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EXPLAINER

How to Finance Urban Infrastructure

City governments in Asia and around the world are struggling to finance urgently needed urban infrastructure.

This Explainer helps them to understand the range of options they have, to raise the resources to finance their infrastructure projects and to fund their operation and maintenance.

Contents

Executive Summary	1
Introduction	4
Basic urban infrastructure financing options	5
Financing options: The private sector	6
How to finance urban infrastructure	8
Financing options: The public sector	10
Financing options: International organisations	12
Funding urban infrastructure	14
Building capacity to utilise financing and funding mechanisms	16
Related Links	18
Further Reading	18
Bibliography	19
Authors	19

Executive Summary

Given rapid demographic and economic growth in many cities in Asia and around the world, investment in high quality urban infrastructure is desperately needed. Owing to shortfalls in municipal budgets, cities are increasingly looking at a wider range of financing options to bridge their infrastructure needs, particularly in partnership with the private sector.

To meet business as usual infrastructure investment a further

\$3.4–9 trillion

is needed per annum



FIGURE 1
PwC. 2014. Ernst & Young. 2015

While traditional forms of municipal finance, including municipal revenues, loans, or intergovernmental transfers (grants) from either national or international governments, retain their importance, there is a wide selection of financial instruments both in the private and public sector to fit a variety of infrastructure projects. In the private sector, these options include for instance bonds, public-private partnerships (PPPs), privatisation/divestiture, infrastructure investment funds, private risk mitigation, and crowdfunding. In the public sector, options include, among others, municipal development funds and development financing institutions, pooled financing, viability gap funding, public risk mitigation, and tax exemptions.

International organisations increasingly provide instruments for sub-sovereign finance, through concessional loans, financing facilities, green and climate funds, carbon finance and emissions trading schemes, private sector loans and equity, risk mitigation, sharia-compliant finance, and export credit agencies.

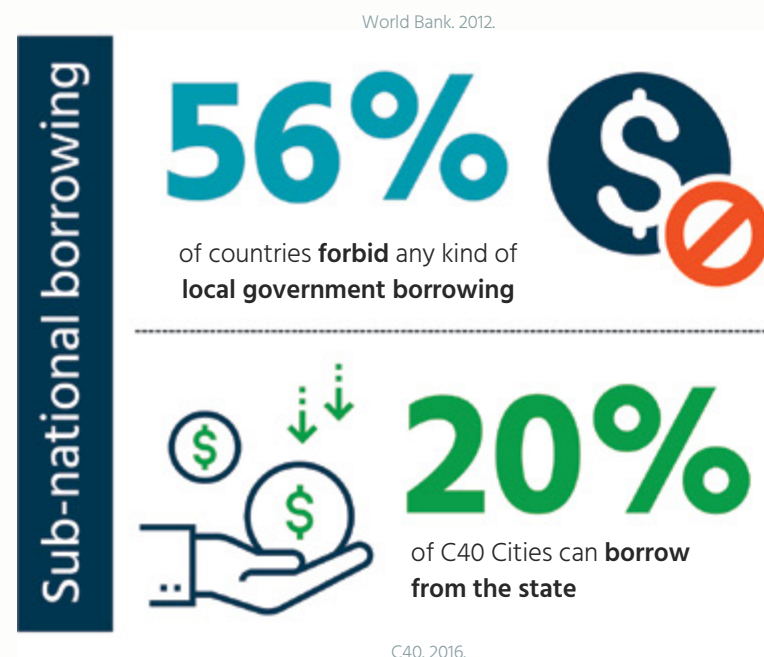
In order to ensure long-term financial sustainability, cities must determine the appropriate funding instrument, namely how they will pay back the financing – where it is not from current cash flows – and the money needed to operate and manage an infrastructure asset. Funding options include, for instance, user fees, revolving funds, land banking/pooling, air rights, development charges, value capture, PPPs, and outsourcing.

Finally, cities need to have the skills and capacity to be able to mobilise these financial instruments and thus manage and operate infrastructure projects effectively. Local governments need not have all specialist skills on staff – knowing where to get them and actually using the required skills and processes is sufficient.

Introduction

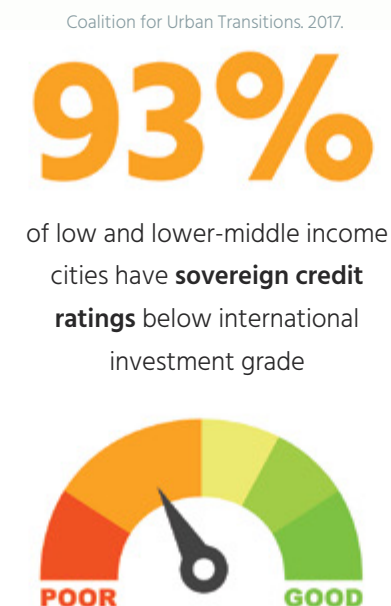
Cities need more and higher-quality infrastructure. However, many cities struggle to find the right finance to realise their projects, and the potential relative benefits of financing through the public sector, the private sector, and international organisations are often unclear. Many city governments lack the capacity to assess these

relative benefits, to access the range of finance options, and to determine the most appropriate ways of funding the infrastructure – both the initial construction, as well as the operation and maintenance. These shortfalls result in less sustainable projects, some of which can become a significant burden for citizens.



C40, 2016.

FIGURE 2



Basic urban infrastructure financing options

In the broadest sense, infrastructure can be financed by government revenues directly, through debt, or through leveraging private sector resources through privatisation of service delivery or through various forms of Public Private Partnerships (PPPs).

55%

of municipalities identified **lack of public funding** as a major barrier to sustainable urban growth

FIGURE 3
Coalition for Urban Transitions, 2017.



Private sector projects and PPPs raise money through selling an ownership share in a project (equity), through borrowing money (debt), or through grants (typically from government to cover viability gaps arising from the need to provide services which are beneficial to the community but not financially viable).

Traditionally, city governments use one or more of the following finance sources:

Municipal Revenues

City governments use their own-source revenues, which come from different kinds of local taxes (e.g. municipal sales tax, property tax, or motor vehicle tax) and non-tax sources (e.g. building permit fees, public utility tariffs, park entrance fees, environmental non-compliance fines, leasing or renting fees/charges). These revenues can either be accumulated (usually in a fund) and used to pay for the project outright, or be used to service debt (see below), which in Asia is almost always more equitable across generations, because city growth allows for a distribution of debt burdens over an increasing number of residents.

Loans (debt)

City governments can borrow from higher-level governments (usually the national government) under concessional (better-than-market) rates or take on private sector (usually bank) loans for infrastructure projects.

Intergovernmental Transfers (grants)

Almost all city governments receive financial resources from higher-level governments (particularly the national government) either for particular purposes ("earmarked") or as unconditional grants ("non-earmarked"). Such transfers can also come in the form of subsidies (for, example reimbursement for all or part of the cost of providing water supplies).

Financing options: The private sector

In addition to traditional loans from private banks, instruments of the private sector include:

Bonds (debt)

City governments can issue a bond to borrow money from the market to finance an infrastructure project. If such project provides a sufficient revenue stream the bond can be tied exclusively to the project. These bonds are called project bonds. Where the bonds are to be repaid from the general revenue (and/or transfers) accruing to the city they are called general obligation bonds. Together these types of city-issued bonds are called municipal bonds. In a slightly different form, a city may “securitise” a stream of revenue such as parking fees and issue a bond backed by such receivables. If a city government provides its infrastructure development through a publicly owned company, this company can also issue corporate bonds.

Also, city governments can issue bonds for particular types of assets. Green or climate bonds can encompass infrastructure assets of certain types if they fulfill certain criteria of environmental sustainability or climate change resilience (e.g. a compressed natural gas busway replacing pollution diesel busses and cars). These bonds have attracted particular attention by large-scale institutional investors (see below under Private Equity Funds). More common in the area of social infrastructure services, city governments can issue social impact bonds, where an intermediary entity borrows money to pay for a certain infrastructure service and the government releases money to this intermediary if a pre-agreed performance target is achieved by the service provider. In that case, the intermediary can use the government return to pay the investors – as such the bond repayment is contingent upon successful delivery.

Public-Private Partnerships (PPPs)

City governments can use many different types of a public-private partnerships (PPPs) to implement infrastructure projects. These range from a limited role for the private sector when it is only contracted to provide the construction or the operation of a project. The private sector's role is larger when it comes to: i) a lease arrangement where it operates an infrastructure asset, pays a certain fee (lease) to the government, charges users, and retains operational profits (to varying degrees); ii) a concession to build and operate and later on transfer the infrastructure asset back to the government (“BOT”); or iii) a concession to design, build, and operate the infrastructure asset (“DBO”). Such arrangements can be based purely on the revenues derived from the asset (as in the case with some toll roads) or as an availability payment where the government pays for the infrastructure provision (performance) irrespective of its actual demand (number of user and/or user fees, which would be retained by the government). Hybrid arrangements are also possible. These arrangements usually involve the establishment of a Special Purpose Vehicle (SPV). Moving toward partial privatisation, PPPs can also be structured as joint ventures, where both public and private sector take a share in the entity building/operating the infrastructure asset.

Privatisation/Divesture (equity)

One scale further than a PPP is the complete privatisation of an infrastructure asset, involving either the sale of an existing asset or, for a new asset, the agreement that the design, construction and operation will be fully owned by a private company. In this case, the government has no direct share in the project. However, the government will normally have legislative, regulatory or administrative mechanisms that govern the operation of the infrastructure asset ensuring the public interest is served.

Infrastructure Investment Funds (equity and debt)

Through equity investments, city governments can attract private investors to take a share in an infrastructure project, usually in a special purpose vehicle or a joint venture company. Potential investors include: i) specialised infrastructure equity funds that pool investments in infrastructure in specific sectors and regions; and ii) institutional equity funds that seek long-term, sustainable investments – which mature infrastructure assets usually are – for pension funds, insurance companies, endowments, as well as sovereign (government) wealth funds. In particular, institutional investors can play a significant role after an infrastructure asset has been built and is in operation – in which case, the institutional equity often works as a re-financing instruments for other – usually more expensive – financing instruments, particularly private sector debt



City governments can use many different types of a public-private partnerships (PPPs) to implement infrastructure projects.

(see above) which were used for the construction of an infrastructure asset. Similarly, some countries and regions, such as the European Union and India, have allowed infrastructure investment funds to structure debt instruments for both senior and subordinated (mezzanine) finance for long-term infrastructure investments.

Private Risk Mitigation (debt and equity)

There are numerous instruments to decrease the cost of infrastructure project finance by lowering the risk profile of such investment. One example is to structure equity into tiers with the provision of a high risk, first-loss tier of capital that will be used first to cover for losses in an infrastructure project to a certain defined amount. Intermediate or mezzanine finance is a form of quasi-equity capital, as it ranks between a project's senior debt and equity – it receives higher returns on investment, as it takes higher risks, but in case of losses it also is repaid only after senior debt. A third example is convertible debt where an initially borrowed amount of money changes from debt into equity shares of the infrastructure asset at a defined point in time, for instance when the project is up and running, thereby providing potential return on investment at a later stage. City governments can also decrease the risk profile of their projects by insuring (hedging) it against

various commercial risks, such as liquidity shortages and interest rate changes, or political and environmental risks, such as regulatory changes or natural disasters. Another way of reducing risk is to provide enhancement to the financing institution itself, thereby reducing the cost of finance (the interest rate), through various forms of credit enhancement and guarantees.

Crowdfunding (equity or debt)

Although a still rather uncommon instrument in infrastructure financing, crowdfunding allows for the contribution of small amounts by individuals into an infrastructure project of particular interest to the public, for instance due to its potential social benefits to a neighbourhood. Due to its limited scale and the need to be quite specific in relation to the scope and funding targets, crowdfunding sources usually finance certain elements of an infrastructure project, such as small-scale feasibility studies, a water supply for a specific small community, or closing a financing gap that would otherwise prevent the realisation of a project (“last-mile” finance). Crowdfunding can also be used as a debt instrument through the form of mini-bonds, where pooled contributions can be structured effectively as a bond and can provide potential return on crowdsourced investments.



Financing options: The public sector

In addition to the traditional finance instruments of intergovernmental transfers (grants) and municipal revenues, city governments use the following options to finance infrastructure projects:

Municipal Development Funds (MDFs) and Government-Owned Development Financing Institutions (DFIs) (debt, guarantees and grants)

Where it is considered that the capacities of local governments are lacking and/or the capital market is insufficiently developed to be able to service local governments, governments have established specialist financing mechanisms to service cities. These mechanisms can operate: i) as funds within established government ministries and agencies (such as India's Jawaharlal Nehru National Urban Renewal Mission or Australia's Better Cities Program); ii) as, effectively, banks (such as the Development Bank of the Philippines or Germany's Development Bank KfW); or iii) as an agency guaranteeing loans by DFIs or commercial banks (such as FINDETER in Colombia). These agencies can also exist at state/provincial levels such as the Provincial Development Banks in the People's Republic of China or the Tamil Nadu Urban Development Fund in India.

These agencies have a range of specialised instruments tailored to the circumstances and capacities of their borrowers. Such instruments include:

Pooled Financing (debt)

Pooled financing mechanisms support local governments that are too small to undertake debt structuring and negotiations on their own, or at least to achieve a lower cost of funds than they could achieve on their own. These funds usually come with specific eligibility criteria and may have particular sector focus. Governments also often channel grant funds for project development and for subsidies to particular activities through such entities.

Viability Gap Funding (grants or debt)

Where a public good is involved that sub-/national governments want to foster (such as the environment), MDFs or DFIs may establish viability gap funding mechanisms to close the financing gap between possible revenues and the actual cost of quality infrastructure that would otherwise prevent an infrastructure project from being realised. Viability gap funding is usually a grant instrument (or a concessional loan) providing finance to projects that apply new technologies or are of a high environmental or social value for which traditional financing instruments do not provide affordable debt, and where private sector financing appetite is low.

Public Risk Mitigation (debt and equity)

Similar to the private sector, the public sector also provides a number of instruments to decrease a project's risk, thereby lowering its costs for debt and increasing its attractiveness for equity investments. One example is the formation of guarantee funds that 'insure' city debt, generating a lower-cost credit. Its members – which are usually smaller municipalities – can thus use the fund to guarantee the repayment of debt finance for an infrastructure project in case of default. Another example are loan loss reserves that can be kept by MDFs and DFIs, reducing their risk of loan default.

Tax Exemptions

These can be provided by higher level governments for specific projects or instruments. For example, the United States provides tax exemption for municipal bonds for which returns are tax-exempt, thus attracting more investors in local capital markets.

Local governments are usually aware of such possibilities in the public sector, but lack the capacity to put forward projects in a systematic manner. The establishment of a project development support facility within sub-/national agencies can help overcome this problem.

Financing options: International organisations

Traditionally limited to sovereign lending to national governments, international organisations increasingly provide instruments for sub-sovereign finance, including that for urban infrastructure. Instruments include for instance:

Concessional Loans (debt)

Multi-lateral development banks such as the Asian Development Bank and bi-lateral development banks such as KfW from Germany provide infrastructure loans at lower interest rates and/or longer repayment periods than are commonly available in the local capital market, thus making the debt more affordable than at standard market terms. In most cases, such concessional loans require a sovereign guarantee (by a national government), which will usually pass on the loan money either as debt and/or partial grant to city governments. Another issue is the currency of the debt. If national government passes on the debt in foreign currency, the local governments can be subject to potentially crippling foreign exchange risk, which underscores the attractiveness of local currency lending.

Financing Facilities (debt and grants)

Multi-lateral organisations have set up various facilities for particular sectors and regions. These facilities are usually within Municipal Development Funds (MDFs) or Development Financing Institutions (DFIs) and usually provide technical assistance grants for the planning and design of infrastructure projects as well as competitive financing (debt), sometimes at concessional rates. These facilities can be structured as viability gap funding (grants or concessional loans – see above under public sector) and/or as challenge funds where cities compete for funding on defined criteria.

Green and Climate Funds (debt, equity, grants, guarantees)

As part of the international agendas for sustainable development and climate change resilience, various global funds have been established that provide concessional loans and technical assistance grants to infrastructure projects that fulfill a specific set of eligibility criteria. For instance, the Global Environment Facility provides funding to projects that address at least one of the focal areas (biodiversity, international waters, land degradation, chemicals and waste, and climate change mitigation, or cross-cutting issues – there is e.g. a pilot cities program). Such funding is provided to public and private sector entities, as well as civil society organisations and research institutes. Another example is the Green Climate Fund, which provides debt, equity, grants, and guarantees to projects with clear mitigation and/or adaptation benefits of low-emission, sustainable, and climate-resilient development for both public and private entities. A regional example for Asia is the Clean Energy Financing Partnership Facility, which is a debt and grants facility managed by the Asian Development Bank. This facility provides finance for clean energy projects that promote renewable energy and/or energy efficiency, particularly for technologically innovative approaches and pilots.

Carbon Finance and Emissions Trading (equity)

City governments can avail of an additional source of grant finance for their infrastructure projects if these lead to a quantifiable greenhouse gas emissions reduction. One example is the Clean Development Mechanism, which allows a low-emissions project to receive 'carbon credits' as certified emission reductions. These can be sold in an international market to, for instance, high-carbon-emitting companies that need additional credits to meet their country's emission reduction targets. In light of the collapse of carbon markets, the additional transaction costs for registration and monitoring of a project may currently not be justified. Still, if carbon markets thrive again, they can form a viable financing source.



Private Sector Loans and Equity (debt, equity, grants, guarantees)

Multi- and bilateral development banks have developed windows for lending and investing in private sector companies (and special purpose vehicles), including those providing urban infrastructure, at competitive rates. In some cases, longer debt repayment periods mirror concessional loans to governments. In addition, some projects may be able to access technical assistance grants for the planning and design of infrastructure projects and/or viability gap funding to apply an innovative technology. Also, various guarantees (see below under risk mitigation) are offered to reduce project risks and to make private sector-led projects more attractive to other debt and equity instruments. One example is the Credit Guarantee and Investment Facility managed by the Asian Development Bank, which provides guarantees for local currency-denominated bonds issued by companies to reduce maturity and currency mismatches in foreign currency borrowing.

Risk Mitigation (debt and equity)

Credit enhancement and guarantee instruments are provided by different international organisations. One example is subordinated debt, often provided as convertible loans (mezzanine finance). Another example are credit guarantees by multi-lateral development banks, for instance to national financial institutions, that can provide credit enhancement to infrastructure project bonds, which in turn

achieve a higher credit rating and can thus mobilise cheaper money from investors with mandated lower risk-profiles, such as insurance or pension funds.

Sharia-Compliant Finance (debt and equity)

In Islamic countries the demand for financing instruments that are Sharia-compliant is increasing (equity-based: Mudarabah and Musharakah; debt-based: Istina'a; lease-based: Ijarah). The Islamic Development Bank is currently the main player in the growing market of Sukuk-type bond investments, which can be issued by multi-lateral development banks, as well as public and private entities. In general, these investments allow for a risk and profit sharing between issuer and investor through debt and equity-like instruments based on particular assets, such as infrastructure. They are particularly attractive to Sharia-compliant savings seeking long-term sustainable investments.

Export credit agencies (generally debt)

These entities are set up by national governments of exporting countries and function as an insurer, debt guarantor or debt provider to investors that want to put their money into infrastructure projects in other countries. Such agencies – although located in another country – can help city governments to attract foreign investors to their projects, as the investors' commercial and other (political, environmental etc.) risks the international project sponsor or equipment provider are reduced.

Funding urban infrastructure

There is often much confusion about infrastructure financing and funding. While the financing refers to obtaining and structuring the money needed to build an infrastructure asset, the funding refers to pay back the financing – where it is not from current cash flows – and the money needed to operate and manage an infrastructure asset. For the funding of urban infrastructure, city governments can use numerous instruments, the most common instruments include:

User Fees

The most straightforward funding option for urban infrastructure is to charge people for using the infrastructure and/or its services. The fee can be on a per-use basis (e.g. toll roads), on a periodic (e.g. yearly) flat rate (e.g. park entrance or garbage collection fee), on a consumption rate (e.g. water consumption rate or electricity fee) or hybrids of these (e.g. a flat rate, affordable 'lifeline' tariff up to a certain consumption of water and consumption-based after that level). It increases the effectiveness of such fee systems when an electronic system is put in place to ensure the correct and easy payment/collection. A special form of user fees are public benefit funds or system benefits charges where improvements to an infrastructure system (e.g. increasing energy efficiency due to decreased electricity supply interruptions through a new electric grid system) are priced on top of the standard utility bill to be paid by all customers – generally these apply only to the current beneficiaries of the enhanced system.

Revolving Funds

Revolving funds have the advantage to provide, for instance, households with below-market loans to pay for the installation or connection to an infrastructure service. Instead of a one-time payment or unaffordable market loans, the households enjoy a longer repayment period at better rates (sometimes combined with a grant). The government provides initial finance into the fund, but once it starts

revolving, households pay back their loans – experience has shown that community-based revolving funds usually have quite high levels of repayment over 90%. These payments replenish the fund, which can then again issue loans to other households. Revolving funds, particularly in location-based projects, such as community water supply or sanitation, have a strong equity benefit, while ensuring a stable funding basis for infrastructure projects that can be rolled out incrementally instead of struggling to pool huge financial resources together at once. They do eventually 'wind down' however, as below-market interest rates and/or grant components (as well as some bad loans) eat into the fund. This does not negate their value however – a well-run fund can have a large impact. Local governments need the skills to establish such funds and, usually, to support communities in administering them.

Land Banking/Pooling

'Land banks' can be accumulated by a city or development agency with sufficient strategic planning capacity, financial resources, and foresight to acquire (or hold) land in and around expansion areas of the city. Where governments already hold larger (undeveloped) land plots, their release can be strategically planned to maximise community benefit and the efficiency of infrastructure provision. Another option is that governments purchase land from private owners before rezoning, implementing infrastructure projects and release of land for development – such operations are undertaken by agencies such as Urban Growth New South Wales but require significant funds. They can be done both on greenfield developments (undeveloped land), or on previously industrialised land that requires rehabilitation (brownfield recycling). In Japan and Korea, governments have brought together land owners in a 'pool' and readjusted holdings to enable higher density development and the efficient provision of infrastructure. In such a case the government does not buy the land, but shares the benefit from rezoning (as do the original land holders). Similar mechanisms have been used in the People's Republic of China. These mechanisms, however, require the just and transparent use of an effective legislative base.

Through the more effective management of land, infrastructure can, in turn, be more efficiently provided and land speculation limited, reducing the increase in prices of housing and commercial development which often plague the citizens of large cities. Such mechanisms also allow the government to capture the value of increased levels of development which it is facilitating through its investments. The land sale revenues usually flow into a land fund which provides the funding to pay for infrastructure assets and/or the purchasing of additional plots. Land funds are also useful in protecting critical ecosystems from unsustainable development.

Air Rights

Cities can generate revenue from this form of transferable development rights. Developers that want to build at a higher density by adding more floors (height) to their buildings can purchase such floor height from neighbouring lower buildings. Typically, public facilities such as schools, libraries, or hospitals can sell their air rights to private developers. The return can then be invested in the funding of infrastructure assets and social services. This and other forms of development rights can be sold at a fixed price or through auctions. The system requires that development controls be enforced and that exemptions are given in a fair and environmentally responsible manner.

Development Charges

There is a wide variety of one-time development charges that can be placed upon private sector companies and individuals that are developing land. One example are tap/linkage fees (connection fees – also possible as developer exactions), which are paid by the developer or beneficiary for linking up to an infrastructure network (e.g. electricity line). Another example are impact fees that are imposed onto developers for the (possible) negative effects of their development onto the environment, people, or the infrastructure system (e.g. due to increased traffic volumes on access roads or noise and air pollution from a newly built industrial facility). In that sense, development charges function to collect fees to pay for related infrastructure or other scale-up or improvement measures.

Value Capture

City governments can benefit from increased land value of newly developed land or neighbourhoods that receive a new or improved infrastructure by imposing various taxes. One example is a land value increment tax where land owners are charged an additional tax to capture some or all of the increase in land value due to the improved infrastructure (e.g. the opening of a new MRT line in that area). In addition to this is the increase in property taxes that will reflect the ongoing increase in land values – if they are correspondingly assessed. Betterment levies work similarly, although they are imposed only once after an infrastructure improvement has been completed. Traditionally these taxes have been poorly designed and utilised in Asia, but they can be base funding for significant development – such as in Tax Increment Financing in the United States.

Public-Private Partnerships (PPPs)/Outsourcing

Although it is highly recommended to plan a project as a PPP from the outset, it is also possible to introduce a PPP scheme after construction. In this case operating contracts or leases are most common. These can provide additional funding for local governments if the outsourcing allows for the net cost of providing the service to be lower through the private sector. This funding is derived from operating leases or usage fee shares as explained above.

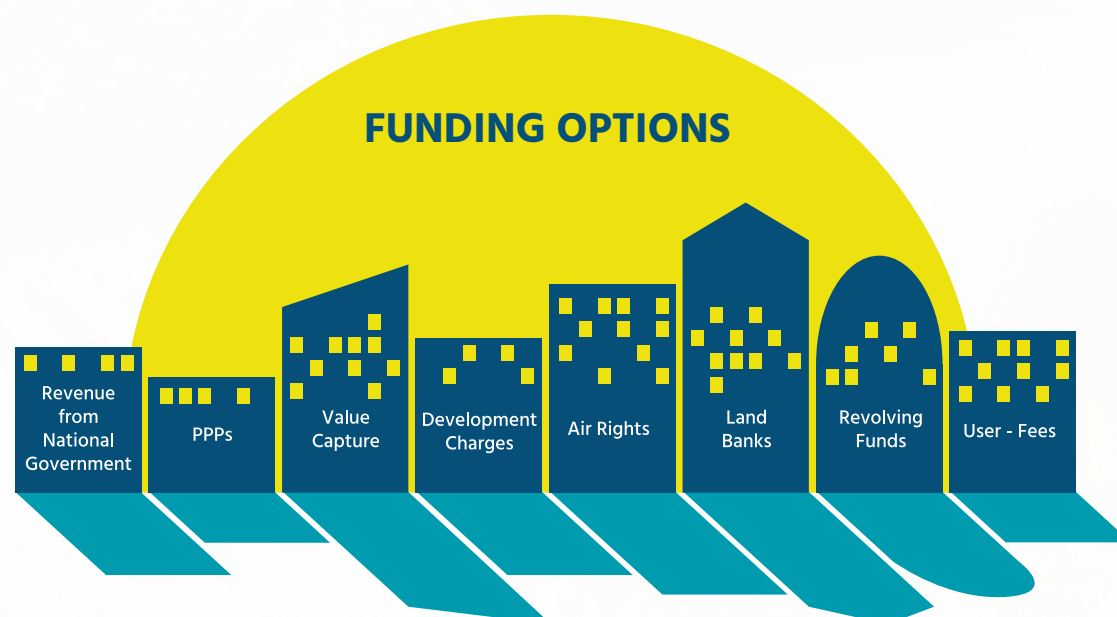
Bonds Funded by New Charges or Asset Sales

As described under private sector financing options, bonds are a debt instrument that can play a significant role in the re-financing stage of infrastructure projects. Although usually not very popular, charges can be introduced on such infrastructure (e.g. an expressway) and, on the basis of such, it is possible for city governments to offer bonds, the proceeds of which can be used to fund infrastructure assets. Another option is the bundling of several infrastructure assets into a municipal bond. Assets, usually land or buildings, that are underutilised can be either sold or leased to the private sector to gain additional revenue. A thorough asset inventory can assist in identifying such opportunities

Revenue Support from Higher Levels of Government

Although well planned urban infrastructure should ideally support itself through the various funding sources described above, it is still quite common that local government revenues are insufficient and they require additional support – similar to the mentioned viability gap funding. Revenue support can be provided by different government levels and it can be made conditional upon the achievement of certain performance targets of an infrastructure project (e.g. meeting a pre-defined emission reduction or serving a specified amount of people).

FIGURE 4



Building capacity to utilise financing and funding mechanisms

City governments should thoroughly assess their in-house capacities to identify where staff requires training to undertake effective planning, execution, and management of urban infrastructure projects. Core competencies relating to financing and funding – the key skills needed – include the following:

Strategic and Project Planning

City governments should have the capacity to focus their strategic planning on developing viable investment plans that can be financed and to assess the basis for funding (demographics, property prices, willingness to pay etc.). Based on an assessment of need in, and coordination across, investment sectors (e.g. water, energy, transport) and participation by the private sector and the community, a city government can draft an integrated urban development strategy and spatial plan that can guide its own public investment, as well as identify potential investments by the private sector. The key is to not only draft a plan, but to use it as the basis of a strategy to undertake the corresponding financing and funding needs of proposed investments. Further, effective planning constitutes an effective risk mitigation mechanism. Sound construction and resettlement planning means that the project will not be delayed by protests and/or litigation.

Project Development and Prioritisation

City governments should be able to identify, formulate and prioritise different financing and funding options for realising

a proposed investment. From the strategic planning process a pipeline of priority projects should be identified. They can use readily available prioritisation tools (e.g. the CLIPP toolkit by the Cities Development Initiative for Asia) to assess these options against several criteria. Such tools support a transparent and rational decision-making process, which weighs advantages and disadvantages of options to arrive at solutions that have the largest socio-economic benefit to their city in balance with financial costs and environmental sustainability concerns. Sufficient budget needs to be available for (pre-) feasibility studies that explore a range of options in order to identify the most efficient for the project sponsor. Well-prepared pre-feasibility studies, especially for large projects, are essential aids in scoping key aspects of an infrastructure investment.

FIGURE 5 The New Climate Economy, 2015.

Compact Urban low carbon cities could generate savings equivalent to **\$16.6 trillion** globally by **2050**



Budgeting

City governments can benefit from multi-year budgeting based on accrual accounting methods that allows for effective financial planning, including planning for large-scale infrastructure projects. Spatial planning tools, such as Johannesburg's GIS-based Capital Investment Management System, exist that can help city governments to see their budget allocations for various investments from a spatial perspective, which helps them to realise interlinkages and interdependencies of different investments. These tools can inform area-focused investment programs, where coordinated investments across several sectors are taken in the same place to achieve high-impact improvements.

Resilience

Many cities are facing recurring impacts from natural disasters and will increasingly struggle with a changing climate. It is important for city governments to assess and strengthen the resilience of their communities and infrastructure systems. This requires staff that can analyse how changes in the climate and other potential events (such as earthquakes) will impact the city and its sub-systems. Climate-sensitive planning is needed and awareness-raising often plays a big role in sensitising decision-makers and the general public. Climate-proofing infrastructure usually means a higher cost of initial investment, but various financing options are available (see above) that can address possible financing gaps. Furthermore, investments into urban resilience pay off when infrastructure and communities can withstand natural disasters.

Municipal Finance

Most of the additional/new financing options from the public and private sector or international organisations can only be attracted by those city governments that have their own house in order. Installing and keeping a proper fiscal management system is indispensable. Based on an electronic system, revenues and expenditure flows of city governments should be streamlined and monitored to enable effective collection and transparent use. Furthermore, such systems in combination with regular reporting are a requisite to assess city governments' fiscal capacity to avail of certain financing options. More and more city governments have opted for third-party auditing of their finances to increase public

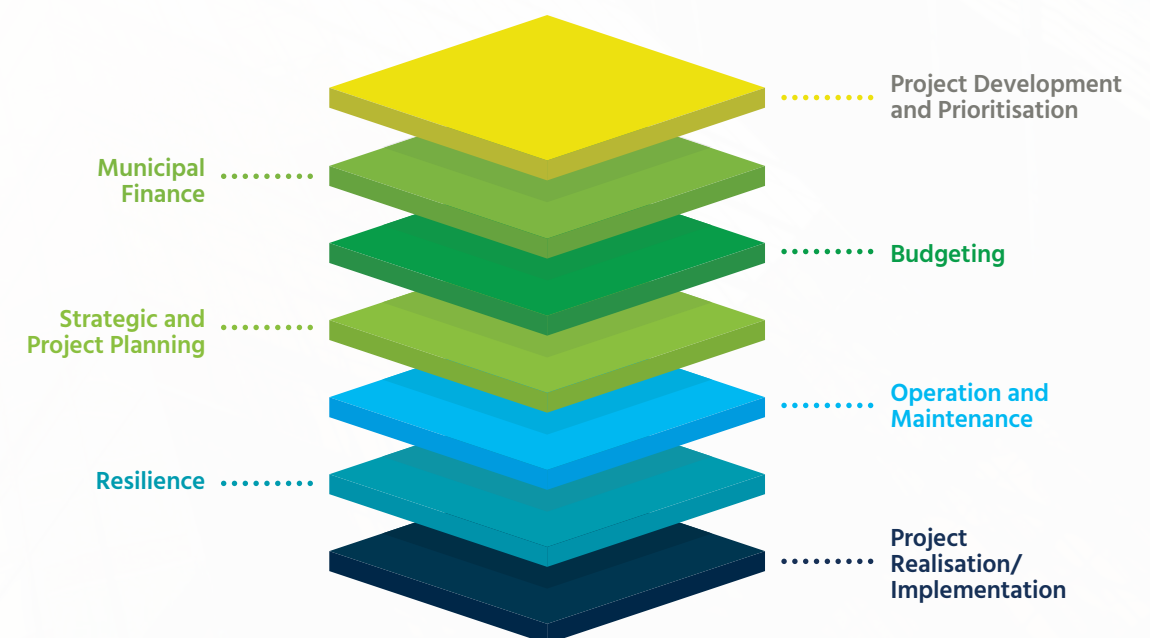
management performance and to show possible investors that they are dealing with a well-organised, effective municipality. The credit rating process also fosters increased transparency and effectiveness and can open the way to additional financing sources such as bonds.

Operation and Maintenance

The performance and impact of many infrastructure assets fall behind expectations because they are badly managed. Much money is invested into large-scale projects without proper calculation, planning, and budgeting for their operation phase. Numerous funding options (see above) should be scrutinised by city governments to identify a sustainable way to repay infrastructure project finance and to fund ongoing operation and regularly needed maintenance of valuable assets. There are tools available to streamline and effectively organise operation and maintenance systems. On the political side, clear budget allocations are required to develop and hold up well-skilled staff for managing urban infrastructure – either through public entities or different forms of public-private or private operation. Proper operation and maintenance systems will save money in the long run, avoiding expensive rebuilds for infrastructure which could have been kept in operation.

In respect of all of these competencies, the local government need not have all specialist skills on staff – knowing where to get them and actually using the required skills and processes is sufficient.

FIGURE 6



The building blocks for implementing an effective infrastructure project

Related Links

C40 Cities Finance Facility

www.c40cff.org

Sustainable Infrastructure Foundation's SOURCE infrastructure project preparation software

www.public.sif-source.org

Cities Development Initiative for Asia

www.cdia.asia

Public-Private Infrastructure Advisory Facility

www.ppiaf.org

Public-Private-Partnership in Infrastructure Resource Center

<https://ppp.worldbank.org/public-private-partnership>

Further Reading

Asian Development Bank. 2008.

Managing Asian Cities.

Sustainable and Inclusive Urban Solutions. Manila.

Available at: <https://www.adb.org/publications/managing-asian-cities>

Asian Development Bank. 2017.

Catalyzing Green Finance:

A Concept for Leveraging Blended Finance for Green Development. Manila.

Available at: <https://www.adb.org/sites/default/files/publication/357156/catalyzing-green-finance.pdf>

Association for Financial Markets in Europe and

International Capital Market Association. 2015.

Guide to Infrastructure Financing. London.

Available at: <https://www.afme.eu/en/reports/publications/guide-to-infrastructure-financing>

C40, Siemens, and CITI. 2016.

New Perspectives on Climate Finance for Cities. London.

Available at: http://www.c40.org/press_releases/press-release-new-financing-options-for-climate-resilient-urban-infrastructure

Long Finance and WWF. 2015.

Financing the Transition: Sustainable Infrastructure in Cities. London.

Available at: <http://www.longfinance.net/long-finance-report/915-financing-the-transition-sustainable-infrastructure-in-cities.html>

McKinsey. 2016.

Bridging Global Infrastructure Gaps. Shanghai.

Available at: <http://www.mckinsey.com/industries/capital-projects-and-infrastructure/our-insights/bridging-global-infrastructure-gaps>

New Cities Foundation. 2016.

Handbook on Urban Infrastructure Finance. Montreal.

Available at: <http://www.newcitiesfoundation.org/financing-urban-infrastructure>

OECD. 2015.

Infrastructure Financing Instruments and Incentives. Paris.

Available at: <http://www.oecd.org/pensions/private-pensions/Infrastructure-Financing-Instruments-and-Incentives.pdf>

UNCDF. 2017.

Financing Sustainable Urban Development in the Least Developed Countries. New York.

Available at: <http://www.uncdf.org/financing-sustainable-urban-development-in-the-least-developed-countries>

UN-Habitat. 2016.

Finance for City Leaders Handbook. Nairobi.

Available at: <https://unhabitat.org/books/finance-for-city-leaders-handbook>

Bibliography

Coalition for Urban Transitions. 2017.

Global Review of Finance For Sustainable Urban Infrastructure. Washington DC.

Available at: <http://newclimateeconomy.report/workingpapers>

World Bank. 2012.

How Close Is Your Government to Its People? Worldwide Indicators on Localization and Decentralization. Washington DC.

Available at: <https://openknowledge.worldbank.org/handle/10986/11969>

C40. 2016.

Unlocking Climate Action in Megacities. London.

Available at: <http://www.c40.org/researches/unlocking-climate-action-in-megacities>

PwC. 2014.

Capital project and infrastructure spending: Outlook to 2025. New York.

Available at: <https://www.pwc.com/gx/en/capital-projects-infrastructure/publications/cpi-outlook/assets/cpi-outlook-to-2025.pdf>

Ernst & Young. 2015.

Infrastructure investments: An attractive option to help deliver a prosperous and sustainable economy. London.

Available at: [http://www.ey.com/Publication/vwLUAssets/EY-infrastructure-investments-forinsurers/\\$FILE/EY-infrastructure-investments-for-insurers.pdf](http://www.ey.com/Publication/vwLUAssets/EY-infrastructure-investments-forinsurers/$FILE/EY-infrastructure-investments-for-insurers.pdf)

The New Climate Economy. 2015.

Accelerating Low-Carbon Development in the World's Cities. London and Washington DC.

Available at: <http://newclimateeconomy.report/workingpapers>

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