FINANCING THE TRANSITION: SUSTAINABLE INFRASTRUCTURE IN CITIES

A Summary

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

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.
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:

- Reduce the environmental impact of urban infrastructure such as energy efficiency and renewable energy projects.
- Support the integration of nature-based assets into urban development.
- Improve the climate resilience of urban areas by improving the ability of infrastructure to cope with the consequences of climate change.
- Help to protect biodiversity and ecosystem services.
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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.
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.
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.

Central governments, provincial and municipal bodies, are unlikely to fund the required infrastructure developments by themselves given budgetary deficits and levels of debt.

Taxpayers are weary of having to provide any more funds following the financial crises, bank bailouts and stalled economic growth in many economies.

Investors, whether banks, institutional investors, specialist funds and investment firms, need a return on investment and are unlikely to commit funds to infrastructure unless tangible opportunities meeting their risk reward criteria.

Taken as a whole, these trio of constraints present a formidable barrier to investment. Other sources of financing will clearly have to be targeted to meet rising needs for both infrastructure upgrading and development. And it is here that cities have a critical role to play.

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.

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.

Leverage other sources of finance
Ensure that future investments are sustainable by setting out adequate policies and targeted...
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:

- **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.
- **Land value capture mechanisms** and “green city” bonds.
- **Low-carbon planning requirements**.
- **Promoting green technologies and renewable energy**.
- **Special purpose vehicles**.

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.

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.

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.

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.

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.
Figure 7
Overview of public finance instruments relevant to infrastructure

Figure 8
Overview of debt finance instruments relevant to infrastructure

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.

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**Figure 10**

ESCO mechanism

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**In 2010, the IEA estimated that buildings accounted for:**

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL FINAL ENERGY CONSUMPTION</td>
<td>32%</td>
</tr>
<tr>
<td>ENERGY-RELATED GREENHOUSE GAS EMISSIONS</td>
<td>19%</td>
</tr>
</tbody>
</table>

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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 ESCOs 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.

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**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.

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**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.

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- **TOTAL FINAL ENERGY CONSUMPTION:** 32%
- **ENERGY-RELATED GREENHOUSE GAS EMISSIONS:** 19%

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**Riverside One, in Teesside, UK, is an exceptional green building whose individual housing units have a low carbon footprint. The whole block is heated by a biomass 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**
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.

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### Table: Financial Instruments with Significant Potential to Support Investment in Sustainable Infrastructure

<table>
<thead>
<tr>
<th>Type</th>
<th>Instruments</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEBT</td>
<td>Loans (incl. concessional loans or loans blended with grants)</td>
</tr>
<tr>
<td></td>
<td>Special purpose bonds (e.g. green city bonds)</td>
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<tr>
<td></td>
<td>Targeted guarantees and credit enhancement</td>
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<tr>
<td></td>
<td>Debt refinancing mechanisms (e.g. asset-backed securities, forfeiting)</td>
</tr>
<tr>
<td>PUBLIC</td>
<td>Public private partnerships (PPPs)</td>
</tr>
<tr>
<td></td>
<td>Tax incentive</td>
</tr>
<tr>
<td></td>
<td>Land value capture mechanisms</td>
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<tr>
<td></td>
<td>Building rights and permits</td>
</tr>
<tr>
<td></td>
<td>Grants and subsidies</td>
</tr>
<tr>
<td>EQUITY</td>
<td>Listed infrastructure equity</td>
</tr>
<tr>
<td></td>
<td>Infrastructure funds</td>
</tr>
<tr>
<td></td>
<td>Thematic/targeted private equity structures and funds</td>
</tr>
<tr>
<td></td>
<td>Equity-funded direct investments (SPVs and JVs)</td>
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</tbody>
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**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.

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**FINDING 3: TOWARDS A ‘PRODUCT & MARKETING APPROACH’**

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.

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

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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.

- 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.

**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 COMPREHENSIVE GLOBAL DATABASE OF URBAN INFRASTRUCTURE PROJECTS CONSOLIDATING EXISTING DATABASES AND DOCUMENTING FINANCING APPROACHES**
  which can be used to leverage investment in sustainable urban infrastructure development and upgrading.

- **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.

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