

# INSIGHT

The global infrastructure magazine / Issue No. 4 / 2013

## Megaprojects

**KPMG**

cutting through complexity

With a special feature on ►

**Africa's  
infrastructure  
market**







# Foreword

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One cannot help but be awestruck by megaprojects. When huge budgets, massive footprints, unanticipated transformative benefits and all the thrills and spills of a theme park ride come together in one exhilarating project, it's hard not to be enthralled.

But beyond all of the hype that naturally accompanies megaprojects, we believe that these monoliths of engineering and construction offer important lessons and approaches that are applicable across the infrastructure industry.

That is why we chose to focus this edition of *Insight* on the world of megaprojects. In these pages, we have examined the challenges, opportunities, risks and complexities facing those involved in creating and operating these important assets.

To offer a wide cross-section of perspectives, we sat down with some of the leaders in the sector. From developer roundtables to one-on-one discussions with project owners, we brought together their thoughts and advice – alongside viewpoints from some of our own leaders in the field – to create an informative and practical view on megaproject delivery.

We are also proud of this edition's special report on Africa. In the new 'Spotlight' feature of *Insight*, we explore some of the biggest and most impactful projects now underway across the continent and identify tremendous opportunities for both domestic and foreign investors. We are excited about the future for Africa and believe the industry should be as well.

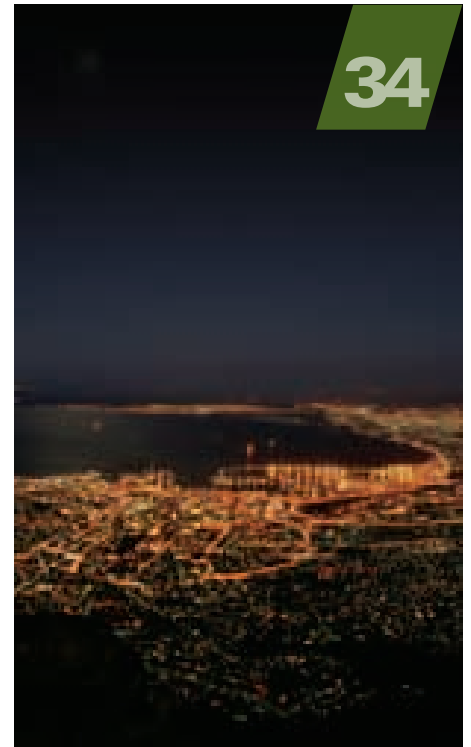
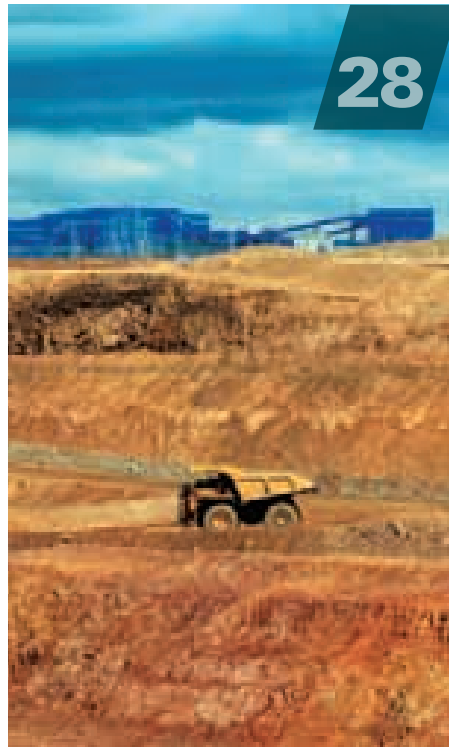
We hope you enjoy this edition and gain some value from the ideas and advice offered within its pages. If you would like to explore these ideas and concepts further, we welcome you to contact your local KPMG member firm or any of the contributing authors.



**Nick Chism**

Global Head of Infrastructure  
Partner, KPMG in the UK

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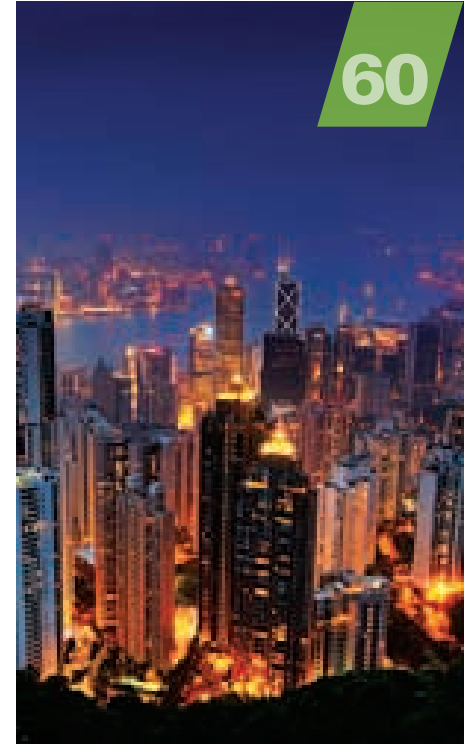
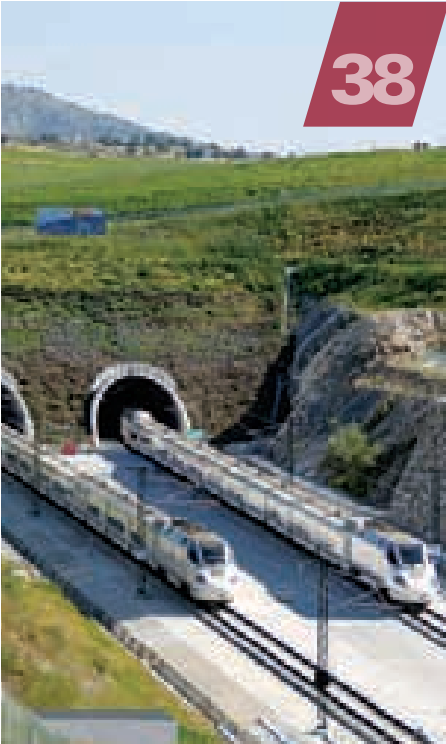
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# Around the world in infrastructure

Private Public Partnership (PPP) structures for infrastructure development are likely to get a boost in **Canada** as public organizations reassess their use of the model. PPP Canada, a crown corporation dedicated to growing the PPP market in Canada, is currently assessing the model for delivering First Nations schools as well as federally operated toll bridges. In addition, municipalities across the country continue to investigate the PPP model in a host of different sectors – including the City of Sudbury with its biosolids treatment facility and the new Evan Thomas water and wastewater treatment facility for Kananaskis County. Several large-scale municipally-based transit projects are also on the near-term horizon with Ottawa, Toronto, Waterloo, Edmonton and Fort McMurray all at various stages of developing initiatives aimed at addressing their local transit needs.

In the **United States**, a number of new transportation projects are now moving forward in the Commonwealth of Virginia. After suffering several setbacks, the USD925 million I95 HOT/HOV Lanes Project reached financial and commercial close in July 2012. The project compliments the Capital Beltway project and is expected to help address the significant congestion in the area. Cleanup efforts are now underway in the aftermath of the devastation of Hurricane Sandy on the **US East Coast**. Learning lessons from the Gulf Coast's experience with Hurricane Katrina in 2005, the City of New York has engaged forensic professionals who are monitoring work progress and ensuring that all payments can be properly supported for reimbursement by FEMA and are free from fraud, waste, abuse and organized crime.

With tourism expected to rise as a proportion of **Mexico's** Gross Domestic Product (GDP) plans are now being drawn up for a new global tourism city in Caribbean Mexico. The privately-led project will be the largest private development in the country's history and will focus on providing tourists with an environmentally-friendly and well-planned vacation experience. Also in Mexico, the Federal Public Security Ministry has allocated eight prison projects that it expects to deliver as PPP projects over the next few years, two of which are to become operational soon.

With the FIFA World Cup and the Olympics rapidly approaching, **Brazil** is a hotbed of infrastructure development, with activity in almost every sector and region across the country. But other non-sports related projects are also underway, such as the USD3 billion PPP project aimed at delivering digital educational content to more than 4,000 public schools in the State of Sao Paulo.

The N33 Assen-Zuidbroek PPP road project in **the Netherlands** reached financial close in November. With a value of around EUR125 million, the project is also notable as the first PPP transaction involving a pension fund linked to Dutch CPI.

## Source:

CANADA	Federally Operated Toll Bridges: Government of Alberta, P3 Canada Fund to Contribute to the Completion of the Edmonton Ring Road, 10 October 2012; City of Sudbury Biosolids Treatment Facility: Greater Sudbury Government, Harper Government and City of Greater Sudbury to Improve Wastewater Management through P3, 12 December 2011; Evan Thomas Water and Wastewater Treatment Facility in Kananaskis County: Government of Alberta, Governments of Canada and Alberta Join in P3 to Renew the Evan-Thomas Water and Wastewater Treatment Facility, 12 September 2011
US	I-95 HOT/HOV Lanes Project: Virginia Business News, State awards \$925 million contract to private sector partnership to build I-95 express lanes, 31 July 2012
MEXICO	Prison Projects: McBains Cooper Project Information, Mexico Prisons PPP Programme, 2012
NETHERLANDS	N33 Assen-Zuidbroek PPP Road Project: The Construction Index, Royal BAM JV Closes Dutch PPP Road Deal, 22 November 2012

There's a lot going on in the world of infrastructure and KPMG's member firms are proud to be the advisors that many governments, private sector investors and developers turn to.

Ask our network of Global Infrastructure professionals to share their insights with you, either from the selection of projects shown here or one in your specific area of interest.



In **South Africa**, the keenly-pursued metro rolling stock replacement program of PRASA has announced the preferred bidder/manufacturer. This replacement of rolling stock is one of the world's largest new metro fleet programs in many decades and – at around USD17-20 billion over the next 20 years – has been one of the most contested infrastructure projects around the globe.

In the **UAE**, the Great Ormond Street Hospital for Children (GOSH) has announced plans to work with a US healthcare provider to operate a children's hospital in Dubai by way of a joint venture. The project will represent the first major expansion for the GOSH into international markets.

In **Indonesia**, PT SMI (a state-owned enterprise tasked with accelerating infrastructure development in the country) is looking into the feasibility of developing a rail line between the Soekarno-Hatta International Airport and the city center of Jakarta, some 30 kilometers to the east.

In the **United Kingdom**, the government unveiled its Energy Bill in November which set out a roadmap for the UK's switch to a low-carbon economy. The Bill, which aims to move the UK from a dependence on fossil fuels to a more diverse mix of energy sources (including wind, nuclear and biomass) also includes key reforms to the electricity market such as the inclusion of Contracts for Difference (CfDs) mechanisms. It is anticipated that a new government-owned entity will act as a single counterparty to the CfDs with eligible generators. The UK is also continuing to push ahead with a number of impressive and potentially transformative megaprojects in the transportation sector such as London's CrossRail (see page 48) and HS2 which will pick up from where HS1 left off and drive high speed rail service into the middle and the north of the country.

For its part, **Australia** is in the midst of a resurgence of infrastructure delivery with a range of new projects either being planned or executed across a variety of sectors. A proposed high speed rail line will move ahead across the east coast connecting Brisbane to Melbourne. On the west coast, the Oakajee Port and Rail project is nearing its scheduled completion date, while a similar scheme for an intermodal transport terminal at Moorebank (on the outskirts of Sydney) also gained approval from the Commonwealth Government. Urban renewal and mass transit projects are also being either considered or undertaken in various parts of the country. Infrastructure Australia has developed ports and freight strategies with the objective of improving supply chain efficiency for business, including the resources sector, while a number of states are either assessing or delivering major transport projects focused on easing congestion in major cities.

**India** continues to roll out its infrastructure investment strategy with the development of a new high speed rail project that will connect Mumbai and Ahmedabad along a 423 kilometer route with trains capable of traveling at 300-350 kilometers per hour. While India currently boasts one of the world's largest rail networks, the project will be the country's first high speed rail line. The Government of Goa, a State located in Western India and a top destination for international and domestic vacationers, will also enhance its global connectivity by building India's second largest greenfield airport.

UK	Energy Bill: BBC News, Departments of Energy and Climate Change Energy Bill, Energy Bill to Create 'Low Carbon Economy', 29 November 2012; London's Crossrail: Transport for London Project Information, Crossrail, 2012; High Speed 2: Project Information, Investing in Britain's Future, January 2012
INDIA	High Speed Rail: Rail.co, Indian Government Fast Tracks High Speed Rail Plan, 2 August 2012; Goa Greenfield Airport: Business Standard, Goa Government to Invite Global Bids for Mopa Airport in September, 24 June 2012
INDONESIA	Rail Line: Jakarta Globe, Soekarno-Hatta to Jakarta Rail Line Attracts Global Investors, 21 September 2012
AUSTRALIA	High Speed Rail: Transport Business International, High Speed Rail in Australia: A Close Reality, November 2012; Oakajee Port and Rail Project: Project Information, Welcome to Oakajee Port and Rail, November 2012; Intermodal Transport Terminal Moorebank: Department of Finance and Deregulation, Moorebank Intermodal Terminal Project, April 2012
SOUTH AFRICA	Metro Rolling Stock Replacement Program: South Africa.info, Intensified Efforts to Invest in Rolling Stock, 7 December 2012

# Transforming the world through megaprojects

If there is one word that sums up the impact of megaprojects, it is probably 'transformational'. Ask anyone involved in megaproject delivery what their greatest legacy is, and they'll probably point to a slew of social and economic benefits that they have unleashed through their megaprojects.

Given the size, scope and impact of most megaprojects, this is not entirely surprising. In fact, many observers insist that a modicum of transformation is a critical characteristic that separates a megaproject from any other infrastructure investment.

This publication is full of stories of transformation. Whether it is wholesale change in a nation's power generation mix (as is the case with the UK's new nuclear build program detailed on page 66), the sudden and dramatic growth of a national economy (such as that provided by Rio Tinto's new mine in Mongolia discussed on page 28), or the development of entire cities and precincts (illustrated by our story on tourism cities in Mexico on page 56) the evidence clearly suggests that transformation is a top objective of today's megaprojects.

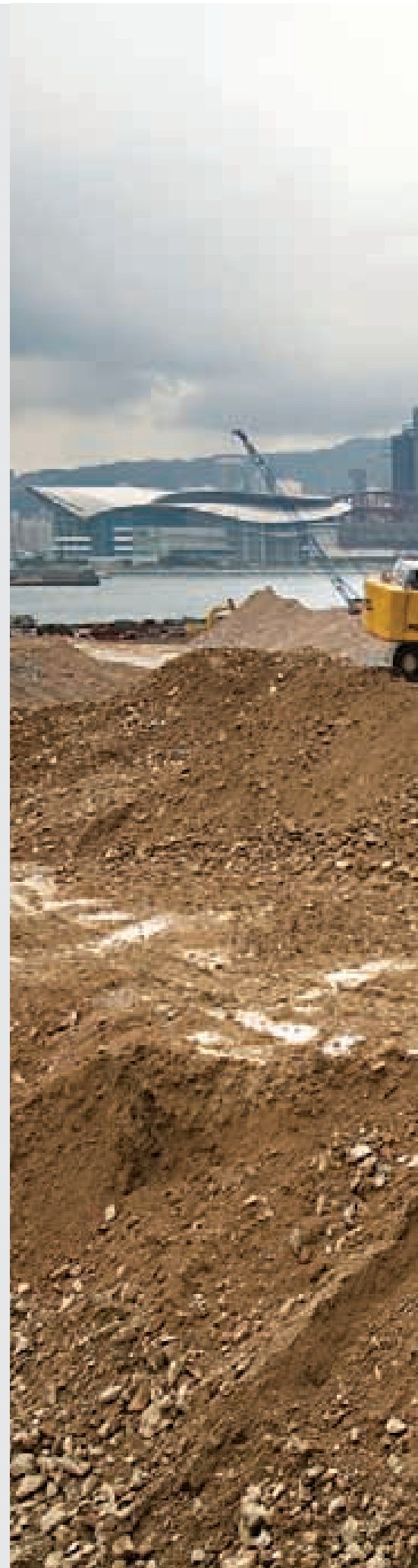
Nowhere is this point made more clearly than in Africa. As our special report on Africa demonstrates, the development of megaprojects on the continent promises to unlock vast resource wealth, exponentially increase productivity, open up new markets for trade, and improve the quality of life for millions of Africans.

But we believe that megaprojects are also transforming the infrastructure industry itself. In part, this is because megaprojects require project owners, planners, developers and operators to radically rethink the way they structure, execute and deliver their various projects to ensure that parcels are integrated, risk is mitigated and collaboration between partners and stakeholders is aligned.

Skill sets and capabilities within the industry are also undergoing a significant transformation in order to meet the massive demand for skilled workers and project leaders that will be needed to deliver the almost overwhelming number of megaprojects now on the books in most countries.

While most observers recognize the transformational impact of megaprojects, few have been able to properly and reliably quantify those benefits in terms of either economic growth or societal change. The reality is that – as an industry – we have tended to focus on articulating the specific cost vs benefit impacts of our projects rather than the long-term, multi-generational benefits that our projects will bring throughout their life-cycles. This will need to change – and quickly – if we expect to continue to convince communities, investors and taxpayers to support the growing trend towards megaprojects.

The bottom line is that megaprojects clearly deliver benefits far beyond the physical assets that are being delivered. Understanding, quantifying and communicating those benefits will be key to our continued success.





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Rather than going to 'bleeding edge' technology, many megaproject planners are demanding proven and tested technology that can inter-operate with future systems.





# Time changes everything

Megaprojects often bring with them mega-challenges. Cost and time overruns, obsolete technology, shifting political support and turbulent economic conditions are all frequent horror stories that emerge from the annals of megaproject delivery.

But, as Bent Flyvbjerg notes in his interview on page 12, almost all of these big challenges ultimately boil down to one thing: time. Given that most megaprojects require a decade – some much more – to complete, the passage of time clearly has a major impact on the eventual success of megaprojects.

The more time between planning and delivery, the more likely that new challenges and complexities will arise. Technology changes every few years, political priorities evolve on an almost weekly basis, and economic cycles rise and fall with the subtlety of a bull in a china shop.

Yet the human brain is not particularly equipped to prophesize future trends and disruptions. Even the most imaginative megaproject designer can't know all of the changes that will occur in the world throughout the asset's life-cycle. So rather than making huge and unquantifiable guesses, many infrastructure owners and planners are instead focusing on developing strategies to help 'future-proof' their designs to flex with the changes that will almost certainly occur; undoubtedly a more achievable and sensible goal.

Take technological change, for example. Rather than going to 'bleeding edge' technology, many megaproject planners are instead demanding proven and tested technology that can inter-operate with future systems. Similarly, changes in the political arena can often be mitigated by creating robust regulatory regimes and independent infrastructure bodies that have the authority to move ahead with development through the political cycles.

Within this publication, we have included a number of projects that exemplify this new, more flexible approach to megaproject development. Queensland's Reconstruction Authority (page 30) is a great example of how an independent authority can cut through the complexity of politics and administrative red tape to achieve great things. UK's Crossrail program (page 48) mixes tried and tested technology with a handful of new innovations to ensure the line serves Londoners well into the future. Mexico's planned tourist city (page 56) plans to tap into a wide mix of investors to smooth out economic cycles.

But megaproject participants must be warned: trying to identify and respond to all of the potential changes can often lead to project paralysis. The trick here is to do whatever possible to future-proof the project, identify the most disruptive future trends and focus on taking a holistic approach to design and delivery. What happens after that, only time will tell.



# Africa rising

To many, Africa is a land of mystery and danger; a place where development is needed and investment is scarce; a complex patchwork of countries, cultures and societies. But to a growing number of infrastructure developers and investors, Africa is quickly becoming one of the hottest and most valuable emerging markets for infrastructure in the world.

As our special report on Africa demonstrates, the opportunities within the African continent are massive and – with a few exceptions – readily available. A cornucopia of projects beckons: new regional rail lines, huge power plants and massive distribution systems, innovative mass transit systems and futuristic port and airport facilities are all in the works.

However, breaking in to the continent will prove challenging for many western and northern players. What works in one

country may not apply to the others. And so investors and participants will need to create a country-by-country and sector-by-sector approach to ensure that lessons gained in one part of the continent can be carried over into others.

At KPMG, we firmly believe that Africa is the next frontier for organizations seeking steady growth, strong returns and bankable opportunities. In fact, as a global network, our firms have invested more than USD100 million across all services on the continent and continue to grow our pool of Africa-savvy professionals.

We, like many of the private and public sector organizations that we serve, are committed to helping Africa grasp its potential wealth and drive sustainable change through infrastructure development.

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# The megaprojects paradox

## An interview with Bent Flyvbjerg, Chair of Major Program Management at Oxford University's Saïd Business School

*As the concept of 'megaprojects' starts to take hold in the modern lexicon of infrastructure development, we sat down with the world's leading megaproject expert to help us set the stage for this edition of Insight.*

*Bent Flyvbjerg is the Chair of Major Program Management at Oxford University and the founding Director of Oxford's BT Centre for Major Program Management. His research spans a broad range of megaproject issues including cost overruns and benefit shortfalls in major programs, theories of success and failure, complexity and innovation, optimism bias and strategic misrepresentation, cost and demand forecasting in high-risk environments, risk assessment and management, and governance of major programs.*



**Editor (ED):** While the industry uses the term 'megaproject' frequently, there still seems to be some discrepancy as to what actually constitutes a megaproject. How does Oxford University define the term?

**Bent Flyvbjerg (BF):** What falls into the bucket of 'megaprojects' really depends on the context in which the project exists. Many pundits would suggest that a megaproject is any individual project that carries a price tag of more than USD1 billion, but that is a highly subjective notion as a billion pounds is quite different from a billion dollars and – given the propensity for cost overruns – what may have started out as a major project can quickly become a megaproject as time goes on.

At Oxford, we look at four criteria that, together, define for us whether a project can be termed 'mega'. Megaprojects in our definition must cost more than a billion US dollars, must take more than 5 years to move from design through to operations, must affect more than a million people and must have a transformational impact on the area in which it is located.

That being said, these criteria must be somewhat flexible and based on the local context. A USD100 million project would certainly not be considered 'mega' in the context of New York City or Singapore, but if USD100 million were to be invested into a single project in, say, the Congo or Myanmar, it would absolutely be a candidate for megaproject status.

**ED:** One of the major challenges noted throughout this publication is the sheer complexity of the megaproject endeavor. What is it that makes megaprojects so complex?

**BF:** Interestingly, our experience tells us that it is not the size or scope of the megaproject that makes it complex, but rather the time factor. The fact is that many megaprojects take upwards of 15 years to become fully operational and there are all sorts of unexpected changes that can – and often do – alter the rules of the game in mid-development.

For example, technology tends to change every 5 years or so, meaning that a project may be exposed to two or even three major



**Bent Flyvbjerg**  
Chair of Major Program Management,  
Oxford University's Saïd Business School

technology changes between planning and delivery. Essentially, the technology that was selected in the planning phase may actually be obsolete by the time the asset becomes operational. But it's not just technology change: political cycles, financial cycles and consumer preference cycles are all constantly changing and adding new complexity to the construction and delivery of megaprojects.

What it boils down to is that project leaders, owners and developers must strive to understand how all of this constant change will impact their megaprojects over the timeframe allotted. Ultimately, this understanding – and shortening project delivery – should reduce the level of complexity that megaprojects face.

**ED:** *Given the impact that megaprojects have on society, what should the relationship be between the public and private sector in the development of these projects?*

**BF:** Simply put, the two must work together closely to ensure that projects are completed successfully, on time and to budget. The reality is that megaprojects are – on the whole – just too big and complex for the public sector to deliver on their own and so a level of collaboration between the public and private sector is critical to achieving success. The public sector must look to the private to support a wide range of aspects from raising the funding required for investment through to delivering the systems and technologies on which the asset will operate.

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**Our experience tells us that it is not the size or scope of the megaproject that makes it complex, but rather the time factor.**

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Select a management team that can provide proven experience in megaproject delivery; someone who actually has a track record for delivering these types of projects on time and to budget and benefits.

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Similarly, the private sector must work closely with the public sector, even in those projects that are 100 percent privately funded and developed. Governments are responsible for upholding safety, environmental and other regulations, providing permissions for designs and zoning, and even how customer or user fees are structured, and all of this will have a significant impact on the eventual success of the initiative.

**ED:** *The allocation of risk often creates challenges at the early stages of megaproject development. Why is that and what can be done to reduce the impact of risk?*

**BF:** In many ways, the risks are rather similar to those found on any infrastructure project but – due to the

size of megaprojects – risks often become overbearing and eventually, can alter the relationship between the public and private sectors.

But the real challenge here actually relates to the contracting process. Far too often, we see the public sector put out tenders that try to push all or a very large amount of the risk onto the private bidders. What happens in these cases is that the project owner either gets a lackluster response from potential bidders or – more often – the bid price increases substantially, to hedge against the potential for the risk actually occurring, or bidders try to game the tendering process by underbidding and then making up for this through later scope changes, which is an ineffective way of doing things.



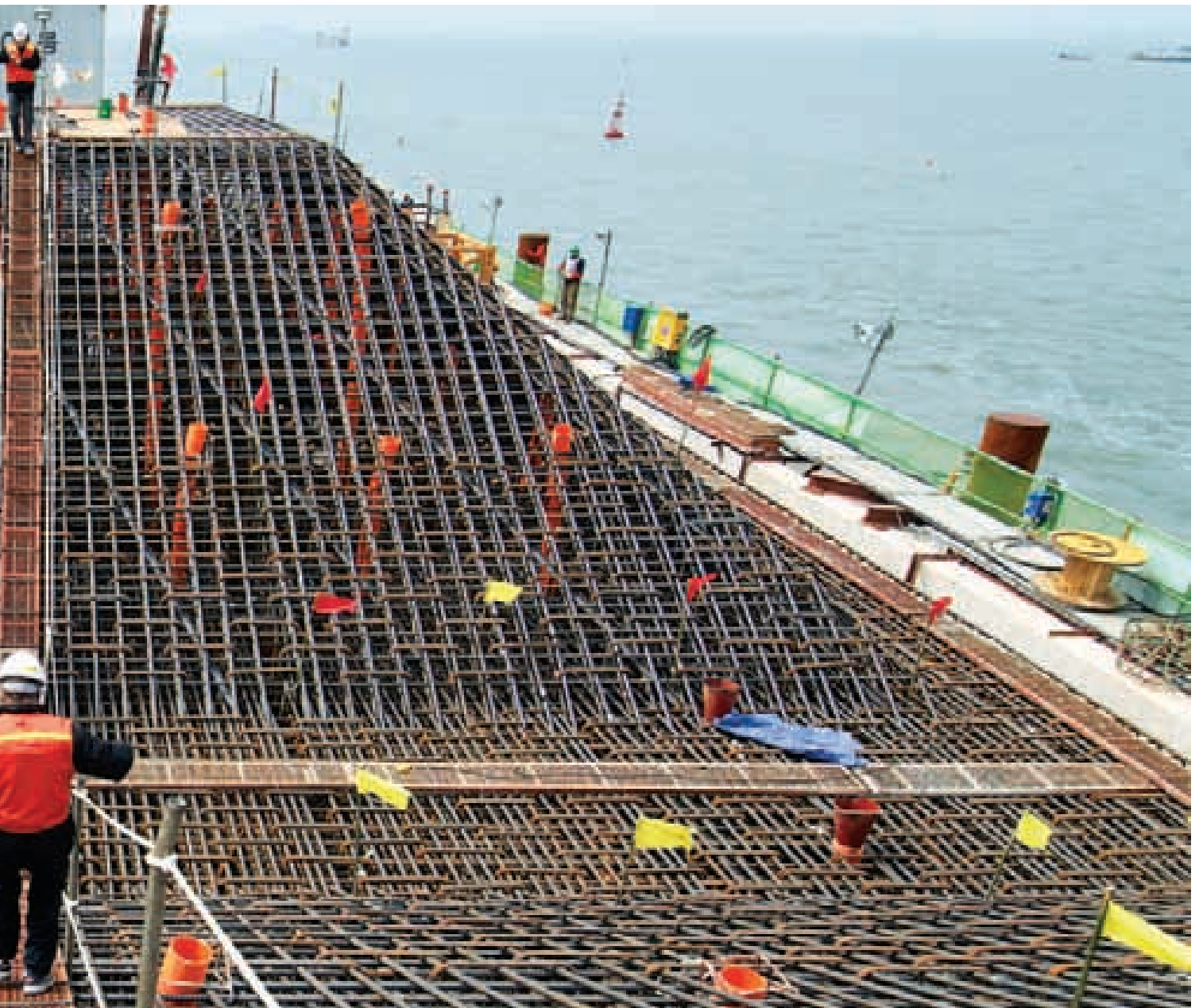
Part of the problem is that the public sector is often less experienced in negotiating megaproject contracts and is therefore at a disadvantage, leading to asymmetrical contracts that create problems further down the road. The UK Cabinet Office is at the forefront in trying to rebalance this experience deficit by creating a Major Projects Authority whose sole purpose is to gather and share information and experience from megaprojects across the public sector and improve their delivery. As a result, the UK's public sector organizations are beginning to make better deals and contract structures for their major projects.

**ED:** *Based on your experience and research, what advice would you give readers who are contemplating a new megaproject?*

**BF:** There are really two main considerations that will have a disproportionate impact on

the success of megaprojects. The first is to get front-end management right. This includes understanding the potentially very large risks that any megaproject faces through its life-cycle and how to curb them. This must be done at the early stages of project design and planning so that project leaders have a really good understanding of what could happen at each stage of development and handover. Methodologies exist to support this. For example, with my team I've developed a Reference Class Forecasting methodology that has been applied with much success in the UK, Denmark, South Africa, Switzerland, among others. It takes into account even Donald Rumsfeld's notorious 'unknown unknowns' and has been endorsed by Daniel Kahneman, winner of the Nobel Prize in economics and godfather of behavioral economics.

The second piece of advice is to select a management team that can provide proven experience in megaproject delivery; someone who actually has a track record for delivering these types of projects on time and to budget and benefits. This is extremely hard to find as project managers are either tied to a single project for 5-10 years or more and are therefore in short supply, or they are rotated around their organization every few years thereby leaving them with broad experience but not the deep experience needed here. The bottom line is, that having management with deep domain experience is one of the most important criteria for success in megaproject delivery. At Oxford we run several programs aimed at developing such domain experience with both young and more mature managers. As we like to say, 'grey hair is often an asset in megaproject management'.





# The Lion Roars:

Africa in ascendency



Infrastructure is at the heart of this African revival. The African Development Bank estimates that the continent will require USD93 billion in basic infrastructure investment every year in order to meet demand.



By **DeBuys Scott**,  
KPMG in South Africa

**A**s the mature economies of Europe, America and Asia continue to struggle, the eyes of the world have started to focus onto the wealth of opportunity that can only be found in Africa.

And rightfully so. Right across the great continent, we are witnessing rapid rates of urbanization and population growth which, in turn, is creating one of the fastest growing labor forces and consumer markets in the world. As a result, most African governments are now keenly focused on fostering economic growth and activity in order to drive down unemployment, raise prosperity and increase national GDPs. The pressure on African cities (already more than 50 cities with a population in excess of 1 million) to develop sustainable infrastructure will only escalate.

Infrastructure is at the heart of this African revival. The African Development Bank estimates that the continent will require USD93 billion in basic infrastructure investment every year in order to meet demand. Recognizing the massive opportunity that Africa presents, foreign direct investment (FDI) has also boomed. In fact, with some USD55 billion in annual foreign capital inflows into the continent, Africa now represents around 12 percent of total FDI globally.

At the same time, many of Africa's age-old challenges are starting to shrink away. Across most of the continent – and with only a handful of notable exceptions – rule of law is on the rise, corruption is being stamped out, incidents of war and violence are waning and stable regulation is being introduced and enforced.

To be sure, much of the infrastructure development currently underway is closely tied to resources. As the world's most resource-rich continent, Africa has already become the resource bread-basket of emerging markets such as China, Brazil and India.

But Africa is no longer just a resource story. With her working age population of 500 million set to double over the next 20 years, Africa is rapidly becoming a consumer market leading to increased demand for all types of infrastructure. One only need look at the most recent edition of the *Infrastructure 100* for proof. New metro lines in Nigeria, hospitals in Lesotho, energy projects in South Africa and continent-wide communications initiatives loom large on the list of top global projects.

It is not surprising, therefore, that the world's infrastructure developers and investors are now piling into Africa, recognizing the opportunity for stable returns and attractive contract terms. Many global investors are revising their sovereign risk profile assessments for the continent to a more positive rating. Indeed, any infrastructure player not currently assessing the opportunities presented by Africa are likely missing a trick and – in short order – may find that many of the richest pickings have already been plucked away by competitors.

As this special report on Africa clearly illustrates, opportunity abounds across the hills and savannahs of Africa and all evidence indicates that Africa's ascendancy is only just getting started. If you listen carefully, you can start to hear the lion's roar.



# Infrastructure and economic development: High potential in East Africa



By **Klaus Findt**,  
KPMG in South Africa

**GDP is growing at around 5 percent per year and populations are set to double by 2050.**

**W**hile many regions around the world are now experiencing slow or stagnant economic growth, Africa stands out as a land of significant untapped opportunity. The continent boasts the highest levels of resource reserves in the world, Gross Domestic Product (GDP) is growing at around 5 percent per year and populations are set to double by 2050.

At the same time, the continent is quickly burying some of the ghosts of its past. Across most of Africa, state-owned enterprises have been privatized or are planning privatization, trade borders have been opened, corporate taxes have been lowered, and regulatory and legal systems have been strengthened.

## **THE COST OF POOR INFRASTRUCTURE**

Outside of South Africa, the continent is being held back from reaching its full potential by a lack of adequate infrastructure. Transport prices are estimated to be anywhere from 50 to 175 percent higher in Africa than global averages and eats up more than

20 percent of foreign export earnings; ports and rail links are overcrowded; and in some countries roads are impassable. All told, the lack of adequate infrastructure is estimated to cut productivity across the continent by as much as 40 percent.

That said, there have been a number of rather exciting infrastructure opportunities coming to the market, particularly in East Africa, many of which hold a strong promise of curing some of the ills that plague the region.

## **OPPORTUNITIES ABOUND**

Take, for example, the Lamu port project in Kenya which aims to exponentially increase regional trade and export potential for Kenya, South Sudan and Ethiopia. The project brings together a range of infrastructure developments including a 32 berth deep-water port; 1,300 kilometers of crude oil pipelines; more than 1,700 kilometers of new highways and almost as many kilometers of new railway; new airports and an oil refinery. The project, which is expected to take about two decades to complete, will require some USD25 billion in project funding, representing more than 80 percent of Kenya's annual GDP.



At the same time, the Kenya Electricity Generating Company Limited (KenGen) is seeking USD5 billion in project funding to increase power capacity by some 3,000 megawatts (MW) by 2018. KenGen already boasts an installed capacity of 1,183 MW (64 percent of which is derived from hydro power) and provides 74 percent of the national capacity. But with demand growth currently estimated at 8 percent per annum, the additional capacity will be sorely needed to ensure the country can maintain its economic growth trajectory.

South Sudan, the world's newest sovereign nation, offers another strong case in point. With almost all of the fledgling country's GDP coming from its abundant oil reserves (some 385,000 barrels per day) it is particularly dependent on pipelines to ensure continued political and economic stability. But with

little commercial agriculture and no real manufacturing operations to speak of, the landlocked country also relies on overland transport from ports in Kenya which often adds upwards of USD9,000 in transportation costs for a single standard container. In response, a number of innovative initiatives are now underway to improve overland connections and create new pipeline routes to more efficiently bring goods into and out of the country.

#### FACING THE CHALLENGE AHEAD

While East Africa clearly has no lack of viable and effective infrastructure strategies, progress has been depressingly slow on many fronts. Part of the challenge, of course, relates to funding. Many of East Africa's nations are largely dependent on development aid for capital investments, but donations are

either insufficient or too overly-restrictive to close the infrastructure gap.

What is needed is greater cooperation between national governments, donors, regional trade associations and the private sector. Yet in most cases, activity has been undertaken on a unilateral basis, with little coordination even within the region itself.

This is a shame. The reality is that East Africa offers the potential for strong and stable returns for infrastructure investors and – if properly planned and executed – will almost certainly create new opportunities for investment across the region. Indeed, investors would be well advised to take a long and hard look at the bevy of new opportunities now emerging from the region. The returns – both economic and social – could be significant.

## SPOTLIGHT ON Zimbabwe



Over the past two decades, Zimbabwe has experienced significant turmoil and upheaval. Inflation (until recently) was ranked among the highest in the world; international sanctions have decimated the nation's GDP and foreign investment has tumbled.

Power generation capacity is a particularly dire challenge for the people of Zimbabwe. Blackouts are common and many parts of the country have no access to electricity at all. In response, Zimbabwe's national state-owned utility company is currently seeking investment and development capability to add an incremental 900 megawatts (MW) of installed capacity over the next 5 years.

But while the project will require upwards of USD2 billion to deliver, only an appetite of around USD600 million has been shown by regional and international banks, infrastructure funds and financial institutions. For now, it seems that the remaining gap may be closed through funding terms provided by China.

However, even this addition of new capacity will not fill the gap, meaning that more investment and development capacity will be required in the near-term. Looking ahead, the power utility has made it clear that it will rely on private developments rather than state-funded projects which, will create a wealth of new opportunities for investors and developers alike.

# Mozambique's promising future



By **Andre Olivenca**,  
KPMG in South Africa

**A**fter almost two decades of civil war, Mozambique is rapidly emerging as one of the fastest growing economies in Africa. Economic growth is expected to average around 8 percent over the next few years, inflation is slowing from 8 percent in 2012 to an estimated 6 percent by 2016, and current account deficits are declining as a proportion of gross domestic product (GDP) to around 4.8 percent by 2016. Moreover, the country is enjoying a period of remarkable stability. Frelimo, the ruling political party, has been in power since the cessation of violence in 1994 and – barring a sudden reversal – is widely expected to be reelected in the parliamentary and presidential polls slated for

2014. Under their oversight, the country has made significant steps towards economic stability with increased focus on key sectors such as resources, infrastructure and agriculture and the promulgation of supportive regulation in areas such as the development of Public Private Partnership (PPP) frameworks and mining concessions.

## **A RESOURCE-LED RESURGENCE**

Natural resources will play a central role in driving the economy forward over the next few decades. Mozambique enjoys one of the largest deposits of coal in the world, much of which is export grade coking coal. Already, some of the world's largest international mining organizations are active across the country and particularly in the mineral-rich



Tete province. Rio Tinto, an Anglo-Australian mining major, owns a 2,500 square kilometer concession thought to hold more than 4 billion tons of coal; Vale, a Brazilian mining conglomerate, holds 35 year concessions on a district with an estimated 6 billion tons of coal.

While much investment is already being poured into these and other concessions, export capability is currently being strangled by poor infrastructure linking the mine pits to export markets. In response, many of the global companies operating in the region are actively seeking agreements with the government to build transport and logistics infrastructure, including dedicated bulk railway lines and expanded or rehabilitated port facilities.

Rio Tinto has plans to develop a 500 kilometer rail link along the Tete-Beira corridor and expand the Beira port which currently boasts a capacity of just 1.2 million tons per year. Rio Tinto is also in the process of developing another corridor – the Zambeze Valley Integrated Transport Corridor – as the Sena line will not be sufficient to evacuate all of the coal extracted from the Tete region. The other major player in Mozambique, Vale, is proposing development of a new 912 kilometer rail line which would lead (through part of Malawi) to an existing port at Nacala where the company plans to develop a new coal terminal worth upwards of USD2 billion.

There have also been substantial off-shore gas discoveries in Mozambique which will further develop and fund growth in the country, ensuring Mozambique as one of the largest resource-based countries in the region.

#### THE POWER TO PROGRESS

Power generation is another key priority for Mozambique's government and a critical requirement for the country's fledgling mining and agriculture sectors. At the same time, the government has indicated its intention to electrify the entire country, which will bring exponential demand onto the already stretched generating capacity. It is estimated that all district capitals will be connected to the national grid during 2013 or 2014. With this in mind, distribution improvement initiatives have begun as well as the implementation of prepaid electricity meters to improve revenue collection.

Here, again, the country's rich natural resources will form the basis for the solution. With Tete's abundance of coal, two new power stations are now being planned: the Benga Station which will eventually generate 2,000 megawatts (MW) of power and the Moatize Station which will produce 1,800 MW. At the same time, a cogeneration independent power producer (IPP) is being established, primarily by the mining majors who already run significant generating stations at their pits. Mozambique has one of the largest hydro-power generating potentials in the region of which 2,075 MW are currently in operation at Cahora Bassa South Bank. Several other hydro power projects have been identified which will contribute to unlocking the 5,000

MW potential offered by the Zambezi River. In addition, it has been estimated the total unexplored hydro potential in Mozambique could be close to 12,545 MW.

The presence of gas in the country has already led to the development of the Sasol gas pipe from the Inhambane province through to South Africa. Other companies such as EDM, Investec, Gigawatt and MGC are in the process of developing gas-powered projects to benefit from Mozambique's abundance of natural gas.

One of the most pressing challenges, however, is the need for a national power grid that can efficiently distribute power across the country. Due to poor connectivity within the country, much of Mozambique's current power capacity is actually exported to South Africa and then re-imported back into the country at higher prices. In response, a new transmission backbone line is being planned, though the process is still at early stages.

#### A BRIGHT FUTURE

While much activity is currently underway in certain infrastructure sectors such as transportation and power, the country has seen little activity in other key areas including education, public health, waste, water and public buildings. In part, this is because the country is still largely reliant on foreign aid with little to no additional funds available to channel into capital investments of the size and scope required. Progress is also being hampered by a lack of skills and capability in domestic infrastructure contracting and development. Nevertheless, both of these challenges should slowly fall away in time. Improving the country's export capacity will lead to increased government revenues which can then be reinvested into other infrastructure sectors across the country. Experience building new rails, power plants and ports should also help to enhance the country's domestic capacity for development.

Clearly, Mozambique holds a wealth of opportunities for foreign investors, developers and contractors. And while there is undoubtedly still some residual risk involved in investing in emerging economies such as Mozambique, all evidence points to the fact that this will likely become a market for foreign infrastructure players over the next decade.

# South Africa's infrastructure triumph



By **DeBuys Scott**,  
KPMG in South Africa

**South Africa has – in many ways – outstripped Africa's rate of development by leaps and bounds. Since the arrival of democracy in 1995, the country has enjoyed a veritable infrastructure renaissance that has only been picking up steam over the past decade.**

**W**hile many infrastructure players in the west may view the continent of Africa through a shroud of mystery, South Africa has long been a lightning rod of investment and activity that has drawn developers and investors from around the world.

Throughout modern history, South Africa has – in many ways – outstripped Africa's rate of development by leaps and bounds. Since the arrival of democracy in 1995, the country has enjoyed a veritable infrastructure renaissance that has only been picking up steam over the past decade.

## **THE ENERGY TO SUCCEED**

In part, South Africa's success can be attributed to its well-defined infrastructure program which – in many of the most critical sectors – has laid out a clear plan for the next 30 to 40 years. In effect, the country is keenly aware of what needs to be done and how to do it.

Take, for example, the country's power and energy plan. After some high-profile power failures in 2007-2008, Eskom (the country's public electricity utility) quickly developed a balanced plan in cooperation with industry that almost immediately ensured the country would enjoy a more reliable and secure power supply.

Today, South Africa sports one of the world's most dynamic power plans including a robust renewables program and a well-advanced nuclear initiative. The renewables program has already been through two rounds of highly-successful bidding (the first round reached financial close mid-October) and is now entering a third phase focused largely on independent power producers (for more on this, see *Power to the Independent Providers* on page 24). In the next 2 years, both the Medupi Power Station and the Kusile Power Station (both dry-cooled coal fired power stations, each

with capacity of 4,800 MW of power) will come online, bringing with them even greater capacity for growth and development. The long-awaited South African nuclear program is anticipated to be announced shortly, which will complete the last missing element in the overall energy plan.

## **BUILDING FROM STRONG FOUNDATIONS**

Infrastructure players are also highly attracted to the country's relatively mature procurement process which is largely based on the UK's public private partnerships (PPP) framework. Across multiple infrastructure sectors, PPP legislation has been tried and tested and now provides significant comfort to both domestic and foreign developers and investors, including financiers and legal parties.

South Africa's financial system has also fared rather well having been well-insulated from the global financial crisis by a strong regulatory environment and somewhat tight foreign exchange controls. As a result, South Africa's banks enjoy greater liquidity than most others around the world and are therefore able to fund most – if not all – of the current infrastructure projects now on the table.

## **A TRACK RECORD OF DELIVERY**

Football fans (or soccer enthusiasts) will also be well aware of South Africa's ability to develop masses of simultaneous infrastructure projects on time and to budget. A slew of world-class airports, a dozen new stadiums, a modern high speed railway and a highly-effective bus rapid transit system were all successfully planned, funded and delivered ahead of the country's hosting of the FIFA World Cup in 2010.

Since then, the pace of development has certainly not slowed. This year, the country plans to spend close to USD115 billion (some 1 trillion rand) on infrastructure across a wide variety of sectors. In



Cape Town, one of the world's top tourist destinations, officials are in the midst of an aggressive infrastructure renewal program that includes a completed major airport upgrade, significant road works, a new waste program and a city-wide broadband initiative.

The eThekweni Metropolitan Municipality, which includes the port city of Durban, recently developed a new international airport and is currently undertaking a significant deep-sea port development. Durban's new Waste to Energy project was recently cited as one of the world's top urban infrastructure projects in the *Infrastructure 100*, which called the initiative a "model for the continent" based on its ability to provide renewable power to up to 6,000 low-income households per day.

#### **A MASSIVE OPPORTUNITY FOR FOREIGN PLAYERS**

South Africa's ability to undertake and deliver such a wide scope of infrastructure projects may – in some ways – be a double edged sword. From funding through to operations, the nation has become somewhat insulated and, more often than not, is getting on with the task at hand without the assistance or support of foreign investors or developers. This may prove to be a moderating factor on the nation's ability to incrementally increase activity in some of the sectors where South African experience is somewhat lacking, particularly in the education and health sectors.

That being said, this will likely not be a challenge for long. Most infrastructure players around the world have woken up to the potential that South Africa presents, both as a national market and as a spring-board into the rest of the continent. At KPMG, we've already seen the number of inquiries from foreign infrastructure players rise exponentially over the past few years, many of which have led to significant investments into the market.

For everyone else, our advice is simple: come see for yourself why South Africa is rapidly becoming a top destination for infrastructure. You won't be disappointed.

# Power to the independent providers: Investing in South Africa's energy sector



By **Phindile Masangane**,  
KPMG in South Africa

**G**iven South Africa's heavy reliance on energy-intensive industries such as mining and manufacturing, it should come as no surprise that the country now boasts Africa's most comprehensive and transparent energy policy.

Ensuring a secure source of power is central to the country's growth. South Africa currently uses some 40 percent of the total electricity consumed on the continent and – outside of a few peak periods where power is imported from the Democratic Republic of Congo (DRC) – the country is largely self-sufficient in power generation. With steadily climbing economic and demographic growth rates, it is clear that the country will require continuous capacity increases to keep pace with projected growth.

#### **A STABLE AND SUSTAINABLE PLAN**

It is encouraging, therefore, that South Africa has developed a long-term energy plan that clearly identifies the country's future needs and articulates a practical and sustainable investment strategy to achieve these goals.

The plan, known as the Integrated Resource Plan for Electricity 2010-2030 (or IRP2010) details the capacity, investment costs, timing requirements and technologies that the country requires to meet anticipated demand over the next two decades. The plan also takes into account other key economic and social considerations such as climate change mitigation, diversity and security of supply, job creation and sustainable development.

Moreover, the plan takes definitive measures to reduce the country's reliance on coal generation. Between 2010 and 2030, the plan envisions coal's proportion of generation capacity falling from 90 percent to 65 percent, while renewable energy sources will rise to 9 percent from a virtually non-existent baseline in 2010. Nuclear and gas generating capacity is also set to increase to replace coal.

#### **IPPS FOR IRP2010**

For the most part, IRP2010 places a significant focus on leveraging independent power producers (IPPs) to rapidly increase capacity without the need for Eskom – South Africa's state-owned utility – to



take on new funding obligations. In the first 2 years of the plan, the IRP2010 envisions IPPs making up 10 percent of the country's generation capacity, increasing to 30 percent by 2030. The energy authority is currently considering a wide range of proposals including renewable energy generation, self-generation and cogeneration as well as more conventional forms of generation such as coal-fired facilities.

Having already conducted two distinct tender rounds led by the Department of Energy, the National Treasury, Eskom and NERSA (the electricity regulator), the country has received a wealth of proposals both from domestic and international players.

Foreign players seeking a foothold into the continent will find South Africa's legal and regulatory environment well-suited to investment. Beyond having what is arguably the continent's most transparent and structured energy policy, the plan also includes strong government backing which means that any deals that are struck are

essentially highly-bankable for at least 20 years.

A word to the wise: success in the South African power market will largely depend on the ability of international players to partner with local investors and conduct at least part of their procurement within the domestic market. As expected, the government intends to use the energy infrastructure development program to address the country's socio-economic imperatives – creating investment opportunities for historically disadvantaged citizens, creating local manufacturing capability where possible and maximizing job creation particularly for the local community where a project is based. Understanding the local environment, marketplace and regulatory regime will be key for international players coming into the country.

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**South Africa has developed a long-term energy plan that clearly identifies the country's future needs and articulates a practical and sustainable investment strategy to achieve these goals.**

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A high-angle photograph of construction workers on a large-scale project. The workers are silhouetted against a bright, overcast sky as they stand on a dense grid of steel reinforcement bars (rebar) laid out on a construction site. The grid extends far into the distance, creating a strong sense of scale and perspective. The workers are engaged in various tasks, some standing and others leaning over, suggesting active preparation for a concrete pour.

# SETTING UP PROJECT SUCCESS IN AFRICA



By **Jeff Shaw**,  
KPMG in South Africa

**From Cairo to the Cape, major new infrastructure projects are now being planned, developed and delivered with the promise of unlocking stranded natural resources, enhancing prosperity and improving the lives of the continent's billion citizens.**

**T**here should be little doubt that Africa has now entered a new era; one marked by rapid economic growth, enhanced quality of life and growing stability. At the foundation of this new era will be a brilliant array of new infrastructure.

As this special report on Africa has illustrated, the continent is now enjoying an unprecedented level of investment in infrastructure. From Cairo to the Cape, major new infrastructure projects are now being planned, developed and delivered with the promise of unlocking stranded natural resources, enhancing prosperity and improving the lives of the continent's billion citizens.

Most will be large and complex. All will require the investment of scarce financial and human capital. While developing major transformational projects in Africa will likely be the key to unlocking this new era, it can also come with significant risks.

The reality is that – for the most part – this new era is still fledgling. Many of Africa's countries lack the funding or skills and capabilities to execute on the full scope of development must be undertaken. Cost overruns, construction delays and red tape are common.

If the continent is to achieve its full infrastructure potential, all players – both private and public, domestic and foreign – will need to focus on ensuring they select the right projects and execute them correctly. The alternative only leads to wasted resources and lost benefits.

Clearly, this truism is not unique to Africa. Even in developed markets where governments have a long history of identifying, defining and delivering major infrastructure projects, the record

of success is patchy at best. In Africa, however, many of the symptoms that can plague a major project are often more keenly felt.

It is critical for Africa's governments and project owners to take particular care when making the project 'go/no-go' decision. In many cases, these decisions seem to have been made on the basis of inadequate or incomplete information. As a result, options are often not properly investigated, leading to project selections and designs that are far from optimal for everyone involved.

In large part, this lack of information boils down to an unwillingness to invest at the early stages of the project design phase. Feasibility studies are either overly optimistic or altogether absent, business case development and contracting is often rushed to meet political objectives, and environmental and social impact studies are frequently glossed over.

This is a shame, particularly given the scarcity of capital and skilled resources available to Africa's governments. The bottom line is that infrastructure project owners and investors must accept that it takes a significant investment simply to bring a project to a point where an informed decision can be made. In a typical case, this may require 2 to 5 percent of the eventual capital cost to be put on the line before a fully informed 'go/no-go' decision can be made.

Given the lack of experience in large infrastructure projects in Africa, it is essential that governments and developers go into them with eyes wide open. Africa simply cannot afford to waste capital and skills constructing infrastructure assets that do not provide the very best returns.

# From nowhere to somewhere: Rio Tinto builds a megaproject in the Gobi Desert

By **Julian Vella**, KPMG in Australia

**D**eep in the Gobi Desert in Mongolia, one of the world's most remarkable natural resources plays is nearing completion. The Oyu Tolgoi mine, a combined open pit and underground mining project, is the largest project to be developed in Mongolia and – once completed – will account for an estimated 30 percent of Mongolia's total annual gross domestic product (GDP).

The feat is made even more remarkable by the timelines that have been achieved. The deposit was only discovered in 2001 and work on the mine site commenced in 2010. Today, the open pit mine is essentially up and running, replete with much of the economic and social infrastructure necessary to run a sustainable and profitable mining venture in an inhospitable environment.

To learn more about the mine's success, Julian Vella – KPMG's Asia-Pacific Head of Global Infrastructure – spoke with Cameron

McRae, President and CEO of Oyu Tolgoi LLC and the Mongolia Country Director for Rio Tinto, one of the three parties involved in the joint venture.

**Julian Vella (JV):** *Rio Tinto is no stranger to developing megaprojects in hard-to-reach places, and this project in Mongolia seems par for the course. Can you tell me a bit about the Oyu Tolgoi project?*

**Cameron McRae (CM):** The project is located in the southern Gobi region of Mongolia, 600 kilometers south of the capital, Ulaanbaatar, and 80 kilometers north of the Mongolian-Chinese border in the arid south Gobi region which is essentially devoid of any infrastructure. It will be one of the world's most technically advanced mines in one of the world's most challenging environments, using sophisticated technologies and processes which have been tested in complex operations and geographies.

The Oyu Tolgoi ore body reserve holds 25 million tons of copper, 5.1 thousand tons of silver and 1.02 thousand tons of gold, making it Mongolia's largest, and Asia's second largest, mine.

I am proud to report that Phase One of the project is a couple of months ahead of schedule, its commissioning is imminent and we are due to move to commercial production in the first half of 2013. In July, our 'First Ore' went through the primary crusher and into the stockpile, so – for all intents and purposes – Oyu Tolgoi's open pit mine is up and running.

The next stage of development will realize one of the biggest and deepest underground mining facilities in the world. This is a hugely complex and technically challenging undertaking that will deliver significantly higher grade copper and higher production rates. While it will take another decade to





## The Oyu Tolgoi ore body reserve holds 25 million tons of copper, 5.1 thousand tons of silver and 1.02 thousand tons of gold, making it Mongolia's largest, and Asia's second largest, mine.

**Cameron McRae**, President and CEO of Oyu Tolgoi LLC and the Mongolia Country Director for Rio Tinto

complete, it's this phase that will really set Oyu Tolgoi apart. Early returns may be substantial, but a massive 80 percent of the project's value lies underground.

**JV:** *What are some of the unique challenges that you are facing with this development?*

**CM:** The first challenge was to develop an Investment Agreement (IA) with the government to give investors the stability they required. This involved about 5 years of debate and was passed in April 2010. But once passed, the progress of the partnership has been rapid.

What very few people realize is that full-scale construction on the mine site was built in just over 2 years after the IA became effective. Of course, building one of the largest mines in the middle of the Gobi desert should be considered a big challenge. Generally speaking, mines of this scale often take up to 5 years to build, but we built it in about 2 years and did it on budget and ahead of schedule, which perhaps was the most profound challenge.

Water would have been the biggest challenge, had we not found enough sources in the deep aquifer near the mine site. The aquifer

is between 40 to 70 meters underground and Oyu Tolgoi has permission from the government to use 20 percent of the aquifer which, we believe, is more than enough for the life of the project. Moreover, Oyu Tolgoi recycles over 80 percent of the water it uses.

**JV:** *Mines require supporting infrastructure such as water, power, and worker accommodation, as well as transport infrastructure in order to get products to market. How are you ensuring this type of infrastructure is available for this mine?*

**CM:** Mongolia has some good infrastructure but it varies from one location to another. Where we are building Oyu Tolgoi, the infrastructure is void – there are no railways, paved roads, and there isn't even electrical power for the town of Khanbogd neighboring the mine.

We have had to develop a significant amount of infrastructure ourselves. For example, during construction, we used diesel power stations, but that is no longer supportive of the planned production. Our plan for the interim is to import power from China. A 100 kilometer (km) long high-power transmission line has been built from the Mongolian-Chinese border to the Oyu Tolgoi site. In the long-term, we plan to have a 450 megawatt (MW) power station built at the site.

**JV:** *Rio Tinto is known for developing social infrastructure projects alongside mining investments. What are some of the key projects you developed or are planning to develop to support the community?*

**CM:** Oyu Tolgoi has spent USD22 million on regional development in South Gobi. It is building an international-standard airport, a 70 kilometer water pipeline, a 100 kilometer paved road and a 200 kilometer-long 220 kilowatt (kW) power line connecting the Mongolian-Chinese borders.

We have been particularly active in the health sector, and have initiated a number of programs, including helping to fund the renovation of the hospital and health clinics in Khanbogd, funding doctors' training programs and launching programs to limit and prevent diseases such as TB and HIV. We have also built the town's first dental clinic which has served more than 80 percent of the population of Khanbogd.

For the local town of Khanbogd, we have constructed a 35 kW power line from the mine to the town and invested USD1.3 million in finding more water sources so that the town would have a continued reliable source of drinking water.

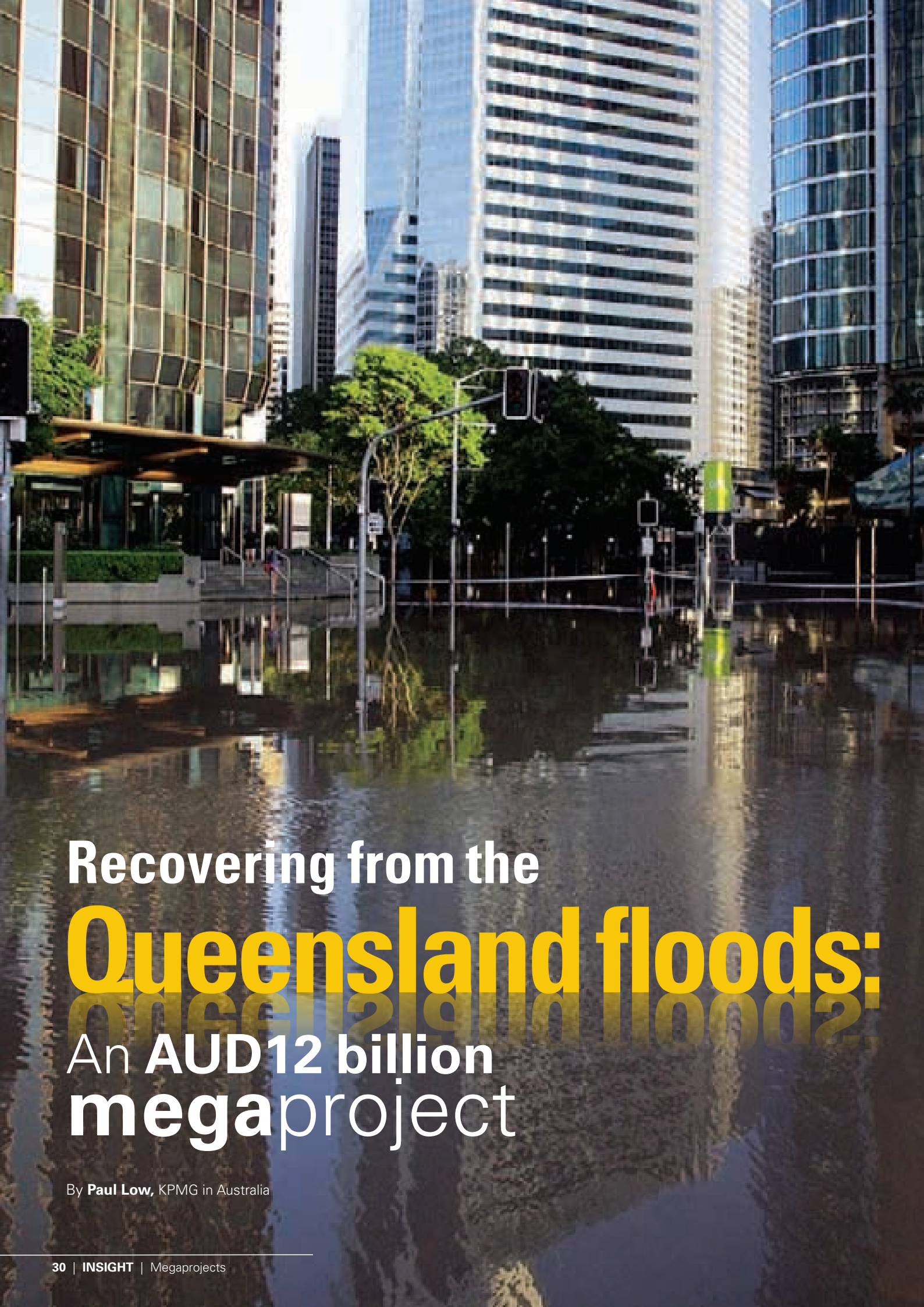
Rio Tinto and Oyu Tolgoi have also launched a world-class Cultural Heritage Program to preserve both tangible and intangible heritage around Khanbogd and, to date, we have spent more than USD1 million to catalogue and protect natural and man-made cultural heritage sites, including recording and preserving ancient songs with 100 elders.

**JV:** *What have you learned from your experience leading these types of megaprojects?*

**CM:** What's most important is the partnership with the host nation. Without a strong partnership that guarantees stability, neither the investors nor the government can have the kind of confidence that is required to sustain a project of this magnitude. In our case, stability and assurance were offered to Oyu Tolgoi's investors by the IA that we signed with the government, without which nothing could have begun.

I look forward to working together with the people of Mongolia to ensure the growth of the mine which will help make Mongolia the fastest growing economy in the world, and I would like to wish the Mongolian people ever more prosperity.





Recovering from the

# Queensland floods:

An **AUD12 billion**  
**megaproject**

By **Paul Low**, KPMG in Australia



**Graeme Newton**  
CEO, Queensland  
Reconstruction Authority (QRA)

**We've also enjoyed a very strong endorsement from senior government officials at all levels which has helped us cut through many of the challenges that we faced.**

**B**etween November 2010 and April 2011, the Australian state of Queensland was hit by a series of severe cyclones and floods that tore through more than 70 towns and affected upwards of 200,000 people, turning three quarters of the state into a disaster zone. More than AUD1 billion of immediate damage was caused, leading to at least AUD30 billion in economic loss.

Just 18 months later, the state has largely bounced back. Infrastructure is quickly being replaced and upgraded, mines – a major source of income for the state – are back in operation and towns and cities are getting back on their feet.

#### **THE AUTHORITY TO REBUILD**

In large part, this rapid return to normalcy is due to the work of the Queensland Reconstruction Authority (QRA). Created in the aftermath of the disaster by the State government, the Authority's mission is to reconnect, rebuild and improve Queensland communities and its economy.

According to Graeme Newton, CEO of the QRA, one of the first orders of business was to come up with a way to channel reconstruction funds to projects. "Most of the assets that were damaged were local government assets and so we quickly needed to find a way to ensure that the state and federal funding flowed smoothly to the local authorities while ensuring that we maintained good governance at the top," noted Mr. Newton. "If you think of this as a megaproject – which it undoubtedly is – you can start to apply a project model that sees the local councils as delivery agents and head contractors, and then simply focus on providing them with the capabilities and resources to run their own programs at the local level."

Recognizing the valuable role that the QRA could play in enhancing reconstruction efforts and ensuring that the local authorities achieved value for their money, the Authority has focused on eliminating some of the complexity and duplication that would have slowed progress. "By virtue of us being a centralized agency, we worked to ensure we had a multi-disciplinary capacity that we could leverage to bring together disparate parties and government departments in order to encourage a real step-change in the way we approached our reconstruction," added Mr. Newton.

## A FOCUS ON BOTH RECONSTRUCTION AND RESILIENCE

The Authority also took on the role of providing resources and best practices to help their local, state and federal partners focus on enhancing resilience as a core component of reconstruction. "We have a team of specialist engineers on staff who work with local councils to evaluate their reconstruction plans to see if there are opportunities to leverage new technologies that can reduce the impact of these events in the future," noted Mr. Newton. "The idea is that everything we build is essentially fit for purpose. We're not replacing wooden bridges with more wood; we are looking at what materials and construction approaches can be used to ensure that this bridge provides value for money and withstands another flood."

Where opportunities exist to centralize activities aimed at reducing the overall cost of reconstruction and resilience planning, the Authority has stepped in. For example, while a fair number of the larger towns in Queensland had conducted their own floodplain mapping initiatives in the past, there was no comprehensive state-wide map to help identify vulnerable communities. "By mapping the floodplain across the entire state, we have effectively provided a platform from which local authorities can make decisions and develop designs and controls which can reduce the risk of damage in the future. Moreover, because we are doing it in a broad base, it is actually costing a lot less than it would have had these mapping exercises been done on an isolated basis," noted Mr. Newton. "Ultimately, we are improving resilience and achieving greater value for money at the same time."

## LEARNING FROM EXPERIENCE

Looking back on the past 18 months, Mr. Newton credits the state's approach to



reconstruction for the rapid gains now being made. "Having a centralized authority that is not buried somewhere in a line agency, but rather cuts across agency lines, has allowed us to bring together the right players and get people's attention in a way that would not have been possible otherwise," he noted. "We have also enjoyed a very strong endorsement from senior government officials at all levels which has helped us cut through many of the challenges that we faced." Collaboration with local government has been an essential factor in the shared successes of reconstruction.

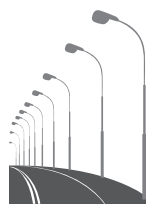
Most importantly, is the need to conduct all activities in an open, accountable and responsible manner. "Right from day one, we had a very open approach to the governance side of things that has allowed us to gain the confidence of the players involved and population at large. We communicate with all of our stakeholders on a regular basis and ensure that all of our plans and activities are conducted transparently so that there is a clear line of sight on where the money is being spent and how. It's made a massive difference in our ability to get people on board with what we are doing."



**1,000,000 sq km**

Total area affected by the Queensland flood – the size of France and Germany combined.

Over AUD1 billion spent in reconstruction effort to date:



**8482 km of road**  
92% complete



**4596 km of rail**  
97% complete

source: <http://www.smh.com.au/business/queensland-flood-insurance-losses-modest-industry-20110110-19kts.html>  
source: <http://www.qldreconstruction.org.au/u/lib/cms2/status-of-recovery-09-11-4.pdf>

\*some coal mines are partially operational

## The reconstruction effort continues in New Orleans



Clearly, we had to rebuild the existing infrastructure that was damaged by the floods, but we've also had to seriously rethink how we approach the redevelopment of the larger infrastructure network in the city.

**Suzanne Mestayer**, Chair of the Business Council of New Orleans and the River Regions

Seven years after Hurricane Katrina devastated the US Gulf Coast, the city of New Orleans is back on its feet and – in many ways – stronger than ever before. The city's gross domestic product (GDP) is now almost USD9 billion higher than it was before the storm; tourism levels have rebounded; and – after declining significantly in the aftermath of Katrina – many of the key economic indicators such as worker productivity, wages and job growth have returned to the national average.

"The scale of the challenge over the past 7 years has been enormous," said Suzanne Mestayer, Chair of the Business Council of New Orleans and the River Regions. "Clearly, we had to rebuild the existing infrastructure that was damaged by the floods, but we've also had to seriously rethink how we approach the redevelopment of the larger infrastructure network in the city."

To date, the Federal Emergency Management Agency (FEMA) has put USD19.1 billion towards reconstruction efforts including USD5.4 billion for general infrastructure such as roads, parks and sewerage facilities, USD3.9 billion for education infrastructure, and USD1.1 billion towards health care facilities. On top of this, the US Army Corps of Engineers, who are ultimately responsible for the city's flood protection system, has also invested some USD14 billion to rebuild and strengthen the city's system of levees.

Revitalizing blighted areas of the city has also been a priority for the city's rebirth. "Our city government has seriously taken on the issue of blight over the past couple of years," added Ms. Mestayer. "Much credit also goes to the grassroots organizations and neighborhoods that did much of the heavy lifting in the early days following Katrina."

Much focus has also been placed on enhancing resilience within the city and its surroundings. New response plans have been developed while new assets have been heavily stress-tested to ensure that they can stand up to another 'once-in-a-lifetime' event like Katrina. Interestingly, the market has also played a role in promoting greater resilience. Insurance companies, for example, have set high resilience standards for assets requiring insurance such as private homes and office buildings. Tax breaks and incentives have also been utilized to encourage home owners and property managers to retro-fit their properties to meet higher codes and standards.

Ms. Mestayer notes that – while many discounted the city's ability to return from the devastation of Katrina – New Orleans now stands as a prime example of what can be achieved through reconstruction and resilience planning. "Our experience offers other cities hope that these types of disasters can be weathered and, with proper planning and risk management approaches, the impact of disasters can be reduced or mitigated."



**89 bridges**  
100% complete



**54 coal mines**  
100% complete\*



**104 water supply schemes**  
100% complete

# Making technology work:

An interview with Roland Busch  
of Siemens AG





## Technology will likely be one of the most challenging and complex aspects of megaproject design and delivery. It's a huge investment and one that needs to last.

**Roland Busch**, CEO Infrastructure and Cities Sector, Siemens AG

By **Stephen Beatty**, KPMG in Canada

**W**ith big projects come big decisions. For megaproject owners and planners, few decisions are more critical than that of technology selection. With asset lifespans that stretch across decades, the right choice of technology can often mean the difference between a valuable investment and an obsolete white elephant.

Few understand this challenge as clearly as the Infrastructure and Cities experts at Siemens AG. The multinational technology company works with cities around the world to deploy a range of products including integrated mobility solutions, building and security systems, power distribution equipment, smart grid applications and low and medium-voltage products.

In his interview, Roland Busch, CEO of Siemens' Infrastructure and Cities Sector and a member of the company's Managing Board, explained that most existing cities tend to be focused on four types of megaprojects: improving connectivity, upgrading energy infrastructure, enhancing safety and security, and delivering environmental projects related to emissions, waste and water. "Our experience is that cities tend to face very similar problems no matter where in the world they are. The difference is in how they choose to respond to these challenges," noted Mr. Busch.

### **MAKING LONG-TERM CHOICES**

For most megaprojects, technology will likely be one of the most challenging and complex aspects of design and delivery. "It's a huge investment and one that needs to last," noted Mr. Busch. "You have to be really serious about getting the right technology that is future-proven and can offer open interfaces that can adapt to new innovations and changes in the marketplace."

Take the development of a smart grid system. Planners will need to consider a wide range of system characteristics that will ultimately help them decide which technology to invest in: How much do you want to invest? How smart should the grid really be? What kind of bandwidth will be required to run future applications? What is the business model for the grid?

"All too often we see cities making the business case work around a technology solution rather than selecting the technology based on the business case and future requirements," added Mr. Busch. And while in some cases the technology purchasing decision comes down to budget, Mr. Busch cautioned that budget saved today may reduce the asset's efficiency and revenue potential in the future.

### **LOOKING FOR EXPERIENCE**

With significant uncertainty weighing down the decision, many civic leaders are seeking out best practices and benchmarks from peers around the world. "One of the big questions I get when I'm meeting with city mayors and civic leaders is about where they can find best practices that might help them with their local situation," explained Mr. Busch. "Megaproject planners tend to recognize that the technology decision is complex and – where possible – they like to understand the experience of others who have taken this path before."

The problem, of course, is that experience in megaprojects is rather hard to come by, particularly when it comes to technology. By the time projects are delivered, technology has often moved ahead, meaning that while lessons can be learned, direct duplication is often not an option. Finding individuals or consultants that can bridge the gap between strategy and technology solutions can also be a significant challenge. "We strongly

believe that megaproject leaders must look for a strategic technology partner that can not only tie the technology together with the project's overall strategy, but one that can also offer proven experience implementing similar projects around the world," suggested Mr. Busch.

### **TAKING A MULTI-DIMENSIONAL VIEW**

In most cases, the first step to selecting appropriate technology for megaprojects starts with developing a holistic view of the objectives that need to be achieved both today and in the future. "Cities are increasingly discovering that they need to break down the silos between departments to ensure that they are making the best decisions for the whole of the city," added Mr. Busch. "In the process, many are finding that they have choices and levers that they can pull to create a better environment for the megaproject."

Rather than simply opting for a metro project, for example, civic leaders must weigh a broad range of options that may achieve the same result through different means. Traffic management, for example, can sometimes be solved by adding new metro capacity or laying down a light rail system. However, it can also be impacted by the introduction of congestion charges, the implementation of traffic management systems or the building of new roads and highways.

"Megaproject leaders have more choice about their technology decisions than they initially believe," noted Mr. Busch. "In the end it comes down to understanding the objectives, taking a holistic approach and relying on professionals that can deliver global best practices and hands-on experience implementing similar projects around the world. Selecting a technology just for technology's sake is an almost certain recipe for failure."

# IMPROVING HEALTH OUTCOMES THROUGH MEGAPROJECT DELIVERY

By **Joel Finlay**, KPMG in Canada

**W**hile modern megaproject planning and development processes tend to put significant focus on ‘non-construction’ considerations such as environmental impact, economic growth, social cohesion and community engagement, few of today’s planners or developers fully appreciate the influence that their projects have on the health of a city (or its residents). Yet a quick glance back through history reveals the importance of megaprojects for health – the Romans built aqueducts to provide clean water and drained the marshes to get rid of malaria, while the industrializing cities of Europe and North America built massive drainage and sewer systems as well as drinking water systems to combat water-borne infectious diseases.

## **BUILDING HEALTHY CITIES**

The concept of health – as defined by the World Health Organization (WHO) – encompasses much more than access to hospitals and healthcare facilities. “Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity,” the WHO notes. And, clearly, the built environment plays a critical role in determining the health of a city.

“The concept of healthy cities is not new; even the ancient Greeks, Romans

and Egyptians understood the relationship between the built environment and health of the population,” noted Dr. Trevor Hancock, a Professor and Senior Scholar at the School of Public Health and Social Policy at the University of Victoria in Canada’s British Columbia. “Today, the idea of a healthy city focuses on creating a process that engages all of the different stakeholders – municipal government, the private sector, community sector, faith sector and so on – to develop a shared purpose and focus on creating a healthier environment for citizens.”

Research shows that part of the challenge relates to the ability of a population to lead more active and healthy lives. According to a report conducted for the Heart and Stroke Foundation of Canada (unpublished), “the design of the physical environment in which we live, work and play results in a choice set” for the local population.

## **HARD INFRASTRUCTURE INFLUENCES HEALTH OUTCOMES**

Civic infrastructure also plays a massive role in the health of a city. Transportation options, access to clean water, efficiency of sewer systems and waste treatment plants and the location and type of power generation facilities all influence the health of a local population. So to do the design and location of development projects such as residential

and commercial developments, shopping malls, sports complexes and parks.

“One of the biggest challenges facing the movement towards more healthy cities is that the direct link between infrastructure megaprojects and specific health outcomes is not always immediately apparent,” noted Dr. Hancock. “We tend to have a fairly intuitive understanding of the relationship between health and individual assets such as parks, sewage systems and hospitals, but when it comes to items such as roads, information technology and educational facilities, the cost-benefit link is much harder to quantify.”

## **GOOD HEALTH GOVERNANCE**

Given that the health of a population is widely considered to have a direct impact on economic growth, productivity, security and – in many cases – government expenditure, it seems clear that infrastructure planners, developers and investors must start to take a lead role in helping governments and civic leaders create more healthy cities.

“Governance of the city is also a key challenge in encouraging the development of a healthier city,” noted Dr. Hancock. “Public sector leaders must start thinking about how they can govern a city in such a way to maximize the health of the population.”

This will require all infrastructure participants and government planners to take



a long, hard look at the role that their projects play in the context of a city's health and, going forward, start to consider the longer-term impacts of proposed megaprojects in terms of their impact on human health and safety. For example, at an October 2012 conference on integrated planning that Dr. Hancock keynoted and supported for the North-West Metropolitan Region of Melbourne, more than 200 participants from 14 local municipalities, 10 state government departments and other key stakeholders, considered the health impacts of four priority issues: housing, transportation, education and employment.

"Megaproject development is not just about engineering or the physical environment," noted Dr. Hancock. "In cities, you are also designing and putting in place soft infrastructure such as human and social

services, education and healthcare, and the soft and hard infrastructure implications must be viewed together within the context of urban governance and the needs and benefits for the local population and key stakeholders."

#### **ENHANCING RESILIENCE TO ENHANCE HEALTH**

The drive towards healthier cities also incorporates the need for greater resilience in the face of mega-events such as natural disasters, security threats, and political and economic upheaval. In many high-impact zones, some progress has been made: flood levies in New Orleans, tsunami warning systems in South East Asia, and stronger building codes in earthquake zones in the US and Asia have all been created or extended over the past decade.

"In many cities, the poorest people tend to live in the areas of highest risk, either in floodplains or on the sides of precarious hills," noted Dr. Hancock. "A major aspect of creating healthy cities relates to either protecting those people with more resilient infrastructure or – better yet – finding ways to move them out of harm's way."

Dr. Hancock notes that while incorporating health considerations into the development of infrastructure may require more work, the benefits are significant. "Most of these things are not hugely expensive and the benefits – both economic and social – to the community as a whole are clearly well worth the investment of time and resources. The bottom line is that infrastructure must be seen as a vehicle to support not just economic growth and societal benefits, but also the health of the local population."



**The concept of healthy cities is not new; even the ancient Greeks, Romans and Egyptians understood the relationship between the built environment and health of the population.**

**Dr. Trevor Hancock**, Professor and Senior Scholar, School of Public Health and Social Policy, University of Victoria in Canada's British Columbia.

# SHOULDERING THE RISK:

A roundtable  
discussion  
with leading  
megaproject  
developers

By **Enrique Fuentes**, KPMG in Spain

*When it comes down to it, much of the heavy lifting in megaprojects falls on the shoulders of the project developers. Developers must manage the construction risk, raise guarantee payments, coordinate the dozens – sometimes hundreds – of subcontractors, all the while under the watchful glare of public scrutiny. To find out how developers are managing the unique challenges of megaproject delivery, KPMG’s Enrique Fuentes sat down to talk with three experienced megaproject developers.*



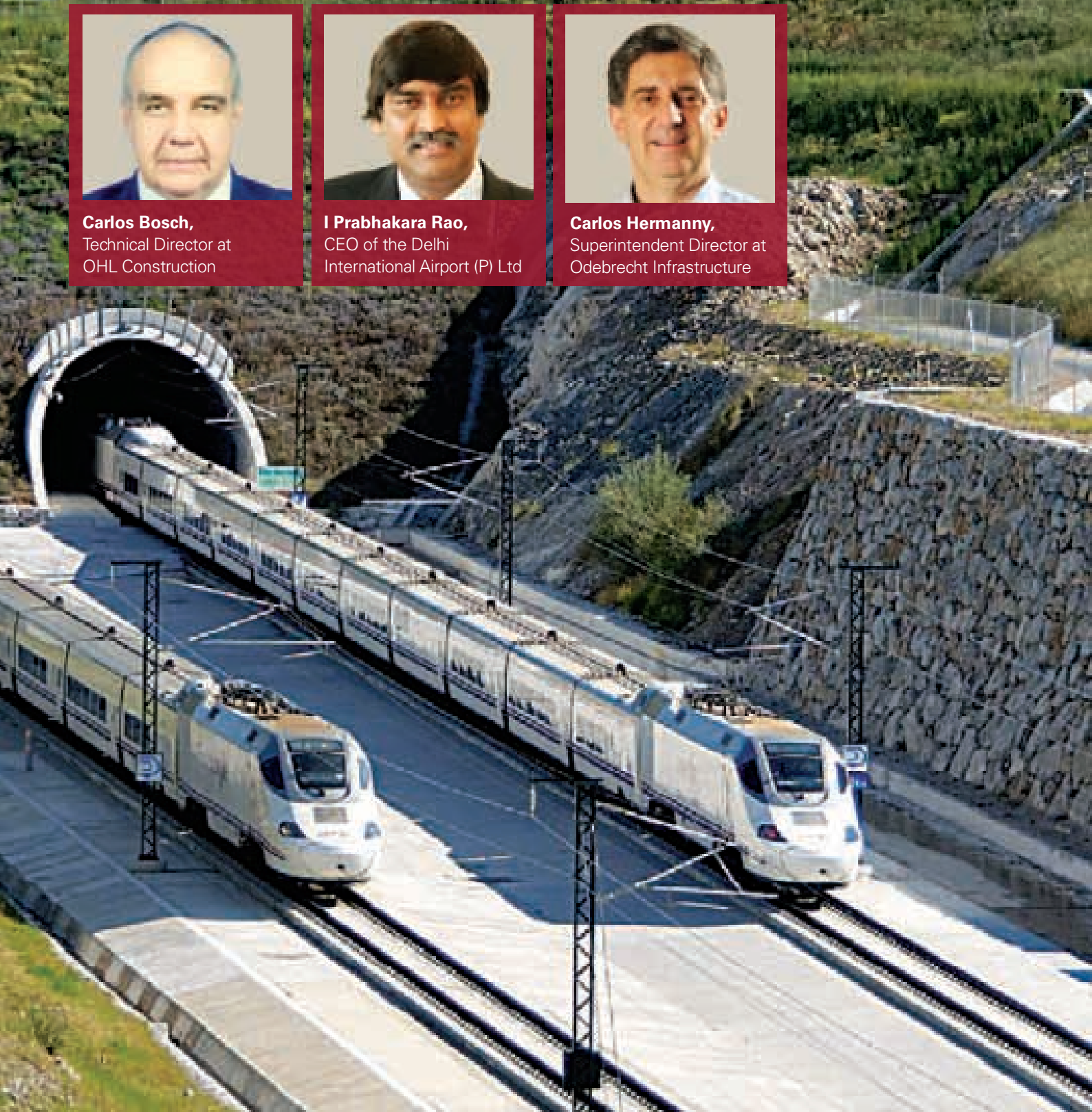
**Carlos Bosch,**  
Technical Director at  
OHL Construction



**I Prabhakara Rao,**  
CEO of the Delhi  
International Airport (P) Ltd



**Carlos Hermanny,**  
Superintendent Director at  
Odebrecht Infraestructura





**Enrique Fuentes (EF):** *Based on your experience developing megaprojects in different parts of the world, what are some of the biggest challenges you face as developers?*

**Carlos Bosch (CB):** Probably the biggest challenge that all megaprojects face is in dealing with the implications of a very long timeline. Megaprojects sometimes take a decade or more to move from design to handover, which can create significant challenges related to both the escalation of costs and the potential for technology or design elements to become obsolete before the project is even completed. Hospital technology, for example, seems to change almost every year which makes designing, building and delivering a turnkey mega-hospital project rather difficult if those parameters and the tools to solve them have not been taken into account from the beginning.

**Carlos Hermanny (CH):** On top of this, many megaproject developers face significant social and environmental risks that can easily cause projects to be delayed or stalled. In effect, this has a direct impact on the financing of the project because it is very difficult to secure funding when some of the risks are unknown. Aligning the vision of multiple subcontractors can also create

unique challenges as each partner brings a different culture and approach to their part of the job. In our experience, a lack of alignment between partners can often lead to further time delays and potential overruns as decisions are debated and consensus is laboriously achieved on an issue by issue basis.

**I P Rao (IR):** I would agree with everything already said and add two more challenges. The first is finding and securing experienced professionals with the right capabilities and skills to successfully deliver on such a large and complex project. In almost every country and region, the supply of experienced professionals who understand the complexity of megaproject development is tight. Another challenge that I would mention relates to stakeholder management. In India, there is no 'single window' for megaprojects and so each government department must be managed individually. For the Delhi International Airport, this meant that we had to work through 53 different government departments. That can make a project very complex and risky.

**EF:** *In my experience, megaproject developers often have hundreds of subcontractors partnering on the same project. Do you have an approach to contract structuring that lets you better apportion construction risk?*

**IR:** Our airport project involved more than 250 subcontractors and three main contractors, so apportioning the construction risk was a very difficult and complex job. The reality is that it is very difficult for many of our subcontractors to take on the construction risk. But it all depends on how the package of work is tendered. If the risks are well known and everything is stated up front, then the costs will be lower because the risks are defined and understood. In other cases, the cost of construction risk is loaded into the contract which can push up the price overall.

**CH:** I think it really all depends on how the client or project owner wants to structure the project. In some cases, the client wants to split the project into multiple packages which makes apportioning of risk much easier because the size of that risk is more easily understood and delegated. But if they are looking for a single consortium that is responsible for all aspects of the project, we have often found that we need to split the job into different inter-related consortiums that take responsibility for their part of the project, yet work together to deliver a single final project to the client.

**CB:** I think the key that underlies both of these views is the need to create a joint collaborative environment amongst



the various partners, with a supportive framework, where each participant has a very clear understanding of what role they play, what the limits are and what is expected of each organization involved. This requires developers to identify and secure mature partners and subcontractors that share the same vision and experience to ensure that all organizations are aligned on what role they play within the consortium or joint venture.

**EF:** *Is there something that project owners and investors should be doing differently in order to reduce the risk of megaproject development?*

**CB:** One of the first things that project owners should be considering during the feasibility phase at the beginning of a project, is whether they actually need a megaproject or whether a phased 'major project' approach would meet the same objectives while also reducing risk. An Olympic village, for example, will need to be constructed and delivered within a very tight timeframe, so it should likely be brought to market as a megaproject. But other projects, such as ports or metro networks, can be completed through a series of phased major projects where the risk of each phase is limited to just that part of the work.

**CH:** My experience is that those projects that have been well thought out before the tender phase tend to achieve higher levels of success. The reality is that megaprojects require more upfront attention in terms of investing time, money and research into the project definition. I've been on projects where the information about the job site was wrong and so our costs and designs had to suddenly change to reflect the reality on the ground. My advice to project owners is not to rush the tender to market but rather take the time to ensure all the information and assessments are completed and correct.

**IR:** Project owners should also be out looking around the world for best practices and new technologies. For example, in the Delhi Airport project, we found new technologies being used in similar projects in other countries and worked with the contractor to bring in new machinery that could improve productivity on the jobsite.

**EF:** *Any last points of advice for other developers around the world that are currently engaged in megaproject development and delivery?*

**IR:** Make sure you have adequate project management capability and consider the inter-relationship between time, cost and risk.

**CB:** Developers should also be keenly aware of the need for strong leadership to ensure the project stays on track and all participants are pulling in the same direction. Developers should continuously switch between the micro-view and the macro-view of the project to ensure the individual components are always aligned to the overall vision. Given that megaproject development tends to span a number of years and new challenges and complexities are sure to arise, and should be solved as soon as they appear, it is critical that developers create strong relationships with project owners and government parties. In my experience, the best way to reduce the impact of unexpected challenges is through cooperation, which can only happen if strong relationships are already in place.

**CH:** I would absolutely agree with that. Collaborative approaches are key to success, but this requires all parties to be flexible and willing to resolve conflict. It also means keeping an open and ongoing line of communication with all parties involved. I would also add that developers need to pay close attention to how the project is contracted and how – within that – the risk is apportioned and recognized. Otherwise, contracts become unbalanced and that will create real challenges down the road.

# Moving resources from pit to port in Africa

By **Klaus Findt**,  
KPMG in South Africa



**Jamie Holley**,  
Divisional Chief  
Executive of Rail,  
Grindrod Rail

The issue of interchange between countries is a major problem because you need everyone along the line to be coordinated and investing at the same pace and level.

**W**hile Africa may be awash with an expanding variety of infrastructure developments, the landscape continues to be dominated by those projects that facilitate the pit to port transportation of natural resources. With commodity prices at historically high levels, the continent is rapidly becoming a hotbed of foreign investment.

To talk about some of the challenges and opportunities facing pit to port developments in Africa, I sat down with Jamie Holley, Divisional Chief Executive of the Rail division at Grindrod, one of Africa's leading shipping and freight logistics operations.

## **BIG VOLUMES BIG DISTANCES**

"Infrastructure is probably the biggest problem that African miners and trading houses are facing these days," Jamie noted. "Decades of underinvestment have meant that the critical infrastructure needed for the export of bulk commodities has regressed to a point where it requires major refurbishment and large capital investment."

Making a business case for that investment, however, can often be a significant problem. In many cases, commodity volumes coming out of mines are simply not large enough to warrant a large infrastructure investment. "So then you have to look at what other commodities could flow on that line, but in many countries and regions your options can be limited," added Jamie. "With lines that often run in excess of 1,000 kilometers (km), it is very difficult to bank large infrastructure projects without the big volumes that come from large-scale mines. In some instances, such as

in the Democratic Republic of the Congo (DRC), soft loans from development funding institutions backed by private party operators are what are required to unlock these projects."

However, Jamie notes that the environment in many regions is changing rapidly due to increased mining investment. In response, some mining interests have started to secure long-term concessions for railway lines on their own in order to ensure a consistent route to export markets. In Sierra Leone, for example, Grindrod has built and delivered 24 locomotives, with a further 10 under construction, to a project that refurbished an existing colonial-era railway line and extended it to connect a new iron ore mine with an existing river port, which also required refurbishment and expansion. Similar – and larger scale – projects are underway across the continent (see Mozambique's promising future on page 20).

## **IMPROVING CONNECTIONS TO DRIVE EFFICIENCY**

The challenges increase when the mine sits within a land-locked country. "The issue of interchange between countries is a major problem because you need everyone along the line to be coordinated and investing at the same pace and level," added Jamie. "Where investments in infrastructure are made, be it in rail or ports, the ability to operate this infrastructure efficiently is central to a successful project. Issues such as border crossing delays and the reliance on third party operators often represent challenges to efficiency."

However, Jamie believes that these challenges can be overcome. The Maputo Corridor – which



connects South Africa's manufacturing and industrial heartland with the deep water port in Maputo, Mozambique – is one such example. "Partners of in the project looked at the full supply chain and came up with opportunities to improve the operating methodologies. The most important of these was simply improved communication across the full supply chain," Jamie noted. "As a result, we have been able to more than double the volumes through our bulk terminal in Matola (at the Port of Maputo) without any investment into new infrastructure."

#### **GETTING GOVERNMENT ONSIDE**

According to Jamie, one of the most critical requirements of any Pit to Port project in Africa is government engagement and partnership. "Whether they are directly investing into the project or not, the manner

in which a company chooses to involve government is a key determinant of success," added Jamie. "Infrastructure projects are long-term investments. For a project to be sustainable we believe it is important that private parties work closely with government in building investment master plans and are transparent with government when operating. This removes expectation gaps between the operators of key strategic infrastructure assets and government, and ensures the needs of the country are properly considered."

Jamie also notes that many of Africa's governments take some time to move projects from announcement through to negotiation and final approval. "The reality, and this is not just an African phenomenon, is that some governments do not have the internal capacity or experience to structure

and conclude large deals like these when they are faced with other pressing obligations," added Jamie. "Development funding institutions such as the World Bank or the Development Bank of South Africa can be of great assistance by providing pre-development funding to governments to ensure they are properly advised."

All told, Jamie is wholly optimistic about the future for infrastructure development in Africa. "Large foreign investment into new markets, impressive GDP growth and a rising focus on infrastructure has meant that infrastructure investment into the continent has become much more commercially attractive," noted Jamie. "We see exciting opportunities across Africa for parties that understand the environment and the risks and challenges of operating within that environment. Things are certainly looking up in Africa."

# Sao Paulo: Keeping transportation megaprojects on the rails

By **Mauricio Endo**, KPMG in Brazil

**A**nyone who has experienced Sao Paulo traffic at rush hour is painfully aware of the city's need for new transportation options. Each year, the city is estimated to lose approximately USD9 billion as a result of congestion, road accidents and lost productivity. It is not uncommon for citizens to be stuck in traffic for hours at a time.

Citizens of Sao Paulo are also quick to point out that the city has already made significant strides to improve urban transportation over the past decade. The city currently boasts some 380 kilometers of urban transportation networks including metros, suburban light rail and bus corridors. As a result, ridership has doubled over the past decade to around 55 percent of the city's population and that number is expected to increase to 65 percent as new lines are developed and opened. It is this type of transformative impact that won Sao Paulo recognition in the most recent edition of *Infrastructure 100* for their soon-to-be-completed metro's line 4.

Today, Sao Paulo is rolling out what is likely the largest urban transportation project in the western hemisphere. The city currently has four separate metro projects underway which will deliver an additional 56 kilometers (km) to the network, and plans are in place for three new lines to augment the metro network and two new suburban rail lines to connect Sao Paulo to other major centers in the region. "It's a big challenge delivering all of these projects at the same time," noted Jurandir Fernandes, the Secretary of State for Metropolitan Transportation in Sao Paulo.

## **FACING DOWN THE MEGA CHALLENGES OF MEGAPROJECTS**

Secretary Fernandes identifies three main challenges that face almost every major transportation project of this size and scope. The first is financing. In total, Sao Paulo plans to invest around USD22 billion across its portfolio of transportation initiatives, all



within a very short timeframe. "We have had to look at securing a mixture of different financing options to raise the capital required to complete all of the different initiatives simultaneously," noted Secretary Fernandes. "Ultimately, around half of the financing requirements will come from multilateral financiers such as the World Bank and the

IDB, while the other half will be made up of direct government investment and – where it is viable – Public Private Partnership (PPP) arrangements."

Securing the capability and capacity to execute the various projects has also created challenges for the city. With massive amounts of infrastructure development now underway



## Sao Paulo plans to invest around USD22 billion across its portfolio of transportation initiatives, all within a very short timeframe.

**Jurandir Fernandes,**

Secretary of State for Metropolitan Transportation, Sao Paulo, Brazil



in advance of Brazil's hosting of the FIFA World Cup in 2014 and the Summer Olympics in 2016, much of the country's internal capacity for infrastructure delivery is now sorely stretched. "We are experiencing a significant shortfall in the number of engineers and project designers with the right mix of skills to meet this level of demand," he noted. "As a result,

we've had to augment our national capacity with expert advisors and professionals from other countries."

The third challenge is one of integration and planning. To maximize the efficiency and effectiveness of the network, new lines must be well-integrated into the existing transportation systems. "Over the

past 4 decades, we have carefully studied traffic patterns across the city to help us to create a network that not only interoperates seamlessly, but also meets the current and future needs of our population," Secretary Fernandes added.

### CREATING THE RIGHT ENVIRONMENT FOR SUCCESS

The Secretary also noted that Sao Paulo's success has been largely facilitated by Brazil's growing reputation as a safe and reliable market for infrastructure investment. At the policy level, the state government has taken great pains to create a well-defined and carefully planned long-term strategy for transportation which creates stability and reduces uncertainty. The government has also demonstrated strong respect for long-term contracts with the private sector. With more than 30 years of experience creating, awarding and maintaining concessions in the country, many foreign investors have already found that Brazil is largely committed to upholding long-term private contracts.

"We believe that Brazil – and Sao Paulo in particular – offers foreign investors a great opportunity to participate in strong and expanding urban transportation projects within a developing world context," added Secretary Fernandes. "By combining a strong track record for political stability with a proven commitment to contracts and a well articulated long-term transportation plan, Sao Paulo stands out as a market that offers rich investment opportunities with minimum risk."

Secretary Fernandes is keenly aware of the transformative impact this megaproject will have on the citizens of Sao Paulo. "Once completed, we'll have created a system that helps us reduce pollution, increase productivity and enhance the quality of life for our citizens," he added. "But while I'm very proud to be helping to transform our city, I also recognize that megaprojects of this size and scope are a massive responsibility that we can't afford to get wrong."



# An emerging Australian icon: Moorebank intermodal terminal

By **Julian Vella**, KPMG in Australia

**F**or Australia, keeping both domestic and foreign trade flowing is key to the country's continued growth. In the last year, more than USD500 billion worth of goods passed through Australia's ports and airports, the vast majority of which trundled into or out of ports via the country's road network.

Sydney's Port Botany currently receives around 2 million containers per year. By 2030, it is expected that throughput will spike to around 12 million containers. Recognizing that the region's existing infrastructure would quickly be overwhelmed by this pace of growth, the Commonwealth government in partnership with the New South Wales State government started developing plans to build a new intermodal terminal at Moorebank, a suburban area about 30 kilometers (km) due west of the existing port.

## DEVELOPING THE RIGHT CONNECTIONS

According to Robin Renwick, First Assistant Secretary at the Moorebank Project Office, the feasibility study group first needed to take a holistic view of the development to better understand all of the infrastructure and systems that would be needed to make the project a success.

"We very quickly came to realize that there was no point in building an inland port if we couldn't offer reliable, cost effective and efficient linkages between the intermodal terminal and the sea port at Botany," noted Mr. Renwick. "That led us to start looking at the usage and capacity of the existing rail line and how we might be able to enhance it in order to move more containers off of the road and onto rail, maximizing the use of the terminal at Moorebank."



We very quickly came to realize that there was no point in building an inland port if we couldn't offer reliable, cost effective and efficient linkages between the intermodal terminal and the sea port at Botany.

**Robin Renwick**, First Assistant Secretary at the Moorebank Project Office

### MANAGING A MULTI-STAKEHOLDER ENVIRONMENT

The project team also needed to coordinate across multiple levels of government to ensure all stakeholders were not only involved, but also actively participating in the project. "The Moorebank Project Office is essentially a partnership between three Commonwealth government departments, but the port and surrounding roads are owned by the state, and the land around the terminal is administered by the local council," added Mr Renwick. "Layer over top all of the consultations that must be conducted with other government functions such as customs, environment and planning, and you are looking at a rather complex set of public sector stakeholders to coordinate and manage."

Given that the project is largely a commercial endeavor (albeit with significant social, political and economic benefits attached), the needs of the private sector are also being carefully considered. "The government does not want to design or build this terminal themselves and – wherever possible – we want the private sector to finance it," noted Mr. Renwick. "So a large part of what we are trying to do is essentially 'de-risk' the areas that the government can impact."

### TIPS FOR MEGAPROJECT SUCCESS

Based on his experience to date, Mr. Renwick has three key areas of advice for other megaproject owners around the world. The first is to ensure you have a clear understanding of the interdependencies of the project and what those entail. "This is essentially all about bringing together a really good team that includes key stakeholders as



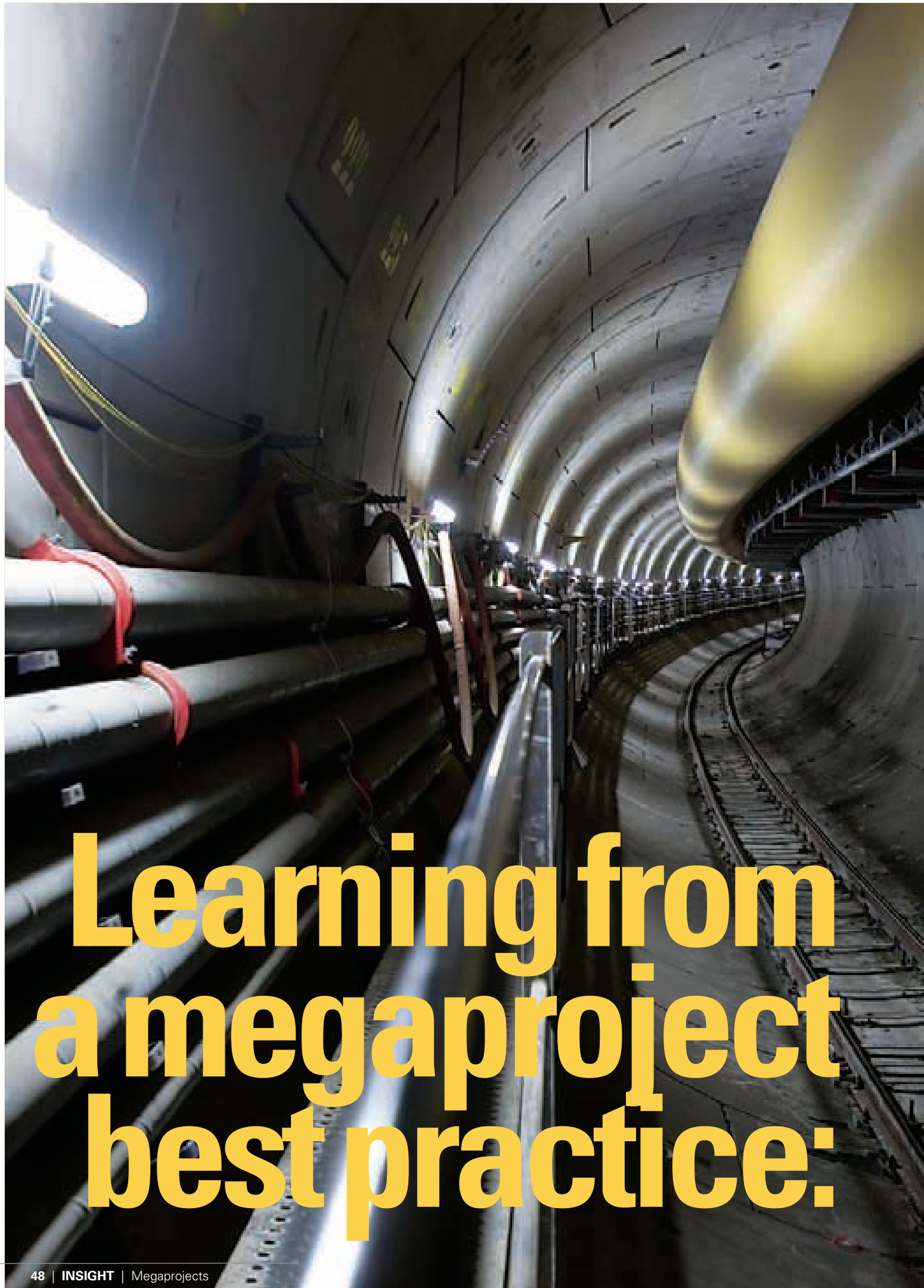
well as expert advisors that can help develop a robust feasibility study and business case at the outset," he suggested. "Particularly in government-led projects, the need to provide strong evidence-based policy advice is critical to capturing broad stakeholder support."

Creating and executing a robust communications plan is also key to achieving broad-based support from stakeholders and the community. "I find that a lot of projects that ultimately fail to either get off the ground or achieve their projected benefits are handicapped by insufficient or inappropriate communications," he noted. "We engaged a communications research team and advisor to help feed in to the project on an ongoing basis and help us ensure that there weren't any surprises out there."

Thirdly, Mr. Renwick notes the importance of strong leadership. "Complex megaprojects of this size and scope absolutely require someone who can be a strong sponsor

and carry the project forward; someone that can bring together minds from across the public and private sector to focus on working together to achieve the stated outcomes," he added.

Ultimately, Mr. Renwick notes that no two projects are the same and that project owners and their advisors must therefore be cognizant of all of the unique factors that impact a project. "Anyone can throw money at a project and get the thing built, but there is a huge difference between building an asset and actually making it work in a way that delivers results for the stakeholders and the community," he summarized. "Inevitably, that tends to expand the project into a much broader range of issues and interdependencies than most project owners would expect."



# Learning from a megaproject best practice:



# UK's Crossrail leaves a lasting legacy



**Andrew Wolstenholme OBE,**  
Chief Executive Officer,  
Crossrail Ltd

Crossrail serves as a strong example of how public sector investment can stimulate growth and improve the quality of life for citizens.

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

**T**hose seeking best practices in megaproject delivery would be well advised to study the progress of the UK's Crossrail initiative. The mammoth metro and rail project, which will run 118 kilometers across the heart of London, is widely-recognized as being not only a triumph of technical skill in engineering and construction, but also a paragon of leadership and management that offers rich lessons for other megaproject leaders. I had the opportunity to sit down with Andrew Wolstenholme OBE, the Chief Executive Officer at Crossrail Ltd, to hear how this megaproject is creating a blueprint for future project delivery in the city.

#### **THE RAILWAY THAT WILL TRANSFORM THE REGION**

Many industry observers believe that the UK's Crossrail program represents the most significant feat of engineering ever undertaken in the UK. And rightfully so. The new transport line will deliver 37 new connections stretching from Maidenhead in the west of London to Shenfield and Abbey Wood in the East. In its wake, more than

42 kilometers (km) of bored tunnels will be constructed alongside and underneath the existing underground lines, sewers, utility tunnels and building foundations, and more than 10 kilometers will be manually excavated, often at a depth of up to 40 meters under London's already busy streets.

And while all of this clearly ranks Crossrail as a noteworthy megaproject, it is the line's transformative value that really makes the project stand out as a global best practice. According to Mr. Wolstenholme, the project serves as a strong example of how public sector investment can stimulate growth and improve the quality of life for citizens. "Simply put, Crossrail will keep London moving," Mr. Wolstenholme noted. "It will provide a better transport service for generations to come, it will deliver economic dividends right across its life-cycle, and it creates both jobs and national capability in a global growth sector."

#### **LAYING THE GROUNDWORK FOR FUTURE DEVELOPMENT**

Crossrail will not only form a vital link between Heathrow Airport and the business district at Canary Wharf, it will also bring some

1.5 million people within 45 minutes of London's core. According to Mr. Wolstenholme, this has spurred additional growth potential along the outlying route which will lead to increased ridership for the line and higher tax revenues for the local authorities.

Mr. Wolstenholme also noted the enabling effect that the project will have on future infrastructure development in and around the city. High Speed 2 (HS2) – a project to extend the UK's high speed train line up the English Midlands – will link with Crossrail at a West London interchange and will be one of its two main London connections.

#### **BUILDING CONSENSUS AND SUPPORT FOR MEGAPROJECT INVESTMENT**

Many would suggest that Crossrail's success comes down to the unifying support that the program has received from government, businesses and citizens. "This is a rather unique project in that it transcends political parties, communities and business, largely because it is seen by the vast majority of Londoners as a benefit to London and the

Southeast and is therefore a proposition that everyone can get behind. This has allowed us to focus more of our attention on getting the job done," pointed out Mr. Wolstenholme.

This support is evident across the project, but may be most prominent in the way that Crossrail is being funded. The project has two joint sponsors in Transport for London (which reports to the Mayor of London) and the Department of Transport. But funds have also been contributed by other key stakeholders such as The Corporation of London (representing the City), BAA (the owners of Heathrow Airport), the developers of Canary Wharf, and the wider London business sector, through a supplemental business rate levy.

"Ultimately, our funding model has really brought together government, the business community, organizations and the citizens of London who are all putting their hands into their pockets to fund this transformative piece of infrastructure," added Mr. Wolstenholme. "We've also had cash contributions from a residential and commercial developer along the route who will benefit from the development of a new station."



## **SOLVING THE CAPACITY AND CAPABILITY CHALLENGE**

Mr. Wolstenholme points to a raft of major benefits that the investment into Crossrail will bring. "Using conservative cost-benefit models, the government may well see some GBP42 billion of economic return for their GBP14 billion investment," he noted. "Moreover, some 14,000 jobs will also be created during the 6 year project construction phase which, in turn, will build the UK's capacity and experience in executing megaprojects."

Similar to most other megaprojects around the world, the Crossrail team quickly recognized that securing the right quantity of qualified professionals would be a key challenge in delivering this project. Once again, Crossrail has come up with an innovative solution. "Early on in the project planning phase, we realized that we would not be able to secure the 3,000 to 5,000 skilled construction workers that we would need to safely build these tunnels, so we set up Europe's first Tunneling and Underground Construction Academy to train employees and 400 new apprentices in a wide range of specialist skills," noted Mr. Wolstenholme.

"But what we have done is essentially trained a generation of tunneling and underground construction workers whose skills and experience will be invaluable to any one of the other megaprojects planned for the city, such as the Thames Tideway Tunnel, HS2 or even the upcoming National Grid and EDF electricity cable tunnels that will all roll out over the next decade."

## **DELIVERING STRATEGIES FOR SUCCESS**

Mr. Wolstenholme credits a number of key strategies for the project's success to date. First and foremost, he notes, is building up a strong business case that unpacks the risks that face the project, not only in design and construction, but also well into delivery and operation. "It's really about understanding the full life-cycle of the asset and how the value unwinds over time," added Mr. Wolstenholme. "For example, throughout the design and construction phases, we have worked closely with the rail operator to help us understand how we can leverage smart technologies and digital modeling to help increase the value of the asset through the full life-cycle."

It is also important to engage project leaders who can properly balance the technical capability with the business and commercial skills required to lead such a complex and high-profile initiative. "The people skills are important yet often overlooked," added Mr. Wolstenholme. "Those leaders that can align their people skills with their technical knowledge are more likely to ask the people on their team the right questions and make prudent and educated decisions regarding risk."

## **LEAVING A POSITIVE LEGACY IN LONDON AND AROUND THE WORLD**

Crossrail certainly stands as a valuable source of best practices for other megaprojects around the world, an honor that is not lost on Mr. Wolstenholme. "We're essentially leaving a legacy not just for London but also for the wider industry," he added. "Yes, we are leaving behind a world-class railway that is transforming London and its surroundings, but we are also developing a skill set that will help future infrastructure owners better manage the life-cycle of the delivery phase. I'm personally very proud to be part of that legacy and our vision of 'moving London forward'."





# Lessons from planners of large infrastructure projects



By **Gary Webster**,  
KPMG in Canada

*Planning a large infrastructure project can often be a long and complex process. Effective planning and management are vital to ensuring long-term value is achieved and risks are mitigated. To find out more about the value of major project planning, **Gary Webster** (a partner with KPMG in Canada's Infrastructure practice) sat down with the leaders of two major projects now underway or being planned for the Province of British Columbia.*

***Susan Yurkovich** is an Executive Vice President at BC Hydro where she is responsible for the Site C Clean Energy Project, and **Mike Proudfoot** is the CEO of the Transportation Investment Corporation (TI Corp) responsible for the implementation of the Port Mann/Highway 1 Improvement Project.*



**Mike Proudfoot,**  
CEO of the Transportation  
Investment  
Corporation (TI Corp)

Consultation is key to ensuring that all risks and challenges are understood and mitigated.



**Susan Yurkovich,**  
Executive Vice President,  
BC Hydro

It's all about starting early. We started with a strong and proven risk framework approach which identified key project risks in each stage of project development, and then identified who best to manage and mitigate those risks.

**Gary Webster (GW):** *What do you see as the top challenge facing managers of major infrastructure projects today?*

**Susan Yurkovich (SY):** I think the most significant – and in some cases most underappreciated – aspect of the planning and delivery of a large infrastructure project is related to managing all of the interrelated stakeholders and their interests. This includes First Nations, communities, regulators, customers and other stakeholders. Particularly in complex projects such as a new hydro development, project managers need to start consulting early to understand who the various stakeholders are going to be, what their issues are, and how you are going to engage with them.

**Mike Proudfoot (MP):** I absolutely agree with Susan; the main challenge often boils down to stakeholder relationships and managing their competing needs in a way that keeps everyone involved and motivated. Staying connected with each of the stakeholders throughout the planning and delivery cycle is always a challenge, especially in projects with long development and delivery timelines. The trick is not only in meeting the initial needs of the stakeholders, but also building an open and collaborative relationship where all parties feel they can speak openly about their role, challenges and pressures throughout the development and planning cycles.

**GW:** *Has this influenced how you have built your project team?*

**MP:** Certainly. Our team must include a wider range of project specialists and consultants than ever before. For example, we work with environmental consultants, First Nations advisors, engineering firms, business and financial advisors and public consultation specialists, just to name a few. Project managers must recognize the wide range of skills and capabilities that are now critical to the success of megaproject delivery.

**SY:** I'd echo Mike's comments. In addition to external stakeholders, project managers are also required to develop clear governance and decision-making processes right at the start of the planning phase, while remaining flexible to adapt to changing circumstances. For the Site C project, we determined early on that a project of this size requires international hydro development expertise and review. For that reason, we recruited an international Technical Advisory Board to advise on the technical aspects of the project. In addition, we have established processes for internal specialists and stakeholders to participate in the project's development, as well as third party external review. These reviews are documented and provide a platform to move forward from our decisions with the confidence that we have made the best choices for the project and have involved stakeholders input.

**GW:** *How are you approaching risk management as part of the planning process?*

**SY:** Again, it's all about starting early. We started with a strong and proven risk framework approach which identified key project risks in each stage of project development, and then identified who best to manage and mitigate those risks. This allowed us to incorporate principles of safety-by-design, and engineering-by-design, which means that where possible, we seek opportunities to 'design out' safety or technical risks of the project. On a regular basis, we go back and revisit the risk framework to keep it updated and develop mitigation options for review by the project's leadership team.

**MP:** For us, it really comes back to understanding what the risks are and then aligning those risks back to the appropriate party. Obviously, construction and design risks that relate to bridges and interchanges lies squarely with the design-builder. But the Province has retained the risks related to things like securing environmental approval certificates and property acquisition. It really comes down to being very deliberate about how those risks are evaluated and aligned.

**GW:** *Based on your experience in megaproject planning, what advice would you offer other project managers now embarking on similar projects in other jurisdictions?*

**MP:** If I were to pick just one thing, I would say communication. On the one hand, we've gone through great lengths to communicate all of the work that we are doing, much of which goes unseen by the public and some of the stakeholders. For example, we've been working to bring salmon stocks back to the rivers that pass through our development, which is an important environmental benefit of the project that most commuters travelling down the highway would never see or know unless we communicated it to them. We've also focused on ensuring transparent and clear communications about the impact that our development will have on every-day issues such as traffic flow and road closures. These are the issues that could easily derail a project unless they are clearly communicated.

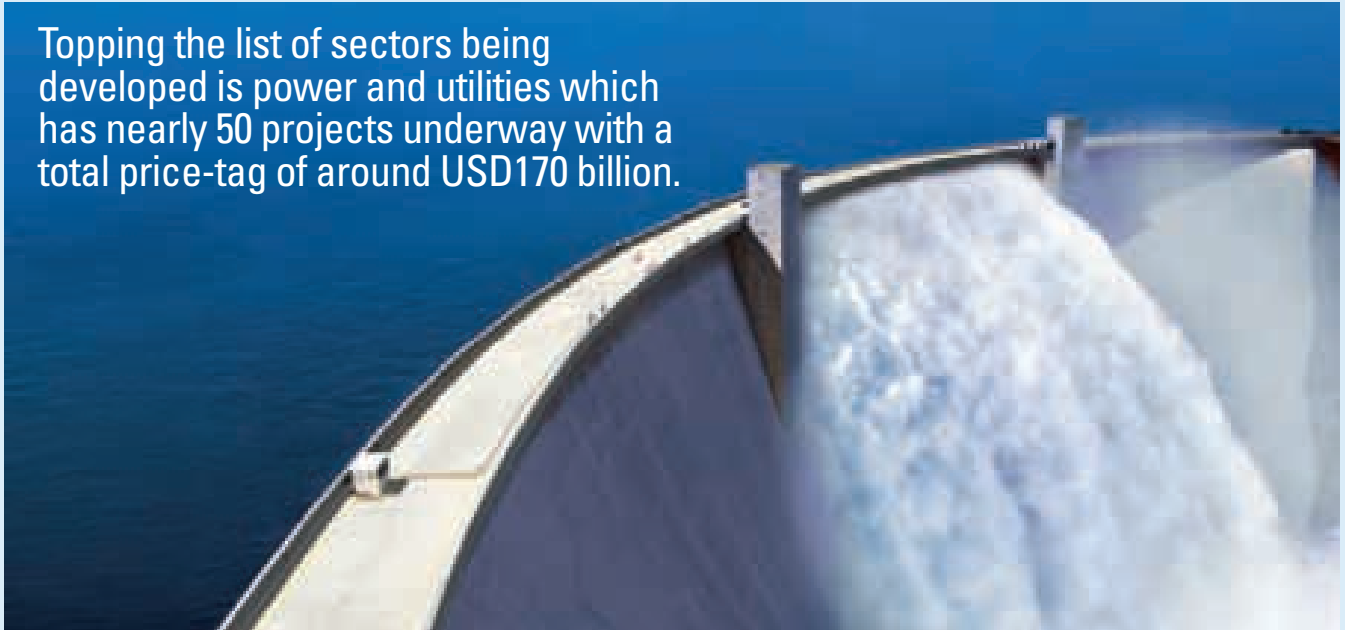
**SY:** I agree. Communicating and engaging with stakeholders as early in the process as possible is critical. Clearly, consultation is key to ensuring that all risks and challenges are understood and mitigated. I would also recommend spending time on developing a governance process with internal stakeholders. Finally, stay motivated. Large infrastructure projects can take years, or even decades, to plan and deliver. Keeping the project team motivated and firing on all cylinders every day can make all the difference in projects of this size and complexity.

# Canada: Mounties, moose and megaprojects

By **Brad Watson**, KPMG in Canada

*By many measures, Canada boasts one of the most active and vibrant megaproject markets in the world. This may come as a surprise to many readers given that – of the G20 nations – Canada ranks 12th in terms of total GDP and 18th in terms of population.*

Topping the list of sectors being developed is power and utilities which has nearly 50 projects underway with a total price-tag of around USD170 billion.



## **A MEGAPROJECT MAJOR**

Across this vast nation, our research shows that there are currently more than 175 megaprojects either on the books or under construction across a multitude of sectors. In total, these projects represent around USD420 billion worth of investment.

Topping the list of sectors being developed is power and utilities which has nearly 50 projects underway with a total price-tag of around USD170 billion. Equally prolific in terms of numbers – though slightly less costly – is the mining and natural resources sector which is expecting nearly USD80 billion in capital spend. At the same time, there are some 54 public infrastructure projects on the list and an estimated USD100 billion in projects within the lucrative Oil Sands region. In total, 93 of these projects are already underway with the other 91 in some stage of planning or preconstruction.

## **STRONG FOUNDATION FOR GROWTH**

In large part, this boom in megaproject development is being spurred by Canada's access to a rich store of natural resources which, in turn, is driving increased investment into many of the top sectors (including the utilities sector which is sorely needed to drive continued growth in the mining and natural resources sectors).

Canada's massive inventory of megaprojects is also being bolstered by an excess of equity in the market. With investors having sat on their war chests since the start of the global

financial crisis, Canada is now positively awash with equity capital in search of a strong investment opportunity.

This quantum of megaproject development will do much to catalyze Canada's future economic growth and development. But the increased pace of development is also starting to bring about a number of challenges related to resources. The ability to secure experienced and qualified workers, for example, has already become a key challenge for Canada's developers and contractors, particularly in highly-specialized or technical capabilities.

## **OPEN FOR BUSINESS**

There is clearly some room for foreign players to participate, especially within the growing number of Public Private Partnership (PPP) projects now being put to tender. Many international players are already well ensconced into the market as both investors and developers, and dozens more are now eyeing the market.

Thankfully, Canada is also one of the least complex markets for foreign entry and – with only a few exceptions – tends to welcome overseas investors into almost every sector and asset class. Moreover, Canada is often seen as a spring-board into the US market and a rich learning ground for foreign players.

Those already active in this market are reaping the rewards. Those not yet participating should really be asking themselves – and their boards – why they are missing out on this lucrative opportunity.

# Building new cities in Mexico



By **Alejandro Villarreal**, KPMG in Mexico

**B**oasting pristine beaches, dynamic ecosystems and a warm, tropical climate, tourism has quickly become a key driver of Mexico's national economic growth. Based on current projections, income from tourism is set to grow exponentially over the next two decades. In the Mayan Riviera alone, capacity is anticipated to increase by 110,000 hotel rooms by 2025, bringing with it more than 200,000 new jobs and approximately USD10 billion of net capital inflows to the economy each year.

To accommodate this rapid growth in tourism, Mexico will need to develop a number of new tourism cities that combine easy access to global markets with affordable, yet luxurious, accommodations that appeal to the wide range of tourist tastes and needs.

One such development that is currently in the planning phase promises to be the largest mixed-use real estate development of its kind in the western hemisphere, encompassing over 1,000 hectares of land and more than 6.5 kilometers of coastline.

## **COLLABORATING FOR SUCCESS**

According to Jeffrey S. Szeszko, the project owner and lead developer, taking on a megaproject of this size and scope brings a number of unique challenges and opportunities for project owners, developers and investors. In part, this is because the initiative is one of the first large-scale private urban developments ever envisioned for Mexico. "Right from the outset, we knew we had to identify and to work very closely with all of the key stakeholders, including government, NGOs and local communities, to communicate the strong benefits that our project will bring to the local economy, population and environment."

Mr. Szeszko notes that the environmental community, in particular, must be brought into the project at a very early stage to ensure the project is developed in a way that promotes environmental sustainability. However, concerns over the local environment also create some unique challenges in planning a new city. "We're taking a much more holistic approach and asking how we can be sustainable from the outset in terms of

social and environmental impacts. I've seen a lot of projects come undone because they have tried to fight the environmental lobby, rather than work with it in partnership," added Mr. Szeszko.

## **TAKING AN INNOVATIVE APPROACH TO FUNDING**

As a privately-led initiative, Mr. Szeszko's team is taking a diversified approach to project financing. He notes that different components of the new tourism city will naturally appeal to different types of investors. As such, his team has divided the project into components, comprised of different asset classes, so as to appeal to a variety of investors. "This has allowed us to refine our investment models by asset class and stage of development in a uniquely phased approach. For example, many of our early investors are Mexican nationals who intrinsically understand not only the value of this type of development, but also important contextual elements to the investment, such as the regulatory framework, political backdrop, etc. In later stages, we'll need to focus on groups of investors such



“Right from the outset, we knew we had to identify and to work very closely with all of the key stakeholders, including government, NGOs and local communities, to communicate the strong benefits that our project will bring to the local economy, population and environment.”

**Jeffrey S. Szeszko**, Project Owner and Lead Developer

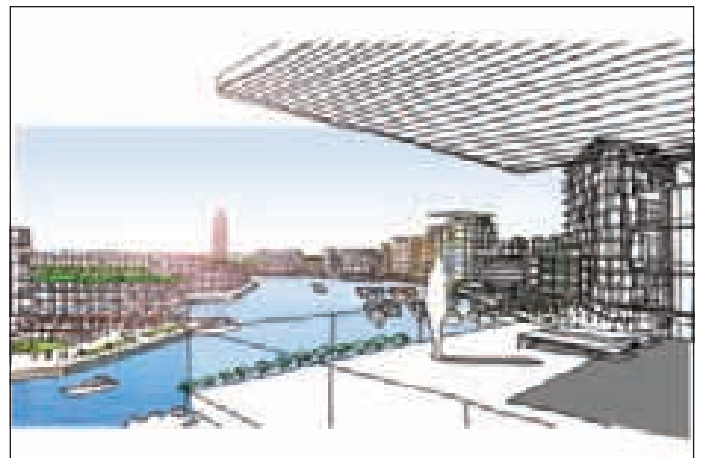
as development banks and sovereign wealth funds who we anticipate will likely have a very different set of investment parameters.”

The project has also focused on reducing both cost and construction risk by leveraging existing assets in the region. While much of the on-site infrastructure will need to be developed in a greenfield approach, the city will be in close proximity to existing trunk infrastructure and international airports. “In Mexico, we have tended to go out to virginal sites and to start building from scratch,” noted Mr. Szeszko. “But there is actually quite a lot one can do in terms of optimizing, renewing or improving existing assets, which not only reduces complexity but also tangibly benefits existing communities.”

#### ADVANTAGE MEXICO

For Mr. Szeszko and his partners, one of the greatest benefits that Mexico offers is a deep bench of highly-skilled professionals capable of moving megaprojects from planning through to operations. His team already comprises large groups of specialists in environmental law, financial law, urban planning, investment management, engineering and architecture, to name just a few. “While we have a tremendous depth of expertise here in Mexico, we’ve also tapped specialists of international repute from abroad with a view to leverage best practices and adapt approaches proven elsewhere to successful megaproject delivery in Mexico.”

With massive targets set for tourism growth, Mr. Szeszko suggests that there is no better time to invest in Mexico. “I believe that the country is on the cusp of a renaissance in terms of infrastructure investment and large-scale megaprojects. Mexico has lots of experience developing Public Private Partnership (PPP) models, a wealth of experienced professionals, and a proven capability of delivering projects both large and small, not to mention an overwhelming enthusiasm for growth and a deep seated sense of entrepreneurialism. Looking ahead, I am confident that we will see significant investment in infrastructure, spearheaded by government and the private sector alike.”





A historical perspective on

# megaproject development

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

If one looks back into history, it quickly becomes apparent that none of the challenges associated with today's megaprojects are new. Short-term thinking, funding challenges, 'future-proofing', public scrutiny and immense demand pressures have all been evident from the days of the Romans.

Yet one thing does stand out from the megaproject history book: the desire to deliver long-term, game-changing and visionary infrastructure.

### **LONDON'S INFRASTRUCTURE LEGACY**

London has always been subject to great innovation to manage some of the more unwelcome side-effects of urbanization. In her earliest days, the ancient Romans invested significant amounts in providing road and water infrastructure, a legacy that – in some parts of London – are still visible today.

One example of innovation that has lessons for modern day private sector investment in infrastructure comes from Sir Hugh Myddelton. In 1609, he built the 'New River' for London, a canal ten feet wide and four feet deep which followed a very circuitous 60 kilometer course. The aqueduct had over 40 sluices and was crossed by over 200 bridges. The job began in April 1609, to much criticism from local land owners. Much like today, Myddelton struggled with the opposition and lack of capital. In 1610, with the canal only partially complete, work stopped and construction remained at a virtual standstill for 2 years. The challenge was solved through an early form of Public Private Partnerships (PPP) when King James I agreed to pay half the costs of the project in return for receiving "forever the one half of the benefit profit". To raise further capital, Myddelton issued shares to 29 investors or 'adventurers', who were essentially the infrastructure funds of their day.

Utilization risk was also a challenge of the day. Despite the large expenditures, there were only 384 users connected to the system in 1615 and they provided minimal income for the company. It was not until

20 years from the date of the opening that profits started to flow to shareholders of the New River Company. The company eventually became an important economic force in London and, in 1695, it was one of the three largest companies in London. In 1973, the asset was passed to Thames Water and is still very visible today around North London.

### **URBANIZATION LEADS TO INNOVATION**

In the 19th century, London continued to struggle with its growing population and lack of sufficient waste management. Cholera was widespread in London during the 1840s leading to the death of more than 10,000 people in 1843, and prompted much needed sanitation reforms. This resulted in the formation of the consolidated Metropolitan Commission of Sewers in 1848, tasked with eliminating the cesspits within London.

Progress was slow and in 1858 London suffered an unusually warm summer which, combined with high pollution levels in the Thames, resulted in "The Great Stink", referring to a smell which was so overwhelming that it affected the work of Parliament. This accelerated the introduction of a single Metropolitan Board of Works.

In 1859, its chief engineer, Joseph Bazalgette undertook one of the world's most impressive feats. He spent four million pounds to build what – at the time – was the most intricate and elaborate sewage system in the world, one which London still relies upon today. Bazalgette stands tall in the annals of infrastructure as being a visionary who would not be constrained by short-termism, and he strove to provide a system with enough excess capacity to meet the needs of a growing city. This act is more impressive if one considers not just the subsequent increase in the population of London, but also the advent of tower blocks, modern flush toilets and power showers.

It is only today, with the development of the Thames Tideway Tunnel, that the Bazalgette system will receive a significant upgrade. In today's era, where predicting technology change further than 12 months ahead is considered to be challenging,

it is reassuring that many engineering disciplines remain as valid today as they did centuries ago.

### **A NATION BUILT ON MEGAPROJECTS**

London clearly does not hold all the lessons for today's students of infrastructure. The modern day economy of the US is, arguably, also built on the foundation of incredible infrastructure development. The Erie Canal, for example, which opened in 1825, is widely considered the first great infrastructure project in the US, as it connected the Great Lakes and America's Midwest to the Atlantic coast and Europe for the first time.

Water infrastructure has also played a big role in the development of the west coast. The Los Angeles Aqueduct system is a brilliant example of a multi-asset megaproject. It was opened in 1913 with a budget of around USD25million and included 359 kilometers of 3.7 meter diameter steel pipe, 190 kilometers of railroad track, two hydroelectric plants, 270 kilometers of power lines, 390 kilometers of telephone line, a cement plant, and 800 kilometers of roads. While this system is still in operation today, it also comes with the salutary tale of the California water wars in the 1920s, precipitated by farmers affected by the impact of the aqueduct to the Owens Valley.

Another noteworthy historical infrastructure megaproject is the Dwight D. Eisenhower National System of Interstate and Defense Highways (commonly known as the Interstate Highway System), a network of freeways that forms a part of the National Highway System in the US. Construction was authorized by the Federal Aid Highway Act of 1956, and the original portion was completed 35 years later. The network has since been extended to around 76,000 kilometers, making it the world's second longest road network. The cost of construction has been estimated at around USD500 billion (in today's dollars) making it the "largest public works program since the Pyramids."

All of which begs the question: when we look back in 100 years, which of today's megaprojects will students of infrastructure be learning from? Who knows, perhaps US high speed rail may turn out to be tomorrow's Erie Canals.

# Learning from experience:

A roundtable discussion with four megaproject masters

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



Megaprojects are not a new phenomenon and, consequently, there are a number of megaproject stalwarts who have been active in the field for decades. James Stewart sat down with four of the industry's most experienced and highly recognized leaders to find out the secret to their success in developing and delivering megaprojects around the world.



**Douglas Oakervee,**  
Chairman,  
UK's High Speed 2  
Former Chairman & CEO,  
Crossrail



**Tony Ridley,**  
Former senior positions  
at MTR, London  
Underground &  
Eurotunnel



**Mike Nichols,**  
Chairman,  
Nichols Group



**Keith Clarke,**  
Former CEO of WS  
Atkins & government  
advisor on sustainability



**James Stewart (JS):** *Given your combined experience in megaprojects around the world, can you tell me what makes these projects so transformational in the region or country in which they are developed?*

**Douglas Oakervee (DO):** Most megaprojects are tied to public funding in some way, which invariably means that they are going to transform society to some extent. In most cases, the transformation is for the better, but there are also other cases where it is not, particularly when the strategy or sequencing of the project is not fully developed.

**Tony Ridley (TR):** One also tends to find that these projects become transformational as a result of their size, complexity and duration. The underground metro developments in Hong Kong and Singapore, for example, were bound to be transformational simply because of the way they changed the patterns of movement, focus of development and land-use trends within a very restricted land mass.

**Keith Clarke (KC):** Absolutely right. Take, for example, the Hong Kong airport which I know Doug played a key role in developing. You could argue that the real benefit of the airport was that it released several hundred million square feet of development right in Kowloon and Central that really changed the dynamics of the city and allowed it to continue to grow.

**Mike Nichols (MN):** The best megaprojects catalyze change far beyond the scope of the physical asset. Ultimately, megaprojects are really big change programs that require a change in attitudes, behaviors, and stakeholder views to be successful. Those that think of megaproject development as a fundamental transformation program are more likely to get it right.

**JS:** *Do you believe there is a tendency to underestimate the benefits of megaprojects?*

**MN:** I think so, yes. Mostly because we tend to be far too narrow in our view, which is driven by business planning models and often look at a very narrow horizon. But it's not just about taking a longer-term view, it is also about having the imagination to think about what the potential impact of a major infrastructure investment will be

to the region or community in which it is being developed. In my mind, the classic example is the initial phase of the Docklands Light Railway, a GBP77 million project in the derelict London Docklands area which, laid the ground work for the Canary Wharf Development to proceed and helped London regain its premiere position as a global financial center.

**KC:** That's certainly true, but I also think it involves a certain amount of faith. The truth is that it is incredibly hard to determine with a high degree of certainty what will happen in the next 30 to 50 years in areas like technology, land use and economic cycles. Without some degree of faith, you'll end up doing nothing while you try to prove everything.

**TR:** It is also worth noting that sometimes the benefits are dramatically over-estimated. Far too many of the world's metro lines, for example, have been created as a legacy monument to a politician or leader and, if that is the objective, then the odds are good it will fail in almost every respect.

**JS:** *So what are some of the challenges that make megaprojects so difficult to develop and deliver?*

**TR:** Megaprojects are technologically complex, politically complex and systemically complex. Simply look at the timelines attached to many of these projects and you start to realize that they will go way beyond the political and technological life-cycle, leading to added complexity and challenges.

**DO:** I'd agree with that and would add that the heightened complexity of megaprojects require increased work at the strategic level to properly consult with all stakeholders and understand how this is going to impact or benefit society and the economy as a whole. Scope creep is also a significant challenge for megaprojects, because size means that even the smallest change in scope can lead to significant cost overruns and delays.

**MN:** The other challenge is a general lack of systems-thinking in these projects. We tend to break complex projects up into silos or packages and then fail to properly integrate them from the start, which leads to more complexity down the road.

**JS:** *Keith, you have been called an 'eco-warrior' and a 'climate change evangelist' when it comes to infrastructure. What is the climate change imperative here?*

**KC:** I think the growing challenge for megaprojects – and one that will become increasingly important over the next decade or so – relates to environmental regulation and targets. There is really no universal understanding of the future cost of carbon and so there is a real problem in applying and measuring the carbon cost over the whole life of the asset. Given the expectation of set targets for carbon reduction by 2050, this is going to become much more important in the near future.

What this means is that we need to dramatically alter the way we design megaprojects so that we are planning for a world where energy is scarce and very highly priced. That's a big challenge for engineers. We have about two knowledge cycles to get this perfected and into the market if we hope to have a valuable impact on our environment through infrastructure.

**JS:** *Do you think that the industry has enough of the right skills and capabilities to overcome these challenges?*

**MN:** I think one of the most important yet notably lacking areas is program integration. It's the ability to look across different activities that make up a single megaproject and then join them together properly that is the biggest challenge in regards to skill sets for megaprojects. To secure funding and land-use planning consents also requires a good feel for what works politically.

**DO:** Agreed. Not to say that we don't need technocrats in every aspect of megaproject delivery, but we also need people who can stand back and look at the strategic plan, which happens less frequently than one would like.

**KC:** I'd like to add that all is not lost. When I look at the graduates of today, they seem to be much more sophisticated than in years gone by. They are motivated, well read, strategic, and tend to have a better view of the world than I did coming out of college. If we give them the opportunity, I am confident that they will perform for us.

**JS:** *Mike, Tony and Douglas, I understand that – very early in your careers – you all worked together on projects in Hong Kong and particularly the Metro. What did you learn from that experience?*

**MN:** The Hong Kong Mass Transit project really was a defining moment for the three of us, but also for Hong Kong itself. It would be hard to see how Hong Kong could have developed without the Metro project. At that time, it was the most exciting project in the world and attracted some of the very best people. The breadth of experience and perspectives was exhilarating and had much to do with our ultimate success. I would argue, however, that the crucial factor was that the MTR Chairman – and indeed everyone involved – never doubted that the project would be a total success.

**TR:** In the 1970s, Hong Kong was managed by the British Colonial Administration which – for better or for worse – meant that the authorities were primarily focused on getting the job done regardless of other challenges the project faced. Nothing was allowed to stand in the way of the project being delivered. And while that's just not a viable

position in other circumstances, it does demonstrate the importance of motivated and supportive government leadership in cutting through the challenges that often trip up urban megaprojects.

**DO:** Much of the credit really has to go to Norman Thompson who was the first Chairman of the MTR. Not only was he a real visionary at that time, but he also strongly believed in short lines of communication. When his team faced a major challenge – they could always go directly to the right person to help overcome the problem. But they also had the authority and responsibility to just get on with the job. That mix of independence and support really helped the team move the project forward.

**JS:** *Based on your experience, what advice would you give others who may be setting out on a megaproject development?*

**DO:** I think one of the most important – and it ties to what we have all said earlier – is the need to develop an integrated strategy that not only brings together the various packages of work across the full asset life-cycle, but also considers the wider benefits of the

project and how they can be maximized to both improve the investment potential and transformational impact on society.

**MN:** Having the right project leadership is critical. A leader that has some understanding of the nature of the project and the need for integration of the type Doug is talking about is vital. Many organizations attempt to apply 'business as usual' principles rather than the skills that are necessary to develop and deliver major projects and that, quite frankly, is a mistake.

**KC:** While we're at it, I'd also suggest that project leaders need to enjoy the project they are working on while also understanding there are other views that must be taken into consideration. You need to respect the rest of the world around you and be able to explain yourself and your project in a way that resonates with others.

**TR:** If I could just add two things: always strive for clarity in both objectives and scope, and focus on your interpersonal relationships. These are two things that will reduce complexity in the long-run and help facilitate project success.



# Lessons from China

## driving sustainable change through megaproject delivery

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

**F**rom the Great Wall of China to the Three Gorges Dam, few countries can rival China's illustrious history of megaproject development. Over the past decade, China's love affair with the megaproject has only become more passionate. Today, China's pipeline and portfolio of megaprojects rivals any in the western world.

Yet, to many in the West, China's megaproject market continues to be shrouded in mystery and – on the whole – not open to foreign participation. To learn more about the market from a China insider, I spoke with Victor Chuan Chen, a Professor of Engineering Management with the Business School of Sichuan University.

### A FOCUS ON PRIORITY SECTORS

Victor has spent the past few years working with the World Bank to monitor the infrastructure market in China. What he has found is a massive and ever-growing market for transformational projects, particularly in the transportation and power sectors. "Of the almost 50 megaprojects that I'm tracking regularly for my research, almost two thirds are in the transport sector and most of the remainder are in the power sector," noted Victor. "With the exception of one water project – the South-to-North Water Diversion Project – and one telecom project, the list really is dominated by two main sectors."

As the country strives to maintain its rates of economic growth, poverty reduction and productivity, the central government is

keenly focused on the transport and power sectors in particular. "Transport projects have played such a crucial role in promoting urbanization in China which has brought real benefits to millions of Chinese," Victor noted. "The same can be said for the power sector which now stretches into some of the most remote parts of the country bringing with it an increased standard of living and massive productivity gains as businesses and households become electrified."

### A DISTINCTLY LOCAL GAME

While much work and investment is being put into the country, few opportunities exist for foreign players. "We have already got a number of very strong State Owned Enterprises in each of these sectors and they are all competing for projects, meaning that there seems to be very little room for foreign players to break into the transportation or power markets," added Victor. "That being said, there have been a number of cases where foreign and local private companies have participated in water projects, but these are often smaller, more localized projects."

### VALUABLE LESSONS

So what lessons can foreign players and governments take from China's extensive megaproject experience? Three main concepts stand out to Victor as viable models for foreign markets.



The first is that by focusing on infrastructure development, governments can help drive greater economic growth and stability. "In China, the government recognizes that if we want to develop our economy, we must develop more infrastructure projects and so the central and provincial governments have all made infrastructure development a key priority over the past few decades," added Victor. "Nobody in China doubts the massive role that infrastructure has played in our progress to date."

Victor's second finding is that China has benefited from developing megaprojects at times where resource and labor costs were comparatively low. "Clearly, China's cost advantages are going to shrink somewhat over the longer-term and prices for projects are only going to rise. I think the government has done an admirable job in getting many of these projects off



## CHINA'S 5 BIGGEST MEGAPROJECTS

### **CNY900.0 Bn** **Transport**

"Five Vertical and Seven Horizontal" National Trunk Road

### **CNY526.5 Bn** **Power**

West-To-East Power Transmission Project

### **CNY500.0 Bn** **Water**

South-To-North Water Diversion Project

### **CNY220.0 Bn** **Transport**

Beijing-Shanghai High Speed Railway

### **CNY170.0 Bn** **Transport**

Shanghai-Chengdu Expressway

the ground while the economics were still very favorable."

Finally, Victor notes the ingenuity and innovation on the part of China's construction and development companies. "On one hand, they have become very good at developing megaprojects using some very economical construction methods that could provide valuable opportunities to other developing countries," noted Victor. "But in other areas, China's innovation has led to amazing developments in areas such as high speed rail and water diversion that could stand as lessons to construction companies, engineering firms and project owners in both developing and mature markets."

#### **A CENTRAL HAND ON THE RUDDER**

Of course, Victor also notes the role of central government in the sector. "China mainly remains a central planning system with regard

to mega infrastructure developments," he noted. "In terms of financing and project implementation, it really comes down to the level of control exerted by the central government."

Ultimately, Victor suggests that much of China's megaproject success stems from the importance the country places on these massive undertakings. "From the central government right down to rural villages, there seems to be a general understanding that megaprojects are key to improving our country, our economy and our standard of living. It is no wonder that China has a love affair with megaprojects," he concludes.



**Victor Chuan Chen,**  
Professor of Engineering Management with the Business School of Sichuan University, Chengdu, Sichuan Province, China

# Lessons from the UK's nuclear program

By **Tim Stone and Dominic Holt**, KPMG in the UK

**A**s governments around the world look to dramatically revise their power generation mix, many are closely watching the UK's new nuclear program to learn important lessons and best practices.

The complexities are enormous. Putting aside all of the construction and development risks that come with building a highly regulated and technical megaproject in the energy sector (and those risks are considerable on their own), the UK is still left with a herculean – yet not insurmountable – task if it hopes to entice private investors into constructing and operating eight new nuclear reactors over the next two decades.

## **AN INDUSTRY RESURRECTED**


The problem is that the UK has, for all intents and purposes, been out of the new nuclear build game for almost a quarter of a century (the last time ground was broken for a reactor in the UK was 1988). While there is a large body of operational, maintenance and decommissioning skill in the UK, one of the most obvious repercussions of this long absence from the sector is a lack of experienced professionals capable of executing not just one, but eight or more of these projects over the coming years. And while the UK is feverishly trying to up-skill workers to fill the looming gap, it is fairly clear that some expertise will need to be imported or externally recruited if targets are to be met.

While talent can easily be imported, the creation of a supportive regulatory and policy environment for new nuclear development is a decidedly home-grown proposition. The reality is that nuclear builds transcend the remit of any individual government department or agency, and therefore requires significant collaboration and a clear vision in order to succeed in encouraging private investors and developers to participate.

## **THE AUTHORITY TO ACT**

Better still would be the creation of a single 'Infrastructure Authority' that could maintain a unified and strategic plan for the country and coordinate government activities across the board. Had this been in place in the UK some 10 years ago, it is most likely that the Authority – if properly empowered – would have noted the sea change that was coming, been able to respond appropriately by advocating for new regulations and policies on a timely basis, and been alive to the skills issue as it emerged over time.

Without this – or the experience in structuring and tendering new nuclear build programs – the government has been forced to develop a regulatory and policy regime that would meet the needs of the nation while also appealing to developers and investors (in part by dramatically reducing the wide array of perceived regulatory and political risk).



The reality is that nuclear builds transcend the writ of any individual government department or agency and therefore requires significant collaboration and a clear, shared vision in order to succeed in encouraging private investors and developers to participate.

#### **YES WE CAN**

On the whole, they have largely been successful. Currently, there are three developers active in the market. Each has already invested significant capital (one is thought to have invested more than GBP1 billion) into planning, design and consultation. Clearly, they would not have taken on this investment if they didn't think that the government could make it all work. The recent acquisition by Hitachi of Horizon Nuclear Power from its founders, Eon and RWE, was an eye-popping demonstration of the trust placed in the UK government by international investors and was described by the British Prime Minister as a "decades-long, multibillion-pound vote of confidence in the UK".

The Horizon acquisition is part of an increasing body of evidence to suggest that the UK will, in fact, be able to achieve their targets using private developers and investors. But the journey is not over yet. Both on the development sites and within the halls of government, more action will certainly be needed. Those looking for best practices and lessons would be well advised to keep their eyes trained on the UK.

# Global diary

KPMG professionals are committed to sharing insights and exploring issues and opportunities through industry events. Here we share a selection of recent and upcoming forums organized, or with significant involvement, by KPMG. Follow the links to learn more or email us at: [infrastructure@kpmg.com](mailto:infrastructure@kpmg.com)

## Gurgaon, India

### CII Invest North



3-4 November 2012

KPMG was proud to be the knowledge partner for the Invest North meeting held by the Confederation of Indian Industry (CII). Over 500 delegates convened at the two-day assembly to discuss investment opportunities in northern India.

[www.cii.in](http://www.cii.in)

## Toronto, Canada

### Canadian Council for Public Private Partnerships (CCPPP) Conference



26-27 November 2012

KPMG was proud to once again take part in the CCPPP Conference. The two-day conference in Toronto marked 20 years of P3 innovations in Canada and focused on industry issues in Canada and internationally.

[www.pppcouncil.ca/events/national-conference.html](http://www.pppcouncil.ca/events/national-conference.html)

## Gurgaon, India

### World Economic Forum on India



6-8 November 2012

James Stewart, KPMG's Global Infrastructure Chairman, was invited to present at the World Economic Forum (WEF) on India. The WEF is a world class summit attended by business, political and academic leaders who will shape regional and global practices to improve the state of the world. The theme of the India Forum focused on Deliberation to Transformation.

[www.weforum.org/events/world-economic-forum-india](http://www.weforum.org/events/world-economic-forum-india)

## Vienna, Austria

### KPMG Global Power & Utilities Conference



28-29 November 2012

KPMG's premier annual event for CEOs, divisional heads and financial executives in the power and utilities sector was held in Vienna, Austria at the end of November, 2012. The intensive program focused on strategic, financial, environmental and risk related issues, including infrastructure, and provided insight into the tools and strategies to help manage them.

[www.kpmgpowerconference.com/](http://www.kpmgpowerconference.com/)

## Dubai, United Arab Emirates

### Summit on the Global Agenda 2012



12-14 November 2012

James Stewart, KPMG's Global Infrastructure Chairman, was also invited to participate at the World Economic Forum's (WEF) Summit on the Global Agenda. The summit brings together thought leaders from the WEF's Network of Global Agenda Councils to provide input for the global, industry and regional agendas.

[www.weforum.org/events/summit-global-agenda-2012](http://www.weforum.org/events/summit-global-agenda-2012)

## Panama City

### Inter-American Development Bank (IDB) Annual Meeting



14-17 March 2013

The Inter-American Development Bank (IDB) Annual Meeting will bring together top economic leaders from the IDB's 48 member countries to discuss the development needs of Latin America and the Caribbean, the economic challenges going forward and priorities for the IDB. Representatives of other multilateral financial institutions, development agencies, commercial banks, companies and civil society organizations will also attend the gathering. Participation at the Annual Meeting is by invitation only.

[www.iadb.org/](http://www.iadb.org/)

## London, UK

### Future of Utilities Conference



19-21 March 2013

The Future of Utilities brings together attendees from the water, electricity and gas sectors to discuss the challenges, strategies and developments in the utilities sector including energy and water policies, utilities investment and finance and customer service. KPMG's Global Infrastructure Chairman, James Stewart, will deliver a keynote speech.

<http://marketforce.eu.com/Conferences/utilities13/>

## Macao, China

### International Infrastructure Investment & Construction Forum (IIICF)



6-7 June 2013

The 4th Annual International Infrastructure Investment & Construction Forum is 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 Global Infrastructure Chairman, James Stewart, has been invited to participate as a speaker.

[www.iiicf.org](http://www.iiicf.org)

## London, UK

### CityWeek 2013



22-24 April 2013

City Week brings together top-level delegates from around the world for three days of cutting edge conferences and seminars, exclusive social gatherings and both formal and informal networking events with the senior management of London-based financial services institutions. KPMG's Global Infrastructure Chairman, James Stewart, will host and moderate a panel on how infrastructure investment is driving economic growth.

[www.cityweek.com](http://www.cityweek.com)

## Bilbao, Spain

### World Cities Summit Mayors Forum



13-14 June 2013

KPMG is 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.worldcities.com.sg/mediarelease/?q=media/bilbao-will-host-2013-world-cities-summit-mayors-forum](http://www.worldcities.com.sg/mediarelease/?q=media/bilbao-will-host-2013-world-cities-summit-mayors-forum)

## Manila, Philippines

### Asian Development Bank (ADB) Annual Meeting



2-5 May 2013

Enrique Fuentes, KPMG's Global Infrastructure Senior Director, will take part in the Asian Development Bank's (ADB) Annual Meeting. Approximately 4000 people, including Finance Ministers from the ADB's member countries, gather to provide guidance on ADB administrative, financial, and operational directions.

<http://www.adbdelhi2013.gov.in>

## 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](http://www.womensinfrastructure.net)

# Bookshelf

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

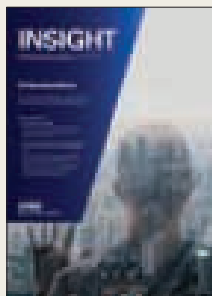
## Insight – The Global Infrastructure Magazine

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



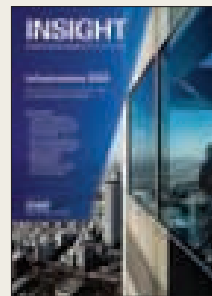
### Infrastructure Investment: Bridging the Gap – Issue No. 3

The third edition of Insight magazine explores the complex world of infrastructure finance and funding and examines some of the key challenges and opportunities facing the market.



### Urbanization – Issue No. 2

The second edition of Insight explores the infrastructure challenges faced by cities, and includes feature interviews with key city leaders and private sector executives from around the world to shed light on how they are responding.



### Infrastructure 2050 – Issue No. 1

The first edition of Insight explores 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.

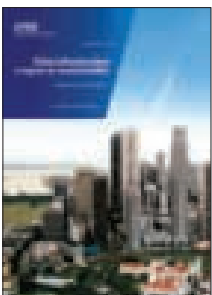
## Latest insights – KPMG Global Infrastructure publications and reports

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.



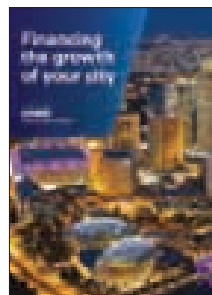
### Infrastructure 100: World Cities Edition

Infrastructure 100: World Cities Edition provides insight into 100 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.



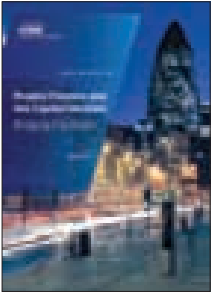
### Cities Infrastructure: A Report on Sustainability

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.



### Financing the Growth of Your City

This paper highlights alternative financing mechanisms and structures for urban infrastructure financing. These financing options, including Public Private Partnerships (PPPs), could help cities gear up to not only meet the challenge of rapid growth but also become global cities with world class infrastructure.



### **Project Finance and the Capital Markets**

This paper examines the barriers to accessing the debt capital markets for project financing and provides a qualitative and quantitative analysis of the potential solutions that are being developed – in particular the product being offered by Hadrian’s Wall Capital as compared to the current project finance bank market.



### **KPMG Global Power & Utilities Conference – Europe 2012: Conference Report**

This publication provides a comprehensive summary of the key issues and perspectives discussed during the KPMG Global Power & Utilities Conference – Europe 2012.



### **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.



### **New nuclear – an economic perspective**

This paper discusses the recent events at the Fukushima Nuclear Power Plant. Nuclear power is already playing a substantial role in the decarbonization of the global economy and currently offers the sole cost-comparable, low-carbon alternative to fossil fuels.

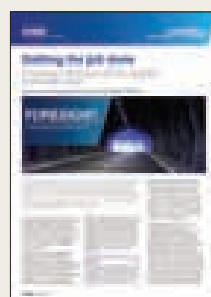
## **Foresight**

In the complex world of Infrastructure, hot topics of conversation and industry ‘buzz’ are constantly changing. Foresight: A Global Infrastructure Perspective, is a new e-blast we’ve developed to feature our take on some of these hot topics, trends and issues facing our clients, and to share what we are observing globally.



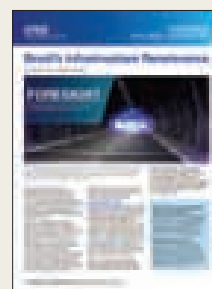
### **Revitalizing Brazil’s ports infrastructure**

In the latest Foresight, Mauricio Endo shares some perspective on Brazil’s major leap forward in an all-out effort to modernize and improve the country’s ports infrastructure.



### **Getting the job done: Enhancing infrastructure delivery capability in the public sector**

In this edition of Foresight, James Stewart explains why a significant change in the current approach to infrastructure is needed.



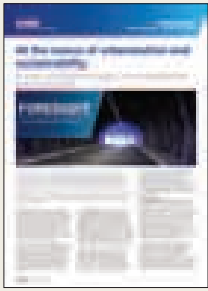
### **Brazil’s infrastructure renaissance**

After enduring a veritable infrastructure ‘dark age’ over the past three decades, Mauricio Endo explains why Brazil has truly emerged as one of the hottest infrastructure markets in the world.



### **Recognizing urban infrastructure excellence**

James Stewart, Steve Beatty and Darryl Murphy share their insight on the importance of recognizing urban infrastructure excellence.



### **At the nexus of urbanization and sustainability: A review of the panel discussion on sustainable cities.**

Dr. Timothy Stone CBE shares highlights from a panel discussion with industry experts at KPMG’s Global Summit “Business Perspectives on Sustainable Growth” in New York City (February 2012).

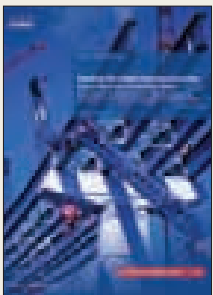


### **Taking a giant leap for mankind: Making the case for wholesale change in the way we approach infrastructure**

In the first edition of Foresight, Dr. Timothy Stone CBE makes the case for wholesale change in the way we approach infrastructure.

## **KPMG-Economist Intelligence Unit (EIU) Survey Series**

During 2009 and 2010, KPMG commissioned a series of surveys with the EIU into issues and the way forward for infrastructure development worldwide. The three resulting surveys show a clear consensus of opinion by business leaders, infrastructure providers and government officials that as infrastructure ages around the world, we are making insufficient investments to protect our future.



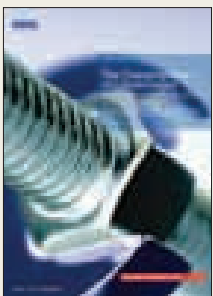
### **Bridging the Global Infrastructure Gap: Views from the Executive Suite**

A survey of 328 C-level executives and board members from 22 countries. The majority of respondents expressed concern about the adequacy, quality and availability of infrastructure to support both their business growth and that of their national economies.



### **The Changing Face of Infrastructure: Public Sector Perspectives**

Survey of 392 public sector infrastructure policy developers and procurers from 50 countries worldwide. The majority of respondents agree that the politicization of infrastructure priorities and lack of funding are the biggest impediments to infrastructure development.



### **The Changing Face of Infrastructure: Frontline Views from Private Sector Infrastructure Providers**

A survey of 455 executives from 69 countries worldwide. The majority of respondents expressed concern regarding governmental effectiveness inhibiting infrastructure development.

# KPMG's Global Infrastructure practice

**Integrated services.**

**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.

For further information, please visit us online at [www.kpmg.com/infrastructure](http://www.kpmg.com/infrastructure) or e-Mail: [infrastructure@kpmg.com](mailto:infrastructure@kpmg.com)

[kpmg.com/infrastructure](http://kpmg.com/infrastructure)

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## Ground-breaking thinking

Infrastructure: one of the biggest and most complex challenges of the 21st century. An estimated US\$40 trillion of investment will be needed by 2050 to sustain global growth. Our Global Infrastructure practitioners, on site in 146 countries, advise governments, developers and investors across the lifecycle of projects – from strategy and financing to delivery and hand-back.

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