



cutting through complexity

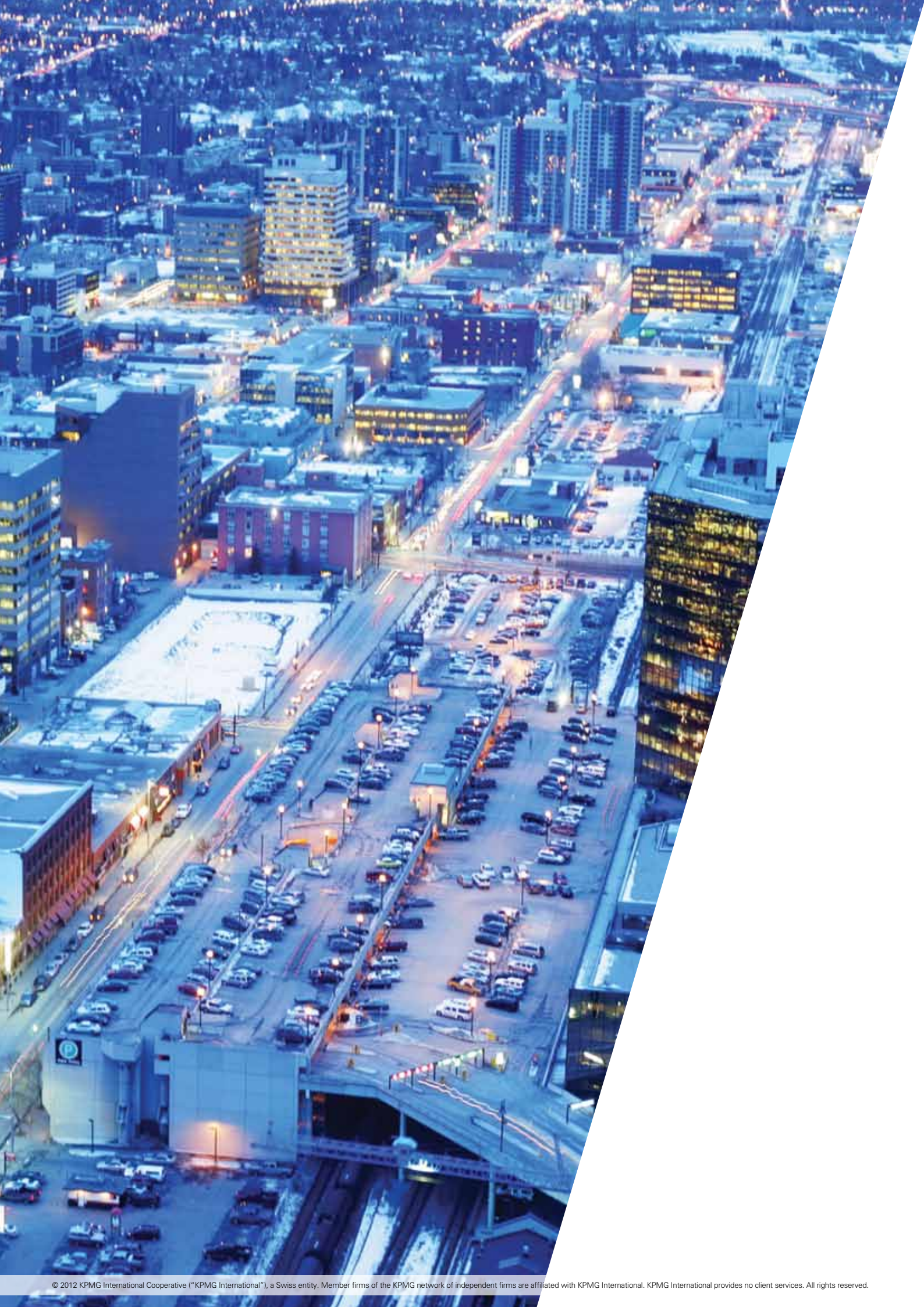
INFRASTRUCTURE

Cities Infrastructure: a report on sustainability

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Responding to the urbanization challenge

Urban infrastructure has become one of the most pressing challenges facing the world today. Already, the world's cities are home to more than half of the global population; emit more than 70 percent of the world's greenhouse gasses; use 80 percent of the world's energy;¹ and drive the vast majority of the world's economic output.

So it is hardly surprising that political and business leaders are now keenly focused on cities and their impact on everything from economic growth and social well-being to climate change and sustainability.

Indeed, in both the developed and the developing world, cities are striving to provide a raft of critical infrastructure to support their burgeoning – in some cases unrelenting – growth; more effective transportation systems, reliable and low-carbon energy, safe and secure water networks, and efficient and scalable social infrastructure will all play central roles in the smooth transition to urbanization.

Pressing questions and bold advances

But these challenges cannot be viewed in isolation. Difficult questions and complex considerations hold significant influence over the ability of governments to provide the improved public services and modern infrastructure that are required. Investment is an obvious challenge for governments of both poor and wealthy economies. But critical

questions also surround considerations such as policy development and tax, the need for greater accountability, the role of the private sector, and the drive for improved sustainability.

As a result, we have seen increasing activity to create 'cities of the future': sustainable and highly-livable urban areas that balance the needs of the population and the economy with those of the environment.

Building the body of knowledge

At KPMG, we are privileged to have a global perspective on the work that urban administrations and national governments are doing to develop sustainable and achievable solutions to these challenges. We recognize the value of sharing insights and lessons to help cities cultivate a clear approach to urban infrastructure development. Indeed, we believe that one of our most sacred challenges as an industry must be to share the innovations and best practices that we gather from urban infrastructure pioneers with those around the world who can benefit from our shared experience.

One way in which we advance this goal is by publishing our firms' professionals' globally-applicable experiences, insights and advice as they work to advance the agenda on sustainable cities. From ground-breaking research reports with leading

¹ *Insight: Urbanization*, KPMG International, September 2011, p.6-7.



academics to in-depth analysis on key urban development challenges, our member firms are focused on helping city leaders to overcome the various challenges that stand on the road to sustainability.

KPMG is also proud to publish *Insight*, one of the industry's preeminent magazines aimed at helping governments, investors and developers cut through the complexity of infrastructure delivery and renewal. Last year, the publication focused exclusively on the specific infrastructure challenges being faced by city executives, engineering and construction firms, and urban infrastructure investors. And with a special report that featured interviews with ten civic leaders and executives from world-class cities around the world, we helped to advance the body of knowledge on sustainable cities and create new approaches to urban infrastructure development.

Catalyzing change

We have developed this publication to act as a further catalyst to change. Within this report, we have captured some of the most innovative concepts and practical insights from our firm's publications and presented them here to provide what – in our opinion – is one of the most definitive reviews of literature on the subject of sustainable cities.

And, as we continue our work with industry leaders, we hope to drive further innovation and action within the sustainable cities agenda, and help create a new approach to urban infrastructure delivery that responds to the needs of all stakeholders: governments, developers, businesses, investors and – most importantly – the citizens themselves.

We encourage you to speak your local KPMG member firm for more information about our work on sustainable infrastructure for cities.



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Why sustainability?

Few could argue the need for new approaches to the development and delivery of urban infrastructure. As existing cities continue to explode at their seams and new cities start springing up in previously-uninhabitable areas of the world, governments and urban planners will need to place a high priority on achieving sustainability.

And while there has already been significant talk of sustainability in industry and world forums, few seem to have really peeled back the hype to examine the actual imperatives behind the movement. What does sustainability really mean for infrastructure? How should it be measured? What are the key contributors and drivers of sustainability in the urban context?

To be sure, the issue of sustainability is highly complex and multifaceted. But in our experience, there are three key areas where concerted action and new approaches can create a fundamental step-change in the way that we approach urban infrastructure: environmental sustainability, financial sustainability and the sustainability of our physical assets.

Environmental sustainability

There is no denying the impact that our urban areas have on climate

change. Already, our existing cities are estimated to contribute approximately 70 percent of the world's greenhouse gasses.² But urbanization is also placing unprecedented pressure on other parts of the environment, particularly in the key areas of water, waste and energy.

Against this backdrop, infrastructure will play a key role. "Infrastructure, if intelligently designed, planned and delivered, is probably one of the best hopes we have of achieving a sustainable future against the impacts of climate change," notes Yvo de Boer, former Executive Secretary of the United Nations Framework Convention on Climate Change and current KPMG partner.³ "On the global scale, governments are largely looking to infrastructure investments to deliver on most of their carbon reduction targets. Renewable and low-carbon power generation, efficient transit, smart electrical distribution systems: all of these are going to be designed, built and even operated by infrastructure providers."

Clearly, environmental sustainability is about more than just 'doing the right thing'. Indeed, the environment poses dramatic challenges and implications for the world's cities. For one, a significant

² Insight: Urbanization, KPMG International, September 2011, p.6-7.

³ *Striving for Sustainability*, Insight magazine, Issue No. 1, 2010

number of the world's largest cities lie in coastal areas and flood plains making them particularly vulnerable to the impact of rising sea levels caused by climate change. The Thailand floods in 2011, for example, are now thought to have caused more than US\$20 billion in damages, mostly to urban areas.⁴

Climate change and environmental degradation drives up infrastructure development costs as well. As resources become increasingly scarce, prices for raw materials rise and competition becomes more intense, stretching infrastructure budgets and increasing the cost of ongoing operations. And, as we discuss on page 8, water scarcity also has dire implications for the world's cities.

What is clear is that there is a growing need for urban planners to understand the implications of infrastructure within the context of their city's environment and resources. As Dr. Anne Kerr, Director of Sustainable Development at Mott MacDonald points out, collective action and collaboration between people, companies and governments will be critical in order to make a positive change in the way cities interact with the environment.⁵

Financial sustainability

For today's governments and city planners, financial sustainability is every bit as important as environmental. Facing tightening budgets and limited resources, planners must consider the long-term costs of their infrastructure assets. Two main challenges exist: financing and funding.

As we discuss on page 14, the issue of infrastructure financing is considerable. With estimates suggesting that more than US\$40 trillion in investment will be required around the world over the next 25 years⁶ – the vast majority of which will be spent on urban infrastructure development and maintenance – governments are increasingly looking for new sources and approaches for securing debt and equity to deliver an enormous range of assets.

However, it is becoming abundantly clear that governments are no longer able to dip into their balance sheets to close the gap. As a result, a range of financing models are being tested such as infrastructure bonds and user-pay approaches. As a result, an increasing number of governments are starting to think about their spend in terms of the overall 'affordability envelope' that

consumers and governments are able to bear in the long-term.⁷

In other words, financing approaches undertaken today cannot unduly burden citizens in the future. When viewed against the context of the rising cost of capital, uncertain economic forecasts and unrelentingly high unemployment in many jurisdictions, it becomes clear that urban planners and government budget holders must keenly consider the long-term financial sustainability of their financing decisions.

Tied to this is the challenge of funding ongoing operations of urban infrastructure. Here, too, we see complexity in ascertaining the affordability of existing and planned assets. Public Private Partnerships (PPPs) are gaining momentum as a viable way to shift costs off of the public balance sheet and onto private enterprise, but – ultimately – many of these costs will be carried by consumers, once again impacting urban infrastructure's financial sustainability.

Going forward, the ability to balance both financing and funding sources to ensure sustainable, secure and appropriate investment within an overall affordability envelope will become a key capability for governments at all levels.



⁴ *Thai Floods Test Yingluck*, Bloomberg, October 5, 2011.

⁵ *The sustainability challenge for cities*, Insight magazine, Issue No. 2, 2011

⁶ *Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat* (2009). *World Population Prospects: The 2008 Revision*. New York: United Nations.

⁷ *Incentivizing Infrastructure*, Insight magazine, Issue No. 3, Spring 2012



Asset sustainability

Governments, infrastructure developers and investors are also starting to consider the overall sustainability of their individual assets. In part, this requires overlaying questions of environmental and financial sustainability onto each asset they plan and develop. How will the asset impact or enhance the environment around it? How will future generations pay for the operation of the asset? How does this influence the overall sustainability 'footprint' of the city?

But asset sustainability goes further than this to take a more 'whole-of-life' approach. This requires urban planners and administrators to consider not just the design and build phases of infrastructure development, but also the maintenance, upgrading and – eventually – decommissioning phases as well.

This approach is most obvious in the energy infrastructure sector where decommissioning processes have (overall) been well planned for assets such as nuclear power generation. But the same thought process must now be carried over into all sectors of urban infrastructure. Developers and planners must ask how the assets that we are building today will be managed once they reach the end of their useful life.

These questions must be made early in the process and – ideally – posed at the design and planning stage in order to ensure that 'whole-of-life' considerations are built into the plan

at the outset. As a result, this will lead planners and developers to place a higher value on environmental building practices such as recyclable materials and LEED-certification (see page 20 for more on this).

The issue of asset sustainability is becoming particularly acute in areas of social infrastructure. Indeed, as populations start to shift and age in the West, many cities are finding themselves with unused and poorly situated stocks of school buildings and a dearth of healthcare facilities that no longer meet the recent community focus of healthcare. The prioritization of asset sustainability would, therefore, naturally lead to facilities that can be 'repurposed' over time to match the needs of the local population.

And, as the world seems poised on the verge of a massive push towards the decarbonization of transport, urban planners must start to think about how existing infrastructure can be leveraged or upgraded to meet the demands of new forms of transport. Indeed, governments will need to rethink many aspects of urban infrastructure: how, for example, will power grids handle the inevitable strain of hooking millions of power-hungry electric cars onto the existing network when – for the most part – the electrical grid (transmission and distribution) is not designed to accommodate future innovations such as mass produced electric cars.⁸

⁸ *Decarbonizing urban personal transport*, Insight magazine, Issue No. 2, 2011

Five key sustainability challenges

Over the next few decades, our cities will be exposed to hundreds of environmental and social changes that will bring both risks and opportunities for urban planners and civic governments as they strive towards sustainable growth.

Some, such as water scarcity, waste management and rising energy demand are already being keenly felt in both the developed and the developing world. Others, such as the decarbonization of transportation and rising rates of urbanization are still evolving and quickly moving up the urban agenda.

In particular, we have seen the rise of five key forces that are making an indelible mark on the urban landscape: water, transportation, waste, energy

and urbanization. And as these forces begin to intertwine, they are creating complex and unpredictable challenges for urban planners.

Responding to these challenges will be critically important if we hope to develop truly sustainable cities.

Water

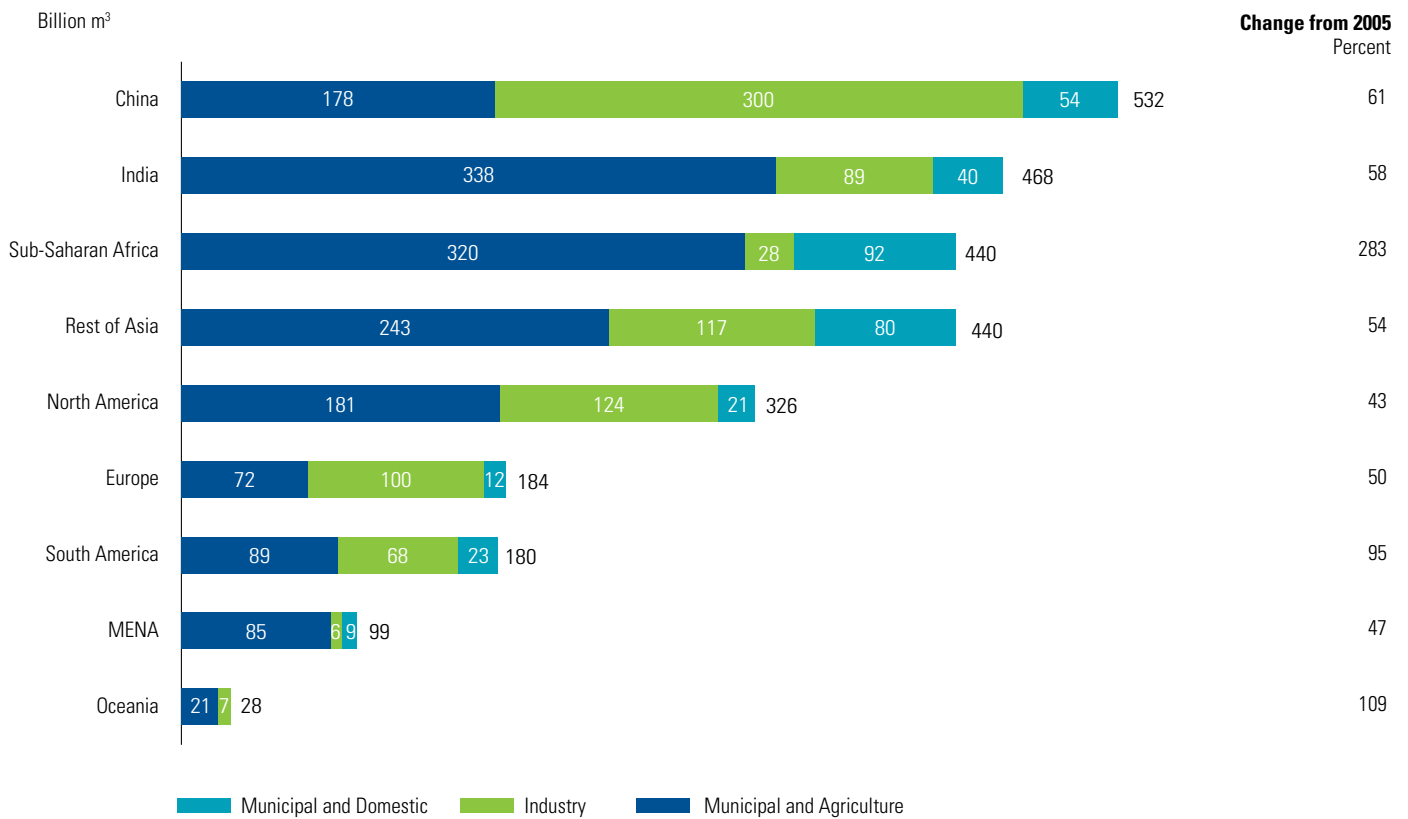
In much of the world, water scarcity is fast becoming one of the greatest sustainability challenges for cities. According to the World Economic Forum, “the impact of a changing climate on water availability and quality is, in many regions, an immediate, tangible and local risk.”⁹

Adding to the complexity is the fact that water is often highly subsidized by

governments who (rightfully so) deem access to water to be a basic civic right. As a result, water is often wasted: in Brazil, almost 40 percent of water is lost through leakage; Hong Kong loses more than 25 percent; Singapore, on the other hand, wastes only around 6 percent.¹⁰ And while the goal of many urban water engineers is to capture and re-circulate 100 percent of water within cities, there is still much work to be done before this goal is realized.

A growing number of urban areas are therefore starting to look to the treatment of wastewater – also known as Treated Sewage Effluent (TSE) – as a viable way to expand their pool of usable water. Today, over 40 million cubic meters of sewage is recycled

Figure 1: Increase in annual water demand 2005-2030



Source: The 2003 Water Resources Group. (2009). Charting Our Water Future.

⁹ *Expect the Unexpected*, KPMG International, Page 23

¹⁰ *At the nexus of urbanization and sustainability*, Foresight, Third Edition, February 2012

daily,¹¹ with some locations – such as Windhoek (Namibia) and Singapore – even utilizing TSE for direct or indirect potable re-use.

Water usage is also inextricably linked to climate change. According to Dr. Anne Kerr of Mott MacDonald, “cities can dramatically reduce their carbon footprint by working with consumers to bring water use down to a more sustainable level – somewhere in the range of 150 liters per capita per day.”¹²

Achieving this, however, will require civic policy makers to both incentivize water conservation, and find ways to make existing facilities more efficient.

Transportation

One of the greatest (and most talked about) challenges facing cities lies in connectivity. But when one starts to look at decarbonizing transportation, urban infrastructure development often becomes a much more complex paradigm. In part, this is because the development of mass transit systems often takes a number of decades to mature and – even then – tends to also require significant cultural changes in the way that populations interact with their environment.

Developing urban transportation networks also requires planners to strike a delicate balance between the traditional expectations of the community and the needs of a modern transportation system. There are already a number of examples where proposed Bus Rapid Transit lanes and light rail transportation systems have threatened to divide communities due

to a lack of proper consultation and community impact analysis.

Urban sustainability is also greatly influenced by the issue of congestion. Reducing congestion is important for a number of reasons; a clear winner would be the environment, but traffic congestion also impacts the quality of life for those living or working in the city. All of this has led many urban areas to focus on renewing their development of mass transit systems.

Indeed, there has been a flurry of activity on mass transit in major urban areas around the world, as we see from the work recently completed or currently underway in Vancouver, Rio de Janeiro, Singapore, Mumbai and Brisbane.¹³

But it is worth noting that connectivity and transportation does not always require new subways or metros to achieve sustainability.¹⁴ For example, Bus Rapid Transit systems are increasingly being seen as a simple way to provide low-carbon transport within the existing urban infrastructure. Municipalities are also starting to look at urban renewal as an efficient way to increase density within close proximity to commercial areas, thereby reducing travel times and the need for extensive transportation networks.

Certainly, in the battle to reduce a city’s carbon footprint, the introduction of hybrid cars will also help. But it will be the development and consumerization of their still-emerging cousin, the all-electric vehicle, that will have a far greater impact on the urban infrastructure landscape. Current technologies such as ‘smart grids’

should help planners to explore the relationship between innovative technologies and the ability of the electrical grid to deliver both the ‘electricity fuel’ needed for electric cars while still protecting the integrity of the electrical grid for its primary purpose. Governments will need to start thinking about how they provide appropriate infrastructure to support these new technologies and how they might move these innovations into higher polluting sectors such as freight and transit.¹⁵

Waste

While the issue of waste has been on the urban agenda for decades, management of waste continues to be a challenge for many cities, both in the developed and the developing world. Indeed, waste management has a massive influence on a wide range of related infrastructure challenges; poor waste management impacts health, economic growth, environmental sustainability and land values.

In the developed world, advances in recycling and waste diversion have reduced the strain on existing waste facilities and provided some much-needed breathing room for urban planners. Even so, it seems clear that waste management will continue to influence the overall sustainability of developed cities as land-fills begin to hit capacity and are forced further and further out of the city centers. At the same time, the continuing debate around incineration will likely increase as landfill options become more expensive and environmentally unacceptable.

In the developing world, however, the situation is often much more dire. With

¹¹ *Global Water Intelligence*, Municipal Water Reuse Market 2010

¹² *The sustainability challenge for cities*, Insight magazine, Issue No. 2, 2011

¹³ *Insight: Urbanization*, Issue No 2, 2011

¹⁴ *At the nexus of urbanization and sustainability*, Foresight, Third Edition, February 2012

¹⁵ *Decarbonizing urban personal transport*, Insight magazine, Issue No. 2, 2011



almost 40 percent of urban dwellers in Asia living in slums with little to no waste collection or removal services,¹⁶ the challenge will only become more acute. And as urban populations in the emerging markets achieve higher levels of wealth, urban planners will increasingly need to focus on managing the detritus of consumerization.

However, this provides an opportunity for emerging cities to innovate from the beginning of their planning processes. Lessons from around the world can serve as the template for best practices in waste management and new and evolving technologies can be used to avoid many of the historic mistakes of the developed world. In many ways, emerging economies can become true world leaders in the use of developing waste management technologies.

Energy

By some accounts, cities now consume more than three quarters of the world's energy. And while a number of jurisdictions are moving slowly towards alternative and renewable sources of energy, most continue to depend heavily on oil, coal and gas in order to keep the lights on. But new technologies and environmental policies are changing the very fundamentals of the way our cities and urban consumers use and generate power.

For example, the introduction of smart meters – and the smart grids they will eventually enable – will not only alter consumption patterns, they will also allow power generators to balance out their capacity peaks.¹⁷ At the same time, new forms of renewable generation capacity are rapidly coming to market,

offering a real opportunity for cities to both reduce carbon emissions and (for those with little to no access to carbon fuels) develop a secure and sustainable power supply.

In balancing the demands of environmental and financial sustainability, the jury still seems to be out on renewable energy. Stripped away of all the national subsidies and tax incentives that currently make many of these technologies economically viable, most renewable sources tend to be somewhat expensive when compared to other generation options, and often deliver unreliable base loads to the grid.¹⁸ Governments will need to work closely with power generators and distributors to find effective ways to incorporate renewable sources without inflating consumer prices.

¹⁶ *Slumdog Millions*, Economist, March 24, 2010.

¹⁷ *Unlocking the power of smart metering*, Insight magazine, Issue No. 2, 2011

¹⁸ *Up Front: Energy*, Insight magazine, Issue No. 2, 2011



What is clear is that cities must adapt to new technologies that make infrastructure more energy efficient. In many cities, facilities such as hospitals, schools and administrative buildings are already enjoying the benefits of lower energy consumption through the use of low-energy HVAC, lighting and building materials, and similar advances are under way in the development of everything from transportation and water networks to telecommunications.

At the same time, the use of renewable based sources of distributed generation will allow many modern buildings to not only benefit from clean energy sources, but will also lessen the demand on an already overtaxed distribution system. Similarly, energy friendly building design should soon become the standard for future development because the

consumer, either a first time home owner or a commercial tenant, will expect it. As a result, leading developers have already begun to recognize the commercial sales benefit of truly energy efficient buildings.

In a growing number of cases, governments and infrastructure authorities are starting to build energy efficiency goals directly into the procurement and contracting of their assets, creating strong incentives for developers to innovate. For example, in designing the tender and bid process for the Melbourne Royal Children's Hospital, the government included an Energy Risk Sharing regime into the contract that bound the developer to deliver and maintain the facility at a certain level of energy usage.

Urbanization

Over the past century, mankind has made a mad dash for the city: in 1900 only 13 percent of people lived in urban areas; today that number is 51 percent. And while North America and Europe were the focus of this historic growth, the balance has now shifted to the East. By 2050, the urban population is expected to jump by more than 3 billion, concentrated in Asia and Africa. In India alone, urban populations are expected to increase by at least 700 million, the equivalent of about 500 new cities.¹⁹

The urbanization process will be a difficult challenge for urban planners and policy makers. In most cases, new urban migrants will find themselves attracted to urban centers that are already struggling with high levels of unemployment, decaying infrastructure

¹⁹ *Asia Economic Analyst*, Goldman Sachs, July 6 2007.



and a lack of affordable housing. At the same time, many parts of the world are struggling with a growing poverty gap, made all the more keen by the impact of the economic crisis. If things continue on their current trajectory, the vast majority can expect to end up in slums, toiling as unskilled labor or in the informal economy.

City governments should be concerned.²⁰ Massive urban migration will put incredible pressure on city services, economies and infrastructure. Even assuming jobs and affordable housing can be found for all of the new urbanites (and that is highly improbable), city planners will need to fundamentally rethink their approach to urban infrastructure.

It is not a case of simply building more roads and pumping more water. Land is at a premium, water is increasingly scarce and – likely the most limiting factor – finances are already strained simply trying to maintain the existing infrastructure. Indeed, barring a miraculous recovery of national

economies over the next decade, most cities are facing an infrastructure funding shortfall in the billions of dollars.

The traditional approach to urban infrastructure cannot sustain the present, let alone the future demands of the emerging cities. Part of this burden will be on urban planners and infrastructure developers who will need to completely rethink their traditional approach to designing and populating communities. Politicians will also have a role to play by creating policies that encourage private investment and set a vision for the future that challenges status quo of urban development. Even individual citizens will be central to achieving a successful urban environment by changing their expectations of what it means to be part of a modern urban environment.

However, the challenges of urbanization cannot be left to city governments to sort out alone. Urbanization is a national issue and demands a national strategy.²¹ Funding is certainly one area that will require inter-governmental cooperation,

but so will conservation, the creation of national standards, and a host of other issues that are critical to the national agenda.

Governments of all levels will have to develop consistent and complementary policies that strategically deal with the emerging urban centres throughout the world. Lessons learned need to be shared openly and equally with both mature and emerging centres of population, to ensure that past mistakes are not duplicated, or compound the already insurmountable financial strain on an urbanizing planet.

²⁰ *The Urban Imperative*, Insight magazine, Issue No. 2, 2011

²¹ *Getting the job done*, Foresight, Fourth Edition, March 2012



Five important considerations

In facing a range of new challenges and imperatives related to sustainability, urban planners and civic governments must also grapple with a set of key considerations that will influence their urban infrastructure strategies.

These considerations may – in many cases – alter the very fundamentals of urban infrastructure planning and delivery, while others will create new and valuable benefits for cities that are able to overcome their challenges to turn adversity into opportunity.

All, however, will require governments to show political fortitude and vision. But many of these considerations can be effectively managed – if not fully overcome – by developing and formalizing a national infrastructure strategy.²²

In our experience, the following considerations must be dealt with directly and with a sense of urgency if governments hope to achieve more sustainable urban development.

Accountability

All too often, issues of accountability and ownership dilute the impact of urban infrastructure investment and delivery. In many cases, accountability for urban infrastructure is fractured between multiple government departments and agencies that – without a holistic plan – tend to lose sight of the broader, more strategic, objective of long term asset planning and deployment.

In Delhi, for example, a handful of institutions including the Home Department, the Lieutenant Governor, the Mayor and the Chief Minister all hold a level of responsibility for infrastructure.²³

Coordinating infrastructure development – especially funding – across multiple levels of government can often be a massive challenge, particularly when your city spans multiple jurisdictions.²⁴ In some of the most mature and developed cities of the world, jurisdictional disagreements can

²² *Getting the job done*, Foresight, Forth Edition, March 2012

²³ *India's Great Urban Infrastructure Challenge: A Round Table discussion on the need for transformation in India's Infrastructure sector*

²⁴ *Brisbane's blueprint for urban infrastructure*, Insight: Urbanization, Issue No. 2, 2011

(and often do) delay or derail even the most critical infrastructure projects.

Cities like Brisbane seem to have largely overcome these challenges, as has Singapore where a centralized agency has been tasked with developing a single, coordinated plan that takes into account all aspects of urban growth such as housing, recreation, water and transport. Mr. Chew Hock Yong (CEO of Singapore's Land Transport Authority) credits the LTAs 'whole of government' approach to development for Singapore's urban infrastructure success. "This means that we have a single vision of where we need to advance to and how we can get there to meet the growing demands of our population," he noted.²⁵

Governments must also create infrastructure agencies with the power and accountability to coordinate spend and planning. "It doesn't just mean deciding what the specifications are it means controlling the procurement."²⁶

Financing models

When it comes to financing urban infrastructure, the reality is that governments only really have two options – taxation or user fees – and both require taxpayers to foot the bill in the long-run. As a result, urban authorities are increasingly seeking new approaches to financing. Given the financial pressures that most governments are now facing, private financing for project development has become ever more important.

Public Private Partnerships help relieve the financial strain on city governments by mobilizing untapped resources from the local, regional or international private sector, which continuously seek investment opportunities.²⁷ Essentially, the availability of private funds acts as leverage for increased and better social services. City governments are thus able to redirect their limited funds towards other important projects that are not well suited to PPP financing. In return, instead of developing one project under the traditional method of



²⁵ *The secret to Singapore's infrastructure success*, Insight magazine, Issue No. 2, 2011

²⁶ Extract from James Stewart's Keynote address to the PPP Days 2012

²⁷ *Financing the growth of your city*, KPMG International, 2012

contracting, PPPs allow governments to develop two to three projects with the same amount of financial resource.

But the simple truth is that – in many markets – the infrastructure finance market remains dependant on commercial banks. Moreover, the world’s urban areas are experiencing an overall dearth of syndication or bond market options for greenfield infrastructure projects, which has exasperated a situation that has become more acute since the financial crisis removed much-needed liquidity from the market. Banks are also under increasing pressure not to lend long-debt tenors, particularly in the face of the impending implications of Basel III.²⁸

Multilateral and Bilateral Financial Institutions (MFIs and BFIs) such as the Asian Development Bank (ADB) and the World Bank (WB) can also provide viable avenues for accessing low-cost, long-tenor financing for infrastructure projects, and can provide additional value by sharing global best practices and experience in project development and financing.

But measuring the economic benefits of infrastructure at a city level is notoriously difficult. In part, this is due to the influence of a wide range of external forces that alter the value of infrastructure from an economic perspective.

More importantly, however, it is because infrastructure tends to be approached as fairly simple equations responding to a specific challenge (“we need to move people and goods faster and more reliably”; “we are running out of generation capacity” or “we cannot go on polluting our rivers”). What’s more, investment is generally rationalized using sector-specific methodologies (such as road users’ value of time saved in traffic versus net costs to taxpayers).

Rather than the traditional approach to evaluating projects, we are seeing the rise of new models that focus on achieving growth and wider economic benefits such as increased tax proceeds, new jobs and enhanced GDP.

In the UK, for example, the Greater Manchester region has led the charge towards a new approach that started with civic leaders thinking about regeneration programs as a way to improve business connectivity, and housing programs as a means to improve labor markets. Rather than simply building out inter-regional transportation systems in order to reduce commuter travel times, they began to think more clearly about how housing, planning and transport can be improved to not only boost labor markets, but also to deliver a catalyst to communities that were less connected.²⁹

Essentially, what it comes down to is the question of what investment will deliver the most potential for job creation and productivity. And suddenly, rather than deciding on the value of a single mass transit system, the field is thrown wide open to also include civic planning, business promotion, urban regeneration and a host of other approaches and investments that may deliver a bigger bang for the investment buck and – as a result – greater economic development.

However, our experience shows that there is no ‘off the shelf’ solution on the horizon; no one-size-fits-all financing models for urban infrastructure. Rather, there are a number of potential scenarios and positive solutions emerging across the sector that – with concerted effort and collaboration – may help to close the growing urban infrastructure finance gap.³⁰



²⁸ *Examining the bank’s perspective of infrastructure finance*, Insight magazine, Issue No. 3, Spring 2012

²⁹ *Taking a holistic view of economic growth*, Insight magazine, Issue No. 3, Spring 2012

³⁰ *Foreword*, Insight magazine, Issue No. 3, Spring 2012

Sustainability as a strategic lens

Sustainability is quickly becoming the strategic lens through which both governments and businesses are viewing their respective futures. For government, it is increasingly important to look at achieving their objectives through the strategic lens of sustainability.³¹ “That means creating policy that encourages long-term planning, and refocusing procurement approaches to reward sustainability;” said Yvo de Boer. “It also means securing funding that recognizes the ‘whole of life’ cost of infrastructure rather than just the design and build phases.”

Sustainability may also provide proactive cities with a valuable benefit by thinking more aggressively about environmental sustainability as an engine of economic growth. There are already countless examples of nations and regions that have capitalized on environmental trends to spawn new industries and drive more efficient industrial activity – and with the right financial engineering – the economic rewards can benefit the public and private sectors, as well as developed and developing nations alike.

For infrastructure providers, climate change and sustainability issues should be seen less as a risk to manage, and more as an opportunity for innovation and competitive advantage. Many providers are already winning contracts based on their ability to deliver a more sustainable project than their competitors, and this trend is only going to continue.

In Rio de Janeiro, for example, city administrators have placed a large focus on leveraging their environmental strengths to drive growth. According to Carlos Roberto Osorio, Secretary of Conservation & Public Services for Rio de Janeiro, the city places a high priority on developing infrastructure that

compliments the city’s environmental strengths.³²

Mr. Osorio suggests that this focus on growing within their environment is one of the major reasons that the city will host three of the world’s biggest events to take place in the next five years: the 2012 UN Summit on Climate Change, the 2014 FIFA World Cup and the 2016 Summer Olympics.

Policy perspectives and initiatives

The development of sustainable cities requires governments and city administrators to focus on creating a supportive policy environment that encourages both financial and environmental sustainability. Indeed, there is a growing recognition that – across the spectrum of infrastructure – different sectors often require very different policy approaches.

Some policy must be set on a regional or national level. For example, many countries still lack a strong policy to encourage the development of public private partnerships. As a result, some cities, particularly in the developing world, are largely unable to take advantage of private investment to drive financial sustainability.

Policy will also be critical in catalyzing transformative change in many sectors. The move towards renewable energy, for example, can be encouraged and supported by policy. The UK government, for example, has used policy levers to create a Green Investment Bank with a mandate to invest in projects that support the country’s ‘green’ objectives such as renewable energy sources.³³

Creating supportive policy must also happen at the city-level in order to overcome local challenges. For example, in Mumbai, the local government has created policy that incentivizes

³¹ *Striving for Sustainability*, Insight magazine, Issue No. 1, 2010

³² *Rio prepares to host the world*, Insight magazine, Issue No. 2, 2011

³³ *The Greening of Infrastructure Finance*, Insight magazine, Issue No. 2, Spring 2012

developers working on infrastructure projects to build tenement housing for some of the 60 percent of residents that currently live in slums.³⁴

Policy is also critical at the tactical level. Both privatization³⁵ and the creation of Regulated Asset Based structures³⁶ demand governments to develop robust policy frameworks in order to ensure that both investors and users are properly protected.

Politicians must strive to take a more pragmatic approach to infrastructure development to ensure that priority is given to policies that encourage both sustainability and economic growth. This will require a greater focus on policy integration between levels of government as well enhancing the public sector's ability to understand and operationalize proper urban land use planning to accommodate sustainable development.

Government intervention

Achieving a long-term vision for infrastructure is a significant challenge for governments. The financial crisis and the consequential impact on the availability of capital and the risk appetite of the private sector means that governments can no longer sit back and wait for the markets to solve their problems.

Many of the private sector financing markets are increasingly incapable of supporting the massive funding requirements that urban infrastructure demands, forcing governments to intervene in a variety of ways. Recent examples would be the guarantee mechanisms in France, the discussions around a National Investment Bank in the US and the proposals for an Infrastructure Debt Fund in India.

The challenge is much tougher in emerging economies where current private sector debt capacity is very

limited and often non-existent. This challenges governments of emerging economies to find the balance between government backing and the complexities of multilateral private sector participation.

If governments plan to meet their infrastructure obligations, they will need to take more of a role intervening in the market to catalyze private sector capital towards infrastructure.³⁷ Some may choose to simply provide grants to sectors of the market that either lack proper pace or are seen as uneconomical in the near-term. Other tools may include revenue subsidies, price or volume guarantees, tax incentives or reductions. Governments will also need to place a particular focus on creating the enabling conditions for private sector investment, such as strong central planning capabilities and transparent policy.

Timing and scope of the intervention are also critical questions. Too small an intervention, and governments run the risk of achieving little for their investment (many of the infrastructure projects funded by the US's economic stimulus plan in 2009 may have suffered this fate). Too large an intervention not only wastes precious public finances, but may also cause false economies in markets or create unsustainable financial obligations (such as Spain's solar panel subsidies which were slashed in 2008).

Unfortunately, there is no magic yardstick by which to measure interventions. Indeed, judging the appropriate level of intervention is an incredibly difficult thing to do and is anything but an exact science. Much will depend on the state of the local market, the availability and willingness of private capital to invest and the pace at which the government is seeking to achieve their objectives.

³⁴ *Mumbai: taking a regional view*, Insight: Urbanization, Issue No. 2, 2011

³⁵ *The Art of Privatization*, Insight magazine, Issue No. 3, Spring 2012

³⁶ *The rise of the Regulated Asset Based model*, Insight magazine, Issue No. 3, Spring 2012

³⁷ *Incentivizing Infrastructure*, Insight magazine, Issue No. 3, Spring 2012

The forces of change



Clearly the movement towards the development of sustainable cities is gaining pace. On a global scale, we have seen a range of players – both public and private – take action to catalyze real and sustainable change.

Meaningful activity is underway on a wide range of levels. For example, the UN Framework Convention on Climate Change and Sustainability has been successful in moving national governments towards setting goals for the reduction of greenhouse gasses that will trickle down to the city level. For their part, cities themselves are beginning to share common goals and best practices in forums such as the C40 Cities Initiative.

Infrastructure developers are also starting to recognize the benefits of being proactive in setting sustainability goals and – as a result – are not only helping civic authorities change the paradigm of sustainability and infrastructure, but are also winning contracts due to their ability to reach beyond the environmental and financial requirements set out in RFP's.

More importantly, grassroots pressure is coming from the residents of the cities themselves, who are increasingly becoming aware of the urgent priority of achieving a more sustainable lifestyle.

UN Framework Convention on climate change

Through global agreements such as the Kyoto Protocol and many of its market-based mechanisms such as emissions trading, the UN Framework Convention on Climate Change and Sustainability (UNFCCC) has been highly successful in driving the issue of environmental sustainability as a political priority.

In part, the UNFCCC has encouraged national governments to set targets for reducing their greenhouse gas emissions which – as a result – has strengthened political resolve around the need for greater sustainability within urban areas. The UNFCCC has also created an international dialogue on the need for increased cooperation between regions that has encouraged many jurisdictions to share and adopt best practices from around the world within their own cities.

But achieving these targets will require government and business to work together. Indeed, the scale of what is required is massive and simply isn't possible to achieve within the tight budgets and capacities of government alone. The growing popularity of PPP models for infrastructure projects are a great first step, and there will need to be a lot more activity from

governments – and a lot more funding from the capital markets and private investors – to make any significant headway.³⁸

The good news is that governments are clearly focused on change. The 2009 United Nations Climate Change Conference in Copenhagen yielded aggressive CO₂ reduction targets. Action plans were submitted from every major industrialized nation and at least 35 developing nations – together accounting for more than 80 percent of energy-related CO₂ emissions.

The UNFCCC now also includes a formal set of policies and actions, known as Nationally Appropriate Mitigation Actions (NAMAs), that developing countries can undertake as part of their commitment to reduce greenhouse gas emissions. The term NAMAs recognizes that different countries may undertake different actions and emission-reduction projects according to their specific national circumstances. It also emphasizes the need for financial assistance from developed countries to developing countries to help reduce their emissions. As a result, many developing world cities are increasingly looking to take advantage of NAMAs to help spur the development and financing of sustainable urban infrastructure projects.³⁹

C40 Cities initiative

Driven by a common belief that city governments play an important role in reducing global carbon emissions, a group of large cities (known as the C40 Cities) have come together to create an effective forum to support collaboration and information sharing between cities and demonstrate leadership.

In 2011, the C40 Cities collaborated with the Carbon Disclosure Project (CDP) on research to measure the climate impact of each participating city as well as their plans for action. An impressive 72 percent of the C40 Cities responded

to the survey, representing over 1,200 million metric tons of CO₂-equivalent, a figure roughly equivalent to the total emissions of a country like Japan or Germany.

The survey showed strong commitment from government and policy makers; nearly every responding city reports the involvement of their senior leadership in taking responsibility for climate change and many made special note of their efforts to engage local citizens, businesses and other stakeholders in climate change-related decisions.⁴⁰

The survey also showed that – while cities have made a strong start – there are still a number of areas where more support is needed. Challenges remain for many city governments looking to build on the low carbon movement. For example, cities are using many different methodologies to guide them in their GHG measurement activities and will clearly benefit from coordinated efforts to standardize these protocols to make measurement of emissions easier, more transparent, and more comparable between cities.

Infrastructure developers

Sensing increasing demand for sustainable infrastructure development, a growing number of contractors, engineering companies and developers have taken a more proactive approach to sustainability.

According to Mr. Baldomero Falcones, Chairman and CEO of FCC (a Spanish-based multinational infrastructure and municipal service provider), most cities are facing a scarcity in economic resources as a result of the global financial crisis, a constant need to integrate new city residents seeking a better life in urban areas, and growing demand for more environmental policies and practices. This requires us to come up with innovative solutions for the infrastructure that we construct.”

³⁸ *Striving for Sustainability*, Insight magazine, Issue No. 1, 2010

³⁹ *Expect the Unexpected*, KPMG International, Page 140

⁴⁰ *Cities' pivotal role in the climate change debate: CDP Cities 2011 Progress Report*, Insight magazine, Issue No. 2, 2011



“We strive to do more with fewer resources by, for example, applying efficiency related criteria to both the construction and design phases of infrastructure development with the ultimate goal of reducing construction and maintenance costs, or using innovative materials to reduce costs and carbon emissions.”⁴¹

It seems clear that infrastructure providers have been stepping up to deliver on carbon emission targets. For example, in designing the Energy Environmental Experiential Learning Building at the University of Calgary in Canada, the project’s architects used building’s façade to maximize the amount of natural light inside the building to dramatically improve energy efficiency. When combined with the earth-tube stem to regulate heating, it is anticipated that the building will be 50 to 60 percent more efficient than a typical lab building.⁴²

Industry certifications and awards

With the rise of environmentally sustainable design principles, there has been a growth in the number of industry certifications and awards focused on sustainable development.

For example, since 1998, more than 7,000 projects in more than 30 countries have gained LEED certification including a number of infrastructure developments. Developed by the US Green Building Council, Leadership in Energy and Environmental Design (LEED) consists of a suite of rating

systems for the design, construction and operation of high performance green buildings.

Similar programs are growing in popularity around the world. In the UK, the Building Research Establishment (BRE) established a measurement rating for green buildings known as BREEAM (BRE Environmental Assessment Method) in 1990. The Green Building Council of Australia created a similar scheme known as Green Star, and the Association pour la Haute Qualité Environnementale in France developed the Haute Qualité Environnementale.

A growing number of industry associations are also placing renewed emphasis on environmental design. KPMG in the UK headquarters in Canary Wharf, for example, was honored by the UK’s Royal Institution of Chartered Surveyors (RICS) for its commitment to sustainability at its new Canary Wharf headquarters.

In reviewing the building’s credentials, Saba Nayab, one of the London RICS Awards judges, said: “This project is an exemplary exercise in recording and monitoring against Sustainable Performance Indicators. Within this huge, user-friendly building the concept of protecting the environment clearly remains paramount.”

Popular pressure

One of the most significant forces driving the move towards sustainable cities comes from the inhabitants of

⁴¹ *Urban infrastructure from the contractor’s view*, Insight magazine, Issue No. 2, 2011

⁴² *Infrastructure 100*, June 2010, Page 11



the cities themselves; citizens are increasingly recognizing the impact of not only their actions, but those of the world in which they live.

One only need look at the significant uptake in recycling programs during the 1990s or the exponential growth in low-carbon vehicles to realize that the general public is – for the most part – willing to dedicate finances and time towards ‘doing their bit’ for the environment.

Similar trends are starting to become evident in the emerging markets as well. According to the TUV SUD Green Gauge 2010 survey, a vast majority of urban Chinese consumers (94 percent) considered green certification to be an important factor in their purchasing decision.

The explosive growth of social media sites has allowed consumers to share perspectives on sustainability and ensure a public platform for debate and discussion. The ability of this medium to influence public policy should not be taken lightly. Many policy and decision makers are part of this phenomenon, and already use the communication attributes of social media to test and share possible solutions to this worldwide dilemma.

Today's consumers want, and have come to expect, that urban planning and development decisions in their communities are sustainable. The use of modern renewable energy technology and distributed generation facilities

are commonplace in modern urban design. What is even more encouraging is that in the developed world, people are willing to pay for this form of sustainability.

International bodies such as the United Nations, The World Bank and others need to develop the financial tools that will ensure this same interest and accountability in the emerging cities throughout the world. Private sector investors will become the catalyst for this change if their investments are protected from political challenges. The global marketplace for strategic infrastructure investments is becoming smaller as the financial markets become more global. Emerging cities offer a new and exciting marketplace for global infrastructure investment and it is up to the international community to help set the ground rules of this development from both a financial and political perspective.

Ensuring a normal marketplace for investment and requiring sustainability in this same marketplace can infuse much needed capital while, at the same time, ensuring that sustainability is the benchmark by which the investment is measured. Taking lessons learned from the developed countries, emerging cities can create an environment where financial interaction between the public and private sector is clearly understood and where expectations for this investment are clearly aligned with long term sustainable development.

Potential approaches to sustainability

Developing sustainable cities will require governments and civic authorities to undertake a wide range of approaches. Some are well established and provide clear precedents and lessons; others, however, are still maturing and – with dedicated action and encouragement – will contribute to the growing body of knowledge in this sector.

For governments, infrastructure developers and investors, there is a clear case for innovation and creativity in seeking the most viable path forward. But each city is unique and, in our opinion, there is no universal path to development.

What is clear, however, is that in each case, authorities will need to work closely with the private sector and the public at large to articulate and execute their vision of sustainability within urban areas. This will require close collaboration and – inevitably – debate and trade-offs on a local, regional and international level.

Through our work with key stakeholders around the world, we have identified a number of potential approaches that can provide a strong framework for achieving the goal of developing sustainable cities.

Sharing best practices

One of our challenges as an industry must be to share the innovations and best practices of urban infrastructure pioneers with those around the world who can benefit from our shared experience.

KPMG's Global Infrastructure Practice strives to be a catalyst for enlarging this body of knowledge. We believe that – through our work with leading infrastructure developers, governments, investors and urban leaders – we can help cross-germinate ideas and achievements to advance the world's

understanding of infrastructure's role in driving sustainability.

One way in which we do this is through *Infrastructure 100*, a special publication that focuses on recognizing individual projects that exhibit ingenuity, promote progress and inspire the industry to imagine, finance and build the foundation for sustainable cities around the world.

This type of inspiration is critical to the public discourse on infrastructure.⁴³ Too often, infrastructure comes across as forbidding and complex to the very people who use it every day. We believe that if the public is to truly become engaged in global consensus building – and no doubt they must – then we all need to do a better job at demystifying what we do and how we do it.

Prioritizing innovation⁴⁴

There is little doubt that the world requires a massive infusion of investment to meet the urban infrastructure challenges ahead. But the reality is that – when we actually start to talk about the changes that must occur – we seem to struggle to transcend the incremental.

This is a significant problem. For one, this type of short-term perspective means that we rarely (renewable power aside) put our minds towards discovering new solutions to our existing problems. Is building more of everything really the right way to solve our most critical challenges like power, transport and urbanization? Indeed, some would argue that the incremental addition of new infrastructure assets in the 1970s, 80s and 90s has led us to the environmental conundrum that we are now in.

Taking incremental steps also means that we are often stumbling ahead without noticing some of the important warning signs that hover just above our view. A good example of this lies in the



⁴³ *Infrastructure 100*, Insight: Infrastructure 2050, Issue No. 1, 2010

⁴⁴ *Taking a Giant Leap for Mankind*, Foresight, First Edition, February 2012



UK's nuclear energy program. Since the last plant was commissioned in 1985, the UK has spent the better part of three decades debating the merits of nuclear power. And now that the country has decided to develop new nuclear assets, they are suddenly starting to realize that – even if they are able to secure the necessary levels of funding – they now face an even bigger challenge: skills.

Think about it: a nuclear technician who was 30 years old (a relative novice in a highly technical field) when the last nuclear plant was built is now closer to 55. In just a few years, they will retire. Since 1985, the UK has trained precious few nuclear technicians to replace them and now, as we look to the future, there is a sudden realization that they were

so busy worrying about the debate that they failed to see the challenge that was clearly looming ahead.

The reality is that we must start to place greater emphasis on innovation and finding new ways to resolve old challenges. Simply maintaining the status quo is a recipe for certain disaster, as we are increasingly learning. We must spend more time asking 'Why' and 'How' rather than 'When' and 'Who'.

But we must also start to think about how our past and current decisions are changing the realities of the future. Otherwise, we will forever be taking a small step for man, rather than a giant leap for mankind.

Building capacity in the public sector

The first step towards developing sustainable urban infrastructure must be to enhance delivery capability in the public sector.⁴⁵ The fact is that governments are – and will continue to be – the top promoters of infrastructure around the world. What's more, given the pressure on budgets and the criticality of most infrastructure projects, it is vitally important for public sector agencies to enhance their effectiveness and efficiency to ensure they get it right. After all, infrastructure is a long-term strategy with wide-ranging national and economic implications.

For one, the public sector must have a clear and holistic view of the vision, priorities and delivery mechanisms

⁴⁵ *Getting the job done*, Foresight, Forth Edition, March 2012

required to achieve their national goals. National infrastructure plans are critical to helping those responsible for infrastructure delivery to understand their spending priorities and how their activity and actions advance the national objectives. Moreover, national infrastructure plans create stronger alignment and coordination between the various national and state bodies to ensure that funding is being spent effectively without costly overlaps or missed opportunities.

Public sector capability will also be enhanced by greater use of public private partnerships (PPPs). And while it should be clear that PPPs are not a panacea to the world's infrastructure challenges, they certainly provide an important tool to enhancing capability. Simply put, the private sector has a wealth of experience in structuring, procuring and managing the delivery of massive projects and – overall – has access to a wider range of resources and skills.

Even with greater use of PPPs, governments will still need to place much greater emphasis on investing in their own resources and processes to meet the massive task ahead. Public sector agencies must have the capability to not only manage the complex web of projects that are on the table, but also to effectively structure and monitor their activity to ensure timely, cost-effective and efficient infrastructure delivery.

Encouraging direct investment

As governments and infrastructure sponsors struggle to attract new sources of financing towards urban infrastructure, the concept of direct investment is quickly becoming one of the industry's 'hot topics'. And rightfully so: direct private investment into infrastructure offers a number of significant benefits to both investors and developers that – if properly managed – could potentially change the infrastructure funding paradigm.

But – to date – attracting direct investment from deep pocketed investment funds has proven to be exceedingly difficult. There have been a few notable successes, particularly in the Regulated Asset Based (RAB) markets in the UK and Australia, but for direct investment to make a significant impact on the infrastructure-financing gap, investment will have to be significantly increased in all regions of the world, especially in the emerging communities.

What is slowing the flow of direct investment into infrastructure? In large part, it is a matter of scope. Most private investors lack the depth of balance sheets to make a material investment into what are often highly expensive (both in capital and operational) projects.

Those with greater financial capacity have also often been exceedingly risk averse. This is not surprising: the benefactors of Pension and Insurance funds will not look kindly on any investment failures that threaten their

ability to meet their obligations in the long-run. As a result, many projects that include unquantifiable risks, particularly political instability or regulatory risk, are often turned down by all but the most aggressive of direct investors.

Another challenge is human and financial capacity. Making the most of a direct investment often takes a fair amount of hands-on management and governance,⁴⁶ and – increasingly – an ability to maximize returns.⁴⁷

What is certain is that governments and project sponsors will need to work closely with potential direct investors to create the right environment to drive the market. And while this will take close collaboration and much discussion to find a common ground, the benefits – for both governments and investors – will almost certainly be significant.

Exploring new models and approaches

New infrastructure financing schemes have been popping up around the world. This is a positive trend: governments' and sponsors' experimentation with innovative approaches to funding creates a wealth of best practices – and hard-learned lessons – that will undoubtedly help the infrastructure industry evolve and mature.

The simple truth is that – in many markets – the infrastructure finance market remains dependant on commercial banks providing debt investment for the sector. But the reality is that the market still requires

⁴⁶ *Talking to Pension Funds about Direct Investment*, Insight magazine, Issue No. 3, Spring 2012

⁴⁷ *Maximizing returns in infrastructure investment*, Insight magazine, Issue No. 3, Spring 2012

new models and innovative schemes to be developed to fill the funding and financing gap.

One such scheme, the UK's Green Investment Bank (GIB), will be keenly watched by infrastructure investors around the world. The GIB should, in practice, lend much-needed confidence to investors concerned about the potential for funding gaps in the renewable energy market and, as a result, speed up the pace of investment.⁴⁸

Much action is also underway in the emerging markets. India's Infrastructure Debt Fund shows significant promise in helping that country bridge their funding gap and bring new sources of both domestic and international investment into the sector.⁴⁹ In China, investors are also starting to evolve their approach to investment and are rapidly building capacity for investment into foreign infrastructure projects.⁵⁰

New models are also emerging in Europe. Finland's experimentation with Australia's Alliancing model is already showing results for infrastructure development.⁵¹ The way infrastructure is taxed is also being reviewed within Revenue Agencies around the world.⁵²

Clearly, governments are increasingly recognizing the need to create practical incentives for the market to drive infrastructure development. But, with a variety of different financing models now on the table, governments will need to start to focus on identifying the

right mix of incentives and approaches to properly respond to their unique situations.

Tapping into infrastructure funds

Infrastructure funds have recently been roaring back into action.⁵³ We are, however, seeing a number of significant changes and trends in the industry that are starting to alter the fundamentals of the managed infrastructure fund model.

For example, most infrastructure funds have started to place an almost single-minded focus on investing into core infrastructure (such as regulated utility assets or regulated transport) which, in turn, has driven some fairly feverish activity around some of these assets, many in the urban infrastructure sector (HS1, OGE, Vattenfall, Endesa).

There has also been increased momentum in the trend towards developing and emerging market investments evidenced by a rising number of funds focused on Asia, and in particular, China and India. There is also ample evidence that the trend will extend to other emerging markets as well. In South America, a growing maturity in PPP structures is starting to spin out a strong secondary market of urban infrastructure assets in countries like Chile and Brazil, which are starting to attract the attention of fund managers, and Peru and Columbia seem set to follow.

However, the ongoing debt crisis in the Eurozone has created significant

uncertainty in the region. So while Greece has put – or is about to put – more than 50 assets on the block and Ireland has made overtures in the port, airport, gas, electricity and utility sectors, many fund managers are sitting on the sidelines worried that an investment that is made in Euros today will saddle them with liabilities in some other currency in the future.

That said, the managed fund model is certainly not disappearing any time soon with some two-thirds of LPs indicating they still intend to invest in unlisted infrastructure funds, demonstrating a strong future for the growth and development of future funds, particularly from the managers that have already raised and deployed second and third funds.

Infrastructure – and urban infrastructure in particular – is clearly building a reputation as a unique asset class in its own right and we see a strong future for infrastructure investors overall.

⁴⁸ *The Greening of Infrastructure Finance*, Insight magazine, Issue No. 2, Spring 2012

⁴⁹ *India's Infrastructure Debt Fund*, Insight magazine, Issue No. 3, Spring 2012

⁵⁰ *Will the Year of the Dragon bring a flood of Chinese investment into western infra markets?*, Insight magazine, Issue No. 3, Spring 2012

⁵¹ *Building Alliances to share risks and realize efficiencies*, Insight magazine, Issue No. 3, Spring 2012

⁵² *Disentangling Infrastructure Tax*, Insight magazine, Issue No. 3, Spring 2012

⁵³ *The Evolution of Managed Infrastructure Funds*, Insight magazine, Issue No. 3, Spring 2012

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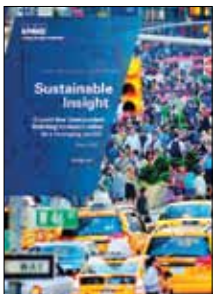
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