycling paths and rainwater harvesting systems. The eco-town continues to be considered as a 'living laboratory' to test new ideas and technologies in Singapore, such as solar photovoltaic systems in buildings, dual bicycle racks, energy re-generation systems for lifts, smart lightening, and smart energy meters. The financing of Punggol Eco Town includes a mix of public and private finance. The Singapore government contributed significantly to the town's development through the national government budget. Throughout the planning process design competitions were held to enable the private sector to shape and suggest innovative features into the master plan of Punggol (Centre for Liveable Cities, 2021_[14]).



Zoning

Raising capital for the redevelopment of brownfield areas through zoning approaches

33. **Zoning** is a key instrument in urban planning that controls and organises land use within a city or municipality by segmenting areas into various districts or zones, each with its own rules and limitations for acceptable land use and development. Zoning is often applied to guide and support controlled redevelopment of brownfield sites, former industrial areas, and abandoned or contaminated land within a city area. For this purpose, cities can include clauses and incentives in their modified strategic plans to attract private investment. These clauses could contain zoning rules that boost eco-friendly and energy-efficient construction, rewards for renewable energy initiatives, and financial assistance for green infrastructure projects.

34. Zoning can also be used to preserve historic areas of a city, as can be seen in the redevelopment of the HafenCity in **Hamburg, Germany** (Case Study 4). This former port district and UNESCO heritage site was redeveloped under strict building regulations to preserve its iconic buildings, such as the world's largest warehouse complex in the former port, as well as to create green spaces and pedestrian zones. In close consultation with private developers, new buildings met environmental and energy efficient standards and incorporated solar panels and green roofs in the design. Throughout the redevelopment phase, collaboration with the private sector was crucial for the financing, construction, and management of infrastructure, such as new residential and commercial buildings, cultural facilities, and a cruise terminal. Private developers purchased land parcels and applied guidelines and regulations as set out by the master plan. Building projects also included multi-generational living for families, students, seniors and people with disabilities. As well as a multitude of private developers, joint building ventures and housing co-operatives, a variety of social organisations are building an extremely diverse and social mixed stock of housing. Most projects received funding from private investors and in 2020, the investment volume for the redevelopment of the HafenCity had reached 13 billion EUR, off which 10 came from the private sector (Deutsche Welle, 2023_[15]).

National Urban Policy and Initiatives

Create a conducive national environment for better urban planning and promotion of infrastructure investment opportunities in cities

35. Most G20 member countries have already initiated, formulated or evaluated **national urban policies** (NUPs)⁴ or equivalents, including through a focus on cities in national development strategies or sectoral plans, such as national housing policies, or transport or land use plans (OECD/UN-HABITAT/UNOPS, 2021, p. 61_[16]) . While formulating a

⁴ Definitions of NUPs vary across countries, but they commonly refer to a coherent set of decisions through a deliberate, government led process rallying and co-ordinating diverse actors towards a common vision and goal to promote transformative, productive, inclusive and resilient urban development for the long term.



common vision and strategy for more productive, inclusive and resilient urban development across a given country, NUPs can also encourage and incentivise national or regional actions to promote private investment in urban infrastructure. For example, NUPs can outline priority areas for future infrastructure development and strategies that may require attracting private financing. They can recommend the adoption of national or local financial incentives, such as grants, for investors that apply sustainable design and construction practices in their projects. National frameworks aiming to support the implementation of NUPs can also facilitate public-private partnerships (PPPs) by providing legal frameworks, risk-sharing mechanisms, and streamlined procurement processes, enabling private investors to collaborate with the government in delivering sustainable infrastructure solutions.

36. **India’s National Urban Policy Framework (NUPF)** formulated in 2018 is an example of how a common vision for cities can be framed to accommodate different capacities of cities to undertake urban planning and attract private investments for infrastructure (Case Study 5). Before the NUPF, Master Plans in India were too detailed to accommodate the externalities emerging from rapid urbanisation of cities in the country. The plans were often *‘unconnected to investment planning’*⁵ and missed linkages between the spatial and functional aspects required for expanding cities (Government of India, 2018, p. 12_[17]). Outlining recommendations in policy areas, such as urban planning, physical infrastructure development and municipal finance, the NUPF aimed at creating conducive mechanisms at national level to improve urban planning in cities by increasing the city’s financial and operational capacity to attract private investments. The NUPF called for a shift from a project-based funding approach to an outcome-based system in which, for example, more financial support is given to those states and cities that were able to access commercial financing for their capital investment projects (‘raise more, gain more’ principle). For those municipalities with limited financial capacity to attract private investment, the Government of India considers *“intervening in the credit market to reduce the cost of funds or help improve their access to credit by interest subventions and partial credit guarantees”*. (Government of India, 2018, p. 10_[17]). As part of the NUPF implementation, the revision of the master planning system, has been proposed in 2018. NUPF has set directions emphasising on several actions that are being adopted by sub-national governments, such as Intelligent Transportation Systems (ITS), gender-friendly designs, alleviation of traffic congestion, improvement of financial standing of local authorities, data-driven decision making etc.

37. In addition to NUPs, several G20 countries have launched specific national investment initiatives to attract private investment for urban infrastructure. Under the **Investing in Canada Infrastructure Program (ICIP)**, over CAD 33 billion for public infrastructure is being delivered through bilateral agreements between Infrastructure Canada and each of the provinces and territories. Under this programme, provinces and territories

⁵ The 10 sectors covered by the framework are Urban Planning, Urban Economy, Physical Infrastructure, Social Infrastructure, Housing and Affordability, Transportation and Mobility, Urban Finance, Urban Governance, Urbanization and Information System and Environmental Sustainability.



prioritise and submit projects to Infrastructure Canada for review. ICIP delivers funding to help communities reduce air and water pollution, provide clean water, increase resilience to climate change and create a clean-growth economy, build strong, dynamic and inclusive communities, and ensure Canadian families have access to modern, reliable services that improve their quality of life (Government of Canada, 2023^[18]).

38. A national initiative aimed at raising private sector interest for urban infrastructure investments can also be found in Australia. Based on the 2011 National Urban Policy and the 2021 Infrastructure Plan, the **Australian Government** and its advisory body, Infrastructure Australia, have been maintaining a national infrastructure and reform priority list for infrastructure investments into cities and so-called reform implementation pathways (Infrastructure Australia, 2023^[19]). Sensitive to different geographies and sizes of cities, the investment plan puts particular attention on a place-based approach in infrastructure investment through targeting a set of place-based outcomes, taking the needs of communities into consideration, as well as fostering a cross-sectoral view of interrelated infrastructure and amenity needs of a given place (Infrastructure Australia, 2021^[20]).

39. National initiatives can also support cities in their aim to attract foreign investment. Japan's 2015 National Spatial Strategy includes an objective for cities and metropolitan regions to attract foreign investment to increase growth (OECD, 2017^[21]). This has been operationalised through initiatives, such as by the Japanese External Trade Organisation (JETRO), which directly supports a strategy to attract overseas companies and investments in cities across Japan (Japan External Trade Organisation, 2023^[22]). Regular Regional Business Conferences (RBC) are also organised by local governments to invite foreign-affiliated companies' executives for investment opportunities and encourage a matchmaking between new local businesses with foreign investors. Additionally, JETRO provides an online navigator for investing in Japan's cities and regions, allowing foreign investors to retrieve customised information. This includes data on the attractiveness and investment environment of the cities, such as their key industry clusters, and the types of financial incentives, such as subsidies, to attract foreign investment.

Planning the Cities of Tomorrow: the way forward

Urban planning can improve the ability of cities to attract private investments for more inclusive, resilient and sustainable infrastructure. To build a conducive environment for the further use of urban planning instruments, the followings actions are proposed:

- **Shape a new generation of strategic plans that are fit for purpose to address the 21st century challenges:** Given the necessary reforms needed in cities, starting from building and transport systems, to curb emissions and to meet climate targets, cities need to revise their strategic planning instruments. Revising Master Plans enables cities not only to be better prepared to face pressing and emerging issues stemming from the climate, digital and demographic transitions, but also to attract private



investors through modernised and responsive plans. National Urban Policies and Support Initiatives could provide helpful guidance, benchmarks and financial incentives to develop a new generation of Master Plans for cities. This new generation of plans may also make use of new forms of geographical data generated through IoT, whose analysis could help informing effective and more targeted master plans. National policies and initiatives can also encourage intermunicipal cooperation for integrated planning across neighbouring cities to pool investments and raise private capital for infrastructure development at the relevant scale (OECD, 2021^[23]).

- **Creating a regulatory environment for private investments that works:** Many cities are facing a more stringent regulatory environment for new building and construction projects. By establishing transparent and predictable processes, including zoning regulations, permit procedures, and environmental impact assessments, governments can create confidence in private investors and attract their participation in sustainable infrastructure projects. In addition, national governments can adapt legal frameworks and instruments allowing private actors and financing institutions to be mobilised to diversify sources of funding to build metropolitan infrastructure projects (OECD, 2016^[13]).
- **Strengthen stakeholder collaboration and engagement:** National and City Governments can foster collaboration between different stakeholders, including government agencies, private sector entities, academia, and civil society organisations through consultations around the introduction of new urban plans and create suitable knowledge exchange and online matchmaking platforms. By facilitating dialogue and sharing best practices, governments can promote the effective use of urban planning instruments for sustainable development and for attracting private investments. This collaboration can lead to innovative approaches, capacity building, and the exchange of ideas in support of the creation of inclusive, resilient and sustainable infrastructure.



Leveraging private investment to make urban space more inclusive, resilient and sustainable

Rationale

Financing of urban infrastructure cannot be achieved without leveraging private investment.

40. City Governments have a key role in the planning and provision of more inclusive, resilient, and urban infrastructure, with subnational governments responsible for almost 60% of total public investments in G20 countries (OECD, 2022^[1]). However, the investment capacity of cities through own revenues, such as taxes and government budgets, particularly in a tight fiscal and monetary environment is limited, creating significant funding gaps for to meet current and future infrastructure needs. Private sector investment⁶ can play an important role in meeting those needs but significant efforts will be needed to raise the current contribution of the private sector.

41. Critically, it's important to stress that private investment is not only a source to fund public infrastructure but also a source of economic growth, providing urban residents with economic opportunities and well-being, that can also stimulate higher revenues for City Governments.

42. The mix of public and private funding and financing mechanisms that are available and suitable to meet local urban infrastructure needs can also vary across places. For instance, in areas where private investment is not present or strong, effective public investment can act as a catalyst for private investment. Policies that place a stronger focus on the role of urban planning and other legal and institutional frameworks can also create private investor confidence.

Adapting urban infrastructure to climate change and ageing requires significant investment.

43. Financing cities of tomorrow will require both public and private investment to effectively address fast-changing and place-specific urban challenges. For example, renewal of ageing and obsolete urban infrastructure is one of the most urgent challenges that cities face in advanced economies, while most of the infrastructure needed to meet the sustainable development goals still needs to be built in developing and emerging economies. The increasing climate and biodiversity crises require cities to urgently invest in decarbonising buildings and urban green infrastructure using with Nature-based Solutions, as alternatives to grey infrastructure, for climate adaptation and for enhancing urban resilience, as the cost

⁶ Urban sprawl refers to uncontrolled urban expansion without adequate infrastructure and adequate service provision. Levies, fees and charges allows cities to manage urban expansion by provide necessary infrastructure in a timely manner with development occurs.



of inaction may be prohibitive. Some cities are facing ageing populations, migration and other demographic challenges, requiring cities to consider adjustments to their urban infrastructure and service structures. Moreover, the advancement of digital technology (e.g., in driving remote working and learning, automated vehicles etc.) is also reshaping infrastructure needs.

Policies and instruments should reflect specificities of urban infrastructure financing.

44. While a variety of different policies and instruments can be deployed to leverage private sector investment in the urban space, they should reflect specific features of urban infrastructure financing, which can be characterised by its actors, scale and diversity. First, enabling and helping local governments experiment with new policies and instruments is essential, given their role in building and maintaining urban infrastructure. Second, policies and instruments should target a variety of private investors in the urban space, ranging from individual landowners to large scale development firms and institutional investors. Third, urban infrastructure varies in scale and type – compared to highways and dams, many urban infrastructures such as streets, parks and utilities are relatively small, while others such as a metro system require large-scale financing. Dykes and coastal infrastructure have strong public goods characteristics, whereas urban buildings and utilities can be operated by the private sector. Fourth, as quality urban infrastructure investment can increase land value, land value capture mechanisms can be effectively used to raise funds for additional investments such as public transportation or affordable housing.

Main instruments

45. Instruments to leverage private investment in urban areas can be categorised into four groups: i) development levies, fees and charges; ii) strategic land and building rights management; iii) subsidies and tax incentives; and iv) partnership models between cities and the private sector (Table 3). The following sections provide more detail on each, including via specific examples in different urban policy contexts.

Table 3. Possible actions to leverage private investment in urban areas

Categories	Development levies, fees and charges	Strategic land and building rights management	Subsidies and tax incentives	Partnership models between cities and the private sector
Type of public sector engagement	(regulatory)			(collaborative)
Suggested action	Take advantage of development opportunities of	Create a conducive investment environment to	Use incentives to direct private investment towards	Explore comprehensive partnership



	developers to gain funding for public urban infrastructure investments that increase the value of private developments	attract private capital in urban space	local policy priorities, such as the green transition or affordable housing development	agreements across levels of government, the private sector and communities to plan, design and implement urban development
Type of development / infrastructure leveraged by private investment	Local infrastructure (e.g., streets, parks, schools). city scale infrastructure (e.g., metro networks)	Offices, commercial and residential buildings in urban areas	Affordable housing, green buildings	Local infrastructure, urban services (e.g., street maintenance), investment in real estates
Types of private sector to be engaged	Developers, individual landowners	Developers, individual landowners, institutional investors	Developers, individual landowners, institutional investors	Local business owners, landowners, enterprises, etc.
Main instruments	<ul style="list-style-type: none"> Infrastructure levies Charges for building rights Biodiversity offsetting 	<ul style="list-style-type: none"> Land banking Land pooling Transfer of development rights (TDR) Charges on underused land 	<ul style="list-style-type: none"> Floor Area Ratio bonus 	<ul style="list-style-type: none"> Local Green Deals Business Improvement District (BID) Payment for eco-system services
Examples	<ul style="list-style-type: none"> Mayoral Community Infrastructure Levy (UK) Biodiversity offsetting in Paris (France) 	<ul style="list-style-type: none"> TDR in Sao Paulo (Brazil) TDR in Chongqing (People's Republic of China) 	<ul style="list-style-type: none"> Density bonus in Vancouver (Canada) 	<ul style="list-style-type: none"> Mannheim Local Green Deal (Germany) Cape Town Central City Improvement District (South Africa)

Source: Author's elaboration

Levies, fees and charges for development rights

Scaling up the use of levies, fees and charges and promoting their flexible use will open new opportunities for cities to finance infrastructure in areas of strategic importance.

46. Cities are often responsible for managing urban development in the form of planning and regulations (e.g., zoning, development permits) and are, therefore, well-positioned to use levies, fees and charges to finance urban infrastructure and associated services. A clear benefit is that these fees are up-front, i.e., landowners or real estate developers are required to pay them prior to or at the time development begins. This guarantees cities access to capital earlier than if it had to wait for incremental service charges, property or other tax revenues that might be generated by the new development (Amirtahmasebi et al., 2016^[25]), thus reducing



the risks of urban sprawl⁷ and associated urban challenges (e.g., traffic congestion). The amount and the use of the collected fees, etc. should be carefully assessed to provide for an economic case for the private sector so as not to discourage investment, but to mitigate distributional impacts on vulnerable population groups (e.g., through targeted infrastructure investment in most needed areas). Since this type of instrument assumes that private sector contribution (or costs from the perspective of the private sector) can be covered, entirely or partially, through increased property value, pooling collected fees with public capital would be necessary in areas where investment demands are not strong.

47. **Infrastructure levies** can be used in combination with other means of financing. For example, in 2012 the Mayor of London introduced the Mayoral Community Infrastructure Levy to specifically help finance the rail link Elizabeth Line (Crossrail) connecting central London to Western and Eastern suburbs (Case Study 6). While the mechanism was introduced and given legal ground by the UK government in 2010, the local planning authorities in London have been responsible for calculating the charges and collecting payments, (Mayor of London, n.d.^[26]). The instrument collected more than GBP 1 billion between 2012 and 2022, which were transferred to Transport for London. The flexible use of levies and fees opens new opportunities for cities to finance infrastructure in areas of strategic importance.

48. **Charges for building rights** are cash or in-kind contributions payable in exchange for additional development rights or development potential above a set baseline (OECD/Lincoln Institute of Land Policy, PKU-Lincoln Institute Center, 2022^[27]), which can also be a powerful tool to raise public revenues. It allows private investors to develop additional building space by paying charges, opening up new investment opportunities, whereas cities can support them by investing in infrastructure using collected charges. It is used in at least 20 countries and relatively more common in the Asia-Pacific and Americas (OECD/Lincoln Institute of Land Policy, PKU-Lincoln Institute Center, 2022^[27]). In Brazil, such charges are commonly used in large cities, where the real estate market is dynamic and the Floor Area Ratio (FAR) is low, either historically or through legal reforms. For example, in **Sao Paulo (Brazil)**, the instrument has been important source of revenue to the city (Case Study 7).

49. Cities are also under increasing pressure to ensure that private development in cities protects long-term environmental sustainability. **Biodiversity offsetting** is a mechanism specifically designed to compensate for significant, residual biodiversity loss that arises through development projects (OECD, 2016^[28]). Offsetting is based on the premise that adverse impacts from development can be offset if sufficient habitat can be protected, enhanced or established elsewhere nearby to the development. Such a mechanism can guide private investment to ensure nature-positive urban development and enable cities to finance green infrastructure investment in strategic locations. For private investors, it may incur a

7



cost in the short term, although they can also find it interesting to cooperate with City Governments, given increasing urban residents' interest in nature-based amenities. For example, the **City of Paris** (France) is working to identify opportunities to pool biodiversity offsetting projects to promote ecological connectivity and large contiguous areas of habitat, for example along the banks of the Seine or railway lines, guided by the Paris Biodiversity Plan 2018-24 (Case Study 8).

Strategic land and building rights management

Attract private urban investment by reducing project risks and increasing profitability for urban development.

50. As acquiring, assembling and developing land is a complex exercise for investors, cities should help reduce project risks and increase profitability for urban development through strategic land and building rights management, therefore attracting private investment. At the same time, cities can often raise funds for infrastructure development through capturing increased land value. This category of instruments includes land pooling, land banking, Transfer of Development Right (TDR) and charges on under-utilised urban land.

51. **Land pooling**, also called land readjustment or land consolidation, can be a useful instrument to stimulate private investment in cities, both for urban expansion and renewal of existing urban space. In areas where land is owned by many small landowners, the transaction cost of negotiating with them to acquire land can be an obstacle for development. To address the challenge, landowners are given incentives to pool their land so that public authorities can provide necessary urban infrastructure by using part of their pooled land for development. Such a mechanism can reduce investment risks and thus accelerate large-scale urban development projects led by private investment. Land pooling has been used widely including in Australia, China, Germany, Korea, Japan and Türkiye. Care must be taken to avoid speculative land transaction and protect the right of urban residents, especially those who do not own land (e.g., tenants).

52. **Land banking** can also be an effective tool for cities to make urban land suitable for private investment. Typically, cities can buy land for future sale or development without earmarking it for a specific purpose. After the purchase, they draw up a development plan, rezone and develop the land, either themselves or through private developers. This prevents unplanned private investment without proper infrastructure leading urban sprawl. Land banking can also be used to specifically address housing challenges. Community Land Trusts, as non-profit corporations, buy land to develop or facilitate the development of social housing. They can operate as a co-operative, under a lease-to-own model or act mainly as a facilitator of further development in partnership with the private sector. The challenge is to acquire reasonably priced land to start or expand the land trust, preferably in blocks of concentrated parcels. Governments can support them by providing land with discounted



price or providing subsidies (OECD/Lincoln Institute of Land Policy, PKU-Lincoln Institute Center, 2022^[27]). Land banking is also useful in cities facing population decline, as it can acquire vacant urban properties, maintain them and prevent them from deterioration, and facilitate desirable future use for cities, for example to provide additional urban green space for amenities. Indeed, addressing the abandoned land and homes was the major reason for many cities in the United States to create land banks in the second half of the 20th century (Blumgart, 2023^[30]).

53. The use of **Transfer of Development Right (TDR)** can be considered to attract private investment in strategic urban locations. Under the TDR scheme, development or building rights in a plot can be transferred to a different plot better suited to higher density development, and, in some cases, the rights can be traded as a financial security at a market price. Therefore, the instrument can be considered as a type of real estate securitisation. **Sao Paulo (Brazil)** has been applying the instrument since 2004, by combining it with the Charges for Building Rights, and succeeded in attracting private real estate investments into its designated urban redevelopment areas while raising funds for urban infrastructure (Suzuki and Murakami, 2015^[31]) (Case Study 7). However, such an instrument can also entail potential unintended consequences such as land speculation or uncoordinated development in certain locations without sufficient infrastructure. In Chongqing (People's Republic of China), the city designated a development right on the upper layer of a railway station to maximise the use of spatial resources (Case Study 9).

54. As underused land in central urban locations represents a large cost for society, **charges on underused land** can be an effective instrument to stimulate private investment, e.g., in urban housing (Moreno Monroy et al., 2020^[32]). In Korea, land left vacant for a minimum of two years is subject to progressive fees between 5% and 10% of assessed property value depending on the vacancy duration, instead of the normal property tax rate of 2% (World Bank, 2015^[33]). In Sao Paulo (Brazil), the city government can request landowners of underutilised or un-built properties to submit a project within one year, start the construction in up to two years and complete it in up to five years after the request. If they fail to comply with these deadlines, the city can charge a progressive tax over time, and after five years, resort to expropriation (City of São Paulo, 2014^[34]). The instrument can also be a substantial revenue source for cities, although effective implementation including identifying underutilised properties and regulating the process has been a challenge (Ondetti, 2016^[35]).

Subsidies and tax incentives

Use incentives to direct private investment towards local policy priorities, such as green transition or affordable housing development.

55. Cities can partner with the private sector to build high-quality urban built environment by providing specific incentives that can direct private investment towards key local policy priorities such as green buildings, public space, essential services (e.g., hospitals), resilient



urban infrastructure, or affordable housing. Cost-efficiency can be achieved if such investments can be carried out as part of private urban development projects, compared with public investment.

56. An example of such incentives to private developers is the **Floor Area Ratio (FAR) bonus**. **Auckland (New Zealand)** has used density bonus schemes primarily for large scale office buildings. In return for additional density, developers provide public amenities – such as public toilets, public spaces, walkways, early childcare centres and nurseries. In the **United States**, local governments frequently offer density and height bonuses and other regulatory reliefs in return for monetary contributions or in-kind provision of land, public utilities or social housing units (OECD/Lincoln Institute of Land Policy, PKU-Lincoln Institute Center, 2022^[27]). **Vancouver (Canada)** has designated “density bonus zones” in areas where extra density up to a specified maximum floor space ratio is allowed in exchange for cash contributions towards amenities and affordable housing, in addition to ordinary density relaxations in exchange for in-kind amenity provision as on-site public benefits (City of Vancouver, n.d.^[36]) (Case Study 10).

Innovative partnership models between cities and the private sector

Accelerate urban transformation through local public-private partnerships

57. Cities and the private sector should further explore ambitious and effective partnerships to plan, design and implement urban development. The **Public-Private Partnership (PPP) model** has been playing an important role to mobilise private finance for specific infrastructure projects, although the complexity of PPPs and the level of capacities required to design and implement them have been highlighted as obstacles for City Governments to widely use the model (OECD, 2018^[37]), especially given the scale of urban infrastructure is often smaller than major PPP projects (e.g. inter-city highways). Recently, many partnership agreements have emerged across G20 and OECD countries encompassing more comprehensive economic, social and environmental policy objectives and targeting specific urban districts. Such partnership agreements often engage a wide range of stakeholders, particularly levels of governments, local communities and the private sector. The following three models illustrate the potential of partnerships: Local Green Deals, Business Improving Districts and Payment for Ecosystem Services.

58. **Local Green Deal (LGD)** is a local tailor-made action plan to accelerate and scale-up a city’s green transition. It builds up existing strategies (e.g., sustainable energy and climate action plans), legislation, market and financial incentives into a coherent approach to advance the EU Green Deal locally. Collaboration with local businesses and other local stakeholders is embedded in the concept of LDG (European Commission et al, 2023), allowing coordination of public and private investment in urban areas. **Mannheim (Germany)** launched its LDG vision (the Mannheim Message) in 2020 and set out a number of actions covering eight thematic fields (climate neutrality, energy, economy, mobility,



building, food, biodiversity, and urban environment). Cooperation between the City and local stakeholders is a core principle of the Mannheim LGD. The city has been facilitating successful partnerships with businesses, industry organisations and service providers, resulting in their *iDEAL Business Climate Action* and over 17 partnerships with private companies (European Commission et al, 2023). For example, GBG (Mannheimer Wohnungsbaugesellschaft mbH), the largest municipal housing association in the State of Baden-Württemberg, committed to the *iDEAL Business Climate Action*, has committed to refurbishing 4000 flats and introduce grey water reuse in buildings (Case Study 11).

59. **Business Improvement Districts (BIDs)** are “a form of special purpose government that utilises special assessments on real estate to deliver services to a spatially defined commercial area” (Stokes and Martinez, 2020_[38]). The instrument can help cities deliver common goods for all in urban centres, including public safety and cleanness, thus contributing to long-term property value appreciation, in collaboration with property and business owners. Assessments are typically collected by local governments and then passed on to BID operating organisations, which are usually governed by non-profit organisations (Stokes and Martinez, 2020_[38]). BIDs emerged in North America in the 1970s and grew significantly in the early 1990s, and are now a common feature of the urban landscape, with some fulfilling more ambitious functions related to infrastructure provision, social service coordination, urban planning, and public space management (Stokes and Martinez, 2020_[38]). The instrument is gaining popularity in other parts of the world. **Hamburg** (Germany) was the first city to introduce BIDs in 2005 (Michel and Stein, 2014_[39]). Japan also introduced the BID system in 2018. In South Africa, the Cape Town Central City Improvement District has been active since 2000 in investing in street maintenance (e.g., repairing) and clean-up activities. The improved security and hands-on city management has brought down crime markedly in the city centre, resulting in higher private investment and increased land value. A possible downside is a rise in rental prices and subsequent gentrification, which requires targeted actions for vulnerable population groups in the BID areas. For example, the Cape Town Central City Improvement District is carrying out two projects providing homeless people a realistic opportunity to reintegrate into society (Case Study 12).

60. **Payments for ecosystem services (PES)** is a market-based partnership model to enhance ecosystem services.⁸ Typically, it is an agreement between City Governments, as users or beneficiaries of an ecosystem service (e.g., water provision), and landowners or communities, as providers of the services (OECD, 2010_[40]). Due to strong pressure for urban development, owners of agricultural or natural land tend to make market-oriented decisions to convert their land to urban use (e.g., housing). On the other hand, cities are increasingly recognising the indispensable value of ecosystem services within or around their city borders and are interested in making payments to maintain such services for a long term. PES can function as an economic incentive for landowners to maintain and further invest in their

⁸ Ecosystem services are “diverse benefits that are derived from the natural environment” (Smith et al., 2013_[41]), including the supply of food and water, and the regulation of air quality, climate and flood risks.



ecoservice service provision. In this regard, PES is a mechanism with a clear focus on the ‘beneficiary pays principle’ (Smith et al., 2013^[41]). In 2018, there were more than 550 active PES programmes around the world, with combined annual payments over USD 36 billion (Salzman et al., 2018^[42]). Watershed-based PES is growing particularly rapidly, including in China and Latin America (Salzman et al., 2018^[42]), reflecting the need to deliver safe drinking water to urban citizens. Eau de Paris (Paris Water), a public company that collects, transports, treats and distributes an average of 483 000 m³ of drinking water per day to 3 million users, established a PES scheme to address the impacts of agriculture on water catchment areas (OECD, 2021^[43]). The use of PES in the urban context has also been increasingly discussed, given the urgency in tackling climate change and increasing recognition of the multi-angle benefits of urban green infrastructure for urban residents (Richards and Thompson, 2019^[44]).

Leveraging private investment in cities: the way forward

61. Cities have major potential to leverage private investment to meet urban challenges through a number of instruments. To further support the use of these instruments across a broader range of cities worldwide, the following approaches can be proposed.

- **Strengthen cities’ competence to be able to deploy innovative instruments to leverage private investment.** National governments have a key role in developing an enabling environment for cities to be able to design and operate diverse instruments to fit with the local contexts. For instance, they can grant cities the power to collect and determine the amount of levies, fees and charges from the private sector. Providing legal and institutional grounds, together with operational details (e.g., through guidelines) is also an important role for national governments to support cities with limited capacity. For example, articulating the responsibilities of cities and the private sector within partnership agreements provides transparency and accountability, allowing the private sector to assess project risks and make informed investment decisions. Building the capacity of cities should remain a priority, to be able to deploy diverse including traditional instruments such as public procurement and PPP.
- **Finance the emerging and changing infrastructure needs with new instruments.** Cities are under increasing pressure to ensure that urban infrastructure address ongoing urban challenges (e.g., global warming, housing affordability, ageing) and to enhance long-term sustainability in cities. To this end, cities should review and adjust existing instruments, and experiment new instruments. For instance, cities should explore the potential use of biodiversity offsetting, PES, and other instruments to provide green infrastructure and associated services in collaboration with the private sector, to address the increasing challenges of climate change and biodiversity loss. Land pooling can be used more strategically to promote brownfield development.



Land banks can also be used to address the shortage of affordable housing or population decline and ageing in cities.

- **Develop built-in mechanisms to address possible negative impacts of land value increase on vulnerable and marginalised groups in designing instruments.** Many instruments leveraging private investment in cities is based on the mechanism that the increase in land value as a result of development can cover the cost of infrastructure. While this may also bring economic benefits to landowners and developers, it can generate negative impacts on renters and those who don't have land in cities. This highlights the need for securing access for vulnerable and marginalised groups to affordable housing and other basic urban services, so that private investment can bring benefits to all urban citizens. Developing scientific evidence and data related to impacts of urban development on different urban actors is thus crucial to design and implement financial instruments properly.



Mobilising sustainable finance for the City Governments of Tomorrow

Rationale

Improving the ability of City Governments to access finance for quality infrastructure investments can help create more inclusive, resilient and sustainable cities

62. Recent growth in the availability of sustainable finance⁹ provides an important opportunity for City Governments to better meet their investment needs. In 2023, the market for sustainable finance – including green, social and sustainable (GSS) bonds and sustainability-linked bonds (SLB) – reached approximately USD 882 billion with over 3,000 separate bond issuances (Environmental Finance, 2023_[45]). This represents approximately 5% of total global bond issuances (CBI, 2023_[46]).

63. This chapter explores how City Governments can better mobilise finance – especially sustainable finance – for urban infrastructure investment (Table 4). It first highlights approaches to enhance City Governments access to finance in general. It then explores the potential for City Governments to better harness existing and emerging forms of sustainable finance.

Table 4. Possible actions to mobilise sustainable finance for City Governments

Enhancing City Governments access to finance				
Enabling environment		Access to funding		
Establish an enabling environment that enables City Governments to harness sustainable finance for infrastructure investment in an effective and fiscally responsible way		Ensure that City Governments have reliable and predictable sources of funding to repay financing and pay for infrastructure operations and maintenance in the future		
Mobilising sustainable finance for City Governments				
Municipal bonds	Green, social and sustainable bonds	Green, social and sustainable loans	Sustainability-linked bonds	Catastrophe bonds
Enhance the use of municipal bonds for City Governments, which provides the basis for accessing green, social and sustainable bonds, and can support	Support the effective use of green, social and sustainability bonds and loans by City Governments through targeted initiatives to enhance benefits and reducing potential barriers	Harness green, social and sustainability loans for City Governments, particularly to finance smaller investments and to support City Governments who	Scale-up the use of sustainability-linked bonds for City Governments, which have the potential to better align financing with long-term policy objectives while supporting budget	Explore the potential for City Governments to build resilience by issuing catastrophe bonds to insure against disasters, such as hurricanes,

⁹ This document adopts the term ‘sustainable finance’ to refer to financing that helps to achieve green, social and sustainable objectives and projects. Many initiatives are underway to harmonise definitions for ‘sustainable finance’. See (OECD, 2020_[68]) for example.



sustainable investments		cannot access capital markets	flexibility and reducing compliance costs	wildfires and earthquakes
Case study: Municipal Bond in Vadodra (India)	Case study: Green Bond in Mexico City (Mexico)	Case study: Green and Social Loans from La Banque Postale (France)	Case study: Sustainability-Linked Bond in the City of Helsingborg (Sweden)	Case study: Catastrophe Bond in Los Angeles (United States)

Enhancing City Governments access to finance

64. All levels of government, and other actors such as Multi-lateral Development Banks, have a role to play in mobilising finance for urban infrastructure investment. Given the role that City Governments have for infrastructure investment, borrowing is particularly important to fulfil their investment responsibilities as it is required to help meet up-front capital costs, in particular when local savings and capital transfers are insufficient (OECD, 2019^[9]). In most countries, a level of subnational government borrowing is considered appropriate given their investment responsibilities (IMF, 2020^[10]). It can permit a better allocation of resources over time, support intergenerational equity and increase the fiscal space for investment. Fiscal frameworks and rules can help to define the appropriate level of subnational government borrowing for a specific country or local context. The “golden rule”, in particular, is a common and useful fiscal rule at the local level that limits the use of debt for investment, and therefore limits risks of over indebtedness.

65. City Governments might borrow from public financial institutions (e.g., National Development Banks, National Infrastructure Banks), the national government, international financial institutions (e.g., Multi-lateral Development Banks), private financial institutions or capital markets. In many countries, Multi-lateral Development Banks have a key role to finance subnational governments through direct or indirect lending programmes. Indirect lending programmes could be loans to a National Development Bank who then on-lend to subnational governments. These programmes are often supported by technical assistance grants and credit enhancement mechanisms (e.g., guarantees) that target City Governments. The City Climate Finance Gap Fund created by GIZ, the European Investment Bank and the World Bank, for example, provides technical assistance and capacity building, supports the development of an urban investment pipeline and shares knowledge on project preparation with developers and financiers. Another example is the EBRD Green Cities programme, which supports cities to develop Green City Action Plans, facilitates public and private green investment, and provides technical support to city administrators.

66. Enhancing the ability of subnational governments to borrow from private financial institutions and capital markets can have several benefits. It can promote the development of domestic financial markets, encourage competitive financing rates and reduce subnational government reliance on national government grants and loans. It can also help to strengthen financial management practices of subnational governments, as borrowing from the private sector can sometimes involve more rigorous processes (e.g., credit ratings, reporting and



audits). Furthermore, it can encourage accountability by increasing transparency and creating a stronger link between borrowing and investment decisions.

67. Avoiding risks relating to subnational government borrowing – such as a ‘deficit bias’ that can materialise in under taxing or overspending (IMF, 2020_[10]) – requires establishing an enabling environment and ensuring that sufficient funding sources are available (G20-OECD, 2022_[7]).

Establish an enabling environment for financing City Governments

Establish an enabling environment for City Governments to harness finance for infrastructure investment in an effective and fiscally responsible way

68. A City Government’s ability to mobilise finance, including sustainable finance, for infrastructure investment requires an enabling environment consisting of fiscal and regulatory frameworks, institutional capacity, coordination and cooperation mechanisms, and the availability of domestic financial markets (Table 5) (G20-OECD, 2022_[7]). The enabling environment should support the effective use of various instruments and approaches for infrastructure investment as relevant for the local context, such as municipal bonds and Public Private Partnerships (PPPs). Improving the enabling environment is essential to improve the creditworthiness of City Governments. In 2013, for example, fewer than 20% of the 500 largest cities in developing countries were deemed creditworthy in local financial markets and less than 4% in international markets (World Bank, 2013_[47]).

Table 5. Key elements of an enabling environment for financing City Governments

ELEMENT	DESCRIPTION
Fiscal and regulatory frameworks	Well-designed fiscal and regulatory frameworks are required for City Governments to access financing for infrastructure investment and manage fiscal risks that can arise from excessive borrowing. Getting these frameworks right requires ensuring that fiscal responsibility frameworks, fiscal rules and regulations are in place. This can include adopting appropriate regulations and guidelines for the effective use of PPPs by City Governments.
Institutional capacity	City Governments require sufficient institutional capacity to access and effectively use finance for infrastructure projects, including the rights skills, policies, processes, and systems. Alongside institutional capacity for accessing finance, City Governments also need capacity to effectively plan, procure, prioritise and implement quality infrastructure investments (including through PPPs) so that proceeds of financing are used effectively.
Coordination and cooperation	City Governments need to co-ordinate and cooperate with other levels of governments, and non-government actors, to effectively plan and finance infrastructure investments. Coordination can also support City Governments to pool their borrowing needs to achieve better financing terms. PPPs are one potential form of co-operation that may be relevant for City Governments with higher institutional capacity.



Developed financial markets and institutions	City Governments need to have access to well-developed domestic capital markets and financial institutions that provide competitive sources of finance. Financing can come from financial institutions, such as commercial banks, public financial institutions and multi-lateral development banks, or directly from capital markets.
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Source: Adapted from (G20-OECD, 2022_[7])

69. Expanding City Governments access to finance must be done in a way that is fiscally responsible to prevent excessive borrowing that can pose a risk to macro-economic stability. This requires ensuring that appropriate fiscal rules are in place (e.g., debt limits, golden rules, etc.), as well as ensuring that sufficient institutional capacity is established to effectively use the proceeds from financing (G20-OECD, 2022_[7]). One of the most common borrowing rules for local governments is the ‘golden rule’, which limits local government borrowing to be used for investment purposes (OECD/UCLG, 2022_[48]). National governments need to find a balance between supporting access to finance for subnational governments and avoiding excessive borrowing due to the potential moral hazard risk that can be created. A ‘no bailout’ policy, for example, might reduce moral hazard risks, but may also have implications for the accessibility and affordability of finance for subnational governments.

Ensure that City Governments have funding sources to repay financing

Ensure that City Governments have reliable and predictable sources of funding to repay financing and pay for infrastructure operations and maintenance into the future

70. While financing is essential to meet the high up-front costs of infrastructure investments, City Governments also require sufficient funding¹⁰ to re-pay financing in the future and to pay for infrastructure operations and maintenance (G20-OECD, 2022_[7]). Sources of funding for City Governments should be identified up-front and be sufficiently predictable, so that finance providers have confidence that they will be repaid and so that City Governments are able to maintain and operate infrastructure once constructed. City government funding sources are mainly grants from upper-level governments, shared or own-source taxes, and user charges or fees (OECD/UCLG, 2022_[48]). Other sources of funding can include the use of ‘land value capture’ instruments and harnessing the revenues from existing infrastructure assets (G20-OECD, 2022_[7]). Provisions can be made up-front so that funding is put-aside for future maintenance interventions.

¹⁰ Funding refers to the money ultimately used to pay for an investment. It can come through various subnational government revenue sources (i.e. grants and subsidies, taxes, various user charges and fees, reserves, property income, etc.) or from a specific user-charge. While funding is not required to pay up-front investment costs, it is always required to pay for operations, maintenance and the repayment of financing. See (G20-OECD, 2022_[7]).



Mobilising sustainable finance for City Governments

71. Sustainable finance holds significant promise for City Governments. Indeed, much of the infrastructure that City Governments provide – such as water, wastewater, waste, green public buildings and public transport – are aligned with sustainable finance definitions (Table 6). This means that there is significant potential for mobilising sustainable finance to meet urban investment needs. This section outlines how to mobilise sustainable finance for City Governments. It first details how to enhance access to municipal bonds, as a prerequisite for accessing some other forms of sustainable finance and as a potential form of ‘unlabelled’ sustainable finance. It then details four main types of sustainable finance that could be available to City Governments: green, social and sustainable (GSS) bonds, GSS loans, sustainability-linked bonds (SLB) and catastrophe bonds.

Table 6. Alignment of City Government responsibilities and sustainable finance definitions

The alignment of common City Government responsibilities with green and social bond principles

Responsibilities linked to green finance	Responsibilities linked to social finance	Other responsibilities
<ul style="list-style-type: none"> ▪ Local public transport and cycle paths ▪ Local utilities (water, sewage, waste, heating network, public lighting) ▪ Environment (parks, climate change adaptation) ▪ Green public buildings (including energy efficiency, renewable energy) 	<ul style="list-style-type: none"> ▪ Education facilities ▪ Healthcare facilities ▪ Recreation and cultural facilities ▪ Social and youth facilities and programs ▪ Public housing ▪ Local economic development 	<ul style="list-style-type: none"> ▪ Local, secondary and regional roads ▪ Public order and safety facilities ▪ Urban and spatial planning

Source: Subnational government responsibilities were adapted from (OECD, 2019^[9]); Sustainable finance definitions were adapted from International Capital Markets Association (ICMA) Green Bond Principles and ICMA Social Bond Principles.

Enhance the use of municipal bonds for City Governments

Enhancing the use of municipal bonds for City Governments provides the basis for accessing green, social and sustainable bonds, and can support sustainable investments

72. Many City Governments have significant potential to further harness **municipal bonds**¹¹ (or sub-sovereign bonds, local authority bonds, etc.) to meet their financing needs. Most municipal bonds are “general obligation bonds”¹², although revenue bonds¹³ are also

¹¹ Municipal bonds are a type of bond issued by a subnational government (e.g., municipal, regional, or state government).

¹² General Obligation Bonds are issued against claim on the future revenues of a city government.

¹³ Revenue Bonds are issued against a claim on future revenues from a specific asset (e.g., water infrastructure and future tariffs revenue).



sometimes used by City Governments. Bonds make up 27% of subnational government¹⁴ debt in G20 countries and 12% globally (unweighted average, (OECD/UCLG, 2022_[48])).

73. While bonds clearly represent an important portion of subnational government debt, the use of bonds by local governments varies significantly across and within countries. For governments with larger financing needs – such as state, provincial, regional and large local governments – bond issuance is a common and affordable way to meet financing needs. In the United States and Canada, for example, up to two-thirds of subnational government debt is financed by bonds, including by many City Governments. For small governments, particularly local governments with smaller financing needs, issuance can sometimes be less appealing as it requires meeting relatively fixed and high transaction costs (e.g., independent credit ratings, improvements in financial management systems, etc.) that are amortised across a smaller transaction. In many countries, there can also be restrictions on bond issuances by regional and, especially, local governments. Increasing subnational government use of bonds for investment needs to also be accompanied by adjustments in fiscal frameworks and improvements in institutional capacity. There are, however, many notable examples of urban local governments issuing bonds in countries like Argentina, Brazil, Canada, France, Germany, India, Mexico, South Africa, Sweden and the United States, among others.

74. Given that a large proportion of the investments that City Governments make are for sustainable infrastructure (see Table 6), much of the financing that these governments receive is already aligned with sustainable finance definitions. This means that, in practice, municipal bonds share some features of sustainable finance (e.g., proportion of the use of proceeds towards green projects). Indeed, a large proportion of municipal finance could be seen as a form of ‘unlabelled’ sustainable finance (PRI, 2023_[49]). This means that enhancing the use of municipal bonds can be an important way to support private investment in sustainable infrastructure.

75. Municipal bonds have several benefits over loans from financial institutions, but there are also barriers to their use (Table 7). One of the key benefits is that municipal bonds have the potential to provide a more affordable source of finance for some City Governments than loans from other financial institutions. Another benefit is that these bonds can provide larger and longer-term financing, which can better match the investment profile of urban infrastructure. However, the relatively high and fixed transaction-related costs of bond issuances can also mean that they may not be accessible for smaller City Governments or those with lower financing needs.

¹⁴ Data for all levels of subnational governments including state, regional, provincial and local governments, which can all have an important role to invest in cities.



Table 7. Potential benefits of, and barriers to, municipal bond issuances for City Governments

Benefits and barriers as compared to lending to subnational governments

Potential benefits	Potential barriers
<ul style="list-style-type: none"> ▪ Can provide better financing rates (lower premiums) as they can access a deeper pool of capital from both domestic and international investors ▪ Can provide access to larger amounts of financing, which can align with the needs of large infrastructure investments ▪ Can provide longer term financing to better match the investment timeline of infrastructure ▪ Encourages financial discipline of City Governments through the additional compliance, reporting and audit requirements ▪ Can support the diversification of financing away from other financial institutions 	<ul style="list-style-type: none"> ▪ Requires suitable regulatory frameworks to be in place to permit the fiscally responsible use of municipal bonds ▪ Requires City Governments to have good creditworthiness, including having access to sufficient and predictable funding ▪ Requires sufficiently large and regular issuance to justify the transaction costs related to issuance (e.g., credit ratings, reporting, auditing, improvements to systems etc.) ▪ May require updating financial management systems and practices of City Governments ▪ Can involve additional costs related to requirements for compliance, auditing and reporting ▪ Would require a sizeable local financial market, with high liquidity and robust regulatory framework.

Source: Authors elaboration based on (G20-OECD, 2022^[7]; Peterson, 2002^[50])

76. In India, Urban Local Bodies have increasingly been using municipal bonds to finance urban investment projects. In 2022, for example, the **Vadodara Municipal Corporation** in the state of Gujarat, India, issued a General Obligation Bond that raised 100 Cr (Case Study 13). The issuance achieved the lowest coupon rate in the history of the municipal bond market in India (7.15 percent) and was oversubscribed 10 times. It was supported through technical assistance from the national government.

77. Enhancing further use of municipal bonds by City Governments can be supported by:

- **Ensuring that an enabling environment is in place** that allows City Governments to mobilise municipal bonds and encourages fiscal responsibility. For example, in 2015, Mexico established a Financial Discipline Law for Federal Entities and Municipalities, which provided a new framework for municipal bond issuances (G20-OECD, 2022^[7]).
- **Strengthening the creditworthiness of City Governments**, including by ensuring that an appropriate enabling environment is in place, that City Governments budgets are well managed, and that there are sufficient and predictable funding sources.
- **Encouraging or incentivising investors in capital markets to invest in municipal bonds**. In the United States, for example, most municipal bonds are tax exempt, which provides a powerful incentive for investors to purchase municipal bonds.
- **Adopting targeted credit enhancement and de-risking mechanisms** (e.g., guarantees) to support the use of municipal bonds by City Governments by making the risk-return profile of bonds more appealing to private investors. The use of credit



enhancement mechanisms should be implemented with a robust framework for managing contingent liabilities.

- **Establishing programs that incentivise City Governments to issue municipal bonds**, particularly where there is an ambition to expand the domestic municipal bond market. In India, for example, the Atal Mission for Rejuvenation and Urban Transformation has provided grants to Urban Local Bodies to support the issuance of municipal bonds.
- **Providing technical assistance and undertaking capacity building programs** for City Governments, particularly where they are issuing a municipal bond for the first time. In India, technical assistance was provided to the Vadodara Municipal Corporation to support the first bond issuance (Case Study 13).
- **Establishing pooled financing mechanisms** (or other financial intermediaries) that can issue bonds on capital markets on behalf of multiple subnational governments and then on-lend to local governments (e.g., Local Government Funding Agencies in Japan, France and New Zealand for example or Municipal Financing Authorities or Corporations in Canada).

Support the use of green, social and sustainable bonds in cities

Supporting the effective use of green, social and sustainability bonds by City Governments through targeted initiatives to enhance benefits and reducing potential barriers

78. City government invest in many forms of sustainable infrastructure where there is potential for increased use of **green, social and sustainability (GSS) bonds**.¹⁵ GSS bonds earmark the proceeds from a bond issuance towards defined green, social and sustainable projects. In many ways, these bonds are similar to traditional municipal bonds, with a key difference being that the ‘use of proceeds’ is defined. For GSS bonds, the ‘use of proceeds’ directs finance to green, social or sustainable projects, in line with relevant principles and taxonomies (for example, see [ICMA Green Bond Principles](#)). Other differences with municipal bonds include requirements relating to the process for project evaluation and selection, tracking the management of bond proceeds, and reporting.

79. Even though many city government investments are aligned with the GSS use of proceeds, the issuance of these bonds appears to remain relatively limited. In 2022, the global green bond market reached approximately USD 493 billion in annual issuances, the social bond market reached USD 168 billion, and the sustainability bond market reached USD 145 billion (Environmental Finance, 2023_[45]). Subnational governments represented

¹⁵ Alongside, green, social and sustainable bonds, several other ‘use of proceeds’ bonds or ‘thematic’ bonds have emerged. As these have similar features to GSS bonds they have not been included in this report. Examples include SDG bonds, hydro bonds, climate bonds, gender bonds, COVID-19 bonds, transition bonds and blue bonds. For more examples see (OECD, 2022_[70]).



approximately 5.5% of total green bond issuances, 9% of social bond issuances and 8.7% of sustainability bond issuances. Countries where cities are common issuers of green bonds include France, Sweden and the United States (OECD, 2019^[51]), among many others. The issuance of GSS bonds by subnational governments globally has grown from USD 17.5 billion in 2017 to USD 54.8 billion in 2022 (Environmental Finance, 2023^[45]; Environmental Finance, 2019^[52]). By comparison, the total issuance of municipal bonds in the United States in 2022 was around USD 400 billion (PIMCO, 2023^[53]). One of the most common use of proceeds for municipal bonds is for green buildings, followed by investments in renewable energy, water and wastewater and clean transportation (Capital Monitor, 2022^[54]).

80. The relatively limited use of GSS bonds by City Governments – as compared to traditional municipal bonds – indicates that the benefits from using GSS bonds may not always outweigh potential additional costs for City Governments (see Table 8). One of the main potential benefits of GSS bonds is that they might provide a more affordable form of finance as compared to traditional bonds (known as the ‘greenium’). While evidence of this is mixed¹⁶, a greenium does seem to exist in many contexts, such as in developing countries (Ando et al., 2022^[55]). Other benefits can include the demonstration of GSS-related policy actions to stakeholders, increased transparency, and better alignment of investments with policy priorities. City Governments weigh these benefits against the specific challenges of issuing GSS bonds. One potential explanation for the relatively limited use is that the earmarking through the ‘use of proceeds’ can reduce budget flexibility, which could make city government budgets more complex to manage. It also means that the GSS bond issuance will only cover a fraction of projects in their budget and other financing will be needed to be sought for other projects (e.g., a separate smaller municipal bond issuance). Other factors that may affect uptake are the increased need for internal coordination and costs associated with management of the proceeds and reporting.

Table 8. Potential benefits of, and barriers to, GSS bond issuances for City Governments

Benefits and barriers as compared to issuing a ‘traditional’ municipal bond

Potential benefits	Potential barriers
<ul style="list-style-type: none"> ▪ Might provide better financing rates (e.g., a ‘greenium’ through higher market demand for GSS bonds) ▪ Can encourage the alignment of city government investments to GSS policy objectives ▪ Can signal to stakeholders and communities commitment to long-term green, social and sustainable development. ▪ Can increase transparency on investment decisions ▪ Can encourage increased collaboration between environmental, infrastructure and finance departments within City Governments 	<ul style="list-style-type: none"> ▪ Can reduce budget flexibility of City Governments as proceeds can only be used for certain types of investments. ▪ Can require additional coordination within City Governments to identify suitable projects ▪ Can have additional costs relating to compliance, reporting, auditing, capacity-building, and the establishment of standards and frameworks to quality as GSS bonds. ▪ Might not meet all financing needs of City Governments, which can reduce issuance size (and potentially increase costs) and require a separate

¹⁶ Evidence on the ‘greenium’ achieved by GSS bonds is often inconclusive, although some research indicates a premium is achieved in some circumstances, and that this premium might be higher in developing markets. For example, see (Doranzo, Siracusa and Antonelli, 2021^[69]), (Ando et al., 2022^[55]) and (MacAskill et al., 2021^[71]).



	<ul style="list-style-type: none"> ▪ municipal bond to be issued for other investments ▪ Can require additional expertise relating to environment and financing within the City Governments. ▪ Requires City Governments to have a green strategy
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Source: Authors' elaboration based on (Green City Bonds Coalition, 2015^[56]; OECD, 2022^[57]; OECD, n.d.^[58])

81. **Mexico City** became a pioneer in Latin America by issuing the first municipal green bond in 2016 for USD 50 million (Case Study 14). Proceeds from the bond were mainly used to finance water infrastructure, energy efficiency, and public transport. The issuance was supported by a Climate Action Programme 2014-2020, which was a tool to guide climate change action in Mexico City. More recently, Estado de México issued a sustainable bond for 2,890 million pesos with a term of 15 years (September 2022). The issuance was based on a Sustainable Bond Framework developed by Estado de México, which complies with the Sustainable Bond Guidelines and is in adherence to the Principles of Green Bonds and Social Bonds developed by the ICMA.

82. Enhancing the use of GSS bonds by city government can be supported through:

- **Encouraging or incentivising capital market investors to give preference to GSS bonds** over traditional municipal bonds, which may increase the 'greenium' and encourage further adoption by City Governments. This might be achieved through specific financial (e.g., tax incentives for GSS bond investors) or non-financial incentives (e.g., public recognition).
- **Facilitating the development of a domestic capital market for GSS bonds** by adopting relevant standards and guidelines at a national level.
- **Developing technical assistance programs** to support City Governments to establish GSS bond issuance frameworks, aggregate GSS projects and issue GSS bonds.
- **Providing financial incentives to City Governments** to help off-set any additional costs that may be incurred for using GSS bonds (over the issuance of municipal bonds), particularly if GSS bonds are considered a cost-effective way to encourage more sustainable investment.
- **Targeting purchases of municipal bonds** by Multi-lateral Development Banks or other financial institutions, who can act as anchor or cornerstone investors to help to crowd-in private investment.
- **Adopting targeted credit enhancement and de-risking mechanisms** (e.g., guarantees) to support the use of GSS bond issuances by City Governments by making the risk-return profile of bonds more appealing to private investors. The use of credit enhancement mechanisms should be implemented with a robust framework for managing contingent liabilities.

- **Adopting green budgeting approaches** to help align government budgeting decisions with green objectives, which has the potential to support the issuance of green bonds. In Hessen and North Rhine-Westphalia in Germany, for example, green budgeting has been used to select expenditure items for accessing financing from green bonds and loans (OECD, 2022^[59]).

Harness green, social and sustainable loans for cities

Harnessing green, social and sustainability loans for City Governments, particularly to finance smaller investments and to support City Governments who cannot access capital markets

83. **Green, social and sustainable (GSS) loans** are similar to GSS bonds, but finance is provided by a financial institution rather than the capital market. As with GSS bonds, these loans earmark the use of proceeds from financing, have requirements for the project evaluation and selection, the management of proceeds, and reporting (for example, see the [ICMA Green Loan Principles](#) or the [LSTA Social Loan Principles](#)). This means that GSS loans provide an alternate form of sustainable finance suited to meet smaller financing needs or to support City Governments who might not be permitted to issue bonds. GSS loans are often also connected to a GSS bond issuance through a financial intermediary (e.g., public financial institution) who might issue the bond on capital markets and on-lend to City Governments.

84. In France, **La Banque Postale** created a subsidiary in 2012 (La Banque Postale Collectivités locales) that is specialised in lending to regional and municipal governments. The Bank aggregates green and social loans from local governments (and other private sector clients), and then issues green and social bonds on capital markets (Case Study 15). As of 2022, the bank had issued 7 green bonds, totalling EUR 926.8 million, and 6 social bonds, totalling EUR 831 million. From these proceeds, local authorities have received more than EUR 1 billion in green loans since 2019, financing more than 250 local authority projects.

85. Alongside GGS loans, blended finance can play a crucial role in supporting early-stage projects that face higher risks and uncertainties. Grants can be utilised to provide technical assistance, capacity building, feasibility studies, and pilot programs, allowing projects to progress beyond the conceptual stage. Once these projects prove their viability, GSS loans can be introduced for further scaling and expansion. The Sustainable Cities Project from Türkiye, for example, implemented by ILBANK, uses European Union grants for developing a comprehensive planning tool for the implementation of municipal investment projects financed through World Bank loans. Blended finance can also encourage innovation by supporting pioneering projects that aim to address pressing urban challenges. Grants can also be used to incentivize experimentation, research and the development of new technologies or approaches in green, social, and sustainable domains. This helps create a



pipeline of innovative solutions that can be replicated or scaled up in other cities, which could create a pipeline for future GSS loans.

Scale-up the use of sustainability-linked bonds in cities

Scaling-up the use of sustainability-linked bonds for City Governments, which have the potential to better align financing with long-term policy objectives while supporting budget flexibility and reducing compliance costs

86. **Sustainability-Linked Bonds (SLB)** have significant potential for further use by City Governments. Rather than define a ‘use of proceeds’ (as with GSS bonds), an SLB is linked to predefined sustainability or environment, social and governance (ESG) objectives (see [ICMA Sustainability-Linked Bond Principles](#)). SLBs are a key performance indicator-based financing mechanism where proceeds are available for general purposes and not earmarked to specific projects but are linked to the achievement of specific objectives. For SLBs, issuers commit (in their bond documentation) to future improvements in sustainability outcome(s) within a predefined timeline. The characteristics of the bonds, such as the premiums paid, are then linked to the achievement of specific Sustainability Performance Targets (SPTs) and Key Performance Indicators (KPIs). If SPTs and KPIs are achieved, the issuer would pay lower premiums (or receive another benefit depending on the design of the mechanism¹⁷).

87. While SLBs have significant potential for use by City Governments, their use by these governments remains very limited. In 2022, the sustainability-linked bond market reached approximately USD 74 billion in annual issuances, with municipal issues only representing 1% of all sustainability-linked bonds (Environmental Finance, 2023_[45]). Although SLBs are a relatively new form of sustainable finance – the ICMA principles were only developed in 2020 – the use of SLBs by City Governments is lagging other categories of issuers.

88. SLBs have several potential benefits for City Governments, but there are also barriers to their use (Table 9). One key benefit is that proceeds can be used for general purposes rather than having restricted for specific purposes (i.e., earmarking). This flexibility means that SLBs can allow a city government to have larger bond issuances that meet more of their financing needs, as compared to a GSS bond that can only meet a proportion of their financing needs. Another benefit is that SLBs have an important potential for ‘additionality’ (i.e., having impact beyond what could be achieved through other instruments) as they can encourage the establishment of clear, ambitious and measurable targets that meaningfully align financing with longer-term policy objectives, such as net zero targets. The setting of relevant KPIs for each bond issuance, however, creates new challenges. For example, it could risk a proliferation of different SPTs and KPIs that might reduce the visibility to investors on

¹⁷ Based on the ICMA Sustainability-Linked Bond Principles, other characteristics of the bond may instead be adapted instead of the premium.



secondary markets. Furthermore, the setting of SLBs and KPIs also require credible, independent and transparent sources of information to assess performance against the KPI.

Table 9. Potential benefits of, and barriers to, SLBs for City Governments

Benefits and barriers as compared to issuing a ‘traditional’ municipal bond

Potential benefits	Potential barriers
<ul style="list-style-type: none"> ▪ Can incentive action towards a meaningful, ambitious and relevant policy objectives relating to sustainable development (depending on the design of the SPTs and KPIs) ▪ Can provide City Governments with additional budget flexibility for the use of proceeds ▪ Can allow City Governments to meet larger financing needs through one bond issuance, while still being aligned with sustainability objectives (rather than having to find a second source of finance for other investments as with a GSS bond) ▪ Can allow City Governments to take a holistic view of integrated investments and policy actions to achieve sustainability objectives (avoiding over emphasising investment in GSS projects). 	<ul style="list-style-type: none"> ▪ May provide lower transparency on the use of proceeds from bod issuances for investors ▪ Can be difficult to design meaningful, ambitions and measurable KPIs that align with sustainability objectives ▪ Can misalign the incentives of City Governments (who want lower premiums and achievement of sustainability targets) and investors in the bonds (who may be incentivised to seek higher returns), although this could depend on SPT and KPI design ▪ Variability in the design of the bonds may risk reducing tradability on secondary markets.

Source: Authors elaboration based on (OECD, 2022^[57]; OECD, 2022^[60]; Bruegel, 2022^[61])

89. The **City of Helsingborg** in Sweden was the first city government to issue a SLB in 2022 (Case Study 16). The City’s bond is linked to returns on moving towards a target of net-zero greenhouse gas emissions by 2035. More specifically, the bond includes a Key Performance Indicator that links the premiums paid by the city, to the achievement of an absolute GHG emissions reduction in tonnes CO₂e of 85% by 2035 (vs 1990 levels) in the geographical area of the City of Helsingborg.

90. Enhancing the use of sustainability-linked bonds by City Governments can be supported through:

- **Promoting the use of SLBs for City Governments** by establishing principles, frameworks and guidelines that support their use that are adapted to specific country governance structures and needs as appropriate.
- **Avoiding the proliferation of SPTs and KPI measures** adopted by City Governments by considering standard targets linked to common policy objectives of City Governments (e.g., adopting KPIs that support achievement of specific SDGs or the Paris Agreement), which can enhance the tradability of these bonds on secondary markets.
- **Adopting relevant SPTs and KPIs** that are ambitious, measurable, transparent and within the control of City Governments.
- **Designing SLBs to support alignment of incentives** between bond investors and City Governments towards sustainable objectives.



- **Harnessing institutions and processes** to provide transparency to investors on the achievement of SPTs and KPIs by City Governments.

Explore the potential for catastrophe bonds for City Governments

Explore the potential for City Governments to build resilience through the issuance of catastrophe bonds to insure against disasters, such as hurricanes, wildfires and earthquakes

91. Although rarely used by City Governments to date, **catastrophe bonds** may become increasingly relevant for City Governments to cope with an increase in extreme weather events due to climate change. Catastrophe bonds are insurance-linked securities that allow the issuer to get proceeds from the capital market only if a catastrophic condition occurs (Ando et al., 2022^[55]). A catastrophe bond sponsor - usually an insurer or reinsurer, but also public authorities or corporations – can seek to transfer defined risks from catastrophic events off their balance sheet to manage exposure. For catastrophic bonds, this is done by creating a special purpose vehicle, which issues a bond to investors and holds the collateral in a trust account. Principle is only transferred to the sponsor from the trust account if a pre-defined trigger account occurs (e.g., disaster).

92. Catastrophe bonds have most commonly been issued by national or state governments, and private companies, although some examples of their use by City Governments are emerging. In 2021, the total outstanding catastrophe bond issuance was over USD 45 billion, mostly in the United States but also in emerging markets. For cities, catastrophe bonds have the potential to help become more resilient against future risks, such as hurricanes, floods, bushfires or earthquakes, by providing an alternative form of insurance.

93. In 2020, the **Los Angeles Department of Water & Power** issued its first wildfire catastrophe bond. This was one of the first catastrophe bonds to benefit a municipal utility anywhere in the world. The catastrophe bond had a payment trigger based on a calculation of the reconstruction cost within a defined wildfire perimeter (Case Study 17).

Approaches to further mobilise sustainable finance for City Governments

94. Mobilising sustainable finance for meeting the future investment needs of City Governments can help make infrastructure investments in cities more inclusive, resilient and sustainable. To unlock the potential of sustainable finance for City Governments, the following actions are proposed:

- **Create an enabling environment for City Governments to access affordable and sustainable finance, in line with national institutional contexts and ensuring fiscal responsibility.** Given the responsibilities for City Governments to invest in urban infrastructure, there is a need to ensure that these governments have access to sufficient



and affordable sources of finance. Creating the right enabling environment for the effective use of finance requires getting the right fiscal and regulatory frameworks in place, strengthening the institutional capacity of City Governments, enhancing coordination and cooperation among and across levels of governments, and developing city friendly financial markets. The enabling environment should also encourage fiscal responsibility of through appropriate fiscal frameworks and borrowing rules.

- **Ensure that cities have access to sufficient and predictable sources of funding.** To meet the capital, operational and maintenance costs of infrastructure, and to repay financing, cities need to mobilise diverse sources of funding, such as taxes, user charges, grants and land value capture mechanisms. Ensuring that cities have access to sources of funding can enhance City Governments creditworthiness, which can help to unlock finance for urban infrastructure.
- **Enhance the use of sustainable financing instruments for infrastructure investments made by City Governments.** Growing interest in sustainable finance is creating a significant opportunity for City Governments to mobilise this finance to invest in more inclusive, resilient and sustainable infrastructure. A range of different sustainable finance instruments will need to be mobilised through targeted measures to support each instrument's adoption in line with the national institutional context.



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Annex A. Compendium of Case Studies

Chapter 2 Case Studies

Case Study 1: Seeking investors to implement Southampton's New City Vision for economic growth within a low carbon environment (United Kingdom)

Case Study 2: The redevelopment of the Hudson Yards in New York (United States)

Case Study 3: Planning and leveraging financing for green, urban infrastructure for Punggol Ecotown (Singapore)

Case Study 4: HafenCity Hamburg (Germany)

Case Study 5: India's National Urban Policy Framework (India)

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Case Study 6: Mayoral Community Infrastructure Levy in London (United Kingdom)

Case Study 7: Charges for Additional Building Rights in Sao Paulo (Brazil)

Case Study 8: Biodiversity offsetting in Paris (France)

Case Study 9: Shapingba Station renovation in Chongqing (People's Republic of China)

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Case Study 11: Local Green Deals in Mannheim (Germany)

Case Study 12: Cape Town Central City Improvement District (South Africa)

Chapter 4 Case Studies

Case Study 13: Municipal Bond in Vadodara (India)

Case Study 14: Green Bond in Mexico City (Mexico)

Case Study 15: Green and Social Loans from La Banque Postale (France)

Case Study 16: Sustainability-Linked Bond in the City of Helsingborg (Sweden)

Case Study 17: Catastrophe Bond in Los Angeles (United States)



Chapter 2 Case Studies

Case Study 1: Seeking investors to implement Southampton's New City Vision for economic growth within a low carbon environment (United Kingdom)

Name of instrument	Master Plan
Location	Southampton, United Kingdom
Context	Southampton is one of the fastest growing cities in the UK and has major strengths in banking, finance and insurance, as well as public administration, education and health sectors and emerging strengths in low-carbon technologies. Over the past 20 years, Southampton's strategy for attracting investors has been strengthened by actively seeking out investors and carefully plotting out the precise developments needed to realize the city's objective. Southampton's development is guided by its Local Development Plan providing a framework for planning and investments for the city until 2026. Capitalizing on previous strategic plans, such the past master plan formulated in 2013, the city council has been set out a participatory process in 2022 to renew its city vision for the next 20 years. The aim of the new strategic plan is to provide necessary infrastructure and facilities to support the growth of the city, protect and enhance the environment, to connect the city with its waterfront and encourage growth and further investment in the city. A draft development plan with a set of comprehensive maps for redevelopment areas has been published by the city council for online consultation
Description	The current documentation published for consultation highly reflects the way through which Southampton was able to attract private investments in the past. Having formulated its first master plan in 2013, the council organised a series of launch events of the Masterplan with local investors in the real estate industry to inform about the visions and draw attention to particular areas for redevelopment. The current draft master plan is also identifying key sites for redevelopment, such as its Mayflower Quarter providing detailed scenarios how the area could be redeveloped to accommodate new facilities for business, homes, retail and leisure. Apart from being a guideline, this comprehensive area master plan outlines supplementary strategies that support the vision and design of the masterplan, including explanations of movement, sustainability, viability and delivery principles, thus necessary information to guide future private investments decisions.
Impacts, success factors and lessons	This proactive approach in former strategic plans to raise private investment has secured the city almost GBP 2 billion of city centre investment plus a further GBP 1 billion of investment across the remainder of the city.
Sources	<ul style="list-style-type: none"> Southampton City Council (n.d.), Southampton City Vision, https://www.southampton.gov.uk/planning/planning-policy/emerging-plans/cityvision/ (accessed on 23 of May 2023) Southampton City Council (n.d.), Southampton City Vision: Local Plan: Draft Plan with Options, https://www.southampton.gov.uk/media/5eidwnjh/full-draft-local-plan-with-options.pdf (accessed on 23 of May 2023)



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Case Study 2: The redevelopment of the Hudson Yards in New York (United States)

Name of instrument	Transit-oriented development
Location	New York (United States)
Context	<p>Prior to the redevelopment of Hudson Yards in New York (United States), the area was dominated by railyards, modern structures, and underutilised land on Manhattan's West Side. The site lacked significant commercial or residential development and had a relatively low population density. The area was weakly connected to public transport because of its detached area from the city centre and restricted transportation choices. The railyards went about as actual boundaries, secluding the area from encompassing areas and the remainder of Manhattan. This was the basis against which one of the largest and most ambitious real estate development projects in the United States emerged in New York City.</p>
Description	<p>Realising the Hudson Yards project required a distinct collaboration approach between the city government, developers, and other stakeholders. Based on a revision of land-use guidelines, which changed the parameters for the neighbourhood's vision, such as the permissible building heights, land use categories, and development density, the city government worked closely with developers to clarify the impacts and opportunities of these guidelines for potential investment projects. Negotiating development contracts and agreements, addressing legal and financial issues, and ensuring compliance with the city's requirements and regulations were key subjects of this engagement with property developers.</p> <p>Apart from securing the buy-in of the real estate sector, this close interaction also allowed the government to make use of land value capture to help finance the development and infrastructure improvements in the area. A variety of instruments have been applied for this purpose, such as the creation of a tax increment financing (TIF) ensuring that the increased land value could generate property tax, bilateral agreements for payments in lieu of future property taxes, as well as levying additional taxes on property owners in the area to pay for services or projects involving public infrastructure. This included extending a subway line to serve the area, which required collaboration with the Metropolitan Transportation Authority (MTA) and other relevant organisations</p>
Impacts, success factors and lessons	<p>The USD 25 billion project raised over USD 1 billion of private investments for future capital projects, such as a new subway line. Supporting Public Private Partnerships were created that enabled private developers to finance and build public infrastructure in exchange for long-term leases or other forms of revenue-sharing agreements.</p>
Sources	<ul style="list-style-type: none"> New York City (n.d.), Hudson Yards: Overview, https://www.nyc.gov/assets/planning/download/pdf/plans/hudson-yards/hyards.pdf (accessed on 21 April 2023).



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Case Study 3: Planning and leveraging financing for green, urban infrastructure for Punggol Ecotown (Singapore)

Name of Instrument	Green Urbanism
Location	Punggol district, Singapore
Context	The region of Punggol in Singapore was primarily comprised of agricultural land, and mangroves prior to its development as the Punggol Eco Town. Punggol was once a fishing village as well as a remote rural area with plantations and farms. Plans initiated by the Singapore government in the early 2000s to transform Punggol into an environmentally friendly and sustainable town led to the construction of the Punggol Eco Town. A model town with its urban areas planned and designed with nature, green spaces, and eco-friendly features was the objective.
Description	<p>The preparations for Punggol Eco Town in Singapore included a comprehensive long-term planning and broad land use strategy under the responsibility of the Urban Redevelopment Authority (URA). It included a concerted conceptualisation and visioning of this development by the Housing & Development Board (HDB), requiring collaboration between different tiers of government around the formulation of key strategic plans and initiatives. These included for example HDB’s "Punggol 21" master plan launched in 1996, envisioning the town as a waterfront town with housing, recreational facilities, and a strong focus on enhancing and preserving its natural environment. The plan called for the construction of a network of canals, lakes, and waterways that would increase the scenic value of the town and offer opportunities for water-based recreational activities. It was followed by Punggol Eco Town’s comprehensive development plan launched in 2007, which outlined sustainable living strategies and principles, focusing on four main pillars: economic vitality, smart technology integration, community-centred living, and environmental sustainability. This master plan included the application of various sustainable design practices for energy efficiency, waste management and green spaces.</p> <p>Based on these plans, the town’s infrastructure is being upgraded including its transportation networks. For example through comprehensive cycling paths, walkways and public transportation links, the town offers green, efficient and convenient transport options, encourages active mobility, and enables less reliance on private automobiles. Punggol is considered as a ‘living laboratory’ to test new ideas and technologies in Singapore, such as solar photovoltaic systems in buildings, dual bicycle racks, energy re-generation system for lifts, smart lighting, and smart energy meters. The objective is to provide residents with a liveable, efficient, sustainable and safe living environment. The financing of Punggol Eco Town includes a mix of public and private ventures. The Singapore Government and the</p>



	Housing and Development Board, Singapore's public housing authority contributed significantly to the financing of the town's development through the national government budget. Punggol Eco Town is also developed and funded by private developers in some areas.
Impacts, success factors and lessons	Punggol Eco Town is being built in stages to accommodate changing necessities and socioeconomics of the town but also market demands. Punggol Eco Town grew from being a former rural village to 187,800 people in 2019. ¹⁸
Sources	<ul style="list-style-type: none"> • Housing and Development Board (2023), Punggol, https://www.hdb.gov.sg/about-us/our-role/smart-and-sustainable-living/punggol-ecotown, (accessed on 26 April 2023), Government of Singapore • Centre for Liveable Cities (2021), Urban Systems Studies: Punggol: From Farmland to Smart Eco-Town, https://www.clc.gov.sg/docs/default-source/urban-systems-studies/uss-punggol.pdf, (accessed on 26 April 2023) • UN Habitat (n.d.), Master Planning of Punggol Eco-Town, https://www.urbanagendaplatform.org/best-practice/master-planning-punggol-eco-town, (accessed on 26 April 2023)

Case Study 4: HafenCity Hamburg (Germany)

Name of Instrument	Zoning
Location	Hamburg (Germany)
Context	<p>Preceding its redevelopment, the HafenCity in Hamburg (Germany) was an industrial area and seaport for maritime trade and activities. A collection of docks, warehouses, and shipping facilities made up the area, which was important to Hamburg's maritime economy. However, traditional port activities moved to other locations as shipping methods changed and the need for larger container terminals increased, transforming the HafenCity into a new urban district. How to redevelop this brownfield site into a liveable and sustainable urban district while preserving its historical building and landmarks was the major key challenge of the government of Hamburg and its subsidiary, the HafenCity Hamburg GmbH. After acquiring the necessary land for redevelopment, the city embarked on a multifaceted redevelopment project using with an envisaged investment need of EUR 13 million using zoning and urban design competitions as major instruments to plan and redevelop the area. The redevelopment of HafenCity in Hamburg was a meticulously planned project. At the end of the 1990s, the master plan for HafenCity was formulated. A dedicated urban development competition for the area was launched in 1997, marking the beginning of the process. The objective of the competition was to gather creative concepts for converting the former industrial port into a contemporary urban district. The master plan was based on the winning proposal, after which additional planning and refinement were carried out with the assistance of various stakeholders, the public, and expert consultations</p>

¹⁸ Source: <https://www.hdb.gov.sg/about-us/history/hdb-towns-your-home/punggol>, (accessed on 26 April 2023).



<p>Description</p>	<p>In 2000, the master plan's final version was approved. It illustrated the vision, standards, and system for the redevelopment of HafenCity, including land use, transportation, design and public spaces. It outlined a zoning approach that sought to balance out different land uses with sustainable buildings and a mixed use. A number of zoning maps for the area defined the land use designations, green building practices and heights, densities, open spaces between buildings, the preservation rules for historical buildings and access to public transport.</p> <p>Already in 1995 a port and location development company (GHS) was set up to manage the development of HafenCity – since 2004 it has been known as HafenCity Hamburg GmbH. It is responsible for the “special city and port fund”, which consists of land owned by the City of Hamburg located in the HafenCity area. The sale of these sites provides finance for the lion’s share of public investment in HafenCity, notably roads, bridges, squares, parks, quays and promenades. By concentrating non-official functions in a dedicated development company of its own, Hamburg can ensure the integrated planning and realization of the distract and the efficiency and quality of the urban development project. It also creates the conditions for a strong focus on innovation while guaranteeing a high degree of public accountability Throughout the redevelopment phase, collaboration with the private sector turned out to be a crucial and successful aspect for the financing, construction, and management. Private developers purchased land parcels and applied guidelines and regulations as set out by the master plan. The majority of projects received funding from private investors and the HafenCity turned out to be an attractive area for restaurants, cafes, retailers, and other commercial businesses that were interested in leasing or purchasing space. The onsite management and maintenance of buildings was procured to private property management companies to ensure the functionality and use of the buildings.</p>
<p>Impacts, success factors and lessons</p>	<p>Building projects include multi-generational living for families, students, seniors and people with disabilities. As well as a multitude of private developers, joint building ventures and housing cooperatives, a variety of social organizations are building an extremely diverse and social mixed stock of housing. This is facilitated by the process for site tenders that prioritizes concept (70%) over price (30%). Since 2010 at least 20 per cent of all housing has been publicly subsidized, and in 2011 this share rose to one third. The diversity of housing provision is significantly increase further by the so-called three-way mix.</p> <p>This port district was redeveloped under strict building regulations to preserve its unique character as well as create green spaces and pedestrian zones. In close consultation with private developers, new buildings met environmental and energy efficient standards and incorporated solar panels and green roofs in the design. Up until 2020, the investment volume for the redevelopment of the HafenCity has been around EUR 13 billion, of which EUR 10 billion stemmed from private investments.</p>
<p>Sources</p>	<ul style="list-style-type: none"> • Lee Kuan Yew World City Prize (2021), Creating a city-within-a-city, https://www.leekuaneyeworldcityprize.gov.sg/resources/case-studies/hafencity/, (accessed on 28 April 2023) • HafenCity (n.d.), Urban planning: A European city for the 21st century, https://www.hafencity.com/en/urban-development/urban-planning, (accessed on 28 April 2023) • DW (2023), HafenCity Hamburg: Mit viel Luft nach oben, https://www.dw.com/de/hafencity-hamburg-mit-viel-luft-nach-oben/a-64219714, (accessed on 28 April 2023)



	<ul style="list-style-type: none"> • HafenCity (n.d.), HafenCity Hamburg GmbH, https://www.hafencity.com/en/hafen-city-hamburg-gmbh/hafencity-hamburg-gmbh (accessed on 19 June 2023) • HafenCity (n.d.), Social development: Urbanity in a social context, https://www.hafencity.com/en/urban-development/social-development (accessed on 19 June 2023)
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Case Study 5: India’s National Urban Policy Framework (India)

Name of Instrument	National Urban Policy
Location	India
Context	<p>Before the NUPF, Master Plans in India were too detailed to accommodate the externalities emerging from rapid urbanisation of cities in the country. The plans were often ‘<i>unconnected to investment planning</i>’¹⁹ and missed linkages between the spatial and functional aspects required for expanding cities. The Indian government formulated therefore a National Urban Policy Framework (NUPF) in 2018, which offers an integrated and coherent approach to urban planning in India. Structured in 10 different themes (so called functional areas) the policy highlights interventions in sectors such as Urban Planning, Physical Infrastructure and Urban Finance.</p> <p>The national government sees itself largely as a catalytic enabler creating conducive mechanisms at national level, to help cities become financially sound and to be able to borrow commercially. State and city administrations are seen as the main drivers of change in cities to meet the needs and demands of a rapidly growing population. Considering the regional variations across states of the country in the way they attract private investments for infrastructure, the policy has formulated actions for each theme at city, state and central level. A new strategic intent and particular shift from a project-based funding approach to an outcome-based system was announced, aimed at creating a flexible, outcome-based funding support for subnational entities.</p>
Description	<p>The outcome-based funding system is based on several core principles, such as a rationalisation and harmonisation of fundings schemes into a single funding window, the explicit encouragement to work in partnership between the three tiers of government (Central-State-Local) as well as incentivising the leveraging of private investments. The latter is achieved through dedicated premiums to states and cities that access commercial financing, based on the ‘raise more, gain more’ principle. For municipalities with lower financial capacity, the national government considers assisting cities with lower capacity to reduce the cost of funds or help improve the access of to credit by interest subventions and partial credit guarantees. In these cases, the cities can be reimbursed a portion of the interest charged on their loans, thereby reducing the burden for borrowing.</p>

¹⁹ The 10 sectors covered by the framework are Urban Planning, Urban Economy, Physical Infrastructure, Social Infrastructure, Housing and Affordability, Transportation and Mobility, Urban Finance, Urban Governance, Urbanization and Information System and Environmental Sustainability.



<p>Impacts, success factors and lessons</p>	<p>As the NUPF has been formulated as a strategic intent by the national government, the mainstreaming of its major features into the delivery of national initiatives as well as practices exercised by states and cities in India requires time. Since NUPF recognized that urban development is a state subject, states have been encouraged to develop their own state policies and plans based on this framework. NUPF's emphasis on transportation, mobility, and urban environment focus on ITS, reducing specific private transport, intermodal operations, gender-friendly design, and easing traffic congestion are helping states to develop their urban strategies. However, features of the NUPF, such as a more customised and decentralised strategy formulation, have been incorporated in national initiatives, such as through the Atal Mission for Rejuvenation and Urban Transformation (AMRUT), the Swachh Bharat Mission and the Smart City Mission²⁰. A National Output-Outcome Framework for national schemes and initiatives, which is updated on a quarterly basis, was also introduced, allowing a better outcome-based monitoring across all urban missions.</p>
<p>Sources</p>	<ul style="list-style-type: none"> • Ministry of Housing and Urban Affairs (2020) National Urban Policy Framework: Strategic Intent, https://iica.nic.in/images/Articles/NUPF_Final_Oct%202020.pdf, (accessed on 18 April 2023) • Ministry of Housing and Urban Affairs (2021) Annual Report, https://mohua.gov.in/upload/uploadfiles/files/Annual_Report_2020_21_MoHUA_EnglishVersion%20(Final).pdf, (accessed on 18 April 2023)

²⁰ Url: https://smartnet.niua.org/sites/default/files/resources/nupf_final.pdf, (accessed on 19 April 2023)



Chapter 3 Case Studies

Case Study 6: *Mayoral Community Infrastructure Levy in London (United Kingdom)*

Name of instrument	Infrastructure Levy
Location	London, United Kingdom
Context	In 2012, the Mayor of London introduced the Mayoral Community Infrastructure Levy (MCIL) to specifically help finance the rail link Elizabeth Line (Crossrail) connecting central London to Western and Eastern suburbs. In February 2019 the Mayor adopted a new charging schedule (MCIL2), which will be used to fund the Elizabeth Line and Crossrail 2, a railway line linking the south-west of London.
How the instrument works	The infrastructure levy mechanism was introduced and given legal ground by the UK government in 2010. MCIL is calculated on the net additional floorspace, although floorspace for medical or education purposes have a nil charge, and relief and exemptions from CIL are also available for some types of development such as affordable housing, self-build housing and developments by charitable organisations for charitable purposes following approval by the collecting authority. The local planning authorities in London have been responsible for calculating the charges and collecting payments on behalf of the Mayor. The charge is calculated once a planning application is submitted to the local planning authority. MCIL is payable when work on the new development commences and for major developments with a large CIL liability, the payment can be made in instalments.
Impacts, success factors and lessons	The instrument collected more than GBP 1 billion between 2012 and 2022, which were transferred to Transport for London. The flexible use of levies and fees opens new opportunities for cities to finance infrastructure in areas of strategic importance.
Sources	<ul style="list-style-type: none"> Mayor of London (n.d.) Mayoral Community Infrastructure Levy , https://www.london.gov.uk/programmes-strategies/planning/implementing-london-plan/mayoral-community-infrastructure-levy#how-mcil-works-32470-title (Accessed 15/05/2023)

Case Study 7: *Charges for Additional Building Rights in Sao Paulo (Brazil)*

Name of instrument	Charges for Building Rights (and Transfer of Development Right)
Location	Sao Paulo, Brazil
Context	São Paulo is highly urbanised, and despite strong infrastructure investment needs, the city cannot raise revenue by selling land because it possesses little developable land. Therefore, charges for additional building rights (Outorga Onerosa do Direito de Construir, OODC) are one of possible measures for São Paulo to raise funds for infrastructure investments.



<p>How the instrument works</p>	<p>OODC is based on the widely accepted notion in Brazil that the landowner’s property right is limited to a basic floor area ratio (FAR). The right to build at a density up to the basic FAR is free, but developers wanting to build at a higher density up to the FAR established by the zoning law must pay compensation to the city (Smolka and Maleronka, 2019^[62]). Local Master Plans and ordinances must specify the conditions and rules of operation, as well as the maximum Floor Area Ratio allowed in an area. The charge is defined in the auction market, unlike some other cities where it is calculated according to the volume of the extra floors and their local market value.</p> <p>In 2004, the city identified redevelopment zones and issued “Certificates of Additional Construction Potential (Certificados de Potencial Adicional de Construção or CEPAC), which created and entitled building rights. CEPACs were sold by auction as a tradable financial security, and they were applicable only to designated urban districts, with the revenues to finance predetermined urban infrastructure. In 2014, the City of São Paulo instituted a universal basic FAR of 1.0 as the building right applied to all landowners. The FAR scale ranges from 1.0 to a maximum of 4.0, specified in the city’s master plan (City of São Paulo, 2014^[34]). This reform has significantly increased the potential of the use of OODC in the entire city.</p>
<p>Impacts, success factors and lessons</p>	<p>Since their first issuance in 2004, CEPACs have been important source of revenue to the city. By auctioning CEPACs, the city could allocate limited air rights according to market needs at a price to be fixed by market demand. The peak demand for CEPACs occurred in 2010, with 92,151 certificates offered by the city with a minimum price of BRL 2,170 and realisation at BRL 4,000, that is, with a premium of 84.33% (Ferraz and Benfatti, 2020^[63]). However, so as to create higher demand for air rights, the allowable (free) floor areas in large parts of the city were reduced. This has arguably led to less intensive development in certain areas than otherwise is considered optimal (Suzuki and Murakami, 2015^[31]).</p> <p>Coordination across related institutions is key to the effective use of the raised fund. For example, there was competition between the city-owned bus companies and State-owned transit agencies. It is also reported that the allocation of CEPACs has not been linked to metro construction, thus missing the opportunities to capture the increments of land value attributable to such transit development (Suzuki and Murakami, 2015^[31]).</p> <p>The replicability of OODC is highly conditional to the local context. The instrument is more prominent in large cities, such as São Paulo, where the real estate market is dynamic and the Floor Area Ratio is low. The main challenge to implementation is the low demand for building at higher density in secondary cities.</p>
<p>Sources</p>	<ul style="list-style-type: none"> • OECD/Lincoln Institute of Land Policy, PKU-Lincoln Institute Center (2022), <i>Global Compendium of Land Value Capture Policies</i>, OECD Regional Development Studies, OECD Publishing, Paris, https://doi.org/10.1787/4f9559ee-en. • Prefeitura de Sao Paulo (2015), City of Sao Paulo Strategic Master Plan, https://gestaourbana.prefeitura.sp.gov.br/wp-content/uploads/2015/02/Master_plan_english_version.pdf • World Bank (2015), Air Rights Sales, São Paulo, Brazil, https://gestaourbana.prefeitura.sp.gov.br/wp-content/uploads/2015/02/Master_plan_english_version.pdf • Urbanet (2019), Building Rights and Municipal Finance, https://www.urbanet.info/building-rights-and-municipal-finance-sao-paulo-brazil/



- Ferraz, Fabio José ; Benfatti, Denio Munia (2020), Additional building rights certificates: a funding mechanism for urban partnership operations or a speculative instrument? <https://www.scielo.br/j/cebape/a/BfxKNstJG9rxpWbJr75xvpm/?lang=en&format=pdf>

Case Study 8: Biodiversity offsetting in Paris (France)

Name of instrument	Biodiversity offsetting
Location	City of Paris, France
Context	Introduced as a legal obligation by the 2016 Biodiversity Act, the city of Paris set up the Paris Biodiversity Plan 2018-24 and is working on the new ecological offsetting scheme according to three principles: equivalence, the permanence of measures based on the duration of the damage, and proximity, aiming for zero net loss of biodiversity. As biodiversity offsetting only makes sense as a last resort option, the high cost of offsetting is in itself an incentive to avoid or reduce impacts on biodiversity upstream. At the same time, it opens a new opportunity for the city of Paris to mobilise private financing to make most needed investment within or around the city.
How the instrument works	<p>There are three possibilities for compensation: i) directly by the project developer (the option favoured by the City of Paris); ii) by contract with a compensation operator; or iii) by acquisition of compensation units in the framework of a natural compensation site set up by a public or private person. In the context of a development project, the project owner must implement the "avoid, reduce and compensate" principle in accordance with Article 2 of the law for the recovery of biodiversity, nature and landscapes. It must, as a priority, avoid damage to biodiversity, or, failing that, reduce it and, as a last resort, compensate for unavoidable and irreducible residual impacts on biodiversity by restoring ecosystems equivalent (in terms of species, habitats or ecological functions) to those destroyed.</p> <p>To operationalise the instrument, the city initiated a partnership with CDC Biodiversité (a nation-wide agency) to identify and map "natural offset sites" within and outside the city. This will make it possible to anticipate, rationalise and make the offset measures more ecologically coherent. The feasibility of converting certain natural sites in Paris and the metropolitan area into natural compensation sites will be studied, such as the embankments of the ring road, the SNCF railway areas, the Vincennes and Boulogne woods, the Seine and its banks, the Ile aux Cygnes, the canals of Paris and the Eau de Paris aqueducts.</p>
Impacts, success factors and lessons	<p>The actual operation of the offsetting is yet to start. Co-ordination with surrounding municipalities within the metropolitan area is vital for effective implementation.</p> <p>It is crucial to explore the synergy with the Paris Green Fund, a territorial investment fund dedicated to the ecological transition the City of Paris launched in 2018. Since the City Biodiversity plan sets the target that 20 biodiversity spaces are financed by the investment fund by 2024, the financial resource from the biodiversity offsetting mechanism can complement the fund.</p>
Sources	<ul style="list-style-type: none"> • Ville de Paris (2019), Plan biodiversité de Paris 2018-2024, https://cdn.paris.fr/paris/2021/02/17/fbb551749cd3dabdf2b730d5f4097629.pdf



Case Study 9: Shapingba Station renovation in Chongqing (People's Republic of China)

Name of instrument	Transfer of Development Right (and Transit Oriented Development)
Location	Chongqing, China
Context	Chongqing Shapingba Railway Station in the central area of Shapingba, Chongqing, was first built in 1979 jointly by the former Ministry of Railways and the Chongqing Municipal Government. In 2010, the comprehensive renovation project of Shapingba Station was launched, with the joint participation of Chongqing Transportation Hub Group and China Railway Chengdu Bureau Group. The project had two key goals: first, to upgrade an old station and create a modern transportation hub that integrates various modes of transport (high-speed rail, rail transit, buses, taxis, social vehicles, etc.) to increase connectivity; second, to feed the hub with commercial and business properties, improving the urban function and quality of the core commercial district, and thus enhancing the city's image. The station was officially opened in 2018.
How the instrument works	<p>The "layered transfer", a new development right transfer model was introduced for this comprehensive renovation project. The city designated a development right on the upper layer of the development site to maximise the use of special resources. While the space for railways and tracks were placed at the underground layer of the station, forming a transportation hub (Phase I), commercial and residential buildings were built at the upper layer of station to create a comprehensive business district (Phase II). The project has a total of 760,000 square metres, of which the upper layer part is about 500,000 square metres, operated by the developers. The total investment of the project is approximately USD 1.2 billion. The project was mainly financed by project loans. The development right of the upper layer allowed to create the source of income for loan repayment for the project.</p> <p>The project is a good example of transit-oriented development (TOD), as the integrated development can attract passengers, contributing to the economic viability of the railway system.</p>
Impacts, success factors and lessons	The project introduced a modern planning concept of "integration of station and city" and a new financing mechanism using TDR, which can be a model for other urban regeneration projects with railway stations. The local government extended effective guidance and supervision through strengthened inter-departmental coordination.
Sources	<ul style="list-style-type: none"> • Chongqing Finance Bureau • Ministry of Finance of China • The GPSC (2018), Quarterly Report on GEF China Sustainable Cities Integrated Approach Pilot Project, December 2018 (thegpsc.org), https://www.thegpsc.org/sites/gpsc/files/partnerdocs/gef-sciap_newsletter_ch_1218_final.pdf



Case Study 10: Density Bonus in Vancouver (Canada)

Name of instrument	FAR bonus
Location	Vancouver (Canada)
Context	Density bonusing, sometimes referred to as bonusing or floor area relaxations, is used as a zoning tool that permits developers to build additional floor area, in exchange for amenities and affordable housing needed by the community.
How the instrument works	<p>There are two types of bonus mechanism. Density bonus zoning contributions (cash in-lieu) allow for extra density, up to a specified maximum floor space ratio, in exchange for cash contributions towards amenities and affordable housing. Financial contributions are determined by the density bonus contribution rate set out under the schedule of the zoning bylaw. Density Relaxations for Amenities (in-kind) allow for relaxations of buildable market floor area (FSR) in exchange for amenities provided by applicants as on-site public benefits. This is sometimes referred to as inclusionary zoning. Each district schedule differs in the types of amenities that are to be provided, as well as the amount of relaxation in FSR. Amenities and affordable housing are allocated in the public benefits strategies of community plans (e.g., parks, community facilities, daycare). Payment of the density bonus contribution is a condition of Building Permit issuance.</p> <p>Certain residential floor area to be developed using bonus density may be eligible for exemption from density bonus contributions. For example, social housing built within the residential density bonus zones is exempt from density bonus contributions, provided that it meets the DCL By-law definition of social housing and receives approval from the Housing Policy group.</p>
Impacts, success factors and lessons	<p>In 2021, the city approved 75 new projects granting additional density through rezonings and Density Bonus Zoning projects, resulting in 5 million square feet of net additional floor area. The city collected a total of CAD 9 million density bonus contributions, which was the highest record. In addition, the city received commitment of in-kind benefits including 144 social housing units, 123 childcare spaces, 9 artist live-work studios and a Cultural Amenity Space.</p> <p>The value of public benefit contributions typically fluctuates considerably year-over-year due to the cyclical nature of property development.</p>
Sources	<ul style="list-style-type: none"> • City of Vancouver (n.d.), Density bonusing, https://vancouver.ca/home-property-development/density-bonus-zoning.aspx • City of Vancouver (2023), Bulletin: Density Bonus Contributions, https://bylaws.vancouver.ca/bulletin/bulletin-density-bonus-contributions.pdf • City of Vancouver (2022), Annual Report - Community Amenity Contributions and Density Bonusing 2021, https://vancouver.ca/files/cov/annual-report-community-amenity-contributions-and-density-bonusing-2021.pdf



Case Study 11: Local Green Deals in Mannheim (Germany)

Name of instrument	Local Green Deal (LGD)
Location	Mannheim (Germany)
Context	Mannheim, one of the largest cities in southwest Germany and home to 310,000 inhabitants, was once an industrial hub, and has sought to use ambitious sustainability action over the last decades. To transform its entire socio-economic model, the city launched its LDG vision (the Mannheim Message) in 2020 and set out a number of actions covering eight thematic fields (climate neutrality, energy, economy, mobility, building, food, biodiversity, urban environment). Its goal is to drive deep structural change by building bridges between sectoral priorities, leveraging action from local stakeholders and exchanging with other cities to develop more effective ways of working.
How the instrument works	Cooperation between the city and local stakeholders is a core principle of the Mannheim LGD. The dedicated LGD team facilitates partnership with businesses, with businesses, industry organisations and service providers, resulting in their iDEAL Business Climate Action and over 17 partnerships with private companies. The city has also addressed the challenge of financing sustainable solutions by engaging banks, local businesses and educational institutions, as well as individual citizens. For example, the GBG – Mannheimer Wohnungsbaugesellschaft mbH, the largest municipal housing association in Baden-Württemberg – committed to the iDEAL Business Climate Action, is working on forward-looking solutions and initiating model projects for sustainable construction and living.
Impacts, success factors and lessons	The GBG has committed to refurbish 4000 flats and introduce grey water reuse in buildings, providing substantial benefits for both the water supply subsystem and also by reducing the demand for fresh clean water and energy consumption demand. A key challenge is how to encourage communication between city departments and local stakeholders who do not traditionally engage with each other, to ensure that potential synergies between different LGD actions are fully exploited.
Sources	<ul style="list-style-type: none"> European Commission (2023), Local Green Deals: A Blueprint for Action, https://www.intelligentcitieschallenge.eu/sites/default/files/2023-03/2023-Local%20Green%20Deals-update-final.pdf

Case Study 12: Cape Town Central City Improvement District (South Africa)

Name of instrument	Business Improvement District (BID)
Location	City of Cape Town, South Africa
Context	In Cape Town, the BID system is known as the City Improvement District (CID). Even though the Central Business District (CBD) of Cape Town is making huge strides in becoming a hub for business, it faces ongoing challenges such as electricity and water supply crises, decent housing shortages, and high crime and unemployment rates. Therefore public-private partnerships are so critical in Cape Town. Since its establishment in 2000, the Cape Town



	<p>Central City Improvement District (CCID) has been working together in pursuit of safety and security, urban management and social development of the area.</p>
<p>How the instrument works</p>	<p>The Cape Town CCID is a not-for-profit private-public company that operates in a 1.6 km² geographical area in the traditional CBD of Cape Town. This is a specific area approved by the City Council in terms of the municipal Property Rates Act. The CCID is mandated by stakeholders to manage and promote a safe, clean and lively neighbourhood in partnership with the City of Cape Town. The city collects contributions from property owners in the targeted areas, which are then granted to the CID organisation.</p> <p>In cooperation with the City of Cape Town, the CCID carries out repair work of various sizes (over 1,000 repair jobs per year), clean-up activities (e.g., collecting up to four tonnes of cigarette butts a year and cleaning up illegally dumped bulky waste), a quarterly publication of 50 000 copies of the Central City Guide, providing information on the state of the downtown area. In addition, the CCID and the city work together to alleviate homelessness across the CBD and support several work-rehabilitation programmes in conjunction with its NGO partners. Such activities are aligned with the city's strategy in making cities safer and more accessible with investment in safety technology (e.g., CCTV, drones, aerial surveillance, licence-plate recognition) as Cape Town's night-time economy begins to grow (Anderson, 2023^[64]). In 2022, activities related to safety and security account for about 60% (ZAR 47 million) the CCID's budget of approximately ZAR 81 million, followed by cleaning, social services and communications (Cape Town Central City Improvement District, 2022^[65]).</p>
<p>Impacts, success factors and lessons</p>	<p>As of 2018, the areas covered by the CCID are home to more than 1,200 buildings, over 2,000 businesses and more than 1,000 retail outlets, with a daily footfall of approximately 350,000 people and a retail occupancy rate of 93%. Some buildings are under construction or in the planning stages, but property prices in the area have risen to about seven times what they were in 2005. Thanks to the collective efforts between the city and the CCID, the Cape Town Central City is considered today to be South Africa's most vibrant and safest CBD.</p>
<p>Sources</p>	<ul style="list-style-type: none"> • Cape Town CCID (n.d.), Cape Town Central City Improvement District, https://www.capetownccid.org/



Chapter 4 Case Studies

Case Study 13: Municipal Bond in Vadodara (India)

Name of instrument	Municipal Bond (General Obligation Bond)
Location	Vadodara Municipal Corporation, Gujarat, India
Context	<p>The Atal Mission for Rejuvenation and Urban Transformation (AMRUT) was launched by the Ministry of Housing and Urban Affairs in 2015 to support the development of basic infrastructure in 500 Indian cities (e.g., water supply, sewerage, storm water drainage, green spaces and non-motorized urban transport). The programme also included a reform agenda and capacity building, including to improve city creditworthiness and support bond issuances.</p> <p>Vadodara, with a population of 2.3 million people, is the third largest city in the province of Gujarat. To improve basic infrastructure in the city, the Vadodara Municipal Corporation (VMC) had identified two projects that qualified for AMRUT for which it would seek financing: the Sindhrot Water Supply Project, which would cater to the needs of drinking water supply in the city, and the Liquid Waste Management Project, which would help in disposal of sewage water. Issuing bonds was identified as a way to help VMC provide these investments and support the implementation of AMRUT.</p>
Description	<p>In 2019, VMC decided to proceed with a bond issuance. Following internal in-principal approval, VMC appointed advisers (bank, legal counsel, credit rating agencies, chartered accountant, trustee, stock exchange, etc.) and undertook its first credit rating. It sought approval from the State Government and registered with the Bombay Stock Exchange.</p> <p>In 2022, Vadodara Municipal Corporation (VMC) became the 11th Urban Local Body in India to issue a municipal bond (since 2015). It was General Obligation Bond, where bond repayment is committed from the total revenue of the ULB. This involved earmarking tax proceeds to debtors through an escrow mechanism and a trust deed that would pay the debt service on the bond. The mechanisms create a senior lien (claim) position on pledged municipal taxes, reducing the potential future default risk for investors.</p> <p>As it supported a project under the AMRUT programme, the project received an incentive for issuing a municipal bond of INR 13 Cr per 100 Cr of debt issued.</p>
Impacts, success factors and lessons	<p>Vadodara successfully raised INR 100 Cr through its bond issuance. It achieved the lowest coupon rate in the history of the municipal bond market in India (7.15 percent), with a maturity of 5 years. This compared to typical interest rates of around 8-8.5% from other agencies at the time. The issuance was oversubscribed by over 10 times, despite being issued during the COVID-19 pandemic.</p> <p>Key success factors included:</p> <ul style="list-style-type: none"> • Institutional reforms: VMC was an early adopter of reforms relating to accounting and fiscal management practices. This helped it to demonstrate fiscal discipline and build debt management experience before having credit ratings and bond issuance. • Enabling framework: National and state level legislation and programs enabled and supported the issuance of bonds. Vadodara also had the opportunity to learn from



	<p>other nearby cities that were pioneers in the use of municipal bonds: Ahmedabad and Surat. Ahmedabad had issued bonds multiple times since 1998 and raised more than INR 500 Cr in capital markets, and Surat launched its first issue in 2018 and raised INR 200 Cr.</p> <ul style="list-style-type: none"> • Fiscal discipline and performance: VMC had strong revenue receipts and an operating surplus for more than 8 consecutive years prior to the bond issuance. VMC had also developed a history of financing capital infrastructure projects through loan financing from banks and development institutions. • Technical assistance: The bond issuance was supported through capacity building from India’s Ministry of Housing and Urban Affairs and the US Department of Treasury’s Office of Technical Assistance. <p>The experience of VMC highlights that process of issuing a first municipal bond can be challenging but can has several benefits. In particular, it can help to strengthen financial management practices, increase accountability for investment and deepen the domestic capital market for municipal bonds.</p>
Sources	<ul style="list-style-type: none"> • Vadodara Municipal Bond Report (Forthcoming) • Ministry of Housing and Urban Affairs (2022), <i>Vadodara Municipal Corporation to mobilize Rs.100 Cr against its contribution of Rs.224.30 in AMRUT Scheme</i>, https://pib.gov.in/PressReleasePage.aspx?PRID=1809683 • Ministry of Housing & Urban Affairs (2022), <i>Vadodara Municipal Corporation to mobilize Rs.100 Cr against its contribution of Rs.224.30 in AMRUT Scheme</i>, https://pib.gov.in/PressReleasePage.aspx?PRID=1809683 • Vadodara Municipal Corporation (n.d.), <i>City Development Plan</i>, Accessed at https://vmc.gov.in/development_plant.aspx • Ministry of Housing and Urban Affairs (2022), <i>Status of AMRUT</i>, accessed at https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1881751

Case Study 14: Green Bond in Mexico City (Mexico)

Name of instrument	Green Bond
Location	Mexico City, Mexico
Context	<p>Mexico City is one of the largest cities in the world, with a population of approximately 21 million people across its functional urban area. Given its large and growing population, the city has had a substantial need for sustainable infrastructure investments to support population growth and improve quality of life.</p> <p>In recognition of the need for sustainable development, the city adopted a Climate Action Program in 2014 as a planning tool to help guide its climate change response. The program accounted for the environmental, social, and economic risks posed by climate change, and related impacts on people. In line with the program, a series of sustainable investments for the city were identified. These included a Green Corridor project along one of Mexico City’s largest arterial roads, which included 100 electric busses, dedicated bus lanes, cycle paths and pavements for pedestrians to reduce carbon emissions and improve air quality.</p>



<p>Description</p>	<p>To help finance the green projects related to the Climate Action Program, the Mexico City decided to issue its first municipal green bond in 2016. The USD 50 million bond issuance, with a 5-year maturity, was the first green bond issued by a city government in Latin America. Proceeds would help to finance the Green Corridor project, an LED street lighting conversion and a water supply plant project.</p> <p>The city had previously issued around USD 200 million of municipal bonds each year and had a strong credit rating (AAA from Fitch Ratings). The decision to issue a green bond was made instead of a municipal bond issuance to help guarantee that proceeds are used for the defined green projects, increase certainty and transparency to investors (due to certification and reporting requirements), and respond to investor demand. To support the issuance of the green bond, the city had to increase cooperation between its environmental and finance departments and achieve external certification of the green projects.</p>
<p>Impacts, success factors and lessons</p>	<p>Despite being issued in difficult market conditions, the bond was oversubscribed by two and a half times and had a coupon of 6.02% (December 2016 issuance). Mexico City was awarded the Municipal Bond of the Year by Environmental Finance and Green Bond Pioneer Award by the Climate Bond Institute in 2017.</p> <p>Key success factors included:</p> <ul style="list-style-type: none"> • Sustainable finance institutions: In the years before the issuance, there were important efforts to grow the market for sustainable finance in Mexico by a variety of actors, including the Mexican Climate Finance Advisory Group, the Mexican Stock Exchange (including MexiCO2), Climate Bonds Initiative and C40, among others. These organizations supported knowledge sharing, the development of local standards and the creation of local organizations for certification. • Technical assistance: Mexico City worked with the C40 Cities Finance Facility (CFF) to help develop bankable projects. CFF works with cities to prepare urban climate change projects and to access financing instruments to help pay for the projects. Capacity building as part of the programme also aimed to put the city in a stronger position to finance future low carbon projects. • Creditworthiness: Mexico City had substantial experience in issuing bonds to finance investments and had a good credit rating (AAA from Fitch Ratings), which can result in a lower cost of borrowing. <p>Proceeds from issuance of a green bond by Mexico City helped to support the Green Corridor Project and other investments. By issuing a Green Bond, as opposed to a municipal bond, the Mexico City supported the achievement of other benefits, including increasing green finance knowledge and capacity, aligning internal processes with green investment objectives and strengthening internal and external coordination for sustainable investments. The issuance also linked the city to global climate agendas.</p>
<p>Sources</p>	<ul style="list-style-type: none"> • C40 (2017), Cities100: Mexico City - Green Bonds for Climate Action, https://www.c40.org/case-studies/cities100-mexico-city-green-bonds-for-climate-action/ • Reuters (2017), Mexico City places bets on green bonds, https://www.reutersevents.com/sustainability/mexico-city-places-bets-green-bonds • Environmental Finance (2017), Bond of the year: Municipal – Mexico City, https://www.environmental-finance.com/content/awards/green-bond-awards-2017/winners/bond-of-the-year-municipal-mexico-city.html • Hilbrandt, H., & Grubbauer, M. (2020). Standards and SSOs in the contested widening and deepening of financial markets: The arrival of Green Municipal Bonds in Mexico City.



	<p>Environment and Planning A: Economy and Space, 52(7), 1415–1433. https://doi.org/10.1177/0308518X20909391</p> <ul style="list-style-type: none"> Green Biz (2017), Lessons learned from Mexico City's first green bond, https://www.greenbiz.com/article/lessons-learned-mexico-citys-first-green-bond
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Case Study 15: Green and Social Loans from La Banque Postale (France)

Name of instrument	Green and Social Loans
Location	<i>La Banque Postale Collectivités Locales</i> , France
Context	<p>Subnational governments in France (regions, departments and municipalities) undertake for 56% of total public investment and 88% of climate-significant public investment. Their substantial investment responsibilities means that these governments are important borrowers for investment in infrastructure. In 2019, outstanding subnational government debt in France accounted for 11.9% of GDP. Almost all of this debt is for investment purposes as a “golden rule” is in place, meaning that subnational governments can only borrow long-term to for investment purposes.</p> <p>The financing needs of subnational governments in France is highly heterogeneous. This means that not all governments have the scale to efficiently issue bonds on capital markets. While there are some large subnational governments who issue bonds (e.g., Ile de France), many of the approximately 35 000 subnational governments in France are small and instead rely on loans from financial institutions.</p> <p><i>La Banque Postale</i>, created in 2006 as a subsidiary of Le Groupe La Poste, is a public bank that lends to local authorities. Since 2012, the bank has had public sector lending arm (Collectivités Locales) and has become the largest lender to local authorities in France. Half of <i>La Banque Postale Collectivités Locales</i>’ loans are granted to small municipalities.</p>
Description	<p><i>La Banque Postale</i> is an important issuer of GSS bonds in France, with some of the proceeds used to finance or refinance eligible local authority investments in the form of Green Loans or Social Loans. <i>La Banque Postale</i> aims to maintain an eligible loan portfolio to match or exceed the balance of the net proceeds from its outstanding GSS bonds.</p> <p>To support GSS bond issuances, the bank adopted a Green Social and Sustainability Bond Framework in 2019. The framework was developed to support the issuance of GSS Bonds to finance and/or refinance an Green Loans and Social Loans. It was developed in line with ICMA’s Green Bond Principles, Social Bond Principles and the Sustainability Bond Guidelines.</p> <p>Eligible Green Loans and Social Loans to be refinanced by GSS Bond Issuances are those that have been granted by <i>La Banque Postale</i> in France or Europe up to 36 months prior to the GSS bond issuance date. The eligible Green Loans are for renewable energy, low carbon buildings, energy transition and sustainability mobility and the eligible Social Loans are for affordable housing, access to essential services, and sustainable and inclusive finance.</p>
Impacts, success	As of 2021, <i>La Banque Postale</i> had issued 7 green bonds totaling EUR 926.8 million and 6 social bonds totaling EUR 831 million. In 2021, approximately EUR 1.45 billion of Green



factors and lessons	<p>Loans had been granted across 72 projects, much of which was for renewable energy or sustainable mobility. In 2021 alone, approximately EUR 950 million of social loans were outstanding, including EUR 700 million for social housing.</p> <p>Success factors:</p> <ul style="list-style-type: none"> • Targeted investment products: The sustainable finance mechanisms were aligned with the specific characteristics of regional and local authority in France. Green and social loans for local authorities were allocated through a dedicated lending programme. • Refinancing eligible loans: Issuance of GSS loans usually occurs before the issuance of GSS bonds, supporting the bank to ensure that it can define the use of proceeds in the GSS bond issuance. <p>GSS loans issued to City Governments by banks or specialised financial intermediaries can help to support increased issuance of GSS bonds in line with demands of capital markets.</p>
Sources	<ul style="list-style-type: none"> • La Banque Postale (2021), Green Bonds 2021 – Allocation and Impact Report, https://www.labanquepostale.com/en/investors/debt/green-social-bonds.html • La Banque Postale (2021), Social Bonds 2021 – Allocation and Impact Report, https://www.labanquepostale.com/en/investors/debt/green-social-bonds.html • La Banque Postale (2021), Investor Presentation – January 2023, https://www.labanquepostale.com/en/investors/debt/green-social-bonds.html • OECD-UCLG (2022), World Observatory on Subnational Government Finance and Investment, https://www.sng-wofi.org/country-profiles/ (Accessed 10/05/2023)

Case Study 16: Sustainability-Linked Bond in the City of Helsingborg (Sweden)

Name of instrument	Helsingborg Sustainability-Linked Bond
Location	Helsingborg, Sweden
Context	<p>Helsingborg is a coastal city in the south of Sweden with a population of nearly 150,000 inhabitants. Over recent years, the City of Helsingborg has been seeking to create an eco-friendly society and minimise its climate impacts by reducing greenhouse gas emissions. Since 1990, the City of Helsingborg had reduced greenhouse gas emissions by 52% and believed it will reach net-zero emissions by 2035.</p> <p>To demonstrate its intention to reach this target, the City of Helsingborg had created a number of initiatives to support its net-zero target. For example, it had adopted a Climate and Energy Plan, established local climate agreements, and supported innovation in the city. The city was also a finalist in the European Commission’s EU Green Capital initiative.</p>
Description	<p>To help align its financing with the net zero target, the City of Helsingborg identified an opportunity to issue a Sustainability-Linked Bond. In preparation for the issuance of the SLB, Helsingborg released a Sustainability-Linked Bond Framework (September 2021). The framework sought to link its financing with objectives that are material for long-term sustainability. This framework followed the International Capital Market Association’s Sustainability-Linked Bond Principles.</p> <p>Helsingborg’s SLB was a General Obligation Bond. The premium was tied to the achievement of targets relating to the achievement of net-zero greenhouse gas emissions by 2035. Sustainability Performance Targets (SPTs) and a Key Performance Indicator (KPI)</p>



were identified based on the city’s trajectory of emission reduction (see figure), which were measured as total greenhouse gas emissions in the geographical area of Helsingborg in tonnes of CO₂e. If the city fails in meeting the defined targets for net-zero reductions, it will have to pay a higher premium (coupon) to investors or a one-time payment at maturity. Performance will be tracked by the Swedish National Emissions Database, which is independent and provides publicly available information.

Table: Helsingborgs emissions reduction trajectory

SPTs	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Emission Targets tonnes of CO₂e	418k	403k	388k	373k	317k	262k	247k	231k	216k	201k	185k	170k	154k
CO₂e change %	59%	61%	62%	64%	69%	75%	76%	78%	79%	81%	82%	84%	85%

One benefit of an SLB for a city government is that proceeds are not earmarked for specific projects. This means SLB can support investments outside the scope of GSS bonds, while still encouraging actions towards having a measurable environmental impact. It means that the City of Helsingborg could also use financing to support projects that are beyond what is directly controlled by the city (e.g., private sector support).

Impacts, success factors and lessons

The City of Helsingborg was the first city to issue a SLB anywhere in the world. It has demonstrated how a small city can take a lead in climate action and innovate in adopting sustainable finance instruments. The issuance also appeared to achieve a ‘greenium’, although the greenium will shrink if the city does not meet its targets.

Key success factors included:

- **Strong targets:** Defining clear and ambitious KPIs and SPTs that directly link to the city’s net-zero ambition (CO₂e emissions in the geographical area of Helsingborg, which implies emissions from waste, agriculture, transportation, industry, machines, individual heat supply, product use, electricity and districted heating are included).
- **Independent measurement:** Identifying an independent and credible organisation (RUS) to measure the SPT and KPI, which can provide transparency to investors.
- **City climate strategy:** To help reach the goal and achieve the SPTs, the city had to have a comprehensive strategy that involved commitments from businesses, actions to promote sustainable transportation and carbon capture and storage technology.

The City of Helsingborg has demonstrated that SLBs could have an important role to finance City Governments. In the future, use of SLBs might be further strengthened by harmonizing KPIs across City Governments, increasing the incentives from coupon step-ups and identifying KPIs where measurement can occur in a timely way.

Sources

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- Nasdaq (2022), Helsingborg Becomes First City to List a Sustainability-Linked Bond, Supporting Efforts to Reach Net-Zero Emissions by 2035, <https://www.nasdaq.com/articles/helsingborg-becomes-first-city-to-list-a-sustainability-linked-bond-supporting-efforts-to> (Accessed 5/05/2023).
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	<ul style="list-style-type: none"> S&P Global (2022), Second Party Opinion: Helsingborg Sustainability-Linked Bond Framework, https://www.spglobal.com/ratings/en/research/pdf-articles/220126-second-party-opinion-helsingborg-sustainability-linked-bond-framework-101073429 (Accessed 5/05/2023).
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Case Study 17: Catastrophe Bond in Los Angeles (United States)

Name of instrument	Catastrophe Bond
Location	Los Angeles, California, United States
Context	<p>Climate change is increasing the risk to infrastructure in cities that is caused by natural disasters, such as flooding and wildfires. City Governments are often not fully protected against this risk. Although some cities have insurance that covers risk from natural disasters and other catastrophic events, there is a large global insurance gap. In 2017, insurance covered less than 40 percent of losses from natural disasters.</p> <p>California has experienced some of the largest wildfires in its history, which has put its infrastructure at risk infrastructure. The Los Angeles Department of Water and Power (LADWP) has recognized this risk and sought to insure its infrastructure against risks from wildfires. LADWP’s risk from wildfires is both related to ignition from external sources and ignition from its own infrastructure. The risk of ignition from its own infrastructure also requires protection against this liability.</p>
Description	<p>Catastrophe bonds are a type of insurance-linked security (ILS) that transfers the risk of catastrophic event to investors on capital markets. A sponsor - usually an insurer or reinsurer seeks, but also be public authorities or corporations – can seek to transfer defined risks from catastrophic events off its balance sheet to manage exposure. For catastrophe bonds, this is done by creating a special purpose vehicle, which issues a bond to investors and holds the collateral in a trust account (see figure). Principle is transferred to the sponsor if a pre-defined trigger account occurs (e.g., disaster).</p> <div style="text-align: center;"> <pre> graph TD Sponsor[Sponsor] -- Premium --> SPV[Special Purpose Vehicle] SPV -- "Premium + Interest" --> Investors[Investors] Investors -- Principal --> SPV SPV -- Principal --> Trust[Trust] Trust -- "Return" --> SPV SPV -. "Payout (if disaster)" .-> Sponsor </pre> </div> <p>Source: https://riskcenter.wharton.upenn.edu/wp-content/uploads/2021/07/Cat-Bond-Primer-July-2021.pdf</p> <p>In 2020, LADWP sponsored the first wildfire parametric catastrophe bond with USD 50 million of issuance protection (Power Protective Re). The catastrophe bond used a ‘parametric trigger’,</p>



	<p>which is based on a formula that considers the reconstruction cost within a wildfire perimeter. Factors in the formula include the original principal amount, the modelled reconstruction cost and a payout factor. The reconstruction cost is based on a databased of wildfire risk provided by Eqecat, a private risk modeling company. The issuance covered loss of LADWP’s infrastructure and equipment due to wildfire and / or losses where the utility is deemed liable for a wildfire.</p>
<p>Impacts, success factors and lessons</p>	<p>LADWP’s catastrophe bond was the first of its type to benefit a municipal utility globally. It was awarded the Trading Risk’s Non-Life Transaction of the Year and Insurance Insider’s (Re)Insurance Transaction of the Year. Following the first issuance in 2021, LADP issued a second catastrophe bond for USD 30 million.</p> <p>Key success factors included:</p> <ul style="list-style-type: none"> • Innovation: Development of a new type of parametric trigger that was linked to a modeled reconstruction cost value, which allows for a faster payout as it is easier to validate the parameter values after the catastrophe occurs. <p>Globally, catastrophic bonds have increasingly been adopted by national governments, insurers and reinsurers, including in developing countries. In particular, the World Bank has supported several developing countries to issue catastrophe bonds. While issuance is still not common a city level, the increasing frequency of natural disasters may support increased use of this instrument in the future.</p>
<p>Sources</p>	<ul style="list-style-type: none"> • AON (2018), The Role of Insurance in Building Resilience, https://www.aon.com/reinsurance/gimo/20180911-gimo-protection-gap, (Accessed 1/05/2023) • Scientific American (2023), Climate Change Is Escalating California’s Wildfires, https://www.scientificamerican.com/article/climate-change-is-escalating-californias-wildfires/ (Accessed 3/05/2023) • Braun, Alexandre; Kousky, Carolyn (2021), Catastrophe Bonds, https://riskcenter.wharton.upenn.edu/wp-content/uploads/2021/07/Cat-Bond-Primer-July-2021.pdf (Accessed 3/05/2023) • AON (n.d.), Los Angeles Department of Water & Power (LADWP): Power Protective Re Ltd, https://sins.senate.ca.gov/sites/sins.senate.ca.gov/files/presentation_by_katie_sabo_for_aon.pdf • IMF (2022), Sovereign Climate Debt Instruments: An Overview of the Green and Catastrophe Bond Markets, https://www.imf.org/en/Publications/staff-climate-notes/Issues/2022/06/29/Sovereign-Climate-Debt-Instruments-An-Overview-of-the-Green-and-Catastrophe-Bond-Markets-518272 (Accessed 3/05/2023)

