

# Financing Tomorrow's Cities

Meta-Analysis





**FINANCING TOMORROW'S CITIES  
META ANALYSIS**

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# 1. INTRODUCTION

## 1.1 Background

The world of 2050 will hold over 9 billion people. Three quarters of these will live in Cities.

These people will need to be housed, fed, educated and employed. They will need energy and water. Their waste will need to be disposed of and they will need access to transport and telecommunications.

Whilst delivering the goods and services cities need in a resource constrained world is going to present significant challenges, for the City, London and the UK they also present significant business opportunities.

The Tomorrows City programme forms the key theme of the 2013/14 City of London Mayoralty. The programme facilitates dialogue between the City of London and other world Cities regarding these challenges, and promotes UK expertise within both the 'green business sector' (food, water, waste, energy, transport, construction and pollution control) and the financial services sector (legal services, financial services and insurance)

As part of this dialogue three work streams have been developed:

- ◆ **Equalities**- ensuring equality of opportunity for all and in particular increasing access for women to senior management positions.
- ◆ **Urban Development**- assisting cities to address the challenges associated with growth, infrastructure and climate change
- ◆ **The “Green” Economy**- promotion of financial services, professional services, construction, engineering and eco-tech.

In delivering these work streams the focus is on the leadership role of businesses and cities, the underlying assumption being that these two elements working in partnership may be more effective at delivering development and social progress than national governments.

## 1.2 The Financing Tomorrow's Cities Project

In the summer of 2013, the City of London Corporation asked the Z/Yen Group to develop “Financing Tomorrow's Cities”, a Long Finance project to discuss and encourage innovative financing mechanisms for tomorrow's sustainable cities.

The project engaged experts, organisations and initiatives from a wide range of sectors including financial and professional services, risk management, construction, engineering, transportation, energy, waste, and education in discussion on financing instruments, risk management products and engineering solutions for tomorrow's cities.

The project was officially launched in November 2013 with the Rt Hon Fiona Woolf, Lord Mayor of the City of London and senior representatives from the banking, legal, insurance, construction and policy sectors.

### **1.3 Outputs**

Financing Tomorrow's Cities was created as part of the London Accord programme on the Long Finance website. The project delivered four types of activities:

- ◆ Shared research: 33 reports from by 19 contributors were collected between June 2013 and May 2014 on topics relating to cities and finance. The full list of reports is included in *Appendix B – Shared Research*.
- ◆ Online discussions: 18 discussions were created by the team on the Long Finance online community as a way to share information and encourage discussion particularly around financing mechanisms for urban development. The list of discussions is included in *Appendix C – Online Discussions*.
- ◆ Events: three events were organised by Z/Yen Group in collaboration with the City of London Corporation in an effort to engage experts and professionals from a range of sectors: the launch event in November 2013; an academic symposium on cities and measurements with Gresham College in January 2014; and, a roundtable on infrastructure financing with Bank of America Merrill Lynch in March 2014. In addition, the project was presented at two European conferences, in Geneva (Switzerland) and in Brussels (Belgium). An overview of the events is included in *Appendix A – Events Held*.
- ◆ This meta-analysis, which reviews the key topics and issues that emerged throughout this project.

### **1.4 Acknowledgements**

We would like to thank the City of London Corporation, Bank of America Merrill Lynch, Lloyd's and Berwin Leighton Paisner and all those who contributed research or expertise for their assistance in delivering this project.

## 2. THEMATIC META-ANALYSIS

In 1950, New York City was the only metropolitan area with a population of over 10 million, there are currently 23 such cities in the world, 19 of these are in developing economies (UN 2011). Over the coming decades the predicted surge in urban population will create many challenges for decision-makers around the world. In a globalised world, natural disasters and political unrest have a contagious effect on interlinked economies. Leaving aside humanitarian considerations, there is a degree of urgency in finding solutions to the related financial, legal, engineering and environmental challenges required to build resilient, sustainable cities.

This section provides an overview of the current state of research on finance and cities, based on the 33 reports collected between 2013 and 2014 (see *Appendix B*). Three core themes can be distinguished: finance, resilience and sustainable services provision.

### 2.1 Financing Urban Development

While methodologies and estimates vary, the scale of the infrastructure financing need is huge. Standard & Poor's estimated **USD 57 trillion** to be required by 2030 (Standard & Poor's, 2014), the OECD mentions **USD 82 trillion** (including energy generation and related infrastructure) between 2009 and 2030 (EIB; 2013).

Historically, governments have been the primary financiers for infrastructure development. However, public financing of infrastructure and related services has been shrinking following the financial crisis and, more recently in Europe, the debt crisis-

- ◆ OECD governments currently devote around 3% of their GDP to infrastructure financing, a percentage that has declined from an average 4% in 1980.
- ◆ In Europe, public investment in infrastructure has fallen from about 5% in the 1970s to about 2.5% in the 2000s (EIB, 2013).

In the private sector, banks have traditionally provided long-term financing for infrastructure projects, currently about USD 300 billion per year (Standard & Poor's, 2014). Their ability to continue to provide long-term lending is likely to be constrained following the financial crisis and new regulation being implemented including Basel III.

Taking future GDP projections and infrastructure deficits and needs into account, assuming that government financing will stay at the same level, Standard & Poor's (2014) estimate an annual gap of at least USD 500 billion in global infrastructure requirements.

This infrastructure-financing gap is becoming a major policy concern and calls for private sector financing to fill the gap are spreading. However, new

players in the financial sector are emerging as central providers of long-term capital including institutional investors such as pension funds, insurers and sovereign funds.

With over USD 70 trillion in assets in OECD countries (as of 2011), institutional investors are often cited as an alternative source of financing (OECD, 2013). Over the last decade institutional investors have been increasing their investment allocation to alternative assets such as real estate and more recently infrastructure, including 'green infrastructure'.

Such investments represent an opportunity for institutional investors, due to their need to match long-term assets and liabilities, while at the same time picking up higher yields than they might get from traditional investments in government or corporate debt (OECD, 2013).

While many have argued for the diversification benefits of adding direct investments in real assets, such as infrastructure or real estate, to an equity/bond portfolio, real assets such as infrastructure remain fairly distinct when compared to more conventional assets, as they involve relatively higher transaction costs and long-term horizons (DB, 2013).

However, the proportion of infrastructure related investments made by institutional investors remains relatively small with less than 1% of pension fund assets allocated directly to infrastructure projects. Standard & Poor's estimate that the level of investment by institutional investors could rise to 4%, about USD 200 billion a year in additional funding for the infrastructure sector (or 3.2 trillion by 2030), a substantial increase from the current level (Standard & Poor's, 2014).

Securing finance for urban projects can be challenging especially during the early construction phases when the requirements are greatest and the level of risk may be unacceptable to many potential investors and funders.

Potential sources of financing and instruments are varied and multiple but the right mix of sources of financing will ultimately depend on

- ◆ the timing and sequencing of projects to be funded;
- ◆ the capacity and appetite of the relevant entities to take on appropriate levels of risk;
- ◆ and, their ability to take on acceptable forms of security (BLP, 2012).

Barriers to private sector (and institutional investors) investment in infrastructure include the lack of adequate financing vehicles (OECD, 2013), though there is scope for the development of alternative financing arrangements such as public-private partnerships, and investment vehicles such as project bonds and appropriate investment funds, that could be suitable for private sector investment (EIB, 2013).

**Table 1 – Financing Instruments** (Adapted from BLP, 2012)

	<b>Public (governments, international financial institutions)</b>	<b>Debt - capital markets</b>	<b>Debt - Finance</b>	<b>Equity - (Private/SWFs)</b>
<b>Instruments</b>	<ul style="list-style-type: none"> <li>* Municipal Development Fund (or Urban Development Fund)</li> <li>* Capital Contributions</li> <li>* Grant Funding</li> <li>* Donations</li> <li>* Economic Enterprise Zones</li> <li>* Accelerated Development Zones</li> <li>* Community Led Infrastructure Financing Facility (CLIFFs)</li> <li>* IFI Loans/Bonds</li> </ul>	<ul style="list-style-type: none"> <li>* Municipal Bond Markets</li> <li>* Corporate Bonds</li> <li>* Infrastructure Bonds</li> <li>* Project Bonds</li> <li>* Sukuk</li> </ul>	<ul style="list-style-type: none"> <li>* Corporate Loans</li> <li>* Project Finance Loans</li> <li>* Derivatives (commodity hedging, carbon trading)</li> </ul>	<ul style="list-style-type: none"> <li>* Equity investment in SPV project entities delivering infrastructure</li> <li>* Equity participation in joint ventures</li> <li>* Equity participation in investment delivery vehicles</li> </ul>

Other barriers to private sector investment remain, including:

- ◆ the lack of investment and risk management expertise to deal with infrastructure investments;
- ◆ regulatory disincentives;
- ◆ the lack of quality data on infrastructure;
- ◆ the lack of a clear and agreed investment benchmark;
- ◆ and, risks related to regulatory and policy uncertainty (OECD, 2013; Pivotal Innovations, 2013).

Policy risk in particular tends to be significant with long-term projects, with delays, changes and cancellations occurring and a lack of well-articulated long-term public agenda for urban development.

This partly explains why institutional investors have traditionally been reluctant or hesitant to invest in such projects. A stable policy environment, adequate incentives and better information on risks and rewards associated with this type of investments are necessary to attract more private sector finance.

While the general perspective is that institutional investors could provide more long-term finance for infrastructure, many experts stress that expectations should be realistic. As highlighted above, barriers to investment remain and should be addressed. Further, given the scale of the needs in forthcoming decades, traditional players such as the public sector and banks need to continue to be involved in the financing of tomorrow's cities (EIB, 2013).

## **2.2 Improving Cities' Resilience**

Cities' ability to remain economically competitive and socially attractive while adapting to continuously changing conditions is increasingly tied to their resilience – i.e. their ability to prepare for, respond to, and recover from

extreme events (Siemens, 2013). How cities grow and develop i.e. the design, planning, management and maintenance of urban infrastructure, resource supplies and distribution networks, influences their very capacity to absorb and recover from disasters, including those driven by an extreme climate (e.g. flooding in the UK).

The increasing concentration of people, economic activities and assets in urban areas tends to translate into increased vulnerability to extreme weather events and disasters, which are becoming more frequent and less easy to predict (UNISDR, 2012; ClimateWise, 2013).

Between 2000 and 2012, natural disasters, including weather, health and seismic events, caused GDP 1.1 trillion globally in damages, taking into account both direct impacts on infrastructure, assets, communities and the environment and indirect impacts such as reductions in business profitability and economic growth in affected regions (Siemens, 2013).

Building resilience requires long-term coordination and cooperation between cities decision-makers, communities, businesses and other stakeholders to reduce disaster risk, both through specific risk reduction policies and investments, and by improving infrastructure and the provision of services (UNISDR, 2012).

Resilient infrastructure systems may require large-scale changes to the way infrastructure is planned, designed, managed and maintained. While technology is part of the solution, the ability to anticipate risk and to plan urban development in the long term is critical. Resilience should not only be included as a criteria underpinning decision-making of new infrastructure projects but should also be systematically taken into account when evaluating projects aiming to maintain and upgrade existing infrastructure (Siemens, 2013).

Climate resilience not only influences cities' ability to respond to extreme weather events but also has implications for their 'insurability'. Insurance against catastrophic events and other forms of risk transfer are essential for the maintenance of urban assets and for the financing of recoveries from extreme events.

Whilst governments have historically absorbed the gap between privately insured losses and total economic losses, their ability to continue to do so is constrained by declining public finances, in Western countries in particular. Moreover, the unpredictability of such events and the extent of the losses are undermining the insurability of urban infrastructure and assets. Cities decision-makers and insurers in particular have much to gain by working together to improve and strengthen cities' 'insurability' through better resilience (ClimateWise, 2013).

## **2.3 Cities & Services Provision**

Cities are diverse in nature, size and needs. The literature suggests that declining public finances, rising urban populations and increased vulnerability to natural risk present both challenges and opportunities with respect to service provision across a range of sectors including health care, transport, education, housing, resource supplies (including energy and water) and waste management.

Analysts and investors are increasingly aware of a number of 'megatrends' that will likely influence investment opportunities and returns over the coming decades. These include education, energy efficiency, extreme weather and climate change, health, wellness and obesity, safety and security, waste and water among others (BAML, 2013). Population growth and rising urbanisation are underlying pressure factors clearly shaping a number of these megatrends.

Rising demand for the energy, water and other resources necessary to support urbanisation are driving innovation with respect to efficiency (particularly for energy) and environmental protection. Governments have a pivotal role in encouraging the growth of these sectors through the creation of standards and stable policy frameworks that can drive growth and innovation in technological solutions.

New markets and investment opportunities are also emerging as perceptions of services such as waste management gradually shift from "a mandatory public service" to "a sustainable business opportunity" (BAML, 2013).

In responding to rapid urbanisation, spatial planners are rethinking urban systems at macro-level and creating investment opportunities for smart technologies. Transport systems are a good example where the integration of transport systems and networks with technology can provide an easier interchange to support a more efficient and sustainable movement of people and goods (TSB, 2013).

### 3. DISCUSSION

There is a wealth of research and initiatives around cities, resilience and sustainability, much less so on the financing aspects. “Financing Tomorrow’s Cities” has attempted to fill this gap by encouraging cross-sectoral dialogue and research dissemination and as such represents a sensible first step.

Existing research on finance and cities does not seem to capture in detail innovative solutions to address the urban financing gap. While interesting examples around public-private partnerships, community financing models and bonds were mentioned in online discussions, mainstream research fails to reflect these.

Research focusing specifically on financing needs, sources and mechanisms tends to be produced primarily by multilateral organisations, governments and international financial institutions. Moreover, it remains difficult to estimate the scale of the urban financing needs and gaps and these tends to vary across cities and countries. Better information on risks and rewards associated with infrastructure investments and related financing mechanisms should be produced, especially if governments want to attract more private sector investment.

Hedge tools and incentives to address existing barriers to investment, such as policy risk, should also be the subject of further research, and the development of pilot frameworks should be encouraged.

Further research could be encouraged on the following issues:

#### **Financing Urban Development:**

- ◆ Financing vehicles including municipal bonds, private-public partnerships, project bonds and other instruments.
- ◆ Risks and rewards associated with infrastructure investments and related vehicles.
- ◆ Hedge tools to address barriers to investment including policy risk for example index-linked policy bonds where investment in transport could be linked to a bond which performance would depend on a government holding on its policy targets such as traffic reduction or air pollution reduction targets.

#### **Cities’ resilience:**

- ◆ Factors contributing to a city’s ‘insurability’.
- ◆ Key resources (e.g. food, water, energy) distribution networks and supply chains.
- ◆ Water access.

**Urban services provision:**

- ◆ Socioeconomic implications of an aging population particularly in Western Europe.
- ◆ Policy frameworks related to managing a rising urban population (including migration) and the implications for services provisions including housing, education and healthcare.

Finally, cross-sectoral dialogue between policy makers, bankers, insurers, lawyers, urban planners, engineers and other relevant stakeholders should continue to encourage research in the right direction and to inform a forward looking policy agenda for urban development.

## APPENDIX A - EVENTS HELD

### 1. **Financing Tomorrow's Cities: Launch event**, Mansion House, 09 Nov 2013

120 people attended the launch event of Financing Tomorrow's Cities at Mansion House. The Rt Hon Fiona Woolf introduced the project, explaining the challenge but also the opportunities facing city decision-makers around the world given rising urban population. Her presentation was followed by a panel discussion with Michael Turnbull (Bank of America Merrill Lynch), Mukhtiar Tanda (Berwin Leighton Paisner LLP), Sir David King (Future Cities Catapult), Trevor Maynard (Lloyd's) and Roger Bayliss (Skanska).

### 2. **Gresham College's Long Finance Symposium "Measuring Up Cities"**, Museum of London, 30 Jan 2014

120 people attended the Symposium. The Rt Hon Fiona Woolf delivered a lecture on the relationship between cities and measurement, including big data. Her presentation was followed by academic presentations from Professor Tony Travers (LSE), Dr Hyejin Youn (SantaFe), Martin Houghton (TBR) and Dr. Laura Davison (City of London).

### 3. **Long Finance Roundtable "Financing Infrastructure: Challenges and Opportunities"**, Bank of America Merrill Lynch, 12 Mar 2014

Hosted by Bank of America Merrill Lynch, this event explored existing risks and barriers to private sector infrastructure financing as well as opportunities in this area with the Rt Hon Lord Mayor Fiona Woolf of the City of London and senior representatives from the banking, legal, insurance, construction and policy sectors.

In addition "Financing Tomorrow's Cities" was presented at two European conferences:

- ◆ **7th European Conference for Sustainable Cities and Towns** "A Green and Socially Responsible Economy: A Solution in Times of Crisis?", Geneva, Switzerland, 17 to 19 Apr 2013
- ◆ **European Commission Horizon 2020** "Renaturing Cities: Addressing Environmental Challenges and the Effects of the Economic Crisis through Nature-Based Solutions", Brussels, Belgium, 13 to 14 May 2014

## APPENDIX B - SHARED RESEARCH

Contributor	Title	Year
Acclimatise	Embedding Climate Change Resilience in Coastal City Planning: Early Lessons from Cartagena de Indias, Colombia	2013
Acclimatise	Guidelines for Project Managers: Making Vulnerable Investments Climate Resilient	2013
Acclimatise & IFC	Climate Risk and Business Ports	2011
Acclimatise	ESPACE – Planning in a Changing Climate	2008
Acclimatise & TCPA	Climate Change Adaptation by Design - A Guide for Sustainable Communities	
Bank of America Merrill Lynch	Extreme Weather Primer - Weathering The Perfect Storm	2013
Bank of America Merrill Lynch	Global Energy Efficiency Primer - Less Is More	2013
Bank of America Merrill Lynch	No Time to Waste - Global Waste Primer	2013
Bank of America Merrill Lynch	Green Urbanization	2013
Barclays & Accenture	Carbon Capital: Financing the Low Carbon Economy	2011
Berwin Leighton Paisner LLP	Resilient Cities: the Key to the Future	2012
Chuo University	A Theoretical Model Analysis of Urban Transformation after Global Financial Crisis 2008	2013
Chuo University	Sustainability and Network Effects in Global Cities	2010
ClimateWise & CPSL	Building Resilient Cities: From Risk Assessment to Redevelopment	2013
ClimateWise & CPSL	Building Climate Resilience in Cities: Priorities for Collaborative Action	2013
Credit Suisse	Decarbonizing Swiss Real Estate: the Credit Suisse Case Study	2012
Deutsche Bank & Rockefeller Foundation	United States Building Energy Efficiency Retrofits: Market Sizing and Financing Models	2012
Deutsche Bank	The Performance of Direct Investments in Real Assets: Natural Resources, Infrastructure, and Commercial Real Estate	2013
European Investment Bank	Private Infrastructure Finance and Investment in Europe	2013
Lloyd's	Tornadoes: A Rising Risk?	2013

<b>Contributor</b>	<b>Title</b>	<b>Year</b>
OECD	Institutional Investors and Infrastructure Financing	2013
OECD	Pension Fund Investment in Infrastructure	2013
Pivotal Innovations	Financing Future Cities Summary Report - Initial Findings from Expert Engagement	2013
Siemens & Others	Toolkit for Resilient Cities	2013
Société Générale	Green Transport	2009
Standard & Poor's	Global Infrastructure: How To Fill A USD 500 Billion Hole	2014
Standard & Poor's	FAQ - How Europe's Initiative To Stimulate Infrastructure Project Bond Financing Could Affect Ratings	2011
Sustainalytics	Feeding Asia	2011
Sustainalytics	Hong Kong Real Estate	2010
Technology Strategy Board & Others	Developing the End-User Case for Integrated Transport	2013
UNEP Finance Initiative	Responsible Property Investment: What The Leaders Are Doing 2nd edition	2012
UNISDR	Making Cities Resilient	2012

## APPENDIX C - ONLINE DISCUSSIONS

Discussion	Date
London: Towards A Smart Megacity?	April 2014
Financing Infrastructure: Challenges & Opportunities	March 2014
A Closer Look At Green Property Bonds	February 2014
How Standards Can Support the Development of Smart Cities	January 2014
Another PPP Example - RE.invest Initiative	December 2013
Don't Miss Our Next Long Finance Symposium "Measuring Up Cities"	December 2013
Financing and Planning for Second Tier Cities	December 2013
A PPP example - the Chicago Infrastructure Trust	November 2013
Are Public-Private Partnerships Part of the Solution to Finance Cities?	October 2013
I want to live in a smart city	September 2013
Community financing models	July 2013
The potential benefits of climate bonds	July 2013
Addressing the waste management investment gap	July 2013
The EU energy challenge	June 2013
World Cities Network Roundtable	June 2013
How to improve infrastructure financing mechanisms	June 2013
Financing Infrastructure	June 2013
Financing Tomorrow's Cities: Time to Address the Challenge	June 2013

## **LONG FINANCE AND THE LONDON ACCORD**

*Long Finance is a multi-stakeholder initiative, created by Z/Yen Group Limited, which aims to improve society's understanding and use of finance over the long-term.*

*The London Accord is part of the Long Finance initiative and provides free access to investment research on environmental, social & governance (ESG) issues kindly provided by contributors from the financial services sector academia and the not-for-profit sector.*

*The London Accord is the largest and most comprehensive open source financial research resource in the world, containing over 400 research papers provided by 60 institutions, all of which are free to download.*

*By offering tangible examples through which finance connects with long-term sustainability, the London Accord contributes to achieving the overarching goals of Long Finance: **to expand frontiers, change systems, deliver services and build communities.***

For further information visit **[www.longfinance.net](http://www.longfinance.net)**





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