

INSIGHT

The global infrastructure magazine / Issue No. 5 / 2013

Resilience



cutting through complexity

With a special feature on ▶

**Latin America's
infrastructure
market**







Foreword

Ironically, one of the best ways to understand the importance of infrastructure is to sample life without it.

In the developed world, occasional infrastructure failures offer a stark and sudden reminder that power, water, transportation and communications cannot be taken for granted. Sometimes this is the annoyance of a power cut or a loss of broadband, other times the temporary disruption of an airport closure. However, the rising frequency and growing impact of natural and man-made disasters are particularly hard felt by the world's poorest and most vulnerable, who often live in the most high-risk areas.

Our growing reliance on technology and the increased interdependence of infrastructure systems means that our infrastructure may be more 'at risk' today than ever before. Beyond the immediate tragedy of lives lost, the long-term fallout of critical infrastructure failure is often stunted economic growth, depressed productivity and reduced quality of life – challenges that no government wants to face.

That is why, for this edition of *Insight*, we have explored some of the world's most impactful stories of resilience. Infrastructure policy makers, owners, developers, analysts and investors tell us what keeps them awake at night and what they are doing to manage risk and enhance resilience.

Our authors also explore some of the biggest events of the past few years to learn how civic and infrastructure leaders have responded to crisis and what lessons were learned. We talk to leaders in New York City about their experience with Hurricane Sandy; government officials in Queensland, Australia about the 2010-2011 floods; and civic leaders in Christchurch, New Zealand about the 2011 earthquake.

This edition also contains an exciting and revealing Special Report on Latin America featuring exclusive commentary and opinions from many of the region's top political, civic and infrastructure leaders. Whether you are active in the region or simply have an interest in what is happening there, this Special Report should serve as an invaluable and useful guide.

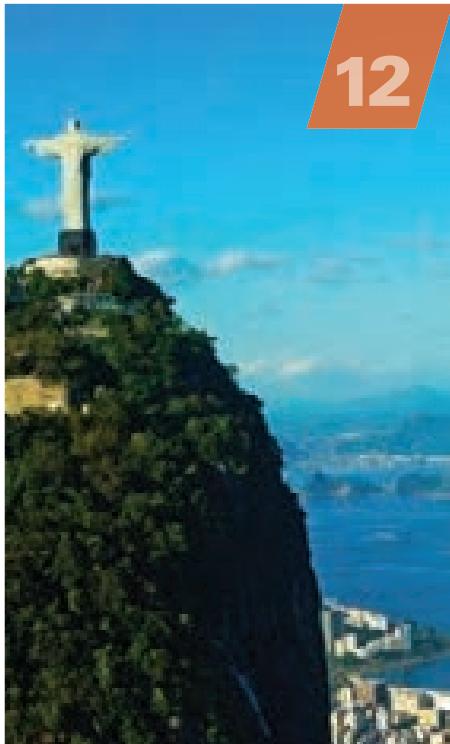
We hope that these articles, insights and expert opinions catalyze the infrastructure sector to place a greater focus on resilience, and in doing so, reduce the risk and impact of infrastructure failure around the world. To explore these ideas and concepts further, we welcome you to contact your local KPMG member firm or any of the authors who contributed to this publication.

Nick Chism

Nick Chism

Global Head of Infrastructure
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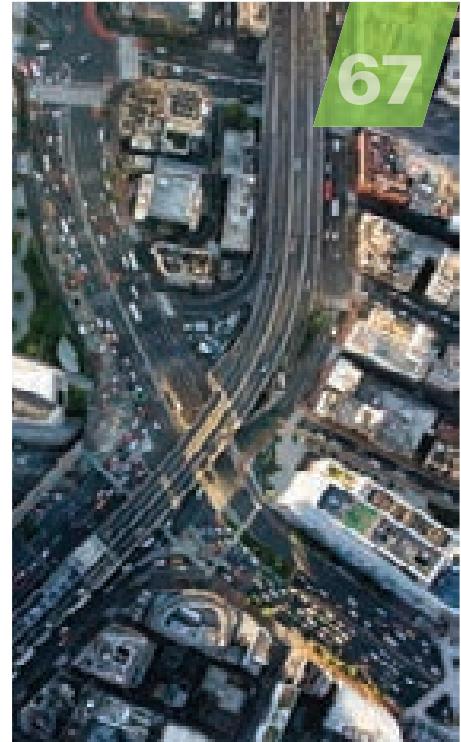
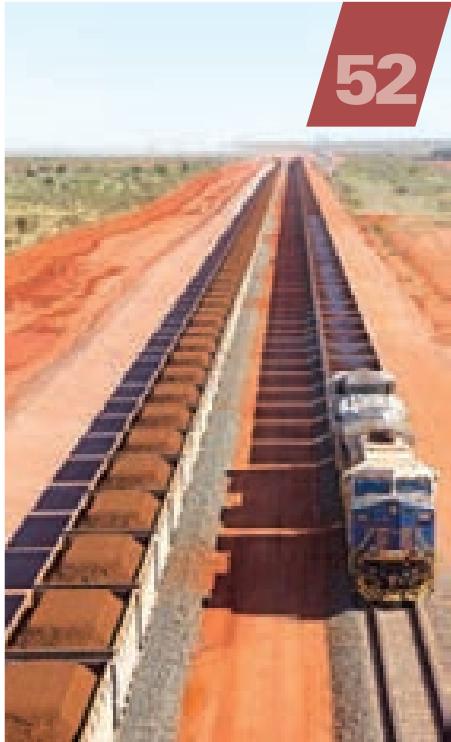
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Around the world in infrastructure

EUROPE



Institutional debt starts to take hold in the European market

The European market is showing an increase in projects closing with non-bank debt sources. In France, Allianz Global Investors closed the Music City project planned for Seguin Island. A Dutch Public Private Partnership (PPP) for Zaanstad prison will involve ING bank and yet to be disclosed institutional investors. In Ireland the N33 road PPP reached financial close with pension administrator APG providing most of the long-term funding. In the UK, Assured Guaranty signalled the monoline insurer's return on a social housing transaction. The EIB also closed its first project bond on a gas storage venture in Spain.^{1,2,3,4,5}

Fennovoima select Rosatom

Finnish nuclear developer Fennovoima announced it is going into exclusive discussions with Rosatom for the 1.2 Gigawatt (GW) Hanhikivi plant. Fennovoima's structure includes 60 regional power users and suppliers as shareholders who would have to decide on their continued participation before a contract can be complete. Hanhikivi would be the sixth nuclear reactor



generating power in Finland and, along with Olkiluoto 3, could take nuclear to around 50 percent share of power generation by 2020. With renewables slated to reach 20 percent of electricity at the same time, Finland's high-demand industrial economy would also be one of the cleanest in terms of carbon dioxide emissions.⁶

Portuguese austerity bites

The Portuguese government continues to look at options to manage its obligations and liabilities under the extensive number of highway PPP projects currently in operation. The government is looking to introduce tolling as widely as possible, to diversify the funding of the projects whilst also looking to negotiate cost reductions through cutbacks in service levels.

UK Electricity Market Reform moves into implementation

The UK Government has released more details on the Contract for Difference mechanism designed to support investment in low carbon generation technology. In particular, draft strike prices (i.e., the price developers will receive through top-up payments from consumers) were released for a range of renewable technologies along with the draft contract for consultation.⁷

Building economic strength with England's City Deals

In England, Wave 2 of the City Deals program is being rolled out and involves 20 cities that will negotiate deals with government to give each city new powers in exchange for greater responsibility to stimulate and support economic growth in their areas. These areas account for 41 percent of England's population and 39 percent of the jobs market. When combined with the core Wave 1 cities, which concluded their deals July 2012, these areas account for 71 percent of the population of England and 68 percent of jobs.⁸

Irish milestone for transportation PPP

The Irish National Roads Authority has reached financial close on the N11/N7 Arklow-Rathnew PPP

project – the first transportation PPP project to be signed in Ireland since the global financial crisis began in 2007. The project is part of the Irish Government's stimulus package and represents an overall capital value of about €282 million (US\$437 million). Closing this deal demonstrates the Irish Government's willingness to work closely with the private sector to raise finance and invest in national infrastructure. Construction commenced during July and is expected to be completed by November 2015.⁹

its positioning to become a key transport hub for the region.^{11,12}



ASIA PACIFIC & MIDDLE EAST



Preparing for the ASEAN Economic Zone

Having paved the way for economic integration with the establishment of the ASEAN Free Trade Agreement (AFTA), The Association of South East Asian Nations (ASEAN) is now over halfway into a six-year period to transform the region into a unified economic zone by 2015. With the objective to create a competitive market of over 600 million people in ASEAN countries, benefits will include a free flow of goods, services, investment capital and skilled labour, including tariff reductions and streamlining of certain administrative procedures. In anticipation, ASEAN member countries (Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam) are stepping up infrastructure investments across the region. Thailand alone is planning to spend US\$70 billion over the next seven years, much of it on transport infrastructure as part of

ADB and IE Singapore jointly launch PPP initiative

The Asian Development Bank (ADB) and International Enterprise (IE) Singapore have jointly launched a PPP initiative to catalyze infrastructure development within ASEAN. The initiative will see the ADB work with Singapore agencies, led by IE Singapore, to enhance private sector participation and investments in regional PPP projects. Based out of Singapore, the initiative will be funded at US\$9 million over three years to develop projects and fund capacity development initiatives. Sectors that the initiative will fund are wide-ranging, covering power, water, transport infrastructure, and more.¹⁰

Riyadh Metro moves forward

In an effort to reduce traffic congestion and support the local economy, Saudi Arabia's Arriyadh Development Authority (ADA) has awarded US\$22 billion in contracts to three consortiums for the design and construction of a new automated metro system in Riyadh. A US\$9.4 billion contract has been awarded to a Bechtel-led consortium, while Fomento de Construcciones y Contratas (FCC) received a contract worth US\$7.8 billion, and an Ansaldo consortium received a US\$5.2 billion deal. Construction of the 175 kilometer, six-line, 85-station Riyadh Metro will require 600,000 tonnes of steel and 4.3 million cubic meters of concrete to complete, and is the longest metro under-development in the world.¹³

Source:

- ¹ <http://www.globalinvestormagazine.com/Article/3230795/Allianz-to-invest-in-Paris-cultural-centre.html>
- ² <http://imtech.com/EN/corporate/Newsroom/Press-releases/Press-releases-2013/Pi2-consortium-selected-for-new-Zaanstad-Penitentiary-building.html>
- ³ <http://www.tfi-news.com/news/item/?id=16341>
- ⁴ <http://assuredguaranty.newshq.businesswire.com/press-release/transactions/assured-guaranty-successfully-closes-first-wrapped-bond-uk-ppp-transaction>
- ⁵ http://eropa.eu/rapid/press-release_BEI-13-117_en.htm
- ⁶ <http://www.fennovoima.fi/en/fennovoima/media/press-releases/press-releases/fennovoima-continues-with-rosatom>

⁷ <https://www.gov.uk/government/publications/electricity-market-reform-delivering-uk-investment>

⁸ <https://www.gov.uk/government/policies/giving-more-power-back-to-cities-through-city-deals/supporting-pages/city-deals-wave-2>

⁹ <http://bamppp.com/news/bam-reaches-financial-close-on-roads-ppp-contract-with-national-roads-authority-in-ireland>

¹⁰ <http://www.adb.org/news/adb-ie-singapore-launch-ppp-initiative-infrastructure-development-asean> <http://www.adb.org/news/adb-ie-singapore-launch-ppp-initiative-infrastructure-development-asean>

¹¹ http://www.business-in-asia.com/asia/asean_economic_community.html

¹² <http://asiahouse.org/news-and-analysis/detail?id=248>

¹³ <http://www.railway-technology.com/news/newssaudi-arabia-awards-22bn-riyadh-metro-construction-contracts>

New committee looks into stalled infra projects in India

Nearly 340 infrastructure projects across India are considered stalled and hindering economic growth. A new committee, approved by the Prime Minister and known as the 'Swarup Panel', has been tasked with reviewing and kick-starting 215 of the projects which are considered priorities and to be worth more than Rs7 trillion (US\$120 billion). The Indian Finance Minister is hoping the Swarup Panel program will show results this fiscal year.¹⁴

AFRICA



Bringing 3G to the Nigerian people

Nigeria's Federal Government has green-lighted a National Broadband Plan that aims to significantly increase broadband penetration – by five times – before the end of 2017. The plan will include rapid rollout of wireless and wireline infrastructure and incentives to expand national 3G wireless coverage to at least 80 percent of the population. Targeted concessions, tax incentives, grants or support will be provided to stimulate demand. The plan recognizes the transformative benefits of having broadband available to the broader population including improved learning, increased job creation, better community and civic engagement, improved trade and commerce, and a positive impact on GDP and global competitiveness.¹⁵

PRASA progresses rapidly in South Africa

The largest metro fleet replacement program in the history of metro passenger trains is progressing rapidly in South Africa with the Alstom-led preferred bidder group. The PRASA Rolling Stock Fleet Renewal Program aims to replace approximately 7,500 metro trains over a twenty year period, at a cost of approximately US\$13 billion. This process will be completed over two, ten-year periods with the first period well underway. A new manufacturing plant for rolling stock will be set up

in Ekurhuleni, creating about 33,000 jobs and ensuring 65 percent of each coach will be produced from local inputs, which will help to re-establish the rail industry in South Africa.¹⁶



South Africa to finalize a nuclear procurement 'roadmap'

South Africa is working on development of a nuclear procurement roadmap. The South African Department of Energy has a cost analysis study underway and, based on the study results, anticipates finalizing a roadmap by November 2013. The roadmap is expected to provide greater certainty on exactly how the country's proposed expansion of 9,600 megawatts of new nuclear capacity will be procured and financed, along with preferred technology platform and ownership models. The study will also assess the cost implications of developing a nuclear industry locally, rather than simply procuring individual power stations.¹⁷

LATIN AMERICA



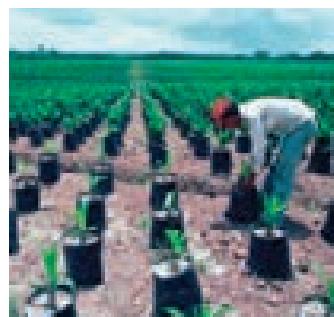
Incentivizing Brazil's new Logistics Investment Program

In an attempt to incentivize local investors and attract international investors, the Brazilian Minister of Finance and the three largest state-owned Banks (BNDES, Banco do Brasil and Caixa Economica Federal) are discussing a new financing scheme that will allow these banks to sign non-recourse project finance with the winners of new concessions related to Brazil's US\$125 billion

Logistics Investment Program. Concessions to be tendered over the next few years cover a range of infrastructure projects across roads, railways, ports and airports. To-date these three banks, which provide the majority of long-term financing for infrastructure projects in Brazil, have only been providing recourse project finance and always requesting substantial corporate guarantees from sponsors during the construction and pre-operational phases of concessions.¹⁸

Legado Verde, unprecedented agro-forestry project in Mexico

An unprecedented agro-forestry project in Mexico is planned to take place in a semi-arid area near the coastal city of Ensenada, in Baja California. Stage one of the project involves growing 10 million trees for an initial investment of US\$200 million using the Groasis Technology (GT), a biomimicry planting technology that utilizes the Waterboxx™ invention and provides a solution for planting trees in deserts, eroded areas, badlands and on rocks. Legado Verde S.A.P.I. de C.V. expects to fully develop an extension of 75 million trees in 10 years, creating over 37,000 new jobs in the region.¹⁹



NORTH AMERICA



Rebuilding Canada's fleet

In 2010 Canada launched the National Shipbuilding Procurement Strategy (NSPS) – the first major shipbuilding initiative for Canada since the 1990's – with a view to improving Canadian shipyards' lack of modern

physical infrastructure, design capacity, world-class productivity, and a cost-effective skilled labour force. Fast forward to 2013 and the first projects in this massive overhaul program are now on-deck and ready to move into building phase – specifically for the Arctic/Offshore Patrol Ship and Joint Support Ship projects. Additionally work is taking place on both coasts to repair and refit smaller, existing fleets.^{20, 21}



Texas Water and future investment

According to estimates made by the Texas Water Development Board, there are some 562 projects totalling US\$53.1 billion that are needed to meet Texas' demand for additional water supply over the next 50 years. In May 2013, Texas Governor Rick Perry signed two bills to allocate a one-time, US\$2 billion towards creating a revolving fund for water-supply projects. Ultimately, this investment will fund up to US\$30 billion in projects over the next 50 years. House Bill 11 will secure US\$2 billion from the Rainy Day Fund, but requires a constitutional amendment and approval by Texas voters in November 2013. House Bill 4 will establish a new Texas Water Development Board to utilize the funds and create a funding mechanism for the State Water Implementation Fund for Texas Fund (SWIFT). The SWIFT fund will become a revolving fund allowing water districts to apply for low-interest loans for water infrastructure, conservation, and agriculture projects.^{22, 23, 24}



Source:

- ¹⁴ <http://www.indianexpress.com/news/swarup-panel-to-revive-stalled-projects-fm/1126095/>
- ¹⁵ <http://www.telegeography.com/products/commsupdate/articles/2013/06/06/national-broadband-plan-receives-presidential-approval/>
- ¹⁶ <http://thenetworks.co.za/2013/07/prasa-assisting-in-job-creation/>
- ¹⁷ <http://www.engineeringnews.co.za/article/sa-to-finalise-nuclear-procurement-roadmap-by-november-2013-07-25>
- ¹⁸ <http://www.brasil.gov.br/para/press/reference-texts/logistics-investment-program-highways-and-railways>

¹⁹ <https://www.youtube.com/watch?v=-birqOg6pd8>

²⁰ <http://www.tpscgc-pwgsc.gc.ca/app-acq/sam-mps/snacn-nsps-eng.html>

²¹ <http://www.tpscgc-pwgsc.gc.ca/app-acq/sam-mps/cbc-eng.html>

²² <http://www.twdb.state.tx.us/newsmedia/swift/index.asp>

²³ http://www.twdb.state.tx.us/newsmedia/swift/doc/Timeline_SWIFT.pdf

²⁴ <http://www.twdb.state.tx.us/waterplanning/data/projections/index.asp>



The once-in-a-lifetime fallacy

The odds are changing; what used to be 1-in-100 is now looking more like 1-in-10. Unfortunately, it seems that nobody has told the punters. But this is no Las Vegas game or off-track bet. The wager in this gamble is staked on lives and economic survival.

The fact that the frequency of natural disasters and weather-related events has picked up pace is almost undeniable. That these events have also grown in ferocity and cost (counted both in human lives and currencies) is also fairly clear to the casual observer.

The problem is that most infrastructure resilience plans have not kept up with these shrinking odds. Planners and designers still tend to use outdated predictions and data to develop 'appropriate' risk-mitigation measures while operators and owners continue to prepare to respond to the 'last big event' rather than the next, potentially bigger, event.

As David O'Brien and Allen Mitchell point out in their article (*Expect the unexpected: building the capacity to protect our cities*), we need to stop thinking about our future in terms of past experiences, events or projections and start thinking more broadly about enhancing resilience overall. New York City is a frontrunner in adopting this approach (see *NYC bounces back: How one of the world's largest cities recovered from Hurricane Sandy*).

What is also needed is a new model for calculating the risk and the cost of infrastructure failure that takes into account a wider variety of variables and more reliable data sources. Adrian Wimmers offers up a new framework for valuing resilience investments in his article (*Building the business case for resilience investment*). More will need to be done on a global level if we want to make sure that investment levels reflect the real risks that our infrastructure is facing. ■



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The reality is – over the past decade – we have networked and connected assets at an incredible speed without standing back to truly understand and map all of the interdependencies that this has created.



Only as strong as your weakest link

As infrastructure systems and assets become increasingly interdependent, many observers and experts are becoming concerned about the growing risk of system failure. The reality is – over the past decade – we have networked and connected assets at an incredible speed without standing back to truly understand and map all of the interdependencies that this has created.

So while most infrastructure owners and operators may have a fairly good grasp of the risks that they face and the strategies they have employed to mitigate them, our experience shows that they have far less visibility into the risks and mitigation strategies of their suppliers and partners.

Over the past few years, we have seen a welcome increase in the focus being placed on understanding the impacts of the interdependencies of infrastructure systems. But as Oxford University's Prof. Jim Hall notes, infrastructure owners and operators will need to become much better at monitoring the rapidly-shifting environment if they hope to stay on

top of the risks across the system (see *System failure: Avoiding the unthinkable*).

They will also need to revisit their approach to supplier risk management. As supply lines become increasingly global and inventories increasingly lean, the risks associated with supplier failure have risen up the agenda for both developers and operators. According to Andrew Burn and Roger Bayly (*Saving money, time and reputations with Supplier Risk Management*), those that are able to take a considered and detailed approach to their supply chain will not only reduce project delays, limit down time and minimize cost over-runs, they will also eliminate unnecessary risks, enhance their resilience and protect their public reputations.

Over the coming years, we expect to see governments, civic leaders and infrastructure owners increase their demand for greater insight into the risks that their infrastructure systems face. The hope is that this exercise happens proactively instead of reactively. ■



A new legacy for Latin America

These days, everybody is talking about Latin America. Whether it is because of the growing strength of the markets, the massive investment programs announced by many governments, or simply because of the impending FIFA World Cup and 2016 Summer Olympics, Latin America has captured the attention of infrastructure investors, developers and operators around the world.

As the Special Report on Latin America illustrates, there is much activity underway across the region. Brazil's recent flurry of investment announcements and regulatory changes have perhaps been

the most visible programs in the region, thanks – in part – to the government's innovative investor 'road show' (see *A new plan for Brazil*), but other major investment initiatives have also recently been announced and initiated by many of the other markets in the region including Mexico, Chile and Colombia.

At the same time, Latin American governments have started to dramatically evolve their approach to infrastructure investment and delivery. Many have become keen supporters of Public Private Partnership (PPP) models, and almost all have recognized the importance

that infrastructure plays in addressing economic growth and social disparity. As a result, the region is rapidly becoming one of the most hospitable to foreign infrastructure investment.

What is clear from the Special Report is that now is the time for those seeking to enter this rapidly emerging market. The reality is that market entry takes time – to build up a reputation, to develop relationships and to set up operations – and local partners will almost certainly be required at the outset. ■

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Heavy lifting required:

How Latin America can win on the world stage



By **Mauricio Endo**,
KPMG in Brazil

SPOTLIGHT



Taken on face value, all signs indicate that Latin America is about to explode in a flurry of infrastructure activity. One need only flip through the pages of this special report on Latin America to find encouraging examples of countries, governments and infrastructure investors making massive commitments and catalyzing important change within the region's infrastructure markets.

BIG MONEY, BIG PLANS

Take, for example, Brazil's new Logistics Investment Program which envisions US\$66 billion being spent on railways and roads, US\$30 billion going to ports and almost US\$18 billion into airports. Or consider Colombia's US\$112 billion in planned infrastructure investments between 2012 and 2020. And Mexico has a list of about 1,100 projects totaling about US\$400 billion that need to be completed over the next 5 years.

Action on the policy side has also been equally encouraging with many governments who – in the past – had been vehemently opposed to private participation in the infrastructure sector now busy drafting and promulgating new laws aimed at encouraging Public Private Partnerships (PPPs) and private investment. Colombia's and Mexico's 2013 passage of new PPP laws are clear evidence of change, as is Brazil's recent efforts to improve its existing PPP law.

MAKING IT WORK

But while all this may seem like good news for the region, the unfortunate reality is that massive investment plans and supportive legislation are simply not enough to catalyze the kind of transformative change that our region so desperately needs. There are three areas where Latin American governments must focus before these ambitious and much-needed infrastructure investment plans can truly start to be tackled.

Firstly, governments must start to shift their focus away from purely popular measures to

instead prioritize and implement sustainable medium to long term economic plans. The reality is that some (but certainly not all) Latin American countries are losing competitiveness and depressing productivity by putting popular opinion ahead of the – often hard – decisions that must be made for the good of their economies. Venezuela and Argentina have suffered significant economic decline since setting out on a populist agenda; Chile and Mexico have enjoyed the opposite.

Secondly, Latin American countries will need to dramatically improve the professionalism and capability of their infrastructure programs. The reality is that international investors are looking for clear, transparent and well-managed programs in which to invest. The problem is that few Latin American countries currently have the capability or capacity to manage the size and scope of the programs currently on the table. What that means is that programs are often badly planned, poorly structured or laden with unmitigated risks and, as a result, do more to dissuade both local and international investors than persuade them. What is needed is to urgently improve the professionalism of the programs, in the short-term through support from experienced external advisors and – in the medium and longer-term – through a continuous program of internal capability hiring, training and development.

The third area that requires immediate attention from Latin American leaders is the financing markets. Few (with the notable exception of Chile) have developed any real private infrastructure financing markets to speak of, and most are struggling to develop the appropriate vehicles to support private investment. As a result, most activity in Latin America has been financed through either national development banks (such as BNDES in Brazil) or multilateral support. But given the massive investment targets and aggressive timelines articulated by leaders across our region, it seems fairly clear that private project financing, bond markets and effective investment vehicles will need to be

developed quickly if the region is to achieve its lofty objectives.

TIME FOR ACTION

Thankfully, there are strong examples of Latin American countries that, having already recognized these realities, have been aggressively taking action over the past few years. First among those is Chile who, almost two decades ago, completely overhauled their infrastructure program and market. PPP legislation is now very well defined, tested and understood; investment programs are professionally prepared and well-received from international players; and commercial banks have been active in financing programs. Colombia has also enjoyed much success in creating infrastructure markets and investment vehicles and – over the past few years – has rarely come up short for investment.

Others, however – Brazil chief among those – are now standing on a precipice. The choice is clear: take positive action today and reap the benefits for generations, or maintain the status quo and allow the country and the economy to falter and – ultimately – fail.

The simple fact is that infrastructure investors and developers operate in a global economy where national programs are compared against each other and competition is fierce. In this global war for investment, other regions are either moving faster or with more commitment. Indeed, if things remain as they are currently, it would not be a surprise if Africa or South East Asia were to eclipse Latin America as an investment destination within the next decade.

The bottom line here is that governments across the region must take immediate action, both individually and as a group, if they hope to raise our countries up to a world-class level. And there is no time to waste; the actions taken today will reverberate for decades to come. Let's hope they are the right actions and not just the easiest ones. ■

MEXICO

continues to break ground





By **Leonardo Estévez**,
KPMG in Mexico

There is no denying that Mexico's reputation has taken some knocks in recent years. The country has been locked in a fierce battle with powerful drug cartels since launching an offensive in late 2006, and news headlines outside of the country have tended to focus on the negatives.

What is often overlooked, however, are Mexico's many advantages and unique strengths. For one, the Mexican economy is fundamentally sound. At the center is a strong manufacturing base and the well-known maquiladoras which import raw materials and produce goods for domestic consumption and export. A strong industrial sector – especially automotive manufacturing and electronics – is complemented by large oil reserves and abundant silver, lead and zinc reserves.

According to The Global Competitiveness Report 2012-2013 published by the World Economic Forum, Mexico's Gross Domestic Product (GDP) continues to outpace the rest of Latin America and the Caribbean region. Goldman Sachs has predicted that Mexico's economy will be the world's fifth-largest by 2050.

NEW CENTURY, NEW APPROACH

The history of infrastructure in Mexico can be described as a patchwork quilt. Until the National Action Party (PAN) broke the Institutional Revolutionary Party's (PRI's) five-decade lock on power in the early 2000s, Mexico's leadership invested most of its infrastructure efforts in just one area at a time.

In the early part of the 20th century, that meant railways. Subsequent governments invested in oil and gas, and then highways. That created an unbalanced and poorly integrated commercial and social backbone for the vast country.

Mexico's 21st century approach to infrastructure – starting with the administration of President Vicente Fox from 2000-2006 – has been decidedly more holistic.

When President Fox came into power in 2000, the government began to approach infrastructure and development opportunities in a more integrated way. His administration launched an infrastructure program that would include every single sector. When the government saw the mountain Mexico had to climb after decades of a single-track method, they recognized the need to adopt a Public Private Partnership (PPP) approach to infrastructure development.

Fox's successor, Felipe Calderón, continued the evolution. When he took office in 2007, the World Economic Forum ranked Mexico's infrastructure 64th in the world. In the Latin America region, the country lagged behind Barbados, Chile, Panama, Jamaica, El Salvador and Uruguay. Infrastructure spending stood at just 3.2 percent of GDP, compared to Chile's 5.8 percent.

Mexico's National Infrastructure Plan was launched in 2007 – along with an emphatic statement by Calderón that, "Mexico cannot and should not fall behind." Infrastructure spending rose to 5 percent of GDP during his administration and attracted significant private investment from home and abroad.



All told, some US\$188 billion in planned investment was allocated to the 300-project plan – about 75 percent of which had been completed by the end of Calderón's term. Projects ranged from rural road paving to construction of the Baluarte Bridge, the highest cable-stayed bridge in the world. About 21,000 kilometers of highways had been constructed by the end of 2012. One of the jewels in the crown – the US\$1.6 billion Durango-Mazatlán highway – will be completed in the summer of 2013, connecting the Gulf of Mexico with the Pacific Ocean.

THE PRI RETURNS TO POWER

In December 2012, Enrique Peña Nieto regained the Mexican presidency for the PRI. The change in political leadership, however, does not foreshadow a change in Mexico's infrastructure ambitions.

KPMG professionals have spent significant time with people from the new administration and they clearly recognize that infrastructure must be one of Mexico's top priorities if the country aspires to compete on the world stage.

One of the first orders of business for Peña's administration was the January

2013 passage of an ambitious new PPP law. Previously, projects were governed by a fragmented series of laws and regulations, which often led to development delays and imperfect risk allocation models that unnerved potential investors. Mexico's Finance and Public Credit Secretariat (SHCP) estimates that streamlining the development and tender processes under the new law will see projects kick off up to 6 months sooner than current averages.

One particularly interesting aspect of the new law is the provision for unsolicited proposals. Previously, government developed all infrastructure projects for tender, but now a private company can propose a project. To make things even more competitive, all unsolicited proposals will be publicly tendered. We expect this will foster a much more proactive private sector, while increasing competition and accelerating project timelines.

NEW ADMINISTRATION, NEW OPPORTUNITIES

Recognizing that Mexico must continue to think about infrastructure holistically, the new administration is taking care to identify the full range of needs. We expect 60 percent

of the investment during this administration will be made in the energy sector, which has been in recession for several years. We also anticipate significant investments in transportation, such as highways, railways, ports and airports; water treatment and desalination plants for human, agriculture and industrial uses; and social infrastructure and tourism.

In total, more than 1,100 projects are on tap, totaling some US\$400 billion. Even at the current public investment rate of about 5 percent of GDP, that leaves a gap of about US\$250 billion in funding that must come from the private sector.

That quarter-trillion dollars opens up a world of opportunity for domestic and international players.

We see a lot of opportunity for international engineering companies, contractors and operators, and we expect to see a truly global approach. Mexico is particularly looking to the UK because it was our early model for PPP schemes. Spain is showing interest because of our common language and culture. But to ensure projects are of the highest quality, we also anticipate participation from the French, Americans, Canadians, Portuguese, Brazilians and many others.



MAKE FRIENDS

For international companies casting an eye towards Mexico, we suggest collaborating with a local partner to help reduce the risk of working in a new country for the first time.

Foreign firms can learn about the local market and how it works, and then build a larger presence with a local office or a subsidiary. Now that Mexico has a lot of experience with PPP schemes, there are plenty of local companies with good qualifications.

Mexico's government is forging an ambitious path to economic prosperity. For international infrastructure players seeking a piece of that pie, the biggest challenge now is to provide the right credentials at the right price.

2013 IS ALMOST OVER

Eight months passed and there was still no clarity on the release date of the new National Infrastructure Program. That is, until 15 July when President Peña Nieto officially announced the launch of the Transport & Communications Investment Program 2013-2018, including US\$130 billion of investment in this sector alone (see Table 1). Surely this marks the first indication that the National Infrastructure Program is coming. ■

Table 1. Mexico's Transport & Communications Investment Program 2013-2018

Sector	Projects	Investment*
Highways	149	30,900
Superhighways	34	8,106
Highroads	49	3,645
Bypass roads	33	4,028
Junctions and bridges	22	926
Roads	9	338
Maintenance	1	8,240
Rural roads	1	5,616
Ports	20	5,230
New ports	3	2,382
Extensions	5	1,440
Specialized terminals	12	1,409
Railways and mass transport	19	7,848
Passenger trains	3	3,932
Massive transport	6	8
Bus terminals	1	2,494
Freight trains	8	1,253
Railways signs	1	160
Airports	20	2,803
Modernizations	19	1,812
Connectivity	1	975
In construction process	1	16
Telecommunications		56,000

* Millions of US Dollars

The view from **SANTIAGO**



By **Santiago Barba**,
KPMG in Chile

Latin America has been one of the world's brightest economic lights over the last quarter century, but one has shone brightest of all: Chile. Cast your eyes across the skyline of its capital Santiago – called 'Sanhattan' by many – and it is clear that this is a country on an upward trajectory.

Chile's growing affluence derives largely from its mineral wealth. The country produces a third of the world's copper, which contributes about 14 percent of the country's Gross Domestic Product (GDP) and half its exports. There continues to be high demand for red metal around the world, especially from China. Not surprisingly, therefore, Chile's state-owned Codelco now ranks as the world's largest copper producer and all of its earnings – more than US\$7 billion in 2012 – flow back into the country's treasury.

KEEPING UP WITH DEMAND

The country's Ministry of Public Works is charged with defining infrastructure investment priorities for the nation.

"Our country has made important advances in public infrastructure in recent decades as we have established clear policies focused on Chile's infrastructure needs," says Carlos Plass, Director of Concessions for the Chilean Ministry of Public Works (MOP). "We know that investing in this area is vital for any country to achieve economic development."

Chile's economic buoyancy has created a growing middle class that expects its governments to develop efficient public infrastructure. Combined with the ongoing demand to keep commodities flowing smoothly in and out of the country, Chile's



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Foreign investment has been central to the development of our country's public infrastructure, and a very good example of this is the concessions industry.

Carlos Plass, Director of Concessions for the Chilean Ministry of Public Works (MOP)

SPOTLIGHT



governments have instituted robust policies to ensure its infrastructure can keep pace.

"By the end of the current administration, we will have invested some US\$14 billion on public infrastructure projects," the Director explains. "This translates into bigger and better connectivity for the country's people and resources – not just through new highways, freeways, ports and airports, but with significant investments in basic roads, improvement of smaller airports and other connectivity projects that have a great social impact."

Water is one of Chile's primary challenges – particularly in the north, where the vast Atacama Desert is widely regarded as the driest place on Earth. Desalinating Pacific seawater is a viable option for mining and other industrial uses, but for human consumption and agriculture, Chile needs to move clean water to areas of the country that are in deficit.

"We have addressed the topic of water with renewed vigor," says Director Plass. "We drafted the 2010-2025 National Strategy of Water Resources, a plan through which the construction of 16 new dams will be prioritized over the next decade. We expect this will enable us to increase our water storage capacity by 30 percent."

BOUNCING BACK

Not only are these investments positioning the country for future success, they are helping to meet the challenges of a vulnerable geography. Chile's 2,700-mile coastline sits atop the "Ring of Fire," a band of frequent earthquakes and volcanic eruptions that encircles the Pacific Rim.

In February 2010 Chile was rocked by an 8.8 magnitude quake and a resulting tsunami that tore into the coastal towns of south-central Chile and damaged the port at Talcahuano, home to Chile's main naval base. While the death toll was relatively low at just 525 killed, expert observers agree that recovery efforts were hampered by the country's limited highway routes. And the quake inflicted over US\$30 billion in damage – nearly a fifth of Chile's annual GDP.

Following the earthquake, the government announced a US\$2.5 billion investment to re-build 300,000 houses, as well as hospitals, schools and roads. In the municipality of Licantén, which suffered heavy damage from the tsunami, the federal government and Universidad Mayor collaborated with a global engineering firm to design new infrastructure – including evacuation corridors, sewage and waste management plants, and a new civic center – that would be safer in the event of a future tsunami impact.

OPPORTUNITIES ABOUND

This kind of private involvement has been central to the development of Chile's public infrastructure. Nowhere is that more evident than in the country's concessions industry.

Chile's concessions system was launched in the early 1990s, when Public Private Partnerships (PPPs) converted Highway 5, the north-south spine of Chile's road system into a four-lane highway. More than 120 companies, including foreign investors from at least eight countries, have participated in concessions bids for projects ranging from US\$8 million to US\$850 million. All told, the program has injected US\$570 million a year into Chile's infrastructure.

"It is clear to us that after almost twenty years of implementing the concessions system in Chile, this industry continues to be increasingly valued by both users and the private sector," says Director Plass. "In 2013 we will tender more than US\$3 billion in new projects, including the Vespucci Oriented urban freeway project, the rebidding of Santiago International Airport, several new hospitals, a new bridge over the Bío Bío River and the Punilla dam."

A RELATIVELY SAFE HARBOR

As far as PPPs are concerned, Chile is a benchmark in the region – one that fellow Latin American tigers should look to for inspiration.

"Foreign investment has been central to the development of our country's public infrastructure, and a very good example of

this is the concessions industry," he says. "A lot of important international consortia saw opportunities when our local concessions system was still nascent, and now they are among the most important investors in the national economy."

"One of the strengths of Chile's open economy is the development of a set of financial tools and guarantees to attract new investors in the area of construction and infrastructure," the Director explains. "The concessions system has provided clear signals of diversification and has developed accordingly over time. In turn, the incorporation of new areas has been part of the system's natural evolution."

The Minimum Income Guarantee (MIG) system and the Revenue Distribution Mechanism (RDM) enable concessionaires in Chile to stabilize their income expectations in exchange for participation in additional government projects. MIG was designed to help reduce risk for lenders and lower the financial costs of projects, and has been used in nearly every highway concession project. RDM, meanwhile, guarantees that a pre-fixed amount of revenues – measured in present value – will be received by the concessionaire. Another important element is the Infrastructure Bond, which facilitates the participation of private long-term financing agents.

MAINTAINING CHILE'S LEADERSHIP

For its prosperity to continue, Chile must forge ahead with PPPs to fulfill the needs of its businesses and citizens alike. KPMG's infrastructure professionals expect Chile's infrastructure future to feature increased diversification in the concessions business, with contracts relating to projects such as prisons, dams, hospitals, bridges and tunnels.

"The objective is to invest and trust in our system of public works concessions, in the strength of our institutions and in our country's legal stability," the Director concludes. "We must continue our joint leadership in this successful system that has contributed both to the country's development and to improving Chileans' quality of life." ■

A new plan for **BRAZIL**



By **Mauricio Endo**,
KPMG in Brazil

At the end of 2010, Brazil's economy was shining bright like a December day in Copacabana. Gross Domestic Product (GDP) grew 7.5 percent that year, the country's best performance in more than two decades. The resource sector was buzzing and Brazilians were still celebrating Rio de Janeiro's winning bid to host the 2016 Olympic Summer Games.

But as the global recovery slowed and commodity prices leveled off, so did Brazil's growth trajectory.

Yet the country's fundamentals are still strong; Brazil remains rich in resources and boasts a growing middle class, relatively low unemployment and controlled inflation. However, the slowdown has compelled

President Dilma Rousseff and her government to look for new ways to keep Brazil moving forward.

Near the top of the list: improving the country's infrastructure.

GET BRAZIL MOVING AGAIN

Brazil's infrastructure has long been an area of concern. "Brazil suffers from high logistics costs due to poor infrastructure coverage," noted Mr. Bernardo Figueiredo, the President of Empresa de Planejamento e Logística (EPL), a public company created by the government to support infrastructure development in the country. "We need to expand our infrastructure into the interior regions of the country and help reduce





logistics costs as a way to become more competitive on the world stage."

Transportation has been a particular challenge. The top 20 airports in the country operated at an estimated deficit capacity of 73 million passengers in 2011. And just outside of São Paulo earlier this year, a 64-kilometer traffic jam of trucks (waiting to unload a record soybean crop) choked access to the largest port in Latin America.

Now, as the 2014 FIFA World Cup and 2016 Olympics beckon, the issue has been put under a microscope not just at home but abroad. "Over the past 3 years, we've been very focused on helping those cities involved in these events prepare not only the arenas

but also all of the infrastructure that will be needed to properly and efficiently deliver such high profile global events," noted Mr. Benedicto B. da Silva Junior, President of Odebrecht Infrastructure, one of Brazil's – and the world's – leading infrastructure, construction and operating firms. The company is a part of the Odebrecht Organization, also present in the petrochemical, ethanol, oil and gas, and real estate sectors.

At the same time, President Rousseff is planning huge investments in power generation and water, and the government's recently announced Logistics Investment Program (LIP) seems set to transform the country's economic infrastructure.

"The LIP will radically change the country's capacity to deliver infrastructure which has traditionally been hampered by low levels of investment, a lack of skilled professionals and tight material availability," added Mr. Figueiredo. "We believe that the LIP will not only help catalyze Brazil to improve our delivery capability, but will also attract skilled professionals and investors from around the world."

A NEW PLAN BASED ON TESTED PRINCIPLES

There is good reason for optimism about Rousseff's plan. Whereas her Workers' Party was once opposed to privatization, it has



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The LIP will radically change the country's capacity to deliver infrastructure which has traditionally been hampered by low levels of investment, a lack of skilled professionals and tight material availability.”

Mr. Bernardo Figueiredo, President of Empresa de Planejamento e Logística (EPL)

now thrown its arms around the concept of both non-subsidized and subsidized Concessions and Public Private Partnerships (PPPs) respectively, a move that should bring new life to Brazil's infrastructure sector.

While this may seem like a fairly new development, Brazil actually has a rather long history of successful concessions that started when the Federal Government first passed national legislation governing concessions in mid-1996 (“the Concession Law”). Since then, both the federal and state governments have signed a raft of concession contracts, particularly in the roads, power and telecommunications sectors. The model was then reinforced in 2004 with the passing of the “PPP Law”, which allowed the government to sign several subsidized concession contracts in the water, social infrastructure and transportation sectors.

“We've been successfully using PPP models in cities for a number of years now and this should help the federal government quickly come up to speed on how to best structure, tender and partner with the private sector for the delivery of infrastructure,” added Mr. Silva Junior.

For example, the federal government recently launched an initiative to extend water and sewage treatment to more than 90 percent of the country's urban population, which has inspired a US\$200 billion investment

program in water and sewage treatment infrastructure that is expected to be rolled out over the next 20 years. This has had spill-over effects in the states. For instance, KPMG in Brazil recently worked with the Pernambuco state government to develop and tender a US\$2 billion sewage treatment PPP project in the metropolitan region of Recife, which was successfully awarded to a private consortium in February this year.

The passage of the PPP Law in 2004 went further in encouraging private participation and inspired state governments such as Minas Gerais, São Paulo, Pernambuco and Bahia to start implementing PPP pilot projects. In just the first 6 years since the law was issued, Brazil has seen tremendous progress in a wide variety of sectors such as highways, metros, prisons, sewage treatment facilities, hospitals and even football arenas ahead of the 2014 World Cup.

“By clarifying and codifying measures to encourage private participation in the Brazilian marketplace, the government has really signaled that there is a place for private enterprise, both as a partner to government and as individual companies,” added Odebrecht's Mr. Silva Junior. “We recognized the growing influence of PPPs early on and have focused on improving our understanding and use of PPP mechanisms, contracts and processes. As a result, we've

been extremely successful in working with the states and cities on PPP developments.”

OPPORTUNITIES ABOUND

Brazil's infrastructure plans open up a world of potential for investors across a wide variety of sectors. For example, Brazil is investing US\$66 billion to make over its rail and road networks. The LIP aims to double the capacity of main roads and railways over the next 5 years – welcome news to industry, which currently transports about two-thirds of the country's goods via the decaying highway system.

The government is paving the way for private contractors to build nine toll roads totaling about 7,500 kilometers, adding to the existing toll ways managed by concessionaires and backed by a regulatory framework set up in the mid-1990s. Railway auctions are also on the agenda. A bullet train to link Rio de Janeiro and São Paulo is expected to be tendered this year with operations expected to be open by 2020.

However, the primary focus of the program is on developing freight lines to not only take some pressure off the roadways, but also to help decrease transportation costs (particularly for commodities such as soy beans and mining cargo, which are considered to be among Brazil's strongest exports). “Foreign investors and participants are keen to understand the exact rules and model that





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By clarifying and codifying measures to encourage private participation in the Brazilian marketplace, the government has really signaled that there is a place for private enterprise, both as a partner to government and as individual companies.”

Mr. Benedicto B. da Silva Junior, President of Odebrecht Infrastructure

are being used in the railway sector,” added Mr. Figueiredo. “The model being suggested in the LIP borrows elements from several different concession models and includes a very innovative risk mitigation component, and so it has been the subject of much interest from the international community.”

The ports sector is also buzzing. With 7,500 kilometers of coastline and a heavy reliance on exports, Brazil’s National Bank for Development (BNDES) expects nearly US\$30 billion to be poured into port infrastructure by 2017. A bill currently making its way through the legislative process will allow private ports to handle any type of cargo, open public port terminal contracts to private tenders, and allow private operators to handle more third-party cargo. Up for debate is a proposal to allow 50-year contracts in the form of renewable 25-year concession periods.

The country’s clogged airports will also see increased activity. Following on the heels of last February’s Concession contracts to upgrade three major airports (São Paulo, Brasília and Viracopos International Airports) for more than US\$14 billion, the government announced in December that it would invest about US\$3.7 billion in 270 regional airports nationwide, and launch new Concession tenders to upgrade the international airports of Rio de Janeiro and Belo Horizonte during the 3rd quarter of 2013.

But the LIP is only the tip of the iceberg. “The current program only represents about a third of the amount the country needs to properly compete,” admitted Mr. Figueiredo. “That’s why the EPL was created: to bring this long-term investment opportunity to the market and demonstrate that investments in Brazil are not only high-return but also very secure.”

HAPPY LANDING?

In an unprecedented move to drum up support from international infrastructure investors, government ministers and other technocrats have crisscrossed the world’s financial capitals to sell investors on Brazil’s infrastructure strategy. All told, the programs will amount to well over US\$500 billion.

“I’ve personally participated in these road shows and have found that investors and foreign infrastructure participants are extremely interested in the program and are seeking partnerships with Brazilian companies and the government as a way to start getting involved in the market,” added Mr. Figueiredo.

Brazilian companies are reporting similar trends; “Over the past 2 years, we have been approached by a wide variety of international players – investors, contractors, suppliers and so on – that want to team up with Odebrecht to ease their entry into the different sectors,” added Mr. Silva Junior.

“Most foreign investors and players that I talk to have said that their chief concern is the need to identify local companies and partners that understand the markets that they want to operate within,” added Mr. Figueiredo. “That’s why we are focused on creating venues to help bring these parties together.” For instance, in August, the EPL teamed up with the Federation of Industries of the State of São Paulo to host international investors and participants interested in building relationships with potential local partners.

The much anticipated arrival of the World Cup and the Summer Olympics has also created significant long-term capacity within Brazil’s infrastructure sector. “Meeting the high standards and aggressive timelines set by the games committees has forced Brazil’s infrastructure providers to really step up to bring a new level of efficiency and quality to their projects,” added Mr. Silva Junior. “These capability gains are not just going to disappear once the games are over; the lessons we are learning will help us improve infrastructure delivery right across the country for a long time to come.”

With fresh thinking on PPPs and a strong dose of investment, we believe Brazil’s current track should help get the country moving more efficiently. And that will go a long way to helping the world’s seventh largest economy live up to its full potential. ■



COLOMBIA LOOKS TO THE FUTURE



By **Camilo Gonzalez**,
KPMG in Colombia

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Colombia's government believes that infrastructure success depends on quality implementation, a fair balance of risk and reward for participants, and reasonable regulation – all of which point to a strong partnership with the private sector.

When Pablo Escobar's reign as the world's most infamous drug lord ended with a rooftop shootout in Medellin in 1993, it was a symbolic milestone in Colombia's rehabilitation on the global stage. While the country had managed to consistently expand its economy – averaging better than 4 percent annual growth between 1970 and 1998 – the drug trade and its resulting violence and political instability had impeded foreign investment.

Fast forward to present day and this nation of 46 million has firmly staked its claim as the least volatile economy in Latin America. While the rest of the world was mired in a deep recession in 2009, Colombia's Gross Domestic Product (GDP) grew 1.5 percent, and in 2013 the International Monetary Fund (IMF) predicts that Colombia will achieve GDP growth of 4.4 percent – double the global average.

According to Colombia's National Planning Department (DNP), the key growth catalyst has been an increase in private investment. In 2000, the investment rate in Colombia was 14.9 percent of GDP and the private investment rate stood at just 7.6 percent – numbers that the DNP says would have allowed the economy to grow no more than 3 percent per year.

The turnaround since then has been remarkable. By the end of 2012 the investment rate had shot up to 28 percent, with private investment accounting for



22 percent of GDP. Foreign direct investment increased six-fold to US\$15 billion in the same period.

THE CASE FOR INFRASTRUCTURE

Colombia is home to a wealth of natural resources. It boasts the largest coal reserves in Latin America, the continent's third-largest oil reserves, and significant deposits of gold, nickel and other minerals. Combined with improved political and social stability, the building blocks for a bright economic future are clearly in place.

But the DNP is first to acknowledge Colombia's immense infrastructure gap with its main trading partners. The Global Competitiveness Report 2012-2013, published by the World Economic Forum, identified inadequate infrastructure as the third most significant barrier to the country's business success.

A wide array of infrastructure projects have been identified as critical to Colombia's future prosperity. However, not all are focused on facilitating trade. The government recognizes that it must balance the social infrastructure needs of its citizens in order to maintain stability with its desire to become a key player in the global economy.

COLOMBIA'S INFRASTRUCTURE PIPELINE

During 2012, the government of President Juan Manuel Santos announced that its forecasted investment in infrastructure would



reach US\$112 billion by 2020. Approximately 57 percent of that investment would be focused on improving national transportation links, while other areas of focus would include city and regional development, mining and energy resources, technology, urban transportation, and housing.

As a result, the National Infrastructure Agency (ANI) has scheduled concessions for planned and potential projects amounting to US\$42 billion between 2013 and 2019. Nine groups of roads have recently been opened for tender, totaling 1,231 kilometers for an estimated investment of US\$6 billion – part of an overall US\$22 billion investment in road infrastructure. In rail transportation, there are seven proposals to rehabilitate rail channels between the southern and northern regions of the country.

Another innovative project is the US\$600 million effort to once again enable commercial navigation along the Magdalena River. The river is only navigable for about half its 1,500 kilometers, but its drainage basin generates 86 percent of Colombia's GDP. Bringing the Magdalena on-stream would reduce freight costs between Colombia's central region and the Caribbean ports, while easing the burden on roads and rail systems.

THE ROLE OF PUBLIC PRIVATE PARTNERSHIPS (PPPS)

Colombia's government believes that infrastructure success depends on quality

implementation, a fair balance of risk and reward for participants, and reasonable regulation – all of which point to a strong partnership with the private sector. Starting in 1993, the country was the first in Latin America to adopt the PPP approach, with its ports in Cartagena and Santa Marta.

In 2012 Colombia introduced a new policy framework to promote PPPs and attract both domestic and foreign participants. The new law is designed to stimulate private sector involvement in the construction, finance, maintenance and operation of infrastructure assets while balancing the risk and reward for participants.

Before shovels hit the ground or bids even reach the table, the law requires extensive studies to be carried out in order to estimate construction costs and assess geological, environmental and financial risks. It also defines the financial investments and concession terms, and allocates risk sharing upfront between public and private participants.

From a commercial standpoint, the new law requires that project cash flows be managed by a trust, to ensure control over each project's financial resources while providing a guarantee to project lenders in the event of bankruptcy. Finally, payment terms and conditions for early terminations of a concession are defined by a preset formula, and lenders can exercise step-in rights if a contractor defaults.

Business has welcomed the new PPP law. In large part because it clearly sets out the

terms and conditions of each investment – lowering risks for investors and participants alike. For end-users (the people and businesses of Colombia) it is expected to reduce delivery delays and incomplete projects.

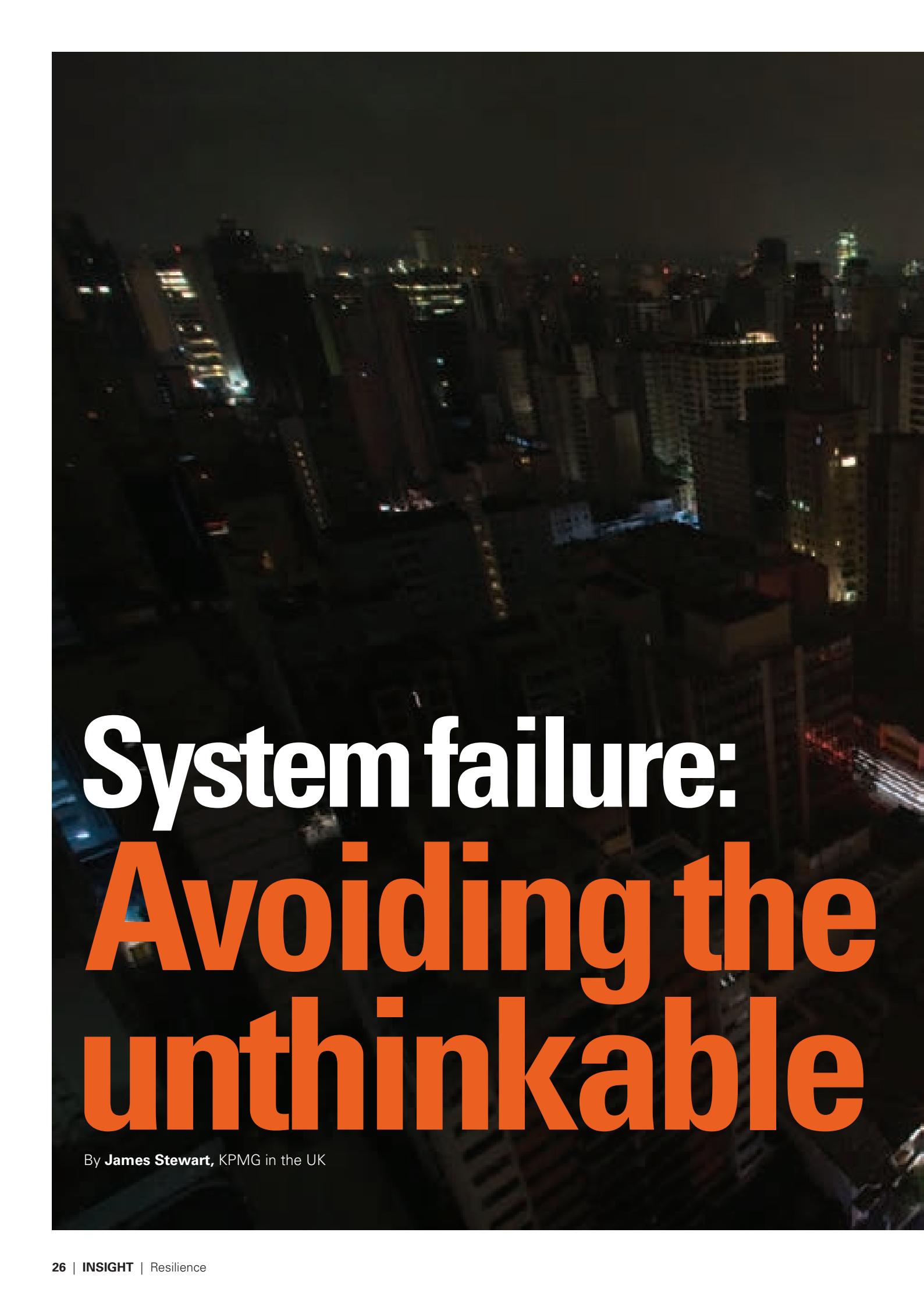
A LAND OF OPPORTUNITY

There is no question that Colombia is a country on the rise. It has tripled the rate of private investment over the last 10 years and regained its investment grade rating since 2000, all while significantly reducing crime, poverty and inequality.

The country's infrastructure is also headed in the right direction. Investors see Colombia as a place that combines opportunity and economic stability with a transparent legal framework. The country has an extensive and attractive pipeline of projects in many sectors that have the potential to generate attractive returns to investors.

Foreign investors have a significant opportunity in the infrastructure business thanks in large part to the new law, which requires that the construction phase of a project be fully financed by private resources. To mitigate risk, we advise international companies – especially those making their first forays into Colombia – to partner with experienced local players.

In the end, this combination of domestic and international experience should deliver better, more profitable projects that benefit investors as well as the people of Colombia. ■



System failure: Avoiding the unthinkable

By **James Stewart**, KPMG in the UK



A conversation between
James Stewart, KPMG's
Chairman of Global
Infrastructure and Jim Hall,
Professor of Climate and
Environmental Risk and a
Director of the Environmental
Change Institute at the
University of Oxford.

James Stewart (JS): KPMG's Infrastructure professionals have been spending some time with clients – particularly government and infrastructure planners – helping them develop a 'systems' view of infrastructure. Essentially, we're trying to help the sector understand the interdependence of infrastructure and how, by taking a more holistic view, these assets can really be designed to drive growth, support productivity and enhance quality of life for their citizens.

You've been doing quite a bit of research into some of the risks that are involved in taking a systems view; what are some of your big concerns?

Jim Hall (JH): First, let me say that I absolutely agree that governments and infrastructure planners need to take a systems view of their investments and assets. Developing and managing infrastructure as a system certainly has significant advantages.

The problem is that – over the past decade or so – we've been so focused on creating efficiencies and integrating assets that we are now looking at systems that have unknown vulnerabilities. I simply don't think that we've put enough thought into understanding where these vulnerabilities may be, particularly in relation to their interdependencies.

JS: We've certainly seen some terrifying examples of how devastating a system failure could be on an economy and a population. If you think about the blackout that hit the Northeast US and Canada in 2003, you can quickly see how failure in one infrastructure asset can easily cascade into failures across the system.

JH: Yes, and I would argue that the interdependencies that we have embedded into our systems today have created much greater vulnerabilities than ever before. One simple reason comes down to cost and the drive for more efficient infrastructure. The problem is that as owners and operators focus on trying to get as much out of their system as they can with the minimum of inputs, they start to erode away the margins for failure.



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We need to be able to properly value the risks and incorporate that understanding of risk into decision making. That's the only way we are going to be able to make the economic and business case for investing in resilience.

Jim Hall, Professor of Climate and Environmental Risk and Director of the Environmental Change Institute at the University of Oxford

The other big reason that we are more vulnerable today comes down to the prolific embedding of information and communications technology for monitoring and control purposes. On balance, that's a good thing because it increases efficiency and makes the system much smarter. But it also opens the system up to new risks stemming from technology failure. Not just hackers getting into the system – which I would argue is no different from any other industry sector's concerns – but also how a failure or unexpected event in one area might impact the technology running another, even more critical system.

JS: *I think one of the big challenges that KPMG's member firm clients are struggling with as they strive towards taking a more system-focused view of infrastructure is one*

of ownership and responsibility. What KPMG professionals have seen is that there is a historical mismatch of incentives.

They often see situations where opportunities could have been taken to make a system or asset more resilient, but it gets left out of the final design for cost reasons. In 10 years' time, however, when that asset fails, it's usually a different government and a different owner that is left to clean up the mess.

JH: Right. I think the question is how do we properly align incentives within what is now a market-based arrangement so that people who can do something about the risks in the system are actually incentivized to do so. And I think the big problem is that we have a number of market failures that are stopping this from happening.

One is that these are often low probability

events that may not happen for a long time and I don't think that people properly evaluate those low probability risks, even when the consequences can be very serious. I think the second market failure is that it's often society in general that suffers the most severe consequences and governments are left to take the lead in emergency response and reconstruction – rather than the designers and developers – so there is a lack of incentive there. There's also the issue of short-termism – whether due to political cycles or project cycles – that creates perverse market incentives to not invest for the future.

I talk to a lot of businesses – utilities, insurers, infrastructure operators – and what I've found is that while they have paid careful attention to the vulnerabilities within the systems for which they are responsible,



they get quite nervous when you start to ask about their interdependencies with the systems they rely on.

JS: *I get the impression that decision makers don't always understand the cost versus benefit ratio of investing in greater resilience at a system level. They are fairly clear on why they don't want a bridge to collapse or a power plant to fail, but they are less clear about the costs and the risks of systemic failure.*

In a time when governments are dealing with constrained capital budgets and where the first question is always 'how much is this going to cost?', it's going to become increasingly difficult to get investors – government or otherwise – to pay for mitigating systemic risk.

JH: I think you are right. We need to be able to properly value the risks and incorporate that understanding of risk into decision making. That's the only way we are going to be able to make the economic and business case for investing in resilience. We need to be able to say what the right level of action would be in proportion to the risks and then put the appropriate investment towards it. That's not something we've been terribly good at in the past.

Where I think we need to start really focusing is on uncovering some of those 'soft' vulnerabilities in the system. For example, some regulatory arrangements tend to be more sector-specific and are often not ideal for dealing with cross-sectoral

interdependencies which can create complexity when you start to take a system view. But there are lots of other soft vulnerabilities like today's complex ownership models, shifting regulation and even the set of human interactions that underpin these systems.

We really need to understand how the rapidly shifting market environment is creating vulnerabilities within our infrastructure systems and then see how they can be adapted to improve resilience.

JS: *You included human interactions in that list. On the one hand, you could argue that human error is reduced through IT and automation, but on the other hand things can quickly go awry if there is nobody at the switch. Is the drive for efficiency and automation eliminating that human element?*

JH: Certainly a lot of the source of this interdependence within systems is around people. But a lot of the resilience is around people as well; having people who understand the systems, being able to make experienced choices when things go wrong, as you say – monitoring the systems to react if there are 'unexpected' failures. If you take too many people out of the system then you are going to increase your vulnerability to critical failures.

JS: *Do you see any countries or regions that are really doing well at understanding those system risks and acting accordingly?*

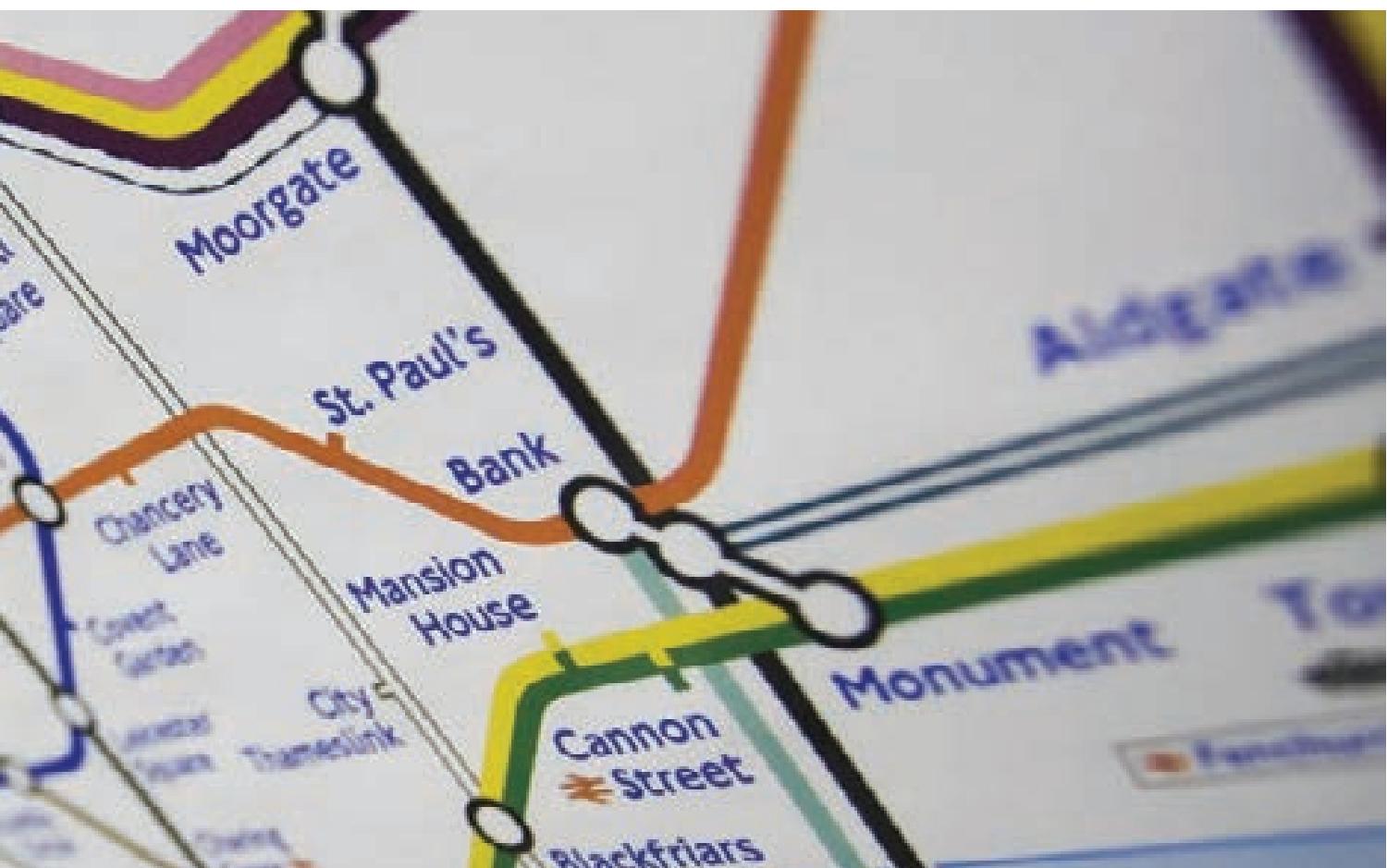
JH: Interestingly, it's those countries that have a longer-term national view of infrastructure that seem to really have a handle on this. France, Switzerland, Germany, the Netherlands – all of these countries have a tradition of thinking longer-term when it comes to infrastructure and that has given them an almost intrinsic ability to understand these issues.

Other markets have also been forced to think more holistically about the system risks of interdependent infrastructure. The US went through a series of exercises to understand the risk as part of their homeland security initiative. New Zealand has also been doing some serious rethinking since Christchurch was hit by the earthquake last year.

That said, I think there are lots of great examples right around the world that could act as a model for other governments and infrastructure planners.

JS: *Do you think we're on course for a system failure any time soon?*

JH: There are system failures every day in some emerging markets. And while that may not be a problem for those readers sitting in the developed world today, it is when you take a global view of infrastructure. Power outages in India impact supply chains which stop raw materials from getting to power plants in developed markets which causes a ripple effect down the chain. Clearly, the interdependencies flow much deeper than we think. ■





Building the business case for resilience investment

By **Adrian Wimmers**, KPMG in New Zealand

In the wake of a natural disaster or critical infrastructure failure, the first thing people often ask is 'why': Why were we not more prepared for this event? Why did we not invest in greater resilience? Why was the failure allowed to happen?

The simple truth is that – in almost every instance – the case to invest in greater resilience did not merit the additional spend. Resilience investments were simply stripped out of the design as part of the value-engineering process. Unfortunately, it is not until a disaster hits that the real cost versus benefit of greater resilience investment is often driven home.

A SIGNIFICANT KNOWLEDGE GAP

The challenge, it seems, is that traditional methods of quantifying the cost versus benefit of infrastructure spend has tended to ignore important considerations such as the asset's criticality to the wider economy, the number and value of the users, the potential impact of loss of life related to failure if a specific event were to occur, and the odds of that specific event occurring.

These are major factors that should play a considerable role in quantifying whether additional investment in greater infrastructure resilience is valuable.

Take criticality for example, at one end of the spectrum are assets with shorter life-spans or lower impact on the health and safety of a population – such as houses, parks and walking trails. At the other end of the spectrum, critical infrastructure such as flood levees, utilities and vital roads and bridges. Clearly the investment case for increased spending on resilience for critical infrastructure far outweighs the case for investing an equal amount in less-vital assets.

There is ample evidence to support this notion. A Global Assessment Report developed by the United Nations (UN) Office of Disaster Risk Reduction¹ highlights

¹ UNISDR Global Assessment Report on Disaster Risk Reduction (GAR13); *From Shared Risk to Shared Value: The Business Case for Disaster Risk Reduction*, 2013

In today's calculations, much of the emphasis is based solely on the asset itself: the cost of replacement or the loss of revenue and stacked against the odds of an event occurring and the cost. Given those narrow factors, it is little wonder that few investments into resilience are given the green light.

examples where organizations have reaped benefits in the ratio of 1:10 for their critical infrastructure prevention investments. The American Society of Civil Engineers estimates that federal spending on levees pays for itself six times over; other flood-control measures achieve returns of 1:3 or 1:4. The UN Report refers to utilities company Orion in my home country New Zealand, which saved US\$65 million in the 2010/11 Christchurch earthquakes through earlier spending of US\$6 million on resilience².

The type and value of users must also be a key consideration when calculating the benefits of incremental resilience investment. A road that carries holiday makers to the

beach would surely not merit the same funding or investment in resilience as a key urban artery carrying business goods and employees around a heavily populated city.

Other, more well-understood but rarely considered factors must also be put into the calculation. The expected life-span of the asset versus the odds of a particular event will naturally have a large impact on any calculations in this area, as would the economic cost of the loss of life, replacement costs for physical assets and the availability of insurance.

FOUR FACTORS TO CONSIDER

Given the increased frequency of events over the past few decades and the dreadful economic and social impacts that we have witnessed as a result, we believe that infrastructure investors, owners and operators must work to develop a quantitative approach to calculating the real benefits of investments into resilience.

Any proposed framework should start with a consideration of four key factors that express the criticality of the infrastructure³:

- The direct economic costs of replacement (including the timeframe required to replace)
- The alternative options available
- The immediate impact on the economy and society
- The long-run business and economic impacts

As an illustrative example, suppose that the Auckland Harbour Bridge in New Zealand

was to fail in some way. There would be a direct economic cost of either repairing or replacing the bridge, but there would also be significant knock-on effects as the limited number of alternative routes into and out of the city become congested and the movement of goods comes to a standstill. The immediate economic and social impact would include not only the lost business activity, but also the social impacts of virtually isolating both the major urban area and rural region to the north. Then there are the longer-run business and economic impacts that would range from lost productivity and broken trade connections through to lost reputation for Auckland in the Asia Pacific region.

However, in today's calculations, much of the emphasis is based solely on the asset itself: the cost of replacement or the loss of revenue and stacked against the odds of an event occurring and the cost. Given those narrow factors, it is little wonder that few investments into resilience are given the green light.

STARTING THE DISCUSSION

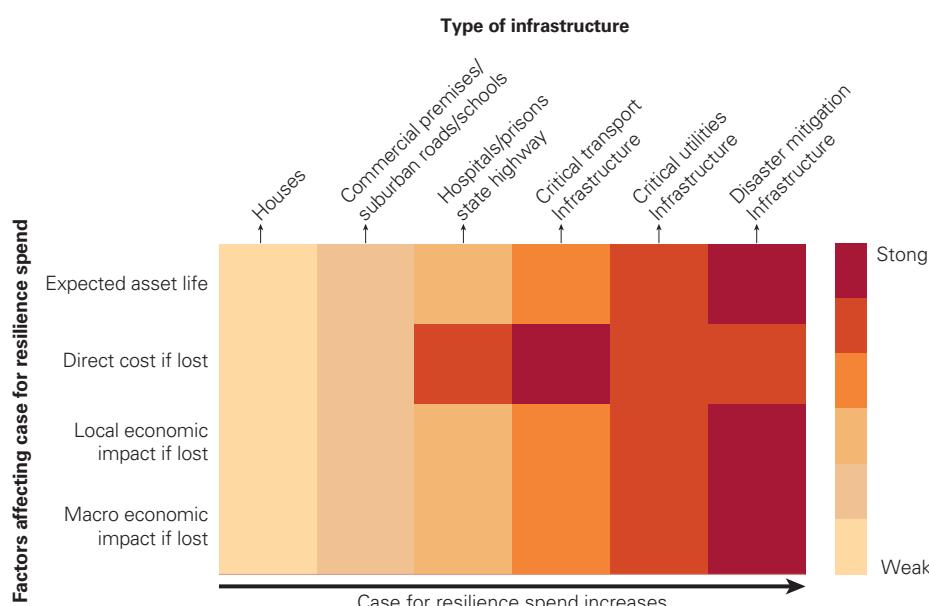
While some jurisdictions have started to broaden their view of the economic value of infrastructure, there has been little evidence of approaches or methodologies for calculating the real cost benefits of investing in greater resilience for infrastructure.

However, value has been generated by the trend towards considering a range of wider economic benefits (WEBs) as part of the framework for making investment decisions for infrastructure. Others, like Greater Manchester in the UK are looking at the value of infrastructure in driving connectivity and using quantified estimates of the local economic activity that each project creates to prioritize infrastructure spend.

While neither of these approaches provides a framework for calculating the cost benefit of resilience investment, they do demonstrate that many of the factors that should be included in any cost vs. benefit analysis for investment are already available or assessable.

Ultimately, with some cooperation and sharing of ideas, the public and private sectors must start to incorporate a more detailed assessment of infrastructure resilience into cost vs. benefit analysis. That assessment must take a broader view than simply calculating the cost of replacement. We look forward to working with our clients, partners and the wider industry to advocate towards that end. ■

Making the case for incremental spending on disaster resilience



² UNISDR Global Assessment Report on Disaster Risk Reduction (GAR13); *From Shared Risk to Shared Value: The Business Case for Disaster Risk Reduction*, 2013

³ Adapted from UNISDR Global Assessment Report on Disaster Risk Reduction (GAR13); *From Shared Risk to Shared Value: The Business Case for Disaster Risk Reduction*, 2013



NYC bounces back:

By **Tony Dalessio**, KPMG in the US



How one of the world's largest cities recovered from Hurricane Sandy



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I think it's also important to note that we are not trying to 'future-proof' or 'climate change-proof' the City. That is impossible for any city. What we are aiming to do is to make NYC more resilient, and that means creating a City where the impacts of extreme weather are fewer and the City is able to bounce back more quickly when they do occur.

Seth Pinsky, President of the New York City Economic Development Corporation (NYCEDC) and Director of Mayor Bloomberg's Special Initiative for Rebuilding and Resiliency

On 29 October 2012, the world watched as Hurricane Sandy crashed into the East Coast of the United States. New York City and the surrounding areas, which lay directly in Sandy's path, were particularly hard hit. In this exclusive interview, Seth Pinsky, President of the New York City Economic Development Corporation (NYCEDC) and Director of Mayor Bloomberg's Special Initiative for Rebuilding and Resiliency, discusses the challenges the City faced in the aftermath of Sandy and explains why the City was particularly well-prepared to meet and recover from this massive storm event.

Tony Dalessio (TD): *I think we all saw the impact that Hurricane Sandy had on the New York City (NYC) area. What was the impact in terms of infrastructure damage?*

Seth Pinsky (SP): Sandy certainly had an enormous impact on the region. In NYC alone, the gross losses are estimated to have totaled approximately US\$19 billion. Those losses were a combination of asset loss and asset impairment, and also include lost economic activity due to damaged infrastructure such as the electrical grid.

TD: *Given the size and scope of Sandy – which was three times larger than Hurricane Katrina – it looks like the City has bounced back very quickly.*

SP: In many ways, I actually think NYC was better prepared than many other jurisdictions for a storm of this magnitude. That's because, back in 2007, Mayor Bloomberg brought together more than 25 City agencies to work together to create a 30-year resiliency and sustainability plan for New York called 'PlaNYC'.¹

Since then, we've been working to carry out that plan, making investments and enhancing resilience. For example, we've been making design changes along our coastline and updating building codes and our regulatory frameworks. What we found with Sandy was that most of the infrastructure built after 2007 stood up fairly well. But we have an enormous amount of infrastructure that pre-dates this plan. Therefore, the real challenge for us going forward is less about making sure that what we build is more resilient, and more about focusing on the tens of thousands of buildings and other infrastructure that pre-date PlaNYC.

TD: *With the frequency of major storms increasing, is the City preparing for the 'next' Hurricane Sandy?*

SP: That's exactly what we are NOT doing. Mayor Bloomberg has been very emphatic about the fact that we need to be focused on identifying all of the potential future vulnerabilities that the City faces as a result of climate change; things like rising sea levels, storm impacts and surges, heat waves and droughts – the full range of potential impacts, rather than just focusing on the next big hurricane.

TD: *And how are those potential impacts being identified and assessed?*

SP: This is another area in which, even before Sandy, Mayor Bloomberg was very proactive. In 2009, for example, the Mayor brought together a group of academics from leading institutions and asked them to project what the likely downside scenarios would be for NYC as a result of climate change. They produced a peer-reviewed report and a highly-technical set of projections that the City has been using ever since. The report was actually just updated, at the Administration's request, to reflect new data and scientific advances over the past 4 years.

In other words, we are looking at the best available science and projections to tell us what the real risks are, not just tomorrow or a year from now, but also in a decade or multiple decades.

I think it's also important to note that we are not trying to 'future-proof' or 'climate change-proof' the City. That is impossible for any city. What we are aiming to do is to make NYC more resilient, and that means creating a city where the impacts of extreme weather are fewer and the City is able to bounce back more quickly when they do occur.

TD: *How is the City working with private sector infrastructure operators to ensure that they are also investing appropriately into resilience?*

SP: Our plan is actually quite specific about the kinds of resiliency investments that we will be looking for from all of the various entities, and we actively monitor their investment plans. For example, we're working with ConEd – NYC's biggest electricity distributor – to ensure that the company is able to make the capital investments required to improve the resiliency of its network.

We're also very heavily focused on working with the appropriate regulators to catalyze change. We have found the current regulatory standards that the utilities are held to, for example, either don't take into account extreme weather events or don't anticipate

¹ <http://www.nyc.gov/html/planycc2030/html/about/about.shtml>

the potential impacts of climate change. In other words, there is little regulatory incentive to focus on climate-related resilience. So that's another very important focus of ours.

TD: *What did the City take away from its experience with Sandy that will help enhance resilience in the future?*

SP: I think our response and our ability to bounce back so quickly is a testament to both the heightened level of collaboration among all levels of government and the resiliency of the people of NYC themselves. One of the key initiatives that helped the City return to normal faster was the Rapid Repairs program, which quickly made repairs to more than 20,000 homes and allowed a large portion of the displaced population to return home quickly.

Mayor Bloomberg is also very keen to understand the lessons that came from

Hurricane Sandy. About 6 months after the event, the Mayor released an 'After Action' report² on city government performance during the storm that helped inform the 'A Stronger, More Resilient New York'³ report released by the Mayor in June. This comprehensive plan contains more than 250 actionable recommendations both for rebuilding the communities impacted by Sandy and for increasing the resilience of critical systems and infrastructure citywide.

TD: *What advice would you give other city leaders based on your experience over the past year?*

SP: I think all coastal cities like New York – and other cities facing the impacts of climate change – must remember they are highly vulnerable and that their vulnerability is only going to increase as the impacts of climate

change become more acute. So it is incumbent upon us as city leaders to think ambitiously about preparing our cities and making the investments needed to make our cities more resistant to climate-related events.

But we also have to balance the desire to think ambitiously against reality, so that we are creating plans that not only have the greatest possible impact but that are also achievable given the resources that we have. This is going to be one of the defining problems facing most cities going forward. ■

**At the time of publication Seth Pinsky is no longer with NYCEDC, but has started a new role as Executive Vice President with RXR Realty.*



² http://www.nyc.gov/html/recovery/downloads/pdf/sandy_aar_5.2.13.pdf

³ <http://www.nyc.gov/html/sirr/html/report/report.shtml>

Societal resilience: Building cities that work for everyone



By **David O'Brien**, KPMG in Canada

The development of a society is often measured by its ability to bounce back from a catastrophic event – whether it is a man-made terrorist attack, or a natural disaster such as an earthquake.

According to author Nassim Nicholas Taleb, each society falls somewhere along a continuum. At one end, 'robust' societies experience virtually no shock when disasters strike, while 'fragile' societies break apart. Between these two extremes are 'anti-fragile' societies, which are resilient in the face of stress and ultimately grow and improve as a result.

THE CONNECTION TO INFRASTRUCTURE

At KPMG's Infrastructure practice, we believe infrastructure is central to creating a resilient society. Consider the recent earthquakes in Haiti and Japan. Both nations suffered tragic human and economic casualties, but Japan's superior

infrastructure helped mitigate the loss of life. While its earthquake was actually much stronger than Haiti's, 16,000 people were killed in Japan, compared to 220,000 in the Caribbean nation. The initial impact of the Haitian earthquake was compounded by poor sanitation, and inadequate roads and transportation systems, both of which hampered recovery efforts.

Building cities – and building them well – is one of our greatest challenges. Londoners and Parisians may curse their lengthy commutes or the occasional power outage, but their lives do not hang in the balance. In countries across Asia, Africa and Latin America however, an unstoppable wave of urbanization is forcing governments and developers to design cities that can accommodate vast numbers of rural immigrants seeking what (they assume) will be a better life.

"The strength of any city is really measured by the strength of its weakest element," says Daniel

Hoornweg, Professor and Research Chair at the University of Ontario Institute of Technology and former leader of the World Bank's Sustainable Cities and Climate Change program. "In cities like Lagos or Mumbai, improving service delivery to citizens often becomes an issue of prioritization: the rich usually get the better municipal services and the poor are moved to the end of the line."

Ideally, cities should accommodate all of their residents in a relatively homogeneous way – providing the physical and economic infrastructure they need in order to prosper, and mitigating the impact of a natural or man-made disaster.

"In these cities that are experiencing a large influx of migration, if you're not careful as a city leader, you could have a really unstable situation," says Hoornweg. "That instability comes from people living in slums who don't feel that they – and especially their children – have the ability to get ahead."



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The strength of any city is really measured by the strength of its weakest element.

Daniel Hoornweg, Professor and Research Chair at the University of Ontario Institute of Technology

SOCIETAL RESILIENCE AT WORK IN RIO DE JANEIRO

For cities struggling to achieve this ideal, there is inspiration to be found in the improved resilience of Rio de Janeiro. In April 2010 torrential downpours shut down Rio for 36 hours, killing 250 people and leaving 10,000 homeless. The storm caught the city by surprise, leaving it unprepared and unable to manage the crisis.

For its young mayor, Eduardo Paes, the disaster was a wake-up call. He spearheaded an innovative project that today has some 70 government agencies – from civil defense to education to energy – working together in one control room that runs continuously year-round. They have access to real-time and predictive information about weather, maps of high-risk landslide zones, and heat maps

of dengue fever outbreaks. Monitors track 10,000 GPS-equipped buses and ambulances, and video streams in from subways and major intersections.

The control room is a model for other cities dealing with potential calamities. When another big storm hit Rio in April 2011, they knew it was coming and were able to map its trajectory against neighborhoods susceptible to landslides. Alarms sounded in 11 communities and the city escaped with no fatalities.

“Rio is at the front of the pack,” says Hoornweg. “They have lots of challenges still, but they’ve turned the corner and are really rolling up their sleeves. It’s probably the fastest improving city in the world in terms of bringing along the most marginalized people and coping with the overall growth.”

GETTING THERE FROM HERE

While the future is full of challenges, the rise in urbanization will have a net positive effect. Three billion more people will live in cities in the next 40 years – which will grow and disperse global wealth to a greater portion of the population. If enough of that new wealth is used to build resilience and lift up marginalized portions of the population, we all can benefit.

Governments will sow the seeds of that success or failure. All governments – but particularly those in emerging economies going through this wave of urbanization – should develop national programs that lay out a strategy for urban development. For example, cities expected to house 10 million people should be planned to accommodate 15 million – not five million. Local governments should be empowered to ensure that land use planning and permitting accommodates growth and drives prosperity for all residents, and private enterprise should be engaged wherever it can add value.

“The best way to become more resilient is to spend more effort on the ‘little things,’” says Mr. Hoornweg. “The majority of flash floods are exacerbated because garbage isn’t collected from drains. It isn’t just about hiring a software company to build a network and create algorithms on everything – you’ve got to start by making sure you do the smaller things well; for example, start with picking up the garbage.”

One thing is certain: no matter where we are on the economic spectrum, we are all in this together. This is not a matter of rural versus urban, wealthy versus poor, or pro-development versus anti-development. Everyone is impacted by the health of our cities, and we should all come together to map their future. ■



MOBILIZING THE RECONSTRUCTION EFFORT

Queensland, Australia innovates to catalyze disaster recovery

By **Paul Low**, KPMG in Australia



It was not until the floodwaters finally receded across Queensland, Australia in late January 2011 that the magnitude of the reconstruction effort started to become clear. Over the course of the 2010-2011 summer, 100 percent of the state had been declared a disaster zone and damages from the immediate flooding were already climbing into the billions of dollars.

A MASSIVE CHALLENGE TO FACE

The impact on the road network was particularly significant. "Almost two thirds of our road network was closed or had limited access at some point in time during the 2010-2011 floods and around 6,700 kilometers of the network was damaged and required reconstruction from the events with a total bill of just under AUD5 billion," noted Shane Doran, Program Director for the Transport Network Reconstruction Program, part of the

state's Department of Transport and Main Roads. "But what many people don't realize is that this was just one – albeit a rather big one – of four floods that we've endured between 2010 and 2013 in Queensland; in fact, the floods in 2012 and 2013 both caused around AUD2 billion of additional damage to the road networks."

Not surprisingly, some of the biggest challenges facing the reconstruction effort were a result of the scale of the damage.

John Curran, CEO of Local Government Infrastructure Services, was involved in helping Queensland's local councils deal with the reconstruction effort. "Many local governments across the state were facing massive reconstruction projects of between 5-10 times their normal annual capital expenditure (CAPEX). As a result, they were finding it really difficult to cope with all the work that needed to get done, which was in addition to their normal annual CAPEX."



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Now that we've moved further into the life cycle of the program we've returned to more traditional procurement models, but I think our ability to be more flexible in the procurement of packages of work was a real innovation and benefit for the reconstruction effort.

Shane Doran,

Program Director for the Transport Network Reconstruction Program



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We helped local councils use already-established panels and their pre-qualified lists of providers so that we could move quickly to expressions of interest. We have found that contractors have been rather competitive and are working hard to ensure local councils are getting value for their money.

John Curran,

CEO of Local Government Infrastructure Services

ASSESSING WHAT IS AVAILABLE

Resourcing was a particular problem. On the one hand, the state lacked the internal capacity to manage all of the procurement and project management that would be required to fulfill the reconstruction mandate. But they also didn't know exactly what resources they had available to them, particularly in terms of construction capacity and supplies.

"It wasn't just about understanding the capacity of the construction industry and the availability of materials, we also had to think about how we would release work out into the market in such a way as to ensure that we wouldn't constrict the supply of those materials or overstretch the construction companies which, in turn, would drive up prices artificially," added Shane Doran.

INNOVATIVE APPROACHES TO PROCUREMENT

Recognizing that the traditional procurement model for infrastructure would be insufficient to manage the scale of work required, a number of new procurement approaches were created. For example, the Department of Transport and Main Roads developed a Performance Incentivized Cost Reimbursable Works Contract model that allowed the state to get work out to the market without having the scope of that work fully defined. Essentially, the Department would work with the constructor to refine the scope of the work and then use a pain share/gain share arrangement based on the particulars of the specific project.

According to Shane Doran, this approach has not only allowed the state to get projects out to the market faster, but it has also helped minimize disputes and ensure that focus is being placed on getting work done rather than administrating contracts. "Now that we've moved further into the life cycle of the program we've returned to more traditional procurement models, but I think our ability to be more flexible in the procurement of packages of work was a real innovation and benefit for the reconstruction effort," added Mr. Doran.

GETTING VALUE FOR MONEY

For local councils, the ability to leverage some of the procurement approaches being led by state departments and panels was key to speeding up the procurement process. "We helped local councils use already-established panels and their pre-qualified lists of providers so that we could move quickly to expressions of interest," noted John Curran. "We have found that contractors have been rather competitive and are working hard to ensure local councils are getting value for their money."

With billions of dollars in procurement contracts moving rapidly into the market, governance has been a key focal point for Queensland's reconstruction effort. "One of the big challenges for local councils – particularly from smaller localities – is a lack of understanding when it comes to creating proper governance arrangements for this type of work," noted Mr. Curran. "All too often, they are trying to do the work as part of their 'business as usual' process which simply isn't going to work when you are dealing with spend of this magnitude."

For the most part, the state used existing governance processes and frameworks to ensure they were receiving value for money and that the procurement process was being conducted transparently and in line with regulation. "The big difference was in frequency; most of these processes and requirements were conducted on an annual basis before 2011, but since the floods we have been running them on a monthly or even daily basis," added Mr. Doran. "This means we are able to quickly identify problems with the program and make improvements, and I think that is where we have seen a significant difference in governance."

BE PREPARED

According to both Mr. Curran and Mr. Doran, preparation is key to ensuring a successful recovery and reconstruction effort. In most cases, infrastructure and public leaders are well aware of the 'big risks' that face their communities and should be able to identify what would be required in the face of a sudden disaster.

"You've got to have all of your processes and procedures in place and know how you are going to manage the program well ahead of an actual disaster," added Mr. Doran. "If it's not really well understood or documented up front, you'll have a lot of confusion on the ground once the effort begins and – ultimately – waste time, money and resources unnecessarily."

Mr. Curran agrees. "When these disasters hit, the impact is often massive and far outside of the 'business as usual' capabilities for most governments, local or otherwise. So leaders really need to think about what approach they are going to use, what partners they will work with, what governance processes they will apply and how these works are going to be released into the market."

Based on the success of Queensland's reconstruction efforts since 2011, it seems that their advice is well founded. ■



Protecting public health

The nexus between infrastructure and the health of our communities

By **Joel Finlay**, KPMG in Canada

In today's society, much of our infrastructure is – once you boil it down – intended to improve the health and quality of life of its users. Clean water, electricity, hospitals, dams, bridges and sanitation all play a role in protecting or enhancing population health and welfare.

But what happens when those services and assets are no longer able to function? Over the past few years, we have witnessed a litany of natural disasters that have clearly demonstrated the importance of infrastructure in protecting and maintaining public health.

"In a public health emergency, infrastructure really acts as a multiplier of the public health professional's capability," said Dan Tuten, Associate Director for Information Resources at the Office of Public Health Preparedness and Response, one of the centers within the Centers for Disease Control and Prevention (CDC). "Roads allow health professionals to reach a wider population, hospitals serve as collection points for the sick or wounded, and communications infrastructure allows health professionals to communicate needs to the outside world."

What worries public health professionals therefore is any event that may disrupt the ability of infrastructure to fulfill this role. "The ones we most worry about from a public health perspective are those acute events – usually weather related – that provide little to no time for preparation; floods, heat waves, forest fires, earthquakes and tsunamis tend to happen without much warning and therefore create very severe public health outcomes," noted Dr. Perry

Kendall, Chief Public Health Officer of the Canadian Province of British Columbia.

EXAMINING THE SYMPTOMS

While infrastructure may play a critical role in the ability of a city, region or nation to resist and respond to public health emergencies, there is often little actual coordination or communication between public health authorities and planning officials during the infrastructure planning, design and engineering phase. Most markets rely solely on building codes and standards to ensure that infrastructure assets will respond appropriately in a crisis.

Few public health authorities have the capability or capacity to review and evaluate each new piece of infrastructure, so building codes offer a very clear route to ensuring the right standards and redundancies are being incorporated to allow these facilities to maintain operations during an emergency," added Dr. Kendall. "But that sometimes doesn't work for the bigger infrastructure pieces like nuclear facilities or hospitals where public health authorities will want – and need – to have greater input into resilience planning."

For the US CDC, one solution is to provide tools and guidance to other levels of government in order to build a stronger understanding of the need for resilience and emergency planning. "The Office of Public Health Preparedness and Response recently put together a series of capabilities related to public health preparedness," noted Dan Tuten. "Basically, we've looked at the various public health emergencies that we've responded

to and found that the communities that have these types of capabilities in place tend to be more resilient and can reduce the time in which it takes to respond to – and eventually recover from – these events."

A key imperative for many public health authorities is to enhance the resilience of infrastructure to help the communities themselves. "Making a community more resilient is key to supporting public health," noted Dr. Kendall. "If they have safe access to clean water, some form of transportation, consistent access to power or simply a place to go when things are being swept away; these are the things that really help to mitigate the impact of a public health emergency."

For the CDC's Mr. Tuten, the link between community resilience, public health and societal cohesion is clear. "If people don't have access to the basics they need to sustain themselves, they won't be able to focus on achieving any of the better things that their society has to offer. I think city, regional and national leaders really need to consider what some of the bigger risks are specific to their cultures and plan to mitigate accordingly."

TRIAGING RISK

There are some signs that more focus on public health impacts and requirements are starting to work their way into the infrastructure planning process. For example, we have recently started to see a growing trend towards the application of health impact assessments alongside other more traditional planning and



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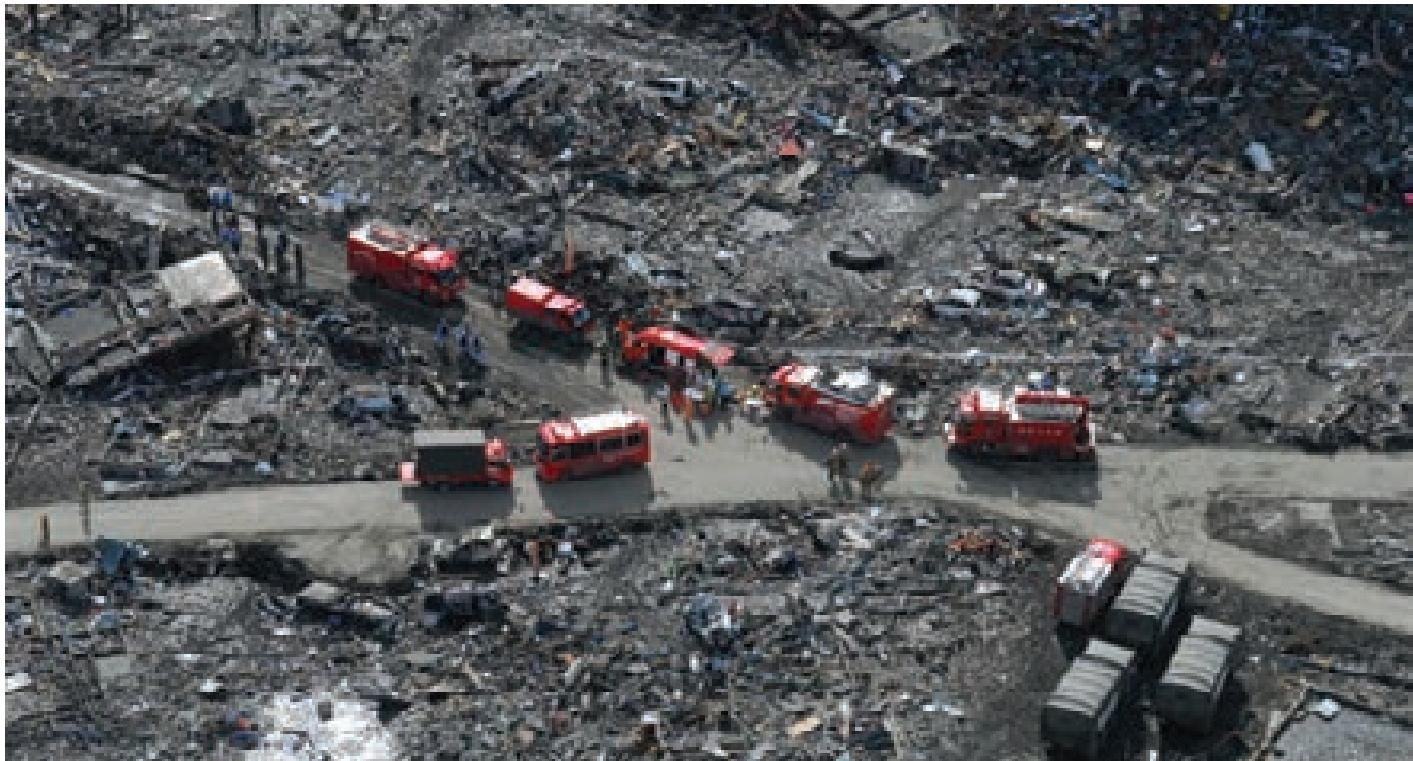
Dan Tuten, Associate Director for Information Resources at the Office of Public Health Preparedness and Response, within the US Centers for Disease Control and Prevention (CDC)



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As a public health authority, I would certainly welcome the opportunity to work alongside the infrastructure sector to help make their developments more resilient; it's a win-win for everyone.

Dr. Perry Kendall, Chief Public Health Officer of British Columbia (Canada)



approval steps such as environmental impact and adherence to building codes.

“In British Columbia there are a number of infrastructure project types where both environmental and health impact assessments should be required such as coal ports, waste to energy generating plants or mine infrastructure,” added Dr. Kendall. “But it’s a relatively new concept and so there aren’t a lot of infrastructure developers or construction companies with experience navigating through them yet.”

Not surprisingly, both Dr. Kendall and Mr. Tuten strongly argue that the best way to ensure infrastructure remains resilient – and effective – during a public health crisis is to carefully assess the risks and then practice the response.

“Each community – regardless of where they are in the world – should really be doing frequent risk analyses that takes a more holistic look at all of the public health-related risks and start to prioritize which are

the most important ones to be mitigated,” suggested Mr. Tuten.

“It’s important to remember that the risks and hazards that a particular city or region faces changes with time and, as population centers continue to grow and move into more at-risk locations, the risk profile of some of these hazards will need to be closely monitored from a public health perspective,” added Dr. Kendall.

A PRESCRIPTION FOR RESILIENCE

For those responsible for public health, the CDC’s Mr. Tuten suggests that particular focus should be placed on ensuring that communication tools, processes and relationships are in place. “Communication is key to building resilience; it helps speed decision making when time is not available and helps teams identify those unexpected surprises before it is too late to plan for them,” added Mr. Tuten. “And if there isn’t open communication between public health authorities and infrastructure planners, you’re more likely to get an ‘us versus them’ situation

that will only hamper resilience planning and disaster response.”

Dr. Kendall agrees that greater collaboration is key to creating more resilient communities in the face of public health emergencies. “I think that infrastructure developers, funders and governments need to be thinking much more carefully about the health implications of their assets and how they facilitate greater health resilience within communities,” added Dr. Kendall. “As a public health authority, I would certainly welcome the opportunity to work alongside the infrastructure sector to help make their developments more resilient; it’s a win-win for everyone.”

All of which makes Mr. Tuten’s final plea so much more critical: “It’s the lessons we learn today that will help us to respond more effectively tomorrow so please – whatever you do – document your experiences and share those lessons.”

A sentiment well-shared by the authors of this publication. ■



After the earthquake: Rebuilding a resilient Chile

By **James Stewart**, KPMG in the UK

Few countries are as resilient in the wake of natural disasters as Chile. It is a necessity for this country perched at the edge of the Ring of Fire, the most seismically active region on Earth. The South American nation has been witness to two of the 10 most powerful earthquakes ever recorded, including the strongest of them all – a 9.5 magnitude quake in 1960 that left two million Chileans homeless.

In the early hours of 27 February, 2010, Chile was struck by the world's sixth-strongest tremor, centered 3 kilometers off its coast. The 8.8 magnitude earthquake triggered a series of tsunamis that pummeled towns up and down the country's south-central seaboard. Roads, bridges, highways, ports and other infrastructure were compromised, while nearly 40 hospitals suffered significant damage. More than 500 were killed and some 220,000 homes were damaged. All told, the

earthquake and resulting tsunamis cost the Chilean economy about US\$30 billion.

THE GOVERNMENT RESPONDS

Following the earthquake, the government identified three major tasks.

First, it needed to address the immediate needs of the population – tending to the wounded, finding those who were missing, and ensuring adequate drinking water, electricity and food. Next, it had to tackle the approaching 'winter emergency'. Since winter in Chile begins in June, the government had to assist a million children as they returned to school, while helping the homeless prepare for the looming cold season. Finally, the government had to prepare a longer-term reconstruction plan and devise a way to finance the country's rebuilding efforts.

For Rodrigo Pérez Mackenna, who today serves as Minister of Housing and Urban Development, the event heralded a dramatic

shift in his career. A civil engineer and MBA, he had enjoyed a long and successful career in finance. Within days of the earthquake, he received a phone call from then President-elect, Sebastian Piñera, asking him to become governor of the O'Higgins Region, which in addition to Maule and Bío Bío, was one of the areas that suffered the worst damage. Piñera himself was scheduled to take office less than 2 weeks later.

"The President-elect wanted to make sure that the governors of the regions affected by the earthquake could start working before the changeover in government, because it was clear that there was not a moment to spare," he recalls. "I had never been very active in politics, but I knew Chile was facing a significant challenge and I thought my private sector experience could be helpful. It was an opportunity for me to give something back to my country."



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We could have done things faster by watering down the regulatory framework and relaxing requirements. But instead we wanted to learn from the earthquake and use the opportunity to not just maintain standards, but strengthen them.

Rodrigo Pérez Mackenna, Chile's Minister of Housing and Urban Development

ALL HANDS ON DECK

While the central government played a strong coordination role – particularly in regards to public works, health and education – every level of government was involved in the recovery effort.

“Local governments were best equipped to meet the immediate needs of people in their communities, such as distributing food and medicine,” says the Minister. “Coordination with towns, cities and regions is vitally important in a crisis, and we wanted to leverage the distribution capabilities of local governments. Once we moved to the reconstruction phase, the federal government was most active.”

The private sector was also a vital player. The Piñera administration recognized that the government could not carry out such a major undertaking alone, and so it laid a strong foundation of leadership and public financing while leveraging the private sector’s capacity to deliver.

In the case of housing – which was expected to consume US\$3 billion of the total US\$8 billion reconstruction budget – a subsidy scheme was established to build homes for under-resourced families and emerging sectors. The government provided funding while construction companies were responsible for the building.

BUILDING A BETTER COUNTRY

Minister Pérez Mackenna points to a number of principles championed by the central government that he believes have been vital to Chile’s housing recovery.

First, government focused on the people affected by the losses rather than the loss of the physical assets themselves. The rebuilding policy also took care to address the needs of renters and their families, as many simply had nowhere to go.

The government also gave families the option of rebuilding on the same land, rather than forcing them to move to new areas. “It would have been an easy fix to rebuild a residential development on the outskirts of a village,” he explains. “But that would

mean uprooting those families from their social networks and their families, which would only compound their losses.”

In areas along the coastline which are susceptible to future tsunamis, the notion of risk was incorporated into the design. Mitigation projects, such as retaining walls, escape routes and parks were designed. Tsunami and earthquake resistant housing was built, and the concept of risk was integrated with urban design. “In general, safety took precedence over solely economic criteria when we were making decisions affecting the coastline,” the Minister explains.

In June, the Housing and Urban Development ministry reported that 164,000 families – 74 percent of those impacted by the earthquake – had moved into their new homes, with construction underway for another 23 percent. The government has set a target date of March 2014 to complete reconstruction.

The events of February 2010 have been an opportunity for the government to improve its overall approach to housing – by passing a regulatory framework that emphasizes quality over quantity. “We could have done things faster by watering down the regulatory framework and relaxing requirements,” says Minister Pérez Mackenna. “But instead we wanted to learn from the earthquake and use the opportunity to not just maintain standards, but strengthen them.”

A LESSON LEARNED

The Minister is justifiably proud of the progress that Chile has made in just over 3 years. But he is careful to counsel others on the dangers of painting too rosy a picture when they face similar circumstances.

“One of the many things I’ve learned in this experience is that you have to be careful to manage expectations,” he says. “You have to convey the message that everything won’t be fixed in just 1 or 2 years – because you look at other countries where it’s taken 8 or 10 years. Building full or partial housing for 200,000 people in less than 4 years is a tremendous achievement.” ■





BUILDING A STRONG FOUNDATION FOR AFRICA

By **Cristina Alberto**, KPMG in Angola

Nowhere is infrastructure resilience more important than in Africa. As the continent once considered 'dark' emerges into a brilliant new era of growth and stability, much of its success will depend on the quality and resilience of infrastructure. Investors will demand efficiency; a growing middle class will demand quality and both will increasingly expect that – when they flick a switch – the lights will come on and stay on.

"Never before has Africa's massive wealth and potential been so evident; this is truly an age of ascendency for Africa's economies and people," noted Lord

Michael Hastings, KPMG's Global Head of Corporate Citizenship. "But if we want to make the kind of human progress that will be necessary to end the continuous cycle¹ of poverty and desperation that – to this point – has largely characterized Africa's story, we need to make sure that infrastructure is resilient, well-planned and up to international standards."

HARDENING INFRASTRUCTURE AND SYSTEMS

Africa's business leaders recognize the importance of resilience in infrastructure. According to a recent KPMG survey¹ of

business leaders across 18 African countries, disruption to critical infrastructure ranked as the second highest risk facing Africa's organizations (just slightly behind disruption to IT systems and data which – one could argue – is almost entirely dependent on the ongoing resilience of critical infrastructure such as power and ICT networks).

Not surprisingly, the risk that concerned respondents the most after IT and infrastructure disruption was the risk of fraud and corruption, an issue that also has a direct impact on infrastructure resilience. "Time and again, we see infrastructure being put up cheaply in Africa because money

¹ Business Continuity Management in Africa: Building resilience in a volatile environment; KPMG Africa Limited, 2013



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There is a clear opportunity for the donor community and national governments to really start thinking about how their investments can be used to inspire the embedding of international standards and best practices around building designs, environmental designs, business continuity planning and resilience planning.

Lord Michael Hastings, KPMG's Global Head of Corporate Citizenship

has been siphoned off to pay bribes or line suppliers' pockets," added Lord Hastings. "The only way that this issue can be addressed is by embedding governance models that ensure transparency between governments, businesses and industry so that the investment resources that are applied actually stay as investment resources."

DELIVERING TO A HIGH STANDARD

Africa's fast economic growth has highlighted the need to pay more attention to risk management and ultimately to business continuity management (BCM) as a corporate discipline, to achieve organizational resilience, protect shareholder value and prevent financial loss and reputational damage.

A major challenge for Africa's businesses in general (and infrastructure operators in particular) is the fact that business continuity is not yet embedded in most organizations' culture. Two thirds of the respondents say they have a business continuity program in place (65 percent), but more than half either have not implemented the majority of BCM components or have not reviewed them in the last 3 years. These organizations will most likely not be able to respond to an operational disruption successfully.

"There has been a tendency for people – both on the continent and off – to assume that Africa's population can survive on dodgy infrastructure and an inadequate supply of services, but that's simply not the case," said Lord Hastings. "Private companies, development organizations and infrastructure developers need to rise to a higher standard both in the construction and operation of critical infrastructure."

A NEW MINDSET

According to Lord Hastings, who has spent much of the past few years visiting projects and talking with government leaders across Africa, one of the most frequent causes for infrastructure disruption in Africa comes from a failure to consider all of the interdependencies required within a modern infrastructure system.

Lord Hastings tells a story of a trip he took to Senegal to visit an irrigation project that had been funded by EU countries to help local farmers create an export market. Recognizing that there was now a secure source of water in the area, the government (with some development partner support) built a brand new school adjacent to the site. But what they did not do was put proper ventilation into the school or a way to power it, so ultimately the new social infrastructure asset was a failure.

The same applies to most modern businesses whose success depends heavily on the resilience of critical infrastructure such as power, telecommunications and transport. And while in the past businesses accepted service failure naturally, this will not likely be the case in the future as modern businesses demand immediate response, and downtime represents heavy financial losses and reputational damages.

"There is a clear opportunity for the donor community and national governments to really start thinking about how their investments can be used to inspire the embedding of international standards and best practices around building designs, environmental designs, business continuity planning and resilience planning," added Lord Hastings. "All parties – public, private and donors – need to start seeing infrastructure as an investment in the growth potential of an economy rather

than simply the delivery of a building or facility; and that's a different mindset altogether."

POSITIVE SIGNS EMERGING

The survey does suggest, however, that African business leaders have recently started to take the need for greater resilience more seriously. Business continuity programs are increasingly sponsored by the Board of Directors and the majority of respondents (80 percent) said they have an IT Disaster Recovery Strategy and an IT Disaster Recovery Plan.

Other BCM components are not so well understood, perhaps due to the fact that international BCM standards are not yet followed by 61 percent of respondents. Many companies do not perform business impact analysis to determine critical business processes and adequate business recovery strategies (40 percent). Crisis management, business recovery plans, BCM training and awareness, and BCM performance evaluation are not yet common practices in Africa (less than 50 percent).

"I see some positive signs, both in the data and in my travels across the continent, that governments, aid organizations and the private sector are starting to put additional focus on ensuring the resilience of their infrastructure assets, but more must still be done," added Lord Hastings. "And in my opinion, there has never been a more critical time for Africa and its supporters to get this right." ■



Out of ashes: Becoming the safest gas utility in the US

By **Geno Armstrong**, KPMG in the US



Three years ago, residents of San Bruno, California were rocked by a natural gas explosion that resulted in the deaths of eight people and the destruction of 38 buildings. Since that time, Pacific Gas & Electric (PG&E) has placed a single-minded focus on improving the safety of their assets and rebuilding trust with their customers, communities and stakeholders.

Shortly following the incident, PG&E hired **Nick Stavropoulos**, a seasoned gas executive with deep experience enhancing safety, to lead their gas operations and drive their new focus on putting safety first. **Geno Armstrong**, KPMG's Global Leader of Major Projects Advisory, recently sat down with Nick Stavropoulos to find out how PG&E is changing the way utilities manage risk and improve safety.

Geno Armstrong (GA): Nick, tell me about the situation that PG&E was facing when you joined the organization.

Nick Stavropoulos (NS): PG&E had been actively responding to the incident for a few months before I parachuted in, so the company had already gained a lot of knowledge from the immediate aftermath. I think it was important that there was already an understanding among the board and senior management that – while there were many elements that contributed to this incident – we had to recognize that it was our pipe, that we were ultimately responsible and therefore we had to do whatever was necessary to minimize the risk that anything like this could happen again.

This led us to take on a rather audacious goal to become the safest gas business in the country. I'll admit that – at the time – we didn't really know what that meant. But it's encouraged us to really strive to identify things that we can achieve and measure, both from an asset standpoint and from a cultural and organizational standpoint, that would drive us to become a safer organization.

GA: That's a big goal to achieve. What was the first thing you did when you arrived at PG&E?

NS: To start, we immediately split apart the gas business from the electricity business. This allowed us to really focus on ensuring that we did what was best for our gas infrastructure, business and customers.

We then began the process of putting together a plan for the specific actions we would take to improve the infrastructure. Two months after I arrived, we had put together a pipeline safety enhancement plan that launched a multi-year effort to strengthen and test our pipes, replace them where necessary and install remote or automatically-controlled valves. We also rebuilt our asset knowledge database so that we could validate – with traceable and verifiable records – what the maximum operating pressure of our pipelines should be.

GA: I assume that the asset knowledge database has allowed you to constantly monitor safety measures on all of your assets and then make intelligent investment



decisions based on real and verifiable information?

NS: Right. Infrastructure operators – no matter what sector they work in – must really have a good understanding of what assets they have and what they are responsible for. You then break those assets out into homogeneous asset groups, understand their condition and then put in place mitigation strategies to address all of the risks that those assets face.

To put it simply, it's OK to have an old roof, but you'll need to make sure you are inspecting it more frequently and taking a look underneath to see if you have water leakage or other structural problems. The bottom line is that you can't just ignore problems; you have to find them and fix them before they find you.

GA: *What role has culture played in making PG&E a safer organization?*

NS: Changing our culture is actually where I spend a large part of my effort. We firmly believe that a safety-first culture is essential to our long-term success. What we realized was that replacing physical assets was only treating the symptoms. We had to make sure we were focused on the underlying cause if we really wanted to become the safest gas company in the country.

One of our historical problems was that we had developed a discipline-oriented culture; when things went wrong, somebody was blamed. What we learned from examining other companies that had emerged from similar safety issues was that we needed to adopt an open, transparent culture where people are encouraged to step up and tell us if they see something wrong. Today, our employees know that if we don't know about it, we can't fix it and so they are encouraged to tell us if anything falls outside of the standard.

We had our annual employee engagement survey recently and noticed that our engagement numbers had gone up by 600 basis points – which is a dramatic improvement in just one year – and I believe that it's because we are working to make sure our people are involved in our safety culture.

GA: *How have you worked with your stakeholders to create a safer and more resilient utility?*

NS: One of the first things we did was reach out to our two unions – the International Brotherhood of Electrical Workers (IBEW) and the Engineers and Scientists of California (ESC) – to ask for their help. We explained what we needed to do and committed to involve them in issues identification and brainstorming exercises to come up with the suggestions and changes that would ultimately be incorporated into our plan. They have been fantastic partners and – by bringing them in as a collaborative party to all of this – we've been able to enact change much faster than we would have done otherwise.

We also worked closely with – and received great support from – the National Transportation Safety Board (NTSB) and the independent review panel that was engaged by the California Public Utility Commission to investigate the incident. The NTSB had 12 recommendations that were made on the back of that investigation and – to date – we've managed to put seven to rest and are actively working towards implementing the remainder.

GA: *What advice would you give infrastructure operators in other sectors and geographies?*

NS: You really have to remember that when you take on this job – and want to do it right – you have to always be asking yourself if you are doing the right thing. You need to be able to look your board, your employees, your regulators and your customers in the eye and say that you are doing the right thing; not the minimally compliant thing, not the most cost effective thing, but the right thing for customers, the community and the business.

You also need to remember how fickle trust is in today's society. Once something happens, it's just amazing, the trust evaporates. And once broken, it is one of the hardest things to get back.

GA: *What are you most proud of since joining PG&E?*

NS: One of my key metrics for success is what I call our 'say versus do ratio'. And I'm proud to say that our ratio is currently at one. In other words, we have done everything we said we would do. We said we would hydrotest 152 miles of pipe, and we did it. We said we'd validate all 6,750 miles of transmission network, and we did. Every single target we have set to improve safety, we have achieved and that is something the entire organization – all 20,000 PG&E employees – can be really proud of.

I also can't say enough about the support we have received from our unions, industry regulators, competitors and service providers who have helped us every step of the way to fundamentally turn our safety record and approach around. ■



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What we realized was that replacing physical assets was only treating the symptoms. We had to make sure we were focused on the underlying cause if we really wanted to become the safest gas company in the country.

Nick Stavropoulos, Executive Vice President of Gas Operations, Pacific Gas & Electric (PG&E)

Saving money
time and reputations with

SUPPLIER RISK MANAGEMENT

By **Roger Bayly** and **Andrew Burn**, KPMG in the UK

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The challenge, in most cases, often comes down to poor planning and lack of rigor at the outset of the project. We believe that a vast majority of project delays and failures could be eliminated entirely if proper focus was placed on ensuring that contracts are developed and executed properly.

Few things are as embarrassing or damaging as project delays – or, worse, failures. So it is surprising how often we see major infrastructure projects missing targets or pushing back deadlines due to unforeseen circumstances.

Many would suggest that the blame for missed deadlines and delays lies squarely on the shoulders of the current financial environment. There is some truth to this; both governments and private investors are making difficult choices about where to invest their limited funds and – occasionally – this means underfunding or delaying one project in order to allocate funds to another. We would argue, however, that this is simply market forces at their best: capital should always flow to the places that provide the best return – either in financial terms or as improved service delivery.

In our experience, it is not the weak financial environment that is the most common reason for project delays, but rather that companies are simply not close enough to their suppliers and are therefore missing clear ‘stress triggers’. More often than simple financial stress, it is a failure – or more specifically a lack of resilience – within the supply chain that is the real culprit behind project delays.

Maybe a critical part has not been delivered on time or to spec; or a natural disaster has delayed shipping of key components; or a supplier simply does not have the experience or capacity to meet their contractual obligations. All of these issues – and countless more – could mean the difference between project success and failure.

All of this may be about to change. A small and savvy group of infrastructure players have recently started to place renewed focus

on improving their approach to supplier risk management and resilience. Not surprisingly, evidence shows improving rates of success in those organizations that get their supply chain right.

THE RIGHT WAY, NOT THE EASY WAY

Infrastructure leaders seeking to better manage their supply chain risk should start by looking at their contracts. Are they working with one supplier or a variety of suppliers? Have all interdependencies been assessed and understood? Have measurable targets been incorporated and are they being monitored? How are risks being mitigated within the contract?

The reality is often that simplicity and cost considerations have been prioritized over rigor when it comes to contracts. For example, we recently worked with a major infrastructure investor who – for a massive and rather complex project – opted to contract the work out to one ‘prime’ developer. This allowed them to reduce some costs, streamline reporting and allocate risk and responsibility conveniently.

Once the project got underway things began to unwind. The developer (a top tier global construction group), in an effort to save costs and reduce complexity, elected to conduct much of the work ‘in-house’ rather than contracting to specialist providers. Moreover, the contracts that were tendered did not provide the developer with sufficient ability to monitor – or act – on their key performance indicators. As a result, the project quickly started to go off the rails.

TAKING A DETAILED APPROACH

The challenge, in most cases, often comes down to poor planning and lack of rigor at the outset of the project. We believe that a vast majority of project delays and failures could be eliminated entirely if proper focus was placed on ensuring that contracts are developed and executed properly. But once contracts are already in place, the challenge of retroactively implementing stronger supply chain risk and resilience practices is often much more difficult.

Our client, the developer, needed to go back to the very beginning to reassess each parcel of work and identify which skills, capabilities and assets would be required to properly fulfill each parcel. Next, they needed to define what the key performance indicators would be for each supply line and supplier and plan how those would be measured and evaluated. They then assessed the potential market and counter-party risks



and finally – rather than simply lumping all the parcels into one mixed bag – sourced the right group of suppliers to not only meet their unique specifications, but also to provide some spare capacity where needed.

The client also applied a simple piece of technology to gain greater visibility into their supply chain. Essentially, the software allowed the developer to view a set of both financial and non-financial data – keyed in directly by each supplier – which in turn helped generate a balanced score card and supported more effective risk identification.

The value has been immense. Not only did the project suppliers have a clearer understanding of what was expected of them, so did the developer. Milestones and metrics allowed for weekly – even daily – evaluation of progress while targeted sourcing approaches meant that each supplier could be counted upon to meet their quality, quantity and timing requirements. Moreover, the developer achieved unprecedented

visibility into their Tier 2 and Tier 3 suppliers which allowed them to better identify supply challenges before they occurred.

KEEPING THE LIGHTS ON

Once an infrastructure asset is operational, managers and owners must continue to focus on enhancing their supplier relationship management techniques to ensure they add resilience and mitigate risk in a way that enables the facility or asset to continue to operate effectively.

But while there are certainly distinct differences in the frequency, scale and monitoring of operational supply chains versus 'capital build' supply chains, the fundamentals are surprisingly similar: understand the unique interdependencies and specs for each element, assess the potential suppliers, and create robust and appropriate contracts to ensure supply risks are mitigated.

Regardless of whether you are planning a supply chain for a development project or

an operating asset, one consideration must remain above all else: logistics. Procuring and paying for a new gas turbine will not do any good if you cannot get it from the manufacturing site to the development site.

Some items will be fairly easy to transport: gravel and dirt are generally sourced locally and almost any truck will do; uranium fusion cores for nuclear power plants will require more specialized and sophisticated logistics providers. Ensuring that third party logistics providers have the appropriate capability, competency and financial security will therefore be key.

Ultimately, we believe that those infrastructure developers, owners and operators that are able to take a considered and detailed approach to their supply chain will not only reduce project delays, limit down time and minimize cost over-runs, they will also be more likely to eliminate unnecessary risks, enhance their resilience and protect their public reputations. ■

Against all odds: A world leading miner bets on resilience

By **Duncan Calder**, KPMG in Australia

While Fortescue Metals Group (Fortescue) may only be 10 years old, the organization has quickly become one of the world's leaders in iron ore production and sea-borne trading. But it is not just their growth that has been remarkable; so too has their attention to resilience planning. With the majority of their operations located in one of Australia's most remote and inhospitable terrains, the organization provides a unique view into how some organizations are dealing with dramatic resilience challenges.

GOING FOR GROWTH

Start with the massive and unprecedented rate of growth that the company has experienced. What started as little more

than a handful of mining tenements in the remote but resource-rich Pilbara region just 10 years ago has quickly grown into an operation that moves more than 120 million tonnes of ore per year. And growth has not abated; Fortescue added around 50 million tonnes of new capacity last year and will accomplish the same feat again this year to reach a 155 million tonnes per annum run rate by year end.

"We oversaw a very rapid expansion that was designed to take advantage of the massive demand for iron ore coming out of China," noted Neville Power, CEO of Fortescue. In just 10 short years, the company has successfully developed one of the most sophisticated private infrastructure networks in the world. Roads, rails, ports, airports, villages and power







facilities were needed to mine and move the ore to customers in China, not to mention all of the core mining infrastructure that would be required on three distinct and separate locations.

"Since 2008 we've dramatically expanded both our discovered resource and our operational footprint," added Mr. Power. "We've developed two new mine sites, expanded our rail service to those mines, added much-needed duplication to sections of our main rail line and expanded the Herb Elliott Port at Port Hedland by almost 120 million tonnes."

LOCATION CREATES CHALLENGES

What makes all of this rapid growth and infrastructure development so remarkable is that it was achieved in one of the world's most remote locations. Sitting some 1,500 kilometers north of Perth and 300 kilometers south of the port facility at Port Hedland, the mine sites are extremely isolated. Supplies, hardware, mine equipment

and even people must be brought in either by air or – in the case of more regular supply runs – via long-haul truck convoy.

"You start to think about all of the interdependencies of running a site in a remote location," added Mr. Power. "Putting employees on the mine site meant building fully self-contained villages with all of their own infrastructure such as power and water; then we built three aerodromes capable of handling 737-800 size aircraft to move the people and cargo in and out."

But it's the rail line that operates as the life-line to and from the mines. Running more than 300 miles from pit to port, the lines were built to carry 40 ton axle loads at 80 kilometer-per-hour speeds. That feat of engineering secured Fortescue a place in the Guinness Book of World Records in 2011 for the fastest and heaviest haul rail system.

Managing the supply to the mines creates particular risk management and resilience considerations. "We have to make assessments about what is critical and

manage our stocks in Perth, Port Hedland and the mine sites accordingly," added Mr. Power. "But we also recognize that if we were aiming to get it right 100 percent of the time we'd be being too conservative, so we aim to get it 90 percent right and then recognize there is a chance that we may need to bring in a few things by air or courier truck if we get it wrong."

PREPARING FOR NATURAL EVENTS

If managing the risk of rapid development in a remote location wasn't enough, Fortescue also faces threats from the environment. At the mine sites, rainfall can top 40 milliliters per day during the wet season, which is followed by ten months with absolutely no precipitation at all. More importantly, both the port and the mine sites can face disruptions during cyclone season.

"Mitigating and managing these climate risks can add a lot to the construction and development of the mines and rail infrastructure," admitted Mr. Power. "For



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Putting employees on the mine site meant building fully self-contained villages with all of their own infrastructure such as power and water; then we built three aerodromes capable of handling 737-800 size aircraft to move the people and cargo in and out.

Neville Power, CEO of Fortescue Metals Group



example, we've had to build a massive number of culverts and bridges which – in the dry season – look downright strange because of their scale, but when the rain comes it's this fore-planning that allows us to keep operations running all year round."

Besides incorporating duplication into the main haul line design and development, Fortescue has also taken extraordinary steps to ensure that the rail line sees as little impact as possible from flooding events. At the start of the cyclone season, for example, the company distributes rail and earth moving equipment down the line so that repairs can be done simultaneously at various points without waiting for equipment to make it down from the port or mine sites.

And while the organization relies heavily on engineers and designers with extensive experience operating under these difficult conditions, they also look to the local population and especially the pastoralists and traditional owners for tips on how to enhance the mine's resilience.

"One of our key sources of information has been the long-term residents of the area and particularly the cattle property owners and the traditional owners who have shared their observations about how the flows operate in the wet season and where drainage can be an issue," added Mr. Power. "That's allowed us to take into account the longer-term resilience of the local environment as well as our assets; we're protecting the Molka Acacia tree which plays a key role in reducing the impact of erosion in the area."

BUILDING COMMUNITY RESILIENCE

Fortescue also recognizes that resilience is not just about hardening assets and reducing supply chain risk. The company is also keenly focused on enhancing the resilience of the local population as well. More than 12 percent of the company's workforce is made up of indigenous people and the company has – to date – tendered more than AUS650 million worth of contracts to indigenous companies and joint ventures.

"We recognize that there is not a lot of employment opportunity in these areas and often the community is dealing with substance or alcohol issues, so we've focused on providing vocational training facilities and providing business opportunities," said Mr. Power. "We've also guaranteed jobs to anyone that completes the training."

Already, more than 2,000 people have been through the training program and today more than 450 program graduates work within the operations. "We want to help make the community more resilient by helping provide jobs and genuine opportunities for development."

For Fortescue, it's all part of the effort to create a more sustainable and resilient organization. "We operate in some of the harshest climates and environments in the world," noted Mr. Power. "I believe that our attention to resilience planning has enabled us to grow and develop by providing us with the confidence that we can maintain our operations in the face of massive odds." ■



Using recovery to enhance resilience: **Exceeding expectations in Sichuan Province**

By **Stephen Ip**, KPMG in China

When the magnitude 8.0 earthquake struck southwestern China on 12 May 2008 the impact – particularly in Wenchuan County where the quake was centered – was devastating. The disaster directly affected more than 47 million people¹ and left more than 85,000 people either missing or dead.

The toll on physical assets was equally severe. Approximately 34,000 kilometers of highway, more than 1,200 reservoirs, almost 7,500 schools and more than 11,000 hospitals and clinics were significantly damaged or destroyed,² as were more than 5.5 million rural and 860,000 urban homes.

Following the disaster, China's government jumped into action with a pledge to spend more than RMB1 trillion (around US\$150 billion) within three years to completely rebuild ravaged quake areas. This funding included investments in waterways, highways, schools and hospitals. The World Bank also assisted in the post-disaster reconstruction by providing funding and advisory support as part of the Wenchuan Earthquake Recovery Project (2009 to 2014).³

FOCUSING ON RESILIENCE IN RECOVERY

Under the Wenchuan Earthquake Reconstruction Master Plan outlined by China's State Council, the central and local government decided to not just rebuild Sichuan, but to focus on creating stronger and more robust infrastructure within the province, while also enforcing higher safety standards on every project.

Activity immediately began at the epicenter of the crisis – Wenchuan – which is a medium sized county of around 100,000 people. The county lost almost everything to the earthquake: waterways, phones and internet lines, homes, schools, hospitals,

¹ <http://www.worldbank.org/en/news/feature/2012/04/10/china-restoring-improving-education-in-earthquake-struck-areas>

² <http://www.shihang.org/zh/news/feature/2012/12/04/supporting-post-earthquake-recovery-in-china>

³ <http://www.shihang.org/zh/news/feature/2012/12/04/supporting-post-earthquake-recovery-in-china>



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The inland western regions of China and, in particular the populous regions of Sichuan and neighboring Chongqing, are critical to China's overall growth plans. I look forward with optimism to seeing how the investment that is flowing strongly today will enhance the development of China's western region over the next five to ten years.

Jacky Muk, KPMG China's Senior Partner in Chengdu

bridges and highways. In the immediate aftermath, just trying to leave the area proved almost impossible.

As efforts to rebuild a stronger, more resilient community continued locally within Wenchuan, activity started to pick up pace within the larger cities and provinces impacted by the event. Other – more wealthy – regions pitched in, with Guangdong and Shanghai donating significant funds towards the reconstruction effort and providing professional workers and builders who lent their skills to developing stronger and more effective infrastructure.

The impact of the program on the affected region has been amazing. In just three years, travel time from Wenchuan to Chengdu (the provincial capital) fell from half a day to just one hour as a result of newly connected and rebuilt highways. Right across the region, scenic riverside roads, new schools and modern hospitals have been meticulously rebuilt.

MAINTAINING A FOCUS ON FOREIGN DIRECT INVESTMENT

While the Wenchuan Earthquake (as it is commonly referred to in China), inflicted heavy losses to Sichuan, the province's productive capabilities, cultural heritage and economic potential avoided any permanent damage.

Many areas within Sichuan have not only been able to construct more efficient infrastructure, but have also become significant tourist attractions that preserve the area's unique ethnic culture famous around the world for embroideries, buildings, unique religions and places of worship, customs, languages and festive celebrations.⁴

Many of the cities within Sichuan province have also continued to keenly promote the advantages of southwest China to the rest of the world. In particular, Chengdu led the way by continuing the development of technology parks and reinforcing the strong business advantages of the region including relatively low rent, personnel and utilities

costs, as well as a friendly enterprise culture for foreign businesses.

According to Jacky Muk, KPMG China's Senior Partner in Chengdu, "The past five years have seen enormous efforts from all government levels, people, and businesses in Sichuan to not only rebuild the physical infrastructure and the province's image as an attractive investment destination, but also to help those in the quake zone who survived the disaster and assist the general population to recover to a level that I did not imagine was possible at the time."

HOSTING THE WORLD IN SICHUAN

Clearly, the combination of more resilient infrastructure and a keen focus on attracting foreign investment is paying off. In the immediate aftermath of the quake, many foreign businesses – such as Dell, Unilever, Intel, Amazon and Carrefour – responded by making donations and hefty capital investments into infrastructure and other plant property and equipment facilities in the province; a particularly notable achievement for the province given the earthquake came at a time when most global business operations were either flat or contracting on a global level.

Significant private sector investment has gone into making the province more productive. In 2009, for example, Intel invested an additional US\$75 million in Chengdu and officially announced that the company's west China distribution center would be located in the Chengdu Hi-Tech Industrial Development Zone. The company also declared its intention to integrate its assembly and testing facilities in the city.

Unilever is another fantastic example of a company that invested in the province. Immediately following the quake, Unilever donated US\$2 million, which went directly to the rebuilding of elementary and middle schools in the hardest hit areas

around Chengdu. By the end of this year, the company also expects to complete construction of its new US\$45 million laundry detergent plant in Chengdu.

WENCHUAN WINS ACCOLADES

At the sixth annual Global Forum on Human Settlements held in New York in 2011, Wenchuan County was recognized for their great achievements and honored with the award for the 'World's Best Implementation of Post-Disaster Reconstruction'.⁵ The award recognizes not only how disaster relief was planned and executed, but also what resources were utilized and how the town's culture was preserved.

From its blueprint and plan through to the design and implementation, the post-earthquake recovery and reconstruction effort is now widely viewed as a 'leading practice'⁶ and offers the world a valuable example of post-disaster reconstruction. In particular, the plan's focus on ecologically-friendly and low-carbon concepts within the reconstruction projects is often noted for the way it integrated with people's lives.

In June 2013 Chengdu hosted the Fortune Global Forum, further reinforcing the importance of the province to the global business community. As Jacky Muk noted following the event, "The inland western regions of China and, in particular the populous regions of Sichuan and neighboring Chongqing, are critical to China's overall growth plans. I look forward with optimism to seeing how the investment that is flowing strongly today will enhance the development of China's western region over the next five to ten years." ■

*Special thanks to Robert Ritacca (Research Manager, KPMG's Global China Practice, KPMG China) for contributions to this article

⁴ http://www.chinadaily.com.cn/cn/2013-05/11/content_16491875.htm

⁵ <http://english.people.com.cn/90001/90776/90882/7361749.html>

⁶ <http://7ibb.com/viewthread.php?tid=875&extra=&page=7>

Putting resilience on the DEVELOPMENT AGENDA

An interview with Professor Stefan Dercon, Chief Economist of the UK Department for International Development

By **John Burton**, KPMG in the UK

Few understand the concept of resilience as well as those living in the slums surrounding Mumbai or begging in the markets of Lagos. Indeed, it is the poorest and most vulnerable who are usually most at risk from the impact of sudden shocks.

All signs indicate that developing countries will be those hardest hit by the effects of climate change: in Africa, 70 million people and 30 percent of the coastal infrastructure could face flooding by 2080 due to rising sea levels¹ while more than a billion people living in Central, East, South and Southeast Asia could suffer reduced – or no – access to freshwater,² setting off an unprecedented wave of environmental migration. Resilience is a matter of life or death for many in the poorest countries.

REDUCING RISK TO BREAK POVERTY

For the international development community, climate change and its impact on the world's poorest will be one of the greatest challenges. According to Professor Stefan Dercon, Chief Economist of the UK's Department for International Development (DFID), "We're seeing increased weather variability and risks of natural disasters and – while many of those that the development community tries to help are fairly adept at handling risk – we think there is a significant need for the strengthening of these societies and the development of new ways of coping with the vagaries of weather or other sudden shocks."

As an economist, he also notes strong socio-economic reasons for enhancing resilience in developing countries. "People living in a risky environment tend to avoid undertaking high return activities because they often come with high risk. One of the goals of the development community should therefore be to help lower the negative consequences of these risks, support people to take advantage of opportunities and break the cycle of poverty," he added.

TRANSFERRING SKILLS AND CAPABILITIES

Helping to enhance capability and encouraging capital flows to projects in the areas of greatest need are among the most important ways that the international development community can help build resilience within developing countries. "We want to focus on building up technical expertise and delivery support capabilities alongside our investments so we always focus on working within partnerships," Professor Dercon advised.

DFID is also active in helping governments to develop their investment opportunities to attract foreign capital and investors. "Our preference is to use our grants to encourage the creation of Public Private Partnerships (PPPs) or partnerships between governments where we can apply our experience and expertise to help projects get delivered," he added.



Stefan Dercon
Chief Economist of the UK
Department for International
Development

“One of the goals of the development community should therefore be to help lower the negative consequences of these risks, support people to take advantage of opportunities and break the cycle of poverty.”

¹ <http://www.one.org/c/international/issue/947/>

² Intergovernmental Panel on Climate Change Report



CHOOSING THE RIGHT PROJECT

The international development community is struggling with a number of challenges when it comes to investing in resilience. One significant challenge is the need to identify projects that deliver longer-term development benefits and enhance resilience without locking countries into particular technologies or positions that may not prove appropriate in the longer term.

At the same time, DFID and other agencies are scrutinizing projects more carefully to ensure that major risks – particularly those related to the impacts of climate change – have been considered and mitigated. “The way projects are designed and structured

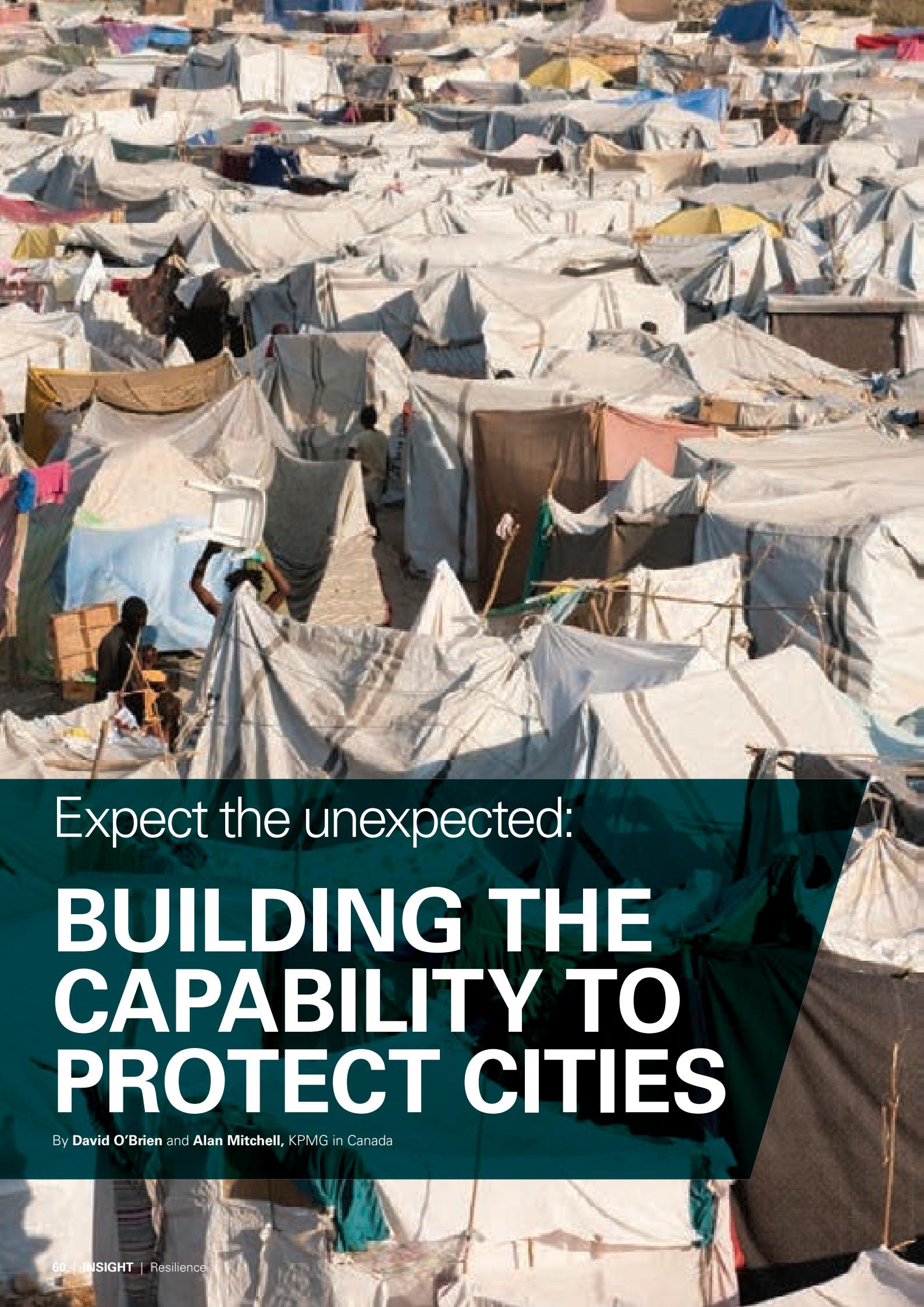
will have a long-term implication from a resilience perspective. So for example, any new port infrastructure in developing regions will need to have the ability to deal with issues such as rising sea levels and this will require a high level of engineering skill and project capabilities which aren’t always available in these markets today,” suggested DFID’s Chief Economist.

A WIN-WIN OPPORTUNITY

This, however, should start to change as foreign players begin to recognize the growth potential and opportunity of working in emerging and developing countries. Indeed, the last decade or so has brought significant

change to most areas of Africa, Asia and Latin America. There are fewer conflicts today, economies have seemingly become more stable, and public institutions have been strengthened in many countries.

“There’s really a lot going on in the developing world and an increasing number of financing vehicles are working to bring in capital for investment in areas such as infrastructure,” noted the Professor. “My hope is that this will bring far more new entrants into these markets to increase competition, build local capabilities and enhance capacity. For the developing countries, that’s probably the most important form of resilience.” ■



Expect the unexpected:

BUILDING THE CAPABILITY TO PROTECT CITIES

By **David O'Brien** and **Alan Mitchell**, KPMG in Canada

If we have learned anything as a global community over the past decade it is that we should expect the unexpected. Unprecedented financial turmoil and sovereign debt crises; truly devastating hurricanes and terrible tsunamis; once-in-a-lifetime storms and once-a-century droughts; each seem to occur with more frequency and greater ferocity than ever before.

And with each event comes unanticipated or unpredictable consequences; social unrest, economic disruption, environmental degradation and other longer-term effects.

CAPACITY FOR RECOVERY

Yet as we watch these events hit city after city around the world, we are struck by the fact that some cities seem much more capable of responding to, and recovering from, sudden disasters than others.

In the more developed markets (where cities often have a longer history of effective city planning), we tend to see fairly strong response capabilities and disaster preparation. But even the best can get better. Take, for example, the experience of two major cities hit by storms last year.

Hurricane Sandy, which hit the US Northeast in October 2012, brought a 13.88 foot storm surge to the shores of New York City. And while defenses held up reasonably well, large sections of the city – including seven subway tunnels – were inundated with water and the city (including the New York Stock Exchange) virtually shut down for almost two full days.

Just a few months before, Hong Kong had demonstrated exceptional resilience when it was hit by its worst storm since 1999. The storm brought down thousands of trees and delayed hundreds of flights, but the city itself was able to return to business as usual within just 12 hours of the storm passing. The Hong Kong stock exchange was closed for a matter of hours.

Clearly, it is unfair to compare two very different cities experiencing two very different circumstances. But what these examples show us is that even well-planned and sophisticated emergency response plans often underestimate the damage and disruption that unplanned events can bring.

AN EMERGING RISK

The challenge for cities in emerging markets is much more complicated. In many cases, rapid urbanization and a history of ineffective (or more often, non-existent) city planning has meant that emergency response planning is often spotty at best. Add to this a history of underinvestment in infrastructure resilience and maintenance and the situation becomes

The road to greater city resilience and disaster response will not be simple for many cities in emerging markets. Some will need to start with the very basics of creating and properly authorizing a central emergency planning function.

dire. One only needs to look at the impact that floods had on Bangkok in 2011 or the effects of the devastating earthquake on Port-au-Prince to witness the challenges faced by those unprepared to respond to a crisis.

The road to greater city resilience and disaster response will not be simple for many cities in emerging markets. Some will need to start with the very basics of creating and properly authorizing a central emergency planning function. This will require cooperation across not only government departments, but also with private sector owners, operators and suppliers.

A ROADMAP FOR EMERGENCY PLANNERS

For their part, emergency planning officials in emerging cities will need to focus on four main areas:

1. *Assess the risk:* While some risks may be fairly well-known and defined, the increasing frequency of events suggests that emergency response organizations should not underestimate the potential for 100-year events to occur on a larger scale and much more often.
2. *Map the interdependencies:* As cities become more complex and infrastructure becomes more integrated within the urban setting, emergency planners will need to understand how failure in one service will impact other areas. Particular focus should be placed on the 'softer' interdependencies like social cohesion and unrest.
3. *Know your resources:* In many cases, emergency plans fail because resources were not available or not applied effectively. Emergency planners must develop a clear understanding of not only the available resources within the city, but also on a regional and national level if required.
4. *Establish a chain of command:* Both at a city-wide level and at a site level, it is critical that everyone involved in emergency planning and response understand exactly who is in charge. This will allow resources to be allocated more efficiently and responses to be better coordinated.

A MULTI-STAKEHOLDER OPPORTUNITY

Much more can also be done by governments, investors and developers to help create more resilient cities. For example, municipal governments will need to develop more effective building codes and rethink their preference for 'lowest-cost' tender processes when procuring critical infrastructure. Political support will also be required to ensure that the emergency planning department has both the mandate and the authority to act where appropriate.

Infrastructure developers and designers can use their extensive experience and familiarity with global leading practices to help their clients understand the risks and advocate for more resilient developments. Designers and engineers will also need to rethink their current assumptions regarding the frequency and ferocity with which sudden events may impact on their projects.

Investors – private, public or multi-national – can also play a part by demanding that assets demonstrate the highest safety and resilience standards and ensuring that their projects only use suppliers with the right experience, good quality products and a strong reputation for building. Investors will also need to ensure their contracts incentivize quality over cost.

BUILDING A COMMUNITY OF EXPERIENCE

As a community, we also have a role to play. We need to get better at sharing our experiences, challenges and successes with each other. We need to learn from those that have faced these challenges and – whether the recovery was a success or a failure – take away what we can to improve our response in other centers. And we need to bring together a wide range of stakeholders with important experiences to share, including NGOs and civil society groups.

But most importantly, we need to stop thinking about our future risks in terms of our past experiences. If we can take one thing from the last decade it is that we should be expecting the unexpected. ■

AFRICA THE RESILIENT

By **DeBuys Scott**, KPMG in South Africa and **Kogan Pillay**, Head of the Southern African Development Community PPP Network

When one thinks of Africa, the word 'resilient' is rarely top of mind. But no longer; prepare to meet Africa the Resilient. The simple fact is that – over the past ten years or so – Africa has become incredibly more resilient. Maybe not in the 'western' view of resilience (which often focuses on hardened assets, mitigated risks, emergency planning, and so on) but rather something far more important for Africa and other developing regions: market resilience.

"For Africa, the most important step we can take to enhance our resilience overall is to focus on building the right environment for the protection of private sector investment," suggested Kogan Pillay, Head of the Southern African Development Community (SADC) PPP Network. "This means stronger institutions, more encouraging legislation, more democratization and legislative protections within a recognized Public Private Partnership (PPP) framework."

A MORE SUPPORTIVE ENVIRONMENT

Certainly many of the wider challenges that have plagued Africa in the past are starting to be resolved. Rule of law and the spread of democracy have led to fewer wars across the continent and significantly more security. Bribery and corruption is at an all-time low in most markets, while economic growth

and prosperity is nearing an all-time high. More importantly, maybe, is that Africa is quickly developing an affluent middle class and strong consumer markets that will, over the coming decades, make up a larger and larger portion of international trade.

But creating a more secure and politically democratic environment for foreign investment is only part of the challenge for Africa. The continent also needs to demonstrate that it has the political will, capability and capacity to design, develop and then follow through on investments.

"The catalyst in the SADC area was the recognition about 10 years ago that we needed a joined-up infrastructure plan for the region," said Mr. Pillay. "That political support and prioritization set the tone for the region by showing that Africa's governments and politicians were serious about setting the stage for private and foreign investment and doing whatever it would take to protect that investment."

ENCOURAGING PRIVATE INVESTMENT

Progress has been strong since. In 2010, the SADC formed the PPP Network to help solve a few of the more critical challenges slowing private investment. One of the most important actions for the PPP Network was to help build capability and create funding mechanisms within the region.

"The truth is that capability is somewhat uneven, even across the 15-member SADC area which means that some markets may need more support than others," added Mr. Pillay. "Therefore, we've focused on creating some pilot PPP projects in many of these markets so that we can quickly identify where more refinement may be needed and demonstrate that our frameworks are viable and secure. We also recently created and publicized a regional PPP framework for policy, legislation and institutional arrangements."

The private sector will also have an important role to play in bringing greater resilience to Africa's investment climate. For one, private funds will be required if Africa is to bridge the massive financing shortfall that is currently slowing development. But more must also be done to improve Africa's capability and capacity.

"While most markets focus on improving the investment environment to attract private capital, some markets have seen the opposite work," added Mr. Pillay. "In Lesotho, for example, an early – and very successful – experiment with a PPP for a hospital has led the government to conduct regulatory and policy reform to set the stage for further PPPs. In other words, it's not a chicken and egg situation where regulation must precede investment."



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For Africa, the most important step we can take to enhance our resilience overall is to focus on building the right environment for the protection of private sector investment.

Kogan Pillay, Head of the Southern African Development Community (SADC) PPP Network



THE RIGHT STUFF

Interestingly, some foreign business people and investors have recently taken fright following a series of challenges to infrastructure projects and PPP arrangements across the continent. But in reality, these challenges should be cheered by the international community. "What these challenges show is that democracy is working well in Africa," noted Mr. Pillay.

"It's not just the population that is now empowered to challenge decisions; companies and investors enjoy significant rights as well, both before the courts and in the arena of public opinion."

All signs indicate that Africa is on the ascendency and – as its value on the world stage increases – investment will soon start to flow into the massive opportunities now underway across the continent. "I don't think

people outside of Africa truly appreciate the growth that is about to occur on the continent and few companies have yet taken the right steps to capitalize on the opportunities that Africa presents," noted Mr. Pillay. "My message to them is to take another look at Africa today, and I think they will find a very supportive and resilient environment for investment." ■

Rethinking emergency management

By **Paul Low**, KPMG in Australia



Craig Lapsley
The State of Victoria's Fire Services Commissioner in Australia



CK Ng
Executive Director of Airport Operations, Hong Kong International Airport



Murray Sinclair
Manager for Civil Defence and Emergency Management and Rural Fire in Christchurch, New Zealand

“Emergency management is no longer all about the people with the red and blue lights on their vehicles; it’s the government, it’s the community, and it’s the private sector that all have to work together. Emergency management is everybody’s business.”

That astute statement by Craig Lapsley (the State of Victoria's Fire Services Commissioner in Australia) aptly sums up the evolution that emergency management has undergone over the past few years. And he should know; Victoria is one of the most fire-prone areas in the world.

BROADENING THE VIEW

Where people once tended to think of emergency management simply as fire and rescue, today's infrastructure and civic leaders are now taking a much more holistic approach to the way they plan, prepare and execute their emergency management programs.

“In the past, emergency management has focused primarily on responding to the immediate threat. Preserving life is our number one priority, of course, but you also have to look at the disruption that these events cause in people's lives, and how they displace people from their homes and businesses,” Lapsley told me in a recent discussion on emergency management.

Looking at emergencies in this new light, an additional set of needs surface. It is no longer just a question of dealing with a specific threat, it is about understanding and planning for the full range of threats, recognizing the potential impact and responding to their consequences. For example, a heat-wave brings about excessive temperatures, potentially causing deaths. If wind is added, the bushfire risk increases, as does the potential for loss of lives. If bushfires then result in electricity failure, there will be a loss of air-conditioning, which

in turn makes it difficult to keep elderly and vulnerable people cool and further increases the potential for loss of lives.

CK Ng, the Executive Director of Airport Operations at Hong Kong International Airport, agrees with the need to think about and plan for the full range of threats. “When you talk about emergency management in the context of an airport, you need to look at many angles beyond the traditional considerations such as crashes, fires and floods. You really need to be taking a more proactive look at all kinds of incidents, even those that are not directly related to your particular operations.”

ENHANCING COORDINATION

I recently had the opportunity to talk with Murray Sinclair, Manager for Civil Defence and Emergency Management and Rural Fire in Christchurch, New Zealand, about how this new view of emergency management affected the response to the devastating earthquakes since 2010.

“I think that what was important was to get strong coordination between all levels of emergency management that had a role to play, including national, regional and local levels,” he noted. “During the earthquake in February 2011, for example, our National Controller of Civil Defence and emergency management brought everyone together in Christchurch as a single unit to ensure that there was one single line of command. That made a big difference and had an impact on how we approached emergency management in the city and across the country.”



Today, planning is taking place to have all of the critical stakeholders in emergency management physically located within a single building that will have a dedicated Emergency Operations Center. The first such center is expected to open in Christchurch in 2016 with others expected to be rolled out in urban areas in later years.

Working across various stakeholder groups to deliver a cohesive and effective Emergency Management capability is not easy and often requires coordination across public, private and community audiences.

"Shared responsibility and shared obligation are important," says Lapsley. "We try to take a systems approach to it that recognizes that government has an organizational capacity to facilitate everyone's involvement in emergency management. I think the fundamental improvement in the last few years is that we have a much more effective communication flow among all the players." In Victoria, these players include state and local government, emergency service agency employees and volunteers, private enterprise and local businesses, not for profit organizations and the broader community.

EVERYONE HAS A ROLE TO PLAY

Building a common understanding of roles and responsibilities is also key to ensuring an effective emergency management capability in this new environment. "Delegating authority to the right players so that they are empowered with the right structure to make the right decisions is critical," noted Sinclair.

So too is ensuring that everyone knows where they need to be and what they should be doing in each situation. "There are a lot of players that have a role to play in Emergency Response from the fire authorities through to security and facilities. At the airport, we bring all of these stakeholders together – particularly after a major event – to review our collective roles and responsibilities and see where we can make improvements," added Ng.

Not surprisingly, one of the key lessons for Lapsley, Sinclair and Ng has been the critical importance of ensuring that everyone has the proper training to fulfill their role. Ng reminds his people of their school lessons. "The teacher always said to do your revisions; go home, digest your lessons and do your homework and the same applies here. Though we still need to prescribe set actions for specific scenarios, we also need to ensure they can be applied with common sense – so more importantly, we need to help each person understand their role in an emergency and be able to go into 'autopilot' when and if they are called upon.

HAVING THE RIGHT RESOURCES AND CAPABILITIES

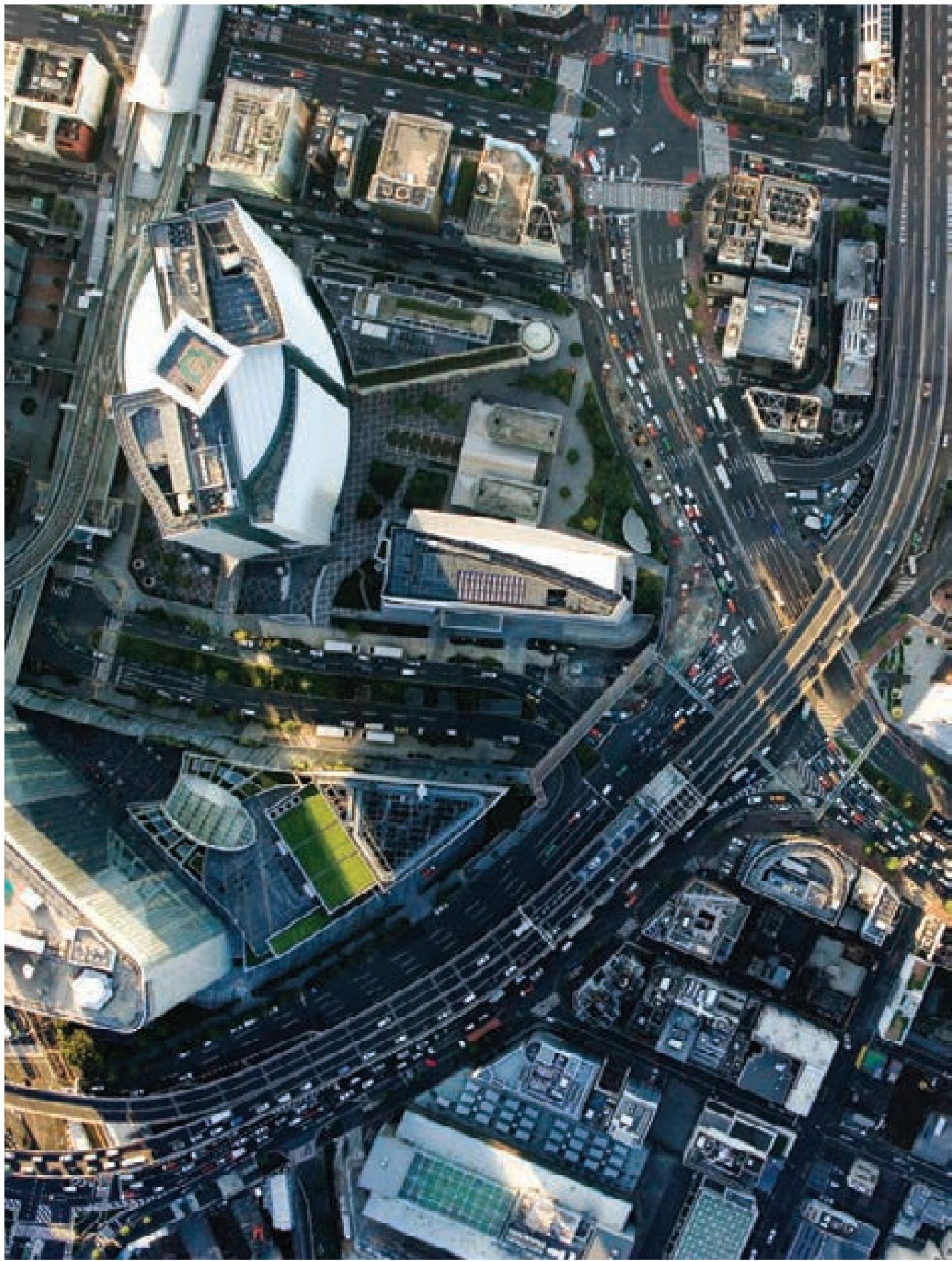
But when facing an extended emergency such as the earthquakes in Christchurch, resources are often run into the ground working around the clock. "We've been working to identify people within our organization who have skills that we would need in an emergency and then we are cross-training them to be able to step into

a role when our existing resources are too stretched out," added Sinclair.

Lapsley and Sinclair also note the importance of community resilience and response when dealing with an extended or massive event. "One of the biggest learnings I took from our recent experience was the value of having community response plans," noted Sinclair. "If the community is empowered, they can often respond much faster than a centralized group and can deliver a range of services that are most needed in that particular community."

Based on his experience with the Victoria fires – and particularly those of 2009 when more than 170 people lost their lives in a single day – Lapsley agrees that community response is critical. District nurses, who visit patients in their homes, for example, have a personal interaction with their patients and serve a primary role of addressing their medical needs. "But perhaps they know that some of their patients work in a heavily forested area," says Lapsley. "They can talk to those people about being prepared in the event of an emergency and they can share that information with emergency management teams when an event happens."

Underpinning my conversations with all three emergency management leaders was one important message: never become complacent. "Once you start taking for granted that you know your role or can manage a particular event, you start to lose your edge, your training and your awareness of your accountabilities," added Ng. "And then all of your hard work and capabilities are lost." ■





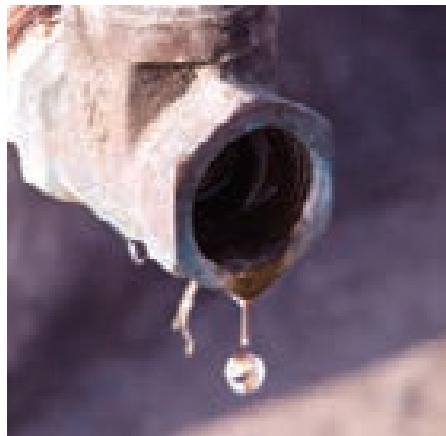
EMERGING TRENDS IN 2013

Trends that will change the world of infrastructure over the next 5 years

By **James Stewart**, KPMG in the UK and **Stephen Beatty**, KPMG in Canada

The past few years have been challenging for the infrastructure sector. Many governments around the world struggled to bring projects to market and, as a result, pipelines were thin. Financing markets continued to be tight, economic stability remained elusive and activity subdued. Looking ahead, the foundations for future growth are being laid and – for many markets – the prospects are exciting.

Earlier this year, we sat down with Nick Chism (KPMG's Global Head of Infrastructure) to examine the state of the infrastructure market and identify some of the key trends that, in our opinion, will change the way infrastructure will be delivered in the future.



TREND 1 – THE COST BURDEN SHIFTS TO THE CONSUMER

Around the world, consumers are feeling the pinch of infrastructure-related costs. Governments – strapped for cash and keen to unload long-term expenses – are increasingly starting to consider how they can shift their infrastructure spend from the taxpayer to the consumer.

This will invariably be political; rising energy costs or water bills are always sensitive topics. Regardless, one thing is clear: we have shifted onto a path of increased transparency and true user pay pricing.

While achieving this transition will be tough for most governments, it is the inevitable answer to infrastructure funding. More realistic pricing and user-pay services will lead to clearer price/consumption signals to users (thereby reducing the need for increased investment in the future), and allow governments to channel funds into higher priority or higher risk projects.

TREND 2 – GOVERNMENTS HAVING TO BECOME MORE ACTIVE

Governments are recognizing the need to take a more significant role if they hope to meet their citizens' infrastructure demands. The simple truth is that not every infrastructure project can attract private investment, meaning that governments are being forced to step up and fill the gap.

With direct public investment quickly becoming an option of last resort, many governments are finding more indirect – yet equally powerful – ways to influence the private sector development and financing market. In some cases, governments are directly intervening by structuring credit enhancements for riskier projects or offering guarantees to investors. In other markets – particularly in the developing world – we are seeing a rise in the role of multilateral-backed funding.

At the same time, governments are also looking at how they can create a more positive

environment for investment through better regulation. Where the user can pay, at least in part, enhanced regulation is as close as one can come to a silver bullet.

TREND 3 – PIPELINES ARE SUBDUED BUT WILL RETURN

With few exceptions around the world (most notably China), the past year has seen a scarcity of infrastructure deals moving through the pipeline. But this does not mean there is any lack of projects in development; in fact planners and project owners have been rather active over the past year thinking through their programs and preparing to take their projects to market while waiting for the right economic, financing, political and social conditions to emerge to support project success.

The upside of this, clearly, is that projects are spending much more time in the planning phase. As a result, we anticipate the next crop of projects come down the pipeline will – for the most part – be better thought out and ultimately more successful.

Based on our work and experience in the market, we believe that deal flow will improve in the medium-term and that we will start to see a welcome increase in numbers of new projects hitting deal tables.

TREND 4 – FOCUS MOVES ONTO CITIES

Cities have become the crucibles of a nation's economic activity. As a result, all levels of government – municipal, state/provincial, national and even international – are increasingly focused on creating the right mix of urban infrastructure to drive and support economic growth, and cities are leading the charge.

Out of cities, a new trend is starting to emerge that ties infrastructure investment to economic growth. Rather than being driven by investment in individual projects or sectors (an occupational hazard for siloed local governments), a growing number of

cities now realize they can maximize their investment and enhance long-run economic returns by carefully considering what project or, more importantly, combination of projects will provide the best bang for their buck.

In Greater Manchester (in the UK), for example, city leaders focused on improving connectivity with the suburbs, revitalizing the downtown core and attracting tourists through infrastructure development which, in turn, has increased economic activity and tax revenues collectable by government across the region.

TREND 5 – MAKING THE MOST OF EXISTING ASSETS

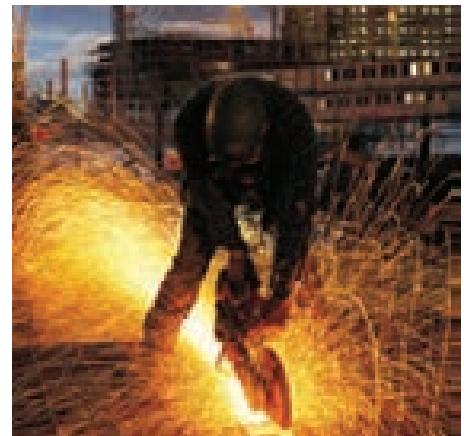
As project owners struggle to get new projects off the ground, more focus is being given to existing assets. In some cases, owners are looking to extend the lifespan of their assets to the limits which, in turn, requires improved operational management to ensure that maintenance and investments are being properly deployed.

In other cases, asset owners are exploring ways to 'bolt on' new technologies and innovations that enhance the asset's long-term value, expand capacity or make it more resilient for the future. Others are investing in technologies to improve the overall efficiency of their assets, meaning fewer new assets need to be developed in the future.

Governments are also looking at how they can make the most of their existing financial assets by conducting asset sales in order to recoup their investment which, in turn, can be 'recycled' into new projects and assets.

TREND 6 – RESILIENCE RISES UP THE AGENDA

Over the past few years, infrastructure participants, governments and the private sector have become painfully aware of the importance of resilience planning. In large part this is because increased interconnectivity among elements of society's infrastructure, meaning that a failure of one piece of



infrastructure may have significant knock on effects across the system.

Protecting valuable assets from the impact of disasters is therefore key to economic and political stability. But so too is recovery time. Consider the experiences this past year of Hong Kong and New York, both hit by equally violent storm systems. New York took almost one week to restore power and bilge out subways and road tunnels; Hong Kong was back to 'business as usual' within 24 hours.

We have also seen increasing incidence of critical infrastructure systems being hacked and hijacked by state-sponsored actors, 'hacktivists' and even teenaged ne'er-do-wells. The repercussions of security failure in the face of a well-planned attack could be disastrous, and so governments around the world are putting pressure on infrastructure designers and planners to ensure that every precaution is taken to secure against this growing threat.

TREND 7 – NEW INFRASTRUCTURE MODELS EMERGE

As perceptions of infrastructure start to shift and the market matures, many project owners and infrastructure planners are starting to rethink how their development and operational models are structured. How can the cost of renewal and operation be recouped across the lifecycle? How can investment models be adapted to better share, manage and price risk? How can projects be tendered to ensure value is maximized across multiple assets?

In part, this shift in thinking is being driven by a renewed focus on achieving infrastructure's long-term objectives and value. This requires asset owners, investors, operators and planners to consider how value can be driven across the full asset life-cycle from planning to end-of-life and how the asset should be optimally structured in each stage.

The desire for greater operational efficiency is also catalyzing a shift towards the adoption

of commercial models and approaches to infrastructure planning in an effort to capitalize on the efficiency and effectiveness that can often be best delivered through private enterprise or sub-contractors.

TREND 8 – THE PACE OF TECHNOLOGY QUICKENS

Never before has technological change had such a dramatic impact on infrastructure. From efficiency-driving technologies (such as cloud computing) to the emergence of entirely new infrastructure sectors (such as the renewable power sector), we have witnessed a decade of technological advancement that makes the industrial revolution look like child's play.

But while modern infrastructure systems are generating a wealth of real time data, we seem to have limited ability to analyze that data and turn it into improved decision making. In response, a growing number of infrastructure planners and owners are starting to take a longer-term view of how technology can be integrated into their assets to enhance efficiency and sustain relevance to future users.

More must be done. The reality is that technology has the potential to solve many of the world's most critical infrastructure challenges (affordability, environmental sustainability, operational efficiency, etc.) if properly commercialized and adopted. The trick will be ensuring the right technologies – those that are economical and viable – are advanced while others are allowed to fail.

TREND 9 – COST REDUCTION COMES INTO FOCUS

Around the world, governments are starting to put the cost of their infrastructure under a microscope to see if there are opportunities to help make it more affordable. Interestingly, experience of KPMG professionals around the globe shows that – from one market to the next – there can be major variations in the cost of infrastructure.

Some of the reasons for differences in infrastructure costs are obvious: labor costs can vary from city to city within a single market, and the cost of materials can range significantly depending on access, prices, import tariffs and so on. However, in some cases, we have found rather preventable (albeit often institutional) factors that are also driving up costs.

Recognizing the ability to drive change, governments are now beginning to focus on the issue. In the UK, for example, Infrastructure UK recently carried out a Cost Review which found that costs could be reduced by around 15 percent (or GBP£2 to 3 billion per year) if certain issues were effectively addressed.

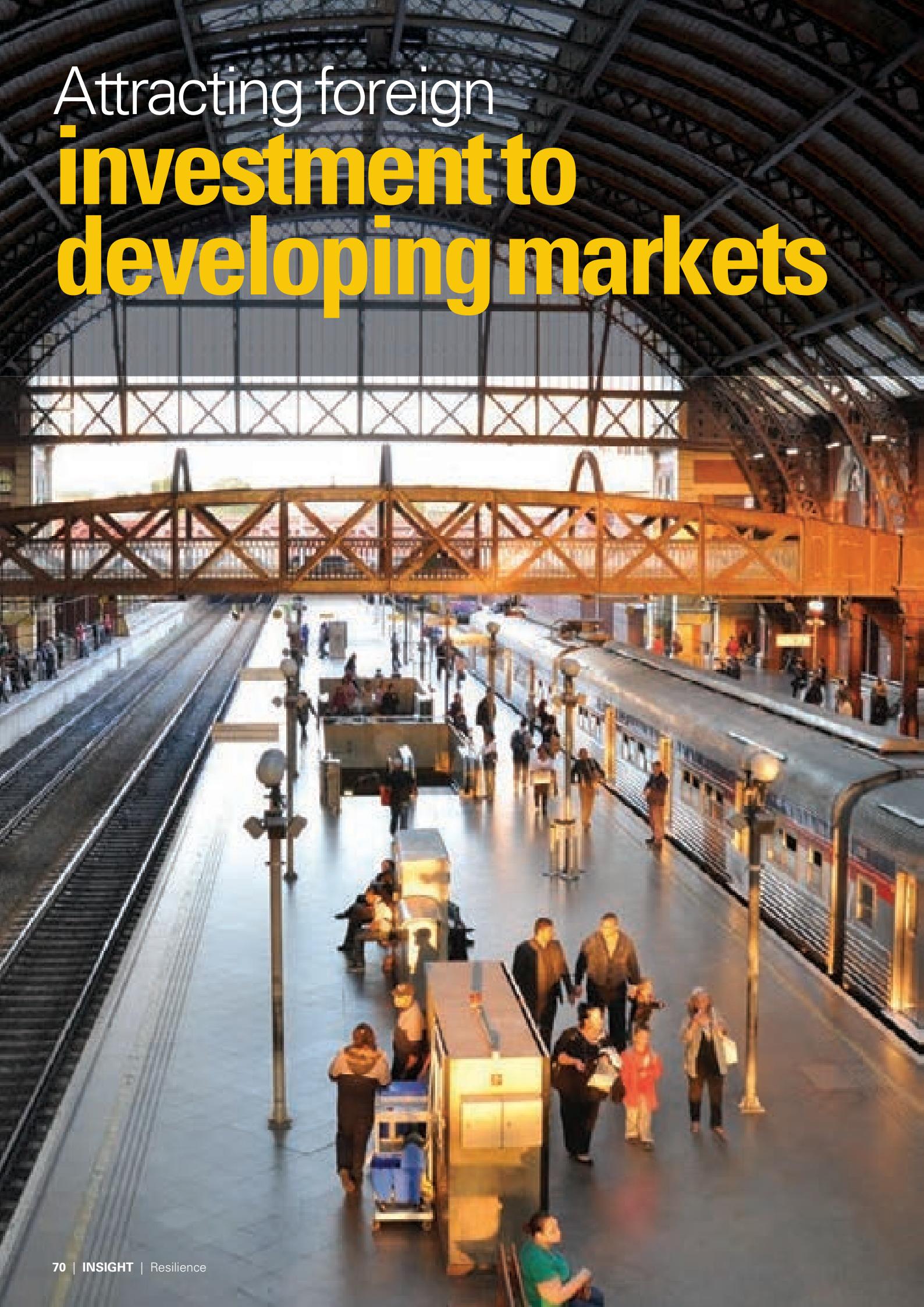
Given the keen focus on costs worldwide, expect to see a greater focus being placed on this area in the coming years.

TREND 10 – THE WAR FOR TALENT AND SKILLS HEAT UP

Possibly one of the greatest and least appreciated drags on the world's ability to meet the growing infrastructure challenge is a lack of leadership for projects and lack of available skills and talent. Whether it is skilled infrastructure and master planners, experienced developers, talented infrastructure fund managers, or nuclear engineers, the scope and scale of the skills shortage is evident across the sector. Sadly, all signs indicate that the situation will get worse before it gets better.

Yet some progress is being made. Targeted training programs are beginning to be established in both corporate and academic campuses, governments have started to promote recruitment and education initiatives, and infrastructure companies around the world are ramping up their pool of skilled talent. The developing world is also proving to be a strong source of human capital with countries like India, China and Brazil exporting their infrastructure talent to the mature markets of Europe and North America. ■

Attracting foreign **investment to developing markets**





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Whether you are a developer, an institutional investor or an asset manager, it is essential to be in the country for some time to understand the local financial, regulatory and investment conditions.

Prof. Luciano Coutinho, President of BNDES

By **James Stewart**, KPMG in the UK

As the competition for foreign investment picks up between emerging markets, Brazil has risen as one of the most attractive growth markets for infrastructure investment. The country's reputation as a safe and profitable investment market is a dramatic turn-around from just 20 years ago when Brazil was widely seen as rife with corruption, inefficiency and lack of fiscal discipline.

According to Prof. Luciano Coutinho, President of BNDES (Brazil's development bank), lack of trust in the market made Brazilian investors addicted to short-term and liquid assets, particularly treasuries. "In these conditions, the issuance of long-term private financial instruments was virtually impossible," he noted.

FIXING THE FUNDAMENTALS

Starting with the Real Plan in 1994, the country has enjoyed growing economic, fiscal and price stability which paved the road for the development of a long-term debt and equity investment market. At the same time, Brazil started to impose longer terms on government treasuries which – combined with strength in the stock markets – brought about a more favorable climate for a private bond market oriented towards longer-term financing.

"The government has taken measures to encourage development in this market," noted Prof. Coutinho. "One of the most important initiatives was the creation of infrastructure bonds that gave tax exemptions to foreign investors on income earned from infrastructure projects. The expectation is that these instruments will help share the burden of long-term financing needs between the investors and BNDES."

ACCELERATING PROJECT IMPLEMENTATION

For their part, BNDES is already deeply engaged in developing the long-term fixed income market. Part of this strategy involves enhancing the bank's ability to stimulate investors to make use of some of the market's complementary market instruments. At the same time, BNDES is leveraging decades of experience in project finance and implementation which should prove invaluable to interested foreign investors.

"In the last five years alone, BNDES has disbursed more than US\$80 billion across more than 350 infrastructure projects in Brazil. We need to be sharing this expertise in project financing with the market," suggested Prof. Coutinho. "Over the course of six decades, the bank has acquired state-of-the-art insight into the legal, technical and financial practices that could help accelerate the implementation of complex financing arrangements."

CATALYZING THE MARKET

To better galvanize the market, BNDES is now focuses on helping the country achieve sustainable economic growth by raising Brazil's aggregate investment to Gross Domestic Product (GDP) ratio and promoting the country's industrial competitiveness. As the ratio increases, BNDES will work to bring new sources of long-term financing to the market. "Brazil needs additional domestic and foreign financial savings to boost the enlargement of our capital market," added Prof. Coutinho.

Prof. Coutinho also points to the recent Logistics Investment Program (PIL) initiated by President Rousseff which aims to secure around US\$20 billion in infrastructure investments over the next five years. "The range of investment opportunities presented by the government makes it clear that Brazil has sound and important investment projects to offer the international community," noted Prof. Coutinho. "Already, investors are showing growing interest in participating as stock holders or bond holders in these projects."

LOOKING AHEAD

Some work still remains for Brazil and BNDES. In particular, Prof. Coutinho suggests that improvements still need to be made with respect to financial guarantees such as better performance and completion bonds or the enhancement of guarantees for non-manageable project risks. The bank also plans to help create a larger and deeper secondary market for infrastructure bonds and securitized investment funds.

"We expect that these will either be induced by the government or – preferably – will spontaneously appear as Brazil's infrastructure market picks up speed and matures."

LESSONS FROM AN EMERGING MARKET LEADER

Based on his experience leading BNDES, Prof. Coutinho offers five points of advice for other emerging market development banks and governments seeking to attract foreign investors to infrastructure projects.

First, Prof. Coutinho suggests that emerging market governments assess the strength of their own market in terms of the underlying institutional frameworks, the robustness of the legal system, the transparency of the procurement process, government sponsorship and the quality of the deal pipeline. "All of these must be consistent with the aims of long-term planning as carried out by public institutions," added Prof. Coutinho.

Emerging markets will also need to create a framework for Public Private Partnerships (PPPs) that engenders transparency and provides a sound rating evaluation across all different stages of infrastructure project development, in order to provide investors with confidence in their investment decisions and ongoing evaluation.

Foreign investors also want to choose from a selection of suitable assets such as purchasing debt or equity from special purpose companies, equity issuances for listed companies or offers of infrastructure bonds. "There is clearly a need to offer investors a variety of financial instruments and terms that might be more suitable for their portfolios."

Prof. Coutinho also suggests that emerging market governments focus on encouraging the banking sector and development institutions to gain greater capabilities in structuring project finance and supplying long-term credit and capital with appropriate costs, terms and durations.

The President of BNDES also has some advice for foreign investors seeking new opportunities in emerging markets. "Whether you are a developer, an institutional investor or an asset manager, it is essential to be in the country for some time to understand the local financial, regulatory and investment conditions," suggests Prof. Coutinho. "Partnerships with local firms and advisory counsel from banks and/or consultants are highly recommended." ■

The DEATH and REBIRTH of infrastructure debt markets

By **Darryl Murphy**, KPMG in the UK

Three years ago, things seemed bleak for project finance in the infrastructure sector. The monoline funding model had long-since 'died' an inglorious death and few options remained for securing project finance. The credit and liquidity crisis had seriously reduced bank debt lending; institutional investors were hoarding not investing; and governments were refocusing their priorities onto austerity measures.

What was clear was that the markets would require some form of credit enhancement vehicle if infrastructure deals were going to continue to be financed and attract institutional investment from the bond market. What was less clear was how that credit enhancement would be achieved, who would shoulder the risk and under what terms.

ONLY THE GOOD DIE YOUNG

As always, necessity drove innovation. In late 2010 KPMG International produced a report on project bonds within infrastructure, with reference to the Hadrian's Wall Capital Fund (HWC) initiative.¹ The report explained how the fund was intended to provide a 'first loss' tranche of debt (as 'B Notes') that would be impacted first under any project loss scenarios. The idea was that this would enhance the risk profile of the remaining debt (the 'A Notes') to a more attractive rating.

By many metrics, the idea was fairly successful. The fund reached its first close last year and is about to close its first deal (the GBP85 million Salford social housing project). So, it is somewhat ironic that the

fund recently announced it would wind down, returning the money to its investors (Aviva, the Development Bank of Japan and EIB).

Some would argue that this simply reinforces what everyone already knows about Europe's debt financing markets. But the reality is that the main HWC team will likely continue on, albeit in a new guise, by sourcing the mezzanine debt required for the credit enhancement from various other sources on a deal-by-deal basis.

So what caused HWC to fail and what does this tell us about the wider market? In part, HWC's demise is due to competition. Keen observers will note that – shortly after the EIB signed up to the HWC fund – consultations started on the EU Project Bond Initiative (PBI) which uses a similar model but with a guarantee tranche rather than a funded tranche to provide the credit enhancement. As a result (and given the EIB return criteria), the PBI product offers a more cost effective solution for project sponsors than that offered by the HWC product.

HWC's death is also related to a wider-spread malady: a lack of deal flow. Slow deal flow and increased competition from various sources may still spell the untimely end for other similar initiatives. It's already believed to be hampering the larger wholesale roll-out of the PBI product which will soon reach its first close on the Castor gas storage project in Spain.

NOT QUITE DEAD YET

So what other options have emerged over the past 3 years? Well, the benefits of the

mezzanine-type approach to achieving credit enhancement are now fairly universally accepted, but success has been somewhat more difficult to achieve. This is mainly due to the lack of deal flow which has prevented standardizing the main issue around the complexity of allocating the relative inter-creditor rights of the subordinated first loss piece.

However, some encouraging examples have emerged. For example, in the UK, Prudential M&G's close of Alder Hey hospital used a credit enhanced structure (funded by Prudential M&G themselves), while in the Netherlands, Ballast is using a credit enhanced structure provided by a bank debt facility (the ING PEBBLE structure) and was recently awarded Preferred Bidder status on the Zaanstad prison project.

It also seems that the monoline model – which it turns out was not quite dead yet – is staging something of a comeback. Assured Guaranty closed the Leeds social housing deal in the UK and others are expected to soon follow.

It almost feels like the small and often challenging social infrastructure market (particularly in housing and universities) has become the world's hotbed for the development of institutional debt solutions. Legal and General recently financed the University of Hertfordshire project in the UK while Allianz is about to close the Paris Music Hall project (albeit with the benefit of the Daily tranche which is effectively government guaranteed).

¹ Project Finance and the Capital Markets – Bridging the Divide, KPMG International, 2010

It almost feels like the small and often challenging social infrastructure market (particularly in housing and universities) has become the world's hotbed for the development of institutional debt solutions.

GOVERNMENT GETS INVOLVED

While activity has been generally limited to the private placement institutional market, there are signs that larger public bond deals will follow. The recently announced Priority Schools Program in the UK, for example, includes a plan for an 'aggregator' to finance five batches of school projects using none other than the credit enhanced mezzanine financing model (some argue, however, that this arrangement may be overly complex given the total financing need of just GBP700 million).

The UK, clearly following France's lead with the Dailly Law, has also introduced the UK Guarantee Scheme (UKGS), which is expected to provide greater financing support to infrastructure projects as the UKGS can take construction risk where the Dailly facility does not. But while the UKGS is flexible, it is typically being used much like a monoline (to guarantee the debt) and therefore investors are essentially buying government-guaranteed debt with no project risk.

EMERGING FROM THE COMA

And what about the good old banking market? The truth is that activity has never really abated and many project sponsors have found that – for the right sponsor and project – bank debt solutions remain available. The recent Thameslink deal closed with a GBP1.7 billion bank debt solution (albeit a legacy deal) and in the Netherlands, the A1/A6 road project was bank financed. All signs indicate that European banking appetites are increasing.

So, as I look back on the events that have occurred since the HWC report in 2010, I am struck by the fact that we are now operating within a vastly different market than we were just 3 years ago. Yes, deal flow remains a challenge (particularly since it masks the true liquidity in the market) as does the financing of mega-deals. But the fact remains that there are now a wide array of financing options for sponsors to consider and – with new multilateral, ECA and government interventions coming online all the time – more options should soon emerge. ■



BRAZIL

takes center stage

By André Coutinho, KPMG in Brazil

When the whistle blew full-time on Brazil's 3-0 FIFA Confederations Cup Final victory over Spain in June 2013, joy in the Maracanã stadium was echoed in the offices of the men and women tasked with readying Brazil for next year's FIFA World Cup and the 2016 Olympic Summer Games.

According to Brazil Sports Minister, Aldo Rebelo, "The Confederations Cup represents a test for our preparations almost exactly one year ahead of the FIFA World Cup; we overcame delays and the tournament was a success."

The financial stakes are also high. The University of São Paulo estimates that infrastructure investments in Brazil leading up to the World Cup will total about US\$18 billion, about 77 percent of which will come from the pockets of Brazilian taxpayers. The Olympics are expected to cost another US\$15 billion.

What will Brazilians get back for that investment? While investment and payback figures for large sporting events are notoriously spotty, the Minister points to reports prepared for the national government that estimate about US\$70 billion will be pumped into Brazil's economy between 2010 and 2014 alone, generating US\$5.5 billion in tax revenues and 3.6 million jobs by the end of the World Cup tournament. Another consultant has estimated that investments in the World Cup will add slightly north of US\$90 billion to Gross Domestic Product (GDP) by 2019.

For Brazil's Minister of Sports, the payback is about more than just money. "The general public will not only have access to stadiums but also to multi-use spaces that include shops, restaurants, cinemas, theaters, and spaces for big events," he noted. "That ensures the profitability of companies that manage the facilities, and the comfort, safety and enjoyment of spectators."



OPTIMISM FROM BRASILIA

In December 2012, President Dilma Rousseff flew to Fortaleza to attend the re-opening of the Castelão, the first of 12 stadiums around the country to be built or redeveloped for the World Cup. She was justifiably proud of the upgrade – the result of a Public Private Partnership (PPP) – and the fact that it was completed four months ahead of schedule and within its US\$250 million budget.

"Many said that we were not capable of building and delivering Castelão to

international standards," she said at the time. "Well today, we are starting to show that we are capable, and the arena is here."

According to Minister Rebelo, delivering massive projects under pressure has become a core capability of the Brazilian construction sector. "We've achieved some of the most advanced feats of engineering in the world in Brazil, and this is no different," he noted. "Today, we are also carrying out huge urban mobility projects, upgrading ports and airports and building and refurbishing stadiums, and



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The Confederations Cup represents a test for our preparations almost exactly one year ahead of the FIFA World Cup; we overcame delays and the tournament was a success.

Aldo Rebelo, Brazil's Minister of Sports



we are doing it all in the highest spirit of environmental stewardship.”

To ensure they are putting their best foot forward, Brazil's authorities are also looking at previous games hosts to take away best practices and new approaches. Brazilian Olympic Committee representatives were present throughout the London Olympics in 2012 and learned a number of key lessons. “We are always seeking positive examples from countries that have hosted these types of events,” added Minister Rebelo. “We try to

find the best solutions to key problems and then adapt them to our unique circumstances.”

CATCHING UP TO ITS ECONOMY

Preparations for the World Cup and Olympic Games are just one piece of a portfolio of infrastructure initiatives aimed at helping the country fulfill its potential. “We are modernizing our cities' road and transport systems, upgrading ports and airports and expanding the telecommunications network,” noted Minister Rebelo.

Indeed, over the past year, Rousseff has announced ambitious plans to overhaul and modernize the country's infrastructure with a heavy emphasis on PPPs to fill the funding gap and operate concessions. In August 2012, her administration unveiled an initial US\$66 billion scheme to build 10,000 kilometers of railways, build or upgrade 7,500 kilometers of roads and pump US\$26 billion into improving the country's congested ports. The most enterprising part of the Logistics Investment Program is a high speed rail link between Rio de Janeiro and Campinas which will run through São Paulo.

TRIAL BY FIRE

Would Brazil be making these investments if it had not won the right to host the two sporting events?

“This work would be done regardless of whether or not the World Cup, Olympic and Paralympic Games were held in Brazil,” says Minister Rebelo. “These projects are necessary because we have grown a lot in recent years and our citizens deserve better public services.”

In fact, the approaching global spotlight and the immovable deadlines posed by the events may be just the tonic that Brazil needs to pull its infrastructure up by the bootstraps. Many observers report a greater emphasis by government on planning projects more carefully – with more attention to timelines and in partnership with private investors, including foreign capital.

It might just be that the rush to put its best foot forward at the World Cup and the Olympic Games will advance the permanent benefits of better infrastructure that Brazil so desperately needs.

“The ultimate response to the skeptics will be when we open both the 2014 FIFA World Cup and the 2016 Olympic and Paralympic games with all of the projects ready,” added the Minister. ■

A MARKET IN ASCENDANCY

A roundtable discussion on
Poland's infrastructure market

By **Miroslaw Proppé**, KPMG in Poland



As the rest of Europe continues to suffer through a prolonged period of slow (or no) economic growth, one country – Poland – seems to be bucking the trend and creating significant opportunities for infrastructure players. The story is remarkable. In the first four years of the economic crisis in Europe, Poland's economy grew by 15.2 percent (2008 and 2011) – the highest rate in the European Union (EU) – and positive growth, however lower, is expected to continue over the coming years. Foreign Direct Investment (FDI) has also been skyrocketing; between 2010 and 2011, FDI rose by two thirds to reach US\$15.1 billion.



Aleksander Wolowiec
Board Member of PKP
Polish Railway Lines



Blazej Moder
Director of New Center
of Lodz Authority,
City of Lodz Office



Michal Skorupski
Director at Mostostal
Warszawa



THE BENEFITS OF MEMBERSHIP

In part, Poland's success is due to its somewhat recent inclusion into the EU and the Schengen Area, which was granted in 2004 and 2007 respectively. But membership in the EU has brought more than just freedom of movement and common policy objectives: it has also unlocked billions of Euros worth of EU structural funds.

For the most part, these funds have brought positive change to the Polish infrastructure market. "To access those funds, we need to align to the European requirements and standards for things like interoperability and tendering," noted Aleksander Włodowiec, a member of the management board at PKP Polish Railway Lines. "And as a result, we have become much more integrated into the European infrastructure network and participate in more holistic regional decisions like which corridors are going to be improved."

The EU structural funds have also helped to improve local and national capabilities. "Part of the EU funds have been developed by the regional authorities which means that there was a decentralization of responsibilities that ultimately helped the local authorities better understand not only how we manage funds from the EU, but how we fund infrastructure more broadly," added Błażej Moder, Director of New Center of Łódź Authority, City of Łódź Office.

ALIGNING TO REGIONAL EXPECTATIONS

One of the most important transformations for the Polish market has been the development of a raft of new laws and regulations to bring the country in line with EU expectations. "It was a very difficult task," noted Błażej Moder. "We had to revise our whole legal system according to very strict European laws while – at the same time – Poland itself was updating many of its laws with regards to evolving issues like environmental protection and public procurement. It was like doing surgery on an open heart."

As a result, some of the early foreign entrants into Poland's infrastructure marketplace found that laws and standards were not yet fully formed. "I think one of the key lessons that we learned as a country was that we were not fully prepared from a logistics and project management perspective to manage all of the funds that suddenly started to flow into the country," added Michał Skorupski, Director at Mostostal Warszawa (construction company) and one of the leaders of the Association of Engineering Services Employers. "Polish regulators and contract authorities had not tested some of the procurement approaches, project

management solutions or construction management controls which ultimately meant that mistakes were made and opportunities for greater value were lost."

GETTING THE FUNDAMENTALS RIGHT

Clearly, some challenges still remain. Contracting is a particular issue as most projects are tendered as lump sum, fixed price bids

meaning that most – if not all – of the risks are placed on the contractor. "This has created an environment that rewards risk-taking within the sector. It is usually the biggest risk-taker for the lowest price, rather than best offer competition. Unfortunately, risk management capabilities are somewhat immature in Poland (for Polish and international players) and so – ultimately – more than half of these projects tend to run into trouble," noted Michał Skorupski.



It was also noted that Poland would need to improve its ability to create a 'systems' view of infrastructure. "I think one of our current challenges is that the system is too fragmented. Too many authorities tend to control different parts of it and so the state as a whole does not understand the interdependencies or relationships as well as it could," added Michał Skorupski. "One centralized regulator/center of excellence

would also help bring some equilibrium between demand and supply and help us take a more standard and consistent approach."

PREPPING FOR PPPs

While the Public Private Partnership (PPP) approach is still relatively untested in Poland, there are high expectations that the model will eventually be integrated into the Polish

marketplace. "I think PPPs are inevitable," noted Błażej Moder. "The fact is, many of our infrastructure projects are now co-financed by the EU but local authorities will need to gain more private funding in the future if we want to execute all of the projects which are planned and needed. That will require some maturity in PPPs."

Stronger capabilities will also be key. "The biggest challenge among the contract authorities here is to build up the ability to better define certain elements such as project scopes, key performance indicators, service expectations, and so on. If Poland can do this correctly, I think we'll start to see more PPPs in the market," added Michał Skorupski.

EYES WIDE OPEN

Foreign organizations seeking to enter Poland's infrastructure market will want to be prepared for these unique aspects. "There really is no mercy in the Polish market. It's a very adversarial approach right now with lump-sum projects and fixed prices. It's not an easy game," advised Michał Skorupski.

"Foreign players will need to get much more comfortable with the Polish marketplace and better understand the risks – environmental, economic, financial, and so on – to ensure their projects are successful," added Aleksander Wołowiec.

As a result, there has been a growing trend toward the creation of partnerships between foreign and domestic organizations. "We've seen a lot of situations recently, especially in Łódź, where polish companies partner with foreign companies on public tenders first. Then, once they have developed a capability and level of trust together, they move on to bidding for private tenders," added Błażej Moder. "That approach seems to be working well."

OPEN FOR BUSINESS

One area that all panelists could agree is the strong potential of the Polish market going forward. "Poland is a perfect place to invest," enthused Aleksander Wołowiec. "It's a stable political and economic environment with great growth prospects so it's definitely a lower-risk market for investors and developers."

"I think over the next decade, Poland will quickly catch up to the rest of Western Europe as far as the rate of economic and infrastructure development. This means Poland will be able to offer infrastructure players a steady and profitable profusion of projects in the foreseeable future. Not many other markets in the world can offer that within such a stable political and economic environment," summarized Błażej Moder. ■



Global diary

KPMG professionals are committed to sharing insights and exploring issues and opportunities through industry events. Below is a selection of recent and upcoming forums organized, or with significant involvement, by KPMG's Global Infrastructure practice. Follow the links to learn more or email us at: infrastructure@kpmg.com

Macao, China

International Infrastructure Investment & Construction Forum (IICF)

6-7 June 2013

The 4th Annual International Infrastructure Investment & Construction Forum was an important platform for industry professionals to exchange strategic thinking and insights on international infrastructure opportunities and the evolving role of project financing, ownership and development. KPMG's Chairman of Global Infrastructure, James Stewart, presented an overview of the opportunities for Chinese investors in the global infrastructure market and how to manage risks in overseas infrastructure projects.

www.iicf.org



Los Angeles, United States

The P3 Hub: West Coast



24 September 2013

The P3 Hub: West Coast brings together US procurers, investors and advisors to debate the future of Public Private Partnerships (PPPs) in a series of interactive panel sessions covering the projects, players and politics driving the use of PPPs in the region. Andrew Garbutt, KPMG's Head of Infrastructure for the US, has been invited to participate as a speaker at this event.

<https://www.cvent.com/events/the-p3-hub-west-coast/registration-da74e605713248d8835baf6902f8b35.aspx>

Bilbao, Spain

World Cities Summit Mayors Forum



13-14 June 2013

KPMG was proud to be included in this invitation only forum that serves as a platform for city mayors and governors to exchange best practices and discuss city challenges.

www.worldcitiesummit.com.sg/mayorsforum/home

San Francisco, United States

7th Annual Institutional Investing in Infrastructure Conference



9-10 October 2013

KPMG is pleased to participate in this forum focusing on emerging global opportunities in infrastructure investing. The forum will bring together senior pension fund, endowment and foundation investors, insurance companies, banks and other capital providers, in addition to global and domestic investment managers and key government officials. At this year's conference Steve Beatty, Americas and India Head of Global Infrastructure will participate on a panel discussing Greenfield and Emerging Opportunities in the United States.

<http://www.cvent.com/events/2013-institutional-investing-in-infrastructure-i3-/event-summary-6dd12d3c1e2b45fc80e66dc4eb5c6527.aspx>

Miami, United States

2013 KPMG Island Infrastructure Summit



22-24 September 2013

This event is the highly anticipated second installment of the successful Island Infrastructure Summit series. KPMG seeks to build on the issues and best practices raised during the 2011 Summit, delivering a snapshot of the current landscape, while exploring practical solutions to meet the growing demand for new and better infrastructure solutions across island jurisdictions. As an added highlight, this year's program features a preview of island infrastructure project pipelines, showcasing high priority projects and providing an opportunity to explore project delivery options with international infrastructure developers and other leading infrastructure advisors.

www.kpmgislandinfrastructure.com

London, UK

Mexico Week in the UK



4-8 November 2013

Mexico Week is a multi-sector business and academic mission intended to promote trade and investment, and further cooperation between Mexico and British companies and institutions. This event will include a series of top-level in-depth conferences to offer delegates greater insight into the business opportunities arising from – and within – the UK.

www.mexicoweek2013.org

Various Locations

Women's Infrastructure Network (WIN)

Various dates

KPMG is proud to play an integral role in the formation of WIN. KPMG, in collaboration with Freshfields Bruckhaus Deringer, initiated WIN in the United States in 2008. Since then WIN has expanded and created chapters in the United Kingdom, Ireland and Canada. WIN's mission is to help women emerge as leaders in the infrastructure sector, and to assist collaboration between the public and private sectors in the development and provision of infrastructure globally. For a list of upcoming events in your region visit:

www.womensinfrastructure.net



KPMG Global Power & Utilities Conference 2013

Hotel Adlon Kempinski
Berlin, Germany
27-28 November 2013

kpmg.com/powerconference

The advertisement features the KPMG logo with the tagline "cutting through complexity" on the left. The right side shows a night photograph of the Brandenburg Gate in Berlin, with its Quadriga statue illuminated.

KPMG's premier annual event for CEOs, divisional heads and financial executives in the power and utilities sector is being held in Berlin, Germany at the end of November, 2013. The intensive program focuses on strategic, financial, environmental and risk related issues, including infrastructure, and provides insight into the tools and strategies to help manage them.

Bookshelf

A selection from our library of global infrastructure reports and insights.
To access these publications, visit: www.kpmg.com/infrastructure
or email us at: infrastructure@kpmg.com

Insight – The Global Infrastructure Magazine

Insight is a semi-annual magazine that provides a broad scope of local, regional and global perspectives on many of the key issues facing today's global infrastructure industry.



Issue No. 4 – Megaprojects

This edition of Insight magazine explores some of the key challenges and opportunities impacting megaproject delivery, and includes a Special Report on Africa's infrastructure market, a key growth area.



Issue No. 3 – Infrastructure Investment: Bridging the Gap

This edition explores the complex world of infrastructure finance and funding, including critical topics ranging from direct investment, to innovative financing and funding models, and the evolving infrastructure fund market.



Issue No. 2 – Urbanization

Insight: Urbanization explores the infrastructure challenges being faced by cities, including feature interviews with key city leaders and private sector executives to shed light on how they are specifically responding.



Issue No. 1 – Infrastructure 2050

The first edition of Insight investigates one of the great universal challenges of the 21st Century – infrastructure. In this issue, our professionals share insights from global experiences, across many sectors, and throughout the infrastructure lifecycle.

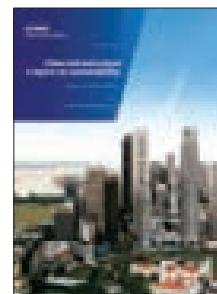
Latest insights – KPMG Global Infrastructure publications and reports

KPMG member firms are privileged to be involved in many of the exciting changes that are happening in every corner of the world, across many sectors, and at various stages of the lifecycle of infrastructure. We continuously seek to share the insights we are gaining in the process.



Infrastructure 100: World Cities Edition (Second Edition)

Infrastructure 100: World Cities Edition provides insight into the infrastructure projects that make great cities, with a particular focus on the innovations that make them 'Cities of the Future' – places where people want to live and do business.



Cities Infrastructure: A Report on Sustainability

This report captures some of the most innovative concepts and practical insights from our firm's publications to provide one of the most definitive reviews of literature on the subject of sustainable cities.



The Great Global Infrastructure Opportunity: KPMG Global Construction Survey 2012

The last three years have, without a doubt, been full of uncertainty for many in the engineering and construction industry. Interviews with senior executives from 140 of the world's leading engineering and construction companies highlights that one constant is the insatiable demand for energy and infrastructure in all forms.

Foresight

In the complex world of Infrastructure, hot topics of conversation and industry 'buzz' are constantly changing. *Foresight: A Global Infrastructure Perspective*, is a series of articles that feature our take on some of the hot topics, trends and issues facing our firms' clients.



SPECIAL EDITION: Emerging trends in 2013

In this special edition of Foresight, three of KPMG's Global Infrastructure leaders look back at 2012 and share their views on the 10 trends that will change the world of infrastructure.



Powering up for growth: An assessment of the power sector in Myanmar

In this edition of Foresight, Sharad Somani discusses the challenges and opportunities affecting the power sector in Myanmar – Southeast Asia's newest country open for business.



Japan's new start: Abenomics and infrastructure

In this edition of Foresight, Yoshihide Takehisa addresses Prime Minister Shinzo Abe's new economic policy designed to end the country's prolonged economic recession and revive the sagging economy.



Giving the lion a voice: How infrastructure can allow Africa to roar

In this edition of Foresight, Nick Chism explains how South Africa's entry into the elite BRICS club is perhaps one of the most notable symbols of Africa's rising – but so too are the statistics that emerge almost every day from the continent.



Mining infrastructure: new ways of extracting value

In this edition of Foresight, Brad Watson and Augusto Patmore discuss the challenges facing mining companies and emerging trends for identifying opportunities in the sector.



Putting the customer at the center of infrastructure

In this edition of Foresight, Gary Webster explains how a growing number of project owners are starting to find that putting cost considerations above all else may not always lead to long-term success.



Mumbai Trans Harbour Link – Transformation on the anvil

In this edition of Foresight, Arvind Mahajan explains how the Mumbai Trans Harbour Link will pave the way for the most awaited developmental initiative in Mumbai City.



The UK updates PFI: What it means for infrastructure investors

In this edition of Foresight, Richard Threlfall addresses the challenges and opportunities of the UK's updated infrastructure funding model, Private Finance 2 (PF2).



Brazil's airports take off

In this edition of Foresight, Mauricio Endo discusses the race to refresh Brazil's airports ahead of the 2014 FIFA World Cup Final and 2016 Summer Olympics.

KPMG's Global Infrastructure practice

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Impartial advice.

Industry experience.

When it comes to infrastructure, KPMG firms know what it takes to drive value. With extensive experience in most sectors and countries around the world, our Global Infrastructure professionals can provide insight and actionable advisory, tax, audit, accounting and compliance-related services to government organizations, infrastructure contractors, operators and investors.

We help our clients to ask the right questions that reflect the challenges they are facing at any stage of the life cycle of infrastructure assets or programs – from planning, strategy and construction through to operations and hand-back. At each stage, KPMG's Global Infrastructure professionals focus on cutting through the complexity of program development to help member firm clients realize the maximum value from their projects or programs.

Infrastructure will almost certainly be one of the most significant challenges facing the world over the coming decades. That is why KPMG's Global Infrastructure practice has built a practice of highly-experienced professionals (many of whom have held senior infrastructure roles in government and the private sector) who work closely with member firm clients to share industry best practices and develop effective local strategies.

By combining valuable global insight with hands-on local experience, KPMG's Global Infrastructure practice understands the unique challenges facing different clients in different regions. And by bringing together numerous disciplines such as economics, engineering, project finance, project management, strategic consulting, and tax and accounting, KPMG's Global Infrastructure professionals work to consistently provide integrated advice and effective results to help our member firms' clients succeed.

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