



WWF®

SUMMARY

2015



FINANCING THE TRANSITION: SUSTAINABLE INFRASTRUCTURE IN CITIES

A Summary

A report produced by Z/Yen and Long Finance,
commissioned by WWF

WHY CITIES NEED SUSTAINABLE INFRASTRUCTURE

If humanity is to navigate its way towards and prosper in a carbon-constrained world, the transition will permeate every aspect of our lives. What we eat, where we live and how we move around will surely be subject of adaptation. Nowhere is this more true than in cities. They are already home to 50% of the world's population, generate around 80% of global economic output and account for 70% of greenhouse gasses.

Moreover, this trend is set to continue. Estimates of future population growth predict that three quarters of humanity will live in cities by mid-century, with developing and emerging countries experiencing most of this increase. By any measure, future generations will largely experience a low-emissions existence through the lens of city life.

The way cities develop, particularly large and fast-growing cities in developing and emerging economies, will therefore have profound and long-term implications for humanity's future. With this in mind, it is imperative that decisions and investments in urban infrastructure are leveraged to achieve sustainable economic growth within the carrying capacity of the planet's systems and resources. The alternative is grave: long-term lock-in effects of unsustainable fossil fuel-based technologies and development, leading to runaway climate change, ecological destruction and biodiversity loss.



ACKNOWLEDGEMENTS

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Aerial view of Mori Tower, Japan
Tokyo, aerial view from the Mori Tower,
showing dense population and pollution,
Japan © Michel GUNTHER / WWF





ABOUT THE REPORT

Huge amounts of investment will be allocated to urbanisation in the coming decades.

Ratings giant Standard & Poor's estimates in the region of USD 57 trillion is needed to finance infrastructure globally between 2013 and 2030. The OECD meanwhile puts the figure even higher: USD 82 trillion needed between 2009 and 2030. But will investment be aligned with the sustainable imperatives outlined above? *Financing the Transition: Sustainable Infrastructure in Cities* was commissioned by WWF to surface how the transition to sustainable cities can be financed.

DEFINITION OF SUSTAINABLE INFRASTRUCTURE

In the absence of an agreed definition in the literature, we consider sustainable infrastructure to include projects that:

 <p>REDUCE THE ENVIRONMENTAL IMPACT OF URBAN INFRASTRUCTURE SUCH AS ENERGY EFFICIENCY AND RENEWABLE ENERGY PROJECTS.</p>	 <p>SUPPORT THE INTEGRATION OF NATURE-BASED ASSETS INTO URBAN DEVELOPMENT.</p>	 <p>IMPROVE THE CLIMATE RESILIENCE OF URBAN AREAS BY IMPROVING THE ABILITY OF INFRASTRUCTURE TO COPE WITH THE CONSEQUENCES OF CLIMATE CHANGE.</p>	 <p>HELP TO PROTECT BIODIVERSITY AND ECOSYSTEM SERVICES.</p>
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METHODOLOGY

Against this backdrop, we comprehensively reviewed existing literature and designed a global canvassing exercise to capture the views of senior city and finance professionals working around the globe. Twenty in-depth interviews were conducted with a further 180 consultees providing in-depth responses to an online questionnaire.



A questionnaire was issued online to gain insight on people's experience and perception of sources of finance and financial instruments. 184 people from 27 countries kindly contributed to the online questionnaire, though a significant European bias should be taken into account when considering the data, given that nearly 80% of the respondents are based in Europe.

Figure 1
Interviews



Figure 2
Respondents by location

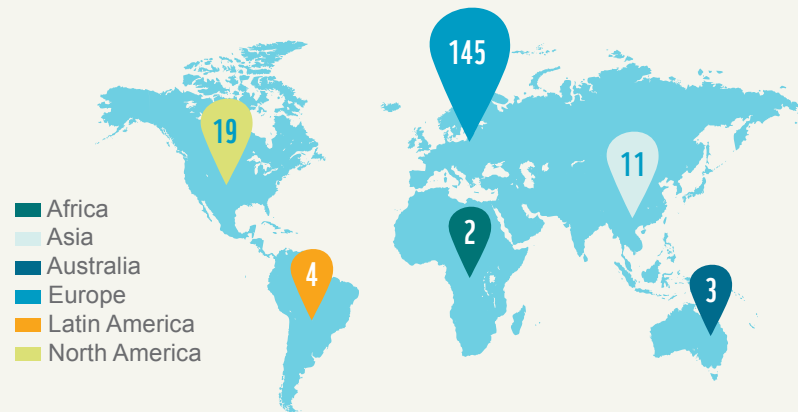
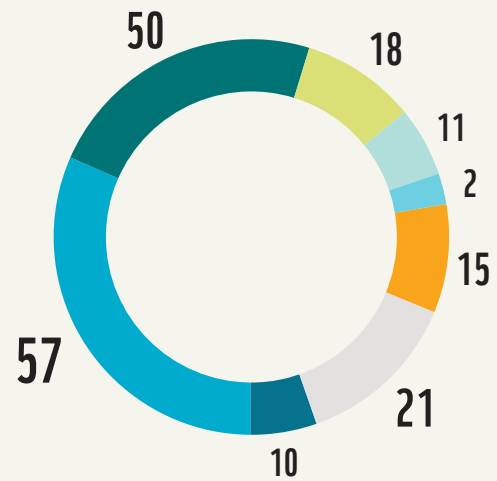


Figure 3
Respondents by sector

- Finance
- Professional Service
- Private Sector Other
- Public Sector
- IFIs & MDBs
- CSOs
- Academia
- Other



184
RESPONDENTS
TOTAL

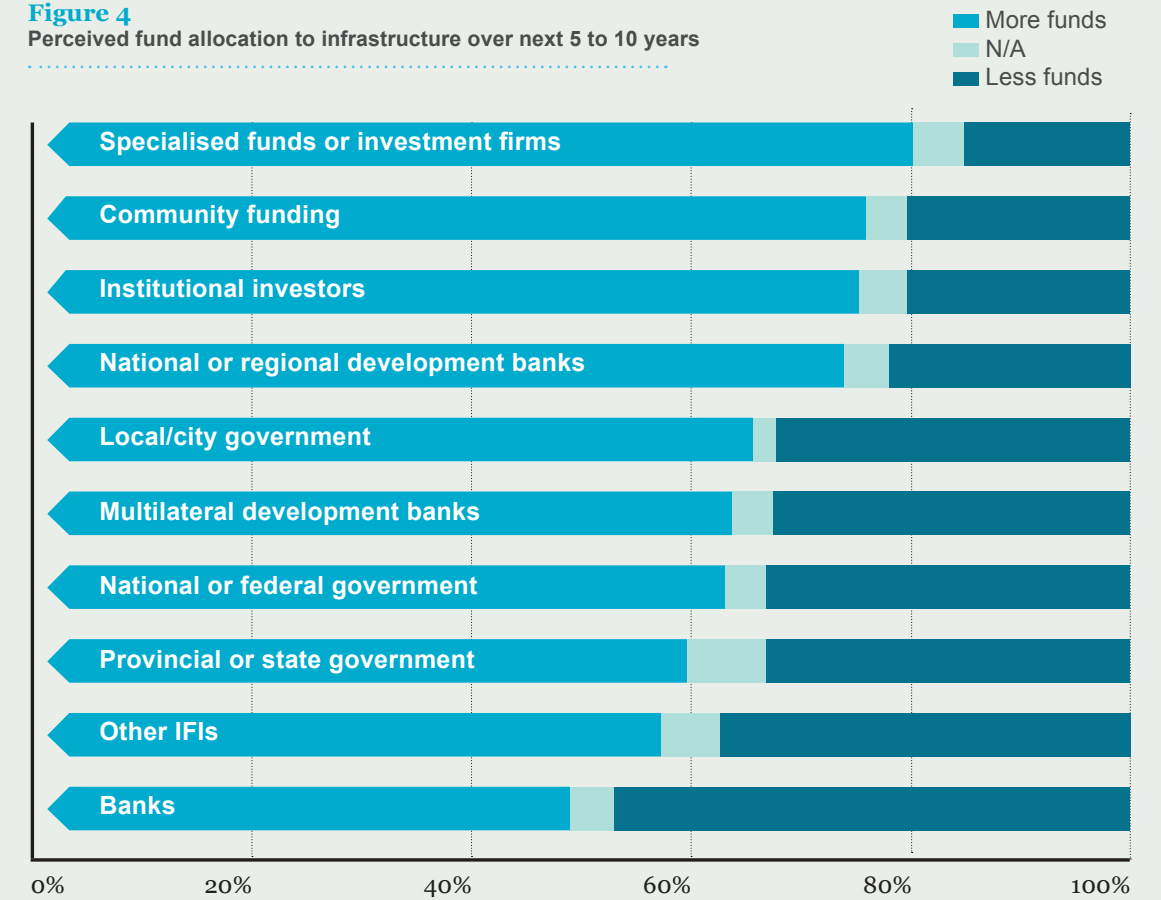
Respondents' views on sources of finance for sustainable infrastructure

Respondents to the survey agreed that financing for sustainable infrastructure would usually come from a combination of sources and was likely to be contingent on a stable and predictable regulatory environment.

The graph overleaf (**Figure 4**) illustrates how respondents perceived that known sources of finance for infrastructure would allocate funds to infrastructure over the next five to ten years.

Respondents suggested that most known sources of infrastructure would commit relatively more funds to infrastructure over the next five to ten years, particularly specialist infrastructure funds and investment firms, national and regional development banks, institutional investors and local communities. The picture was less clear for banks, which seems to be consistent with the increasing regulatory capital constraints most banks face which is reducing their incentive to hold long-term liabilities on their balance sheets.

Figure 4
Perceived fund allocation to infrastructure over next 5 to 10 years



Respondents' investments in infrastructure

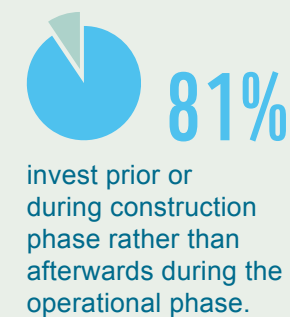


Figure 5
Biggest investors distribution

Investments were primarily located in Europe, followed by North America and Asia, which is not too surprising given that the majority of respondents were located in Europe.



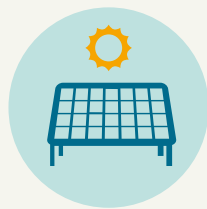
Figure 6
The preferred size of investment depending on the type of investor



We encountered a number of recurrent themes that provide important context for the findings and recommendations summarised here. Firstly, it is not always straightforward to distinguish between sustainable and conventional infrastructure. Upgrades to conventional infrastructure for example can also deliver resource efficiency benefits while enhancing reliability and sustainable quality service provision.



Engineering solutions to mitigate the impact of road development projects in sensitive ecosystems (e.g. High Conservation Value, endangered species).



Smart grid & renewable energy solutions to reduce reliance on fossil fuel energy sources.



Protecting mangrove ecosystems to reduce abrasion of coastal urban areas, sustaining water filtration, etc.

Secondly, we primarily address the role of cities and government authorities at all levels in supporting sustainable infrastructure financing and development. A detailed analysis of the role (and responsibility) of the finance sector in channelling finance towards sustainable infrastructure is left outside the scope of our findings.

THE CHALLENGE OF FINANCING SUSTAINABLE INFRASTRUCTURE IN CITIES

Given the massive levels of investment required, financing sustainable infrastructure is a considerable and an urgent challenge.



Financing for sustainable infrastructure does not only depend on the availability of finance but also on the extent to which sustainability is integrated into lending and investment strategies underpinning infrastructure financing.

Cities' ability to raise finance for urban infrastructure tends to be a function of credit worthiness, access to other sources of public and private funding, and their ability to leverage existing assets in order to develop new ones.

Fortunately a number of cities around the world are heeding this example and facilitating sustainable investment through a combination of policy levers and financial engineering such as:



While a healthy array of financing mechanisms exist, the sheer scale of investment means overcoming the financing challenge will not be the preserve of cities alone. The private sector – including financial institutions and investors – is a significant source of expertise in financing infrastructure, particularly in relation to designing financing structures that allow aggregating and diversifying risk across a range of projects.

Examples of city leadership

Munich has committed to achieving 100% renewable electricity by 2025 by prioritising self-sustaining and cost-efficient projects relying on water, geothermal, solar and wind sources.

Vancouver uses incentives (such as grants, land-based tax abatement) to leverage the low-carbon upgrading of district energy utilities sources.

Private-sector participation (PSP) can be particularly relevant in developing countries where cities and other government entities may have more difficulties in accessing capital markets.

Private sector participation in infrastructure

According to the World Bank's 2013 Global Private Participation in Infrastructure (PPI) Update, private sector participation in infrastructure reached USD 150 billion in 2013 in developing and emerging economies with an average project size of USD 276 million.

USD 150 billion

PRIVATE SECTOR PARTICIPATION IN INFRASTRUCTURE (2013)



Multilateral and national development banks can share expertise in designing and structuring infrastructure projects across and within sectors. And finally, networks and initiatives operating in finance, cities and sustainability, including civil society and academia, should continue their efforts to identify gaps, disseminate best practice and lessons learned and favour multi-stakeholder dialogue.



The challenge of financing sustainable infrastructure is fully explored in Chapters 2 & 3 of the full report.

FINANCIAL INSTRUMENTS FOR INFRASTRUCTURE

A range of public finance instruments and leverage tools that cities can use to support sustainable infrastructure were identified.

Chief among those is public-private partnerships (PPPs) for capital-intensive sustainable infrastructure. Taxes are also cited to incentivise investment in sustainable infrastructure by favouring density over urban sprawl or low-carbon energy over fossil-fuel sources.

Other public instruments include land value capture mechanisms and user charges to encourage sustainable infrastructure development while leveraging funding for finance. For cities with limited public resources grants and subsidies are of particular importance to support projects that have significant potential for leveraging additional sources of finance while delivering sustainable outcomes.



LOW POTENTIAL

Equity funds – listed/unlisted

Depends on stock selection strategy, scope of the fund and disclosure.



MEDIUM POTENTIAL

Equity-funded direct investments in infrastructure

Depends on type of infrastructure, investment strategy and government policy. Future potential depends less on the instrument and more on the suitability of sustainable infrastructure projects being financed through this type of vehicles.

Special purpose vehicles (SPVs)

Commonly used for renewable energy projects. Depends on type of infrastructure and government involvement.

Joint ventures (JVs)

Depends type of infrastructure and JV scope.



HIGH POTENTIAL

Infrastructure equities – listed

Own significant amount of infrastructure assets. Depends on companies' capital expenditure strategy towards low-carbon infrastructure and on policy requirements.

Figure 7
Overview of public finance instruments relevant to infrastructure



Away from public instruments, debt instruments – such as bonds and loans – are required to encourage investment in sustainable infrastructure. Respondents suggested that more effort is required to develop further a secondary debt market for sustainable infrastructure.

Loans and guarantees from government - or development finance institutions - can support debt finance provision in developing countries where domestic financial markets are underdeveloped or access to capital markets is restricted.

Figure 8
Overview of debt finance instruments relevant to infrastructure



LOW POTENTIAL

Syndicated loans

Depends on sustainability being integrated into lending criteria.



MEDIUM POTENTIAL

Loans

Depends on instruments.

Bonds

Depends on scope and purpose. Can be combined with tax efficiency measures.

Infrastructure bonds

Depends on sustainability being integrated into design and scope and on disclosure.

Debt funds

In theory possible. Depends on scope of the fund and integration of sustainability criteria.



HIGH POTENTIAL

Concessional or flexible loans

Depends on design and scope. Terms and conditions should stipulate specific sustainability objectives when possible e.g. energy efficient mortgages.

Green bonds

Depends on standards and disclosure. Project selection criteria should be specified upfront and monitored throughout.

Debt refinancing instruments

E.g. securitisation techniques including forfeiting and subordinate debt financing. Could provide refinancing for long-term sustainable infrastructure projects E.g. renewable energy. Further development of 'green securitization' market required.



Completing our sweep of approaches to financing, equity instruments have the potential to support investment in sustainable infrastructure. As owners of significant amounts of infrastructure assets, listed equities could have medium to high potential depending on their capital expenditure strategy towards low-carbon infrastructure.

Overall, the exact range of instruments at cities' disposal will vary depending on local contexts including institutional and legal frameworks; government structure; and the degree of interactions among government entities at different levels.



LOW POTENTIAL

Land sales

One off source of finance, limited impact. Difficult to incentivise sustainable infrastructure development once land is sold.

Land or infrastructure asset leaseholds

Would depend on government policies and targets. Contracts could stipulate sustainability performance objectives. Difficult to monitor.

Figure 9
Overview of equity finance instruments relevant to infrastructure



MEDIUM POTENTIAL

Public-private partnerships (PPPs) & private-finance initiatives (PFIs)

Depends on the type of project and government policies and targets. Could include sustainability targets.



HIGH POTENTIAL

Taxes

Depends on tax design and scope e.g. tax to favour density over urban sprawl or low-carbon energy over fossil fuel sources. Requires coordination across departments and tax incentives.

Land value capture mechanisms

Depends on design and government policies and targets. Could mandate the achievement of sustainability objectives.

User charges & fees

Depends on the integration of externalities and incentives encouraging sustainable usage of infrastructure or resource conservation.

Grants and subsidies

Depends on design. Given limited public resources, these instruments should be targeted at projects that have significant potential of leveraging additional sources of finance while delivering sustainable benefits.

Building rights and planning permits

Depends if planning processes and permit allocation is tied to sustainability requirements.



FINANCING RENEWABLE ENERGY (RE) PROJECTS AT CITY LEVEL

Approaches towards renewable energy are likely to be influenced by a number of factors, suggesting that related infrastructure development and upgrading strategies should be tailored to local conditions.

Other cities, particularly in developing and emerging economies, mentioned how local authorities can provide guidance on renewable energy standards and support the certification of accredited providers particularly for distributed renewable energy solutions such as solar panels. This type of public support not only encourages the uptake of renewable energy and energy efficiency solutions but can also support local economic development.

While cities (and national governments) have a role to play in setting up conducive policy frameworks and plans, the development and financing of renewable energy projects is likely to require multi-stakeholder collaboration to support capacity building, financing and implementation.



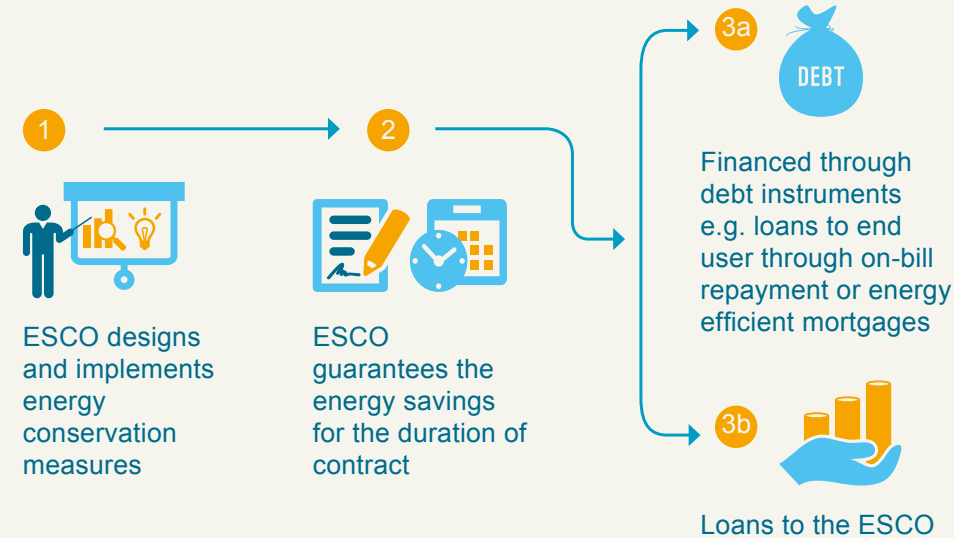
FINANCING ENERGY EFFICIENCY (EE) & BUILDING RETROFIT AT CITY LEVEL

A major component of the transition will be how cities approach energy efficiency (EE) projects such as street lighting, the retrofit of buildings and new investments in energy-using plants and related machinery and equipment.

Given that buildings offer some of the lowest-cost emission reduction opportunities, governments around the world are increasingly adopting policies recommending EE measures.

The financing of EE projects depends on the type of project and the time frame for repayment. Energy Performance Contracts (EPCs) are one example.

Figure 10
ESCO mechanism



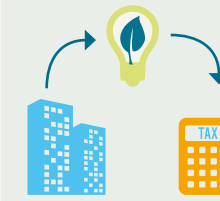
Soft loans however may be limited to homeowners who are able to take on additional debt. Evidence from developed countries suggests that the EPC model is public sector driven, rarely used for deep renovation projects and does not necessarily provide access to new financing.

Supporting the development of private EPC markets can be achieved through market facilitation using intermediaries between ESCOs and clients and through the aggregation of EPCs to increase scale and bankability.

In parallel, instruments and mechanisms to support deep renovation projects with longer repayment time horizons are also emerging. These connect the burden of the debt to the building rather than the owner.

However, several barriers and market failures can impact on the financial viability and thus investment attractiveness of EE projects. Such projects require relatively high upfront investment relative to the size of the project. They often consist of fairly small projects spread across sectors and technologies, which makes them difficult to compare from a risk assessment perspective.

Example



Property Assessed Clean Energy (PACE) programmes have enabled municipalities and counties in the USA to form special tax districts to help property owners finance energy retrofits by allowing a property owner to place an additional tax assessment on his or her property.

Property owners who invest in energy efficiency (EE) measures and small renewable energy (RE) systems repay these assessments over 15 to 20 years via additional annual payments on their property tax bills.

Overall, the viability of EE projects may also depend on external factors. The extent to which distortions in an economy (e.g. fossil fuel subsidies) favour conventional technologies over cleaner and more sustainable technologies can affect purchase decisions for both new and replacement investments.

Moreover, many such projects are financed on the strength of an entity's balance sheet (be it public or private) suggesting that access to financing depends on the overall condition of the entity rather than the project's attractiveness for investment.

And finally, incentives such as tax incentives to replace or upgrade assets, including assets that have not yet reached the end of their lifecycle, contribute to determining the cost benefit ratio of energy-efficient projects.

* *Financial instruments for infrastructure are fully explored in Chapter 4 of the full report.*

In 2010, the IEA estimated that buildings accounted for:



32%

TOTAL FINAL ENERGY CONSUMPTION



19%

ENERGY-RELATED GREENHOUSE GAS EMISSIONS



Riverside One, in Teeside, UK, is an exceptional green building whose individual housing units have a low carbon footprint. The whole block is heated by a biofuel boiler. During construction it used recycled oil rig pipes for piling, the concrete was mixed with recycled aggregate, super insulated with earth wool, it uses grey recycled water to save water, locally sourced timber, the electricity for the building is sourced from renewable sources and the building incorporates Swift bird boxes and bat boxes. © Global Warming Images / WWF

KEY FINDINGS

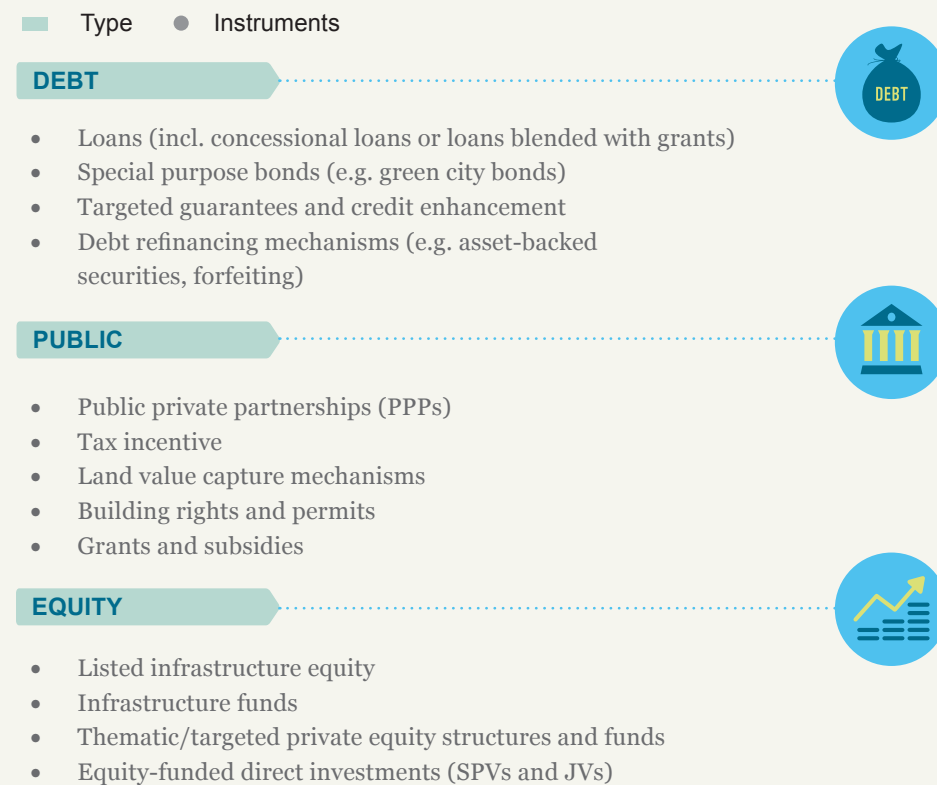
Four key findings that stand out from our research. These span the use of financial instruments, the supply of investable projects, the type of approach to encourage infrastructure financing and the role of collaboration to unlock investment.



FINDING 1: SOME INSTRUMENTS ARE BETTER THAN OTHERS

As outlined in section four, we conclude some financial instruments have a higher potential to support investment in sustainable infrastructure. Whether this potential can be achieved depends on instrument design and scope; the integration of sustainability into investment or lending criteria, and conducive and stable public policies.

Figure 11
Financial instruments with significant potential to support investment in sustainable infrastructure



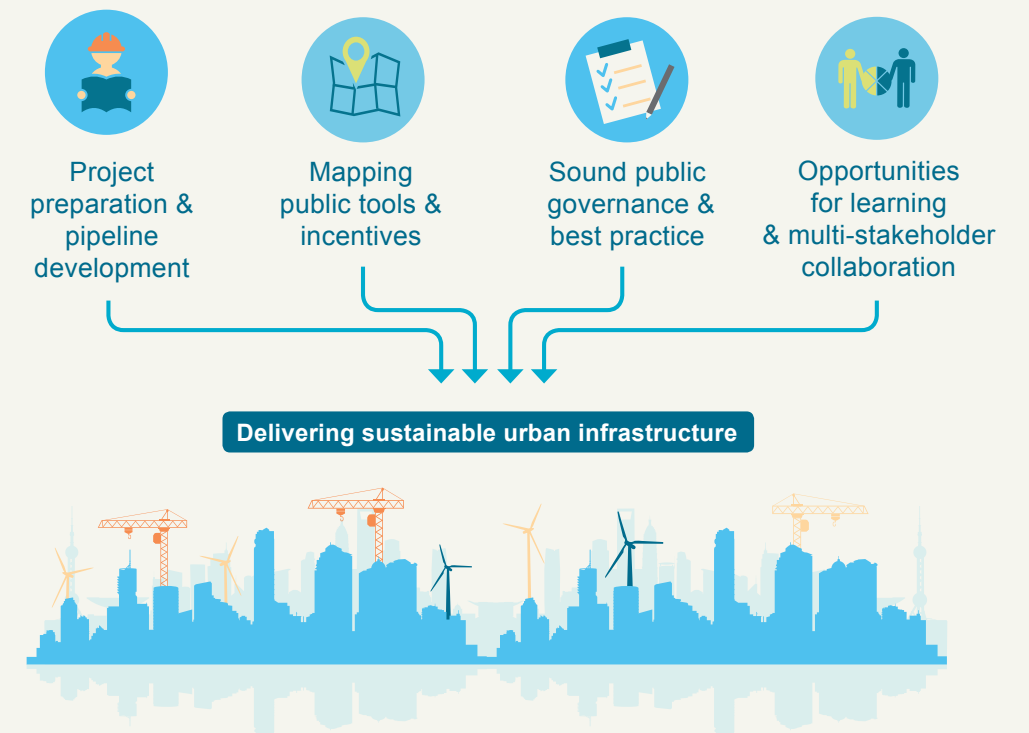
FINDING 2: A LACK OF TRUST AND SUPPLY

The lack of investable projects seems to be the main issue preventing sustainable infrastructure investment at scale rather than the lack of finance. The risk-reward profile of infrastructure projects largely determines the 'investability' potential and thus the attractiveness to private finance investors. A pipeline of investable projects would allow large investors to commit a greater share of their resources to infrastructure.



FINDING 3: TOWARDS A 'PRODUCT & MARKETING APPROACH'

Figure 12
Public instruments, tools and incentives which can effectively support sustainable infrastructure financing and development.



Cities need to develop comprehensive investment propositions rather than demand investment if they want other sources of finance such as bank, institutional investors, specialist funds and even communities to support sustainable infrastructure development.

The lack of robust funding streams (e.g. revenue from user charges) is a major obstacle to investability and thus to the private financing of infrastructure. Energy efficiency projects meanwhile should seek to monetise anticipated savings and renewable energy projects should seek to monetise avoided carbon emissions and other quantifiable benefits.

Investors are particularly wary of cities' credit risk and the latter's ability to contract and manage their finances responsibly. Respondents largely confirmed that the lack of expertise and market capacity in relation to new technologies was more pronounced in developing and emerging countries. This could hinder private sector financing of sustainable infrastructure projects even when funding streams are available. Demonstration and capacity building through multi-stakeholders projects involving public, private and development finance actors might help in this case.

Cities' efforts should primarily focus on project preparation and the financing structure of sustainable infrastructure projects; public sector tools and incentives to leverage alternative sources of finance, while meeting sustainability objectives and targets; and sound governance and best practice in order to boost investor and stakeholder confidence.

- Firstly, cities should seek finance through external sources for projects that have reasonable prospects of meeting investors' risk-return requirements. Public resources should be targeted primarily at priority projects which lack clear and predictable revenue streams.

- Second, cities should identify the range of public instruments, tools and incentives that both match their local contexts and which can effectively support sustainable infrastructure financing and development.
- Third, cities should aim to strengthen investor confidence by improving the transparency, accountability and sustainability of public finances as well as the efficiency of planning and procurement processes.



FINDING 4: COLLABORATION TO UNLOCK INVESTMENT

Local authorities should encourage collaboration internally, across departments, and externally, with provincial and national government agencies.

Outside of the public realm, the private sector, including financial institutions and investors, can share expertise in financing infrastructure.

Improving collaboration between departments in charge of sustainability, environmental services and energy and those in charge of planning, finances and procurement could help to identify areas where synergy is possible.



Multilateral and national development banks can also share expertise in designing and structuring infrastructure projects across and within sectors.



Financial institutions should strengthen their capacity to assess the sustainability impact of infrastructure projects and related investments.



Networks and initiatives operating in finance, cities and sustainability, including civil society and academia, should continue their efforts to identify gaps; disseminate best practice and lessons learned; and favour multi-stakeholder dialogue.



Central governments could support cities in their efforts through adequate regulatory frameworks and incentives and by encouraging best practice in public sector governance and finance management.

* Key findings are fully explored in Chapter 5 of the full report.

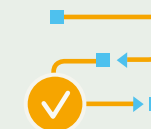
WHAT NEXT FOR SUSTAINABLE INFRASTRUCTURE FINANCING?

We identify four areas where multi-stakeholder collaboration is needed to support investment in sustainable infrastructure at scale and gradually shift towards a ‘product & marketing’ approach.



GUIDANCE FOR CITIES, INFRASTRUCTURE DEVELOPERS AND FINANCIAL INSTITUTIONS

as to what sustainability for infrastructure means, and how the sustainability impact of a project can be quantified and monetised in the planning phase, and then monitored throughout the lifetime of the project.



A FRAMEWORK TO GUIDE CITIES IN THE PROCESS OF IDENTIFYING, ASSESSING AND MAPPING RELEVANT PUBLIC SECTOR TOOLS, INCENTIVES AND FINANCING INSTRUMENTS

which can be used to leverage investment in sustainable urban infrastructure development and upgrading.



A COMPREHENSIVE GLOBAL DATABASE OF URBAN INFRASTRUCTURE PROJECTS CONSOLIDATING EXISTING DATABASES AND DOCUMENTING FINANCING APPROACHES

as well as best practice in the use of public tools and instruments for sustainable infrastructure.



MORE CONSIDERATION GIVEN TO FINDING WAYS OF RECOGNISING GOOD PRACTICE AND INNOVATION

in this space such as for sound methodologies for evaluating investment in infrastructure from a sustainability perspective.

WWF welcomes comments and would like to invite stakeholders to express interest in potential future collaboration to explore some of the findings and recommendations.



Please download the full report at:
<http://bit.ly/1YHON6q>



Why we are here.

To stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature.

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