Research by

OXFORD ECONOMICS

Capital project and infrastructure spending outlook: Agile strategies for changing markets

2016 edition

pwc

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How can stakeholders manage capital project investments in a challenging environment?

It's going to be a bumpy ride for capital project and infrastructure (CP&I) spending, especially in the near term. Volatile economic forces are making decisions about capital spending difficult and inhibiting strategic planning.

A combination of unanticipated concerns – including the decline in oil and commodity prices, a slowdown in China's growth rate, sluggish gains in the developed world, the strong US dollar and uncertain forecasts for multinationals – have for many companies and governments inevitably put CP&I expenditures on the back burner[1].

The UK's recent decision to exit the European Union came after the research for this report was finalised. It is too early to comment on the specific UK and global impact of Brexit in 2020, however, in the short-term the additional uncertainty and volatility is likely to directly impact the UK CP&I market and indirectly impact the global CP&I market, although the latter is unlikely to be severe.

Yet, unlike cost cutting or an M&A deal, increasing or trimming CP&I spending is not a quick fix. Because it involves long-term considerations – do you need a new factory in Asia; is that highway upgrade necessary; will the electric grid provide sufficient energy for demand in ten years? – and long-term projects, enterprises shouldn't make capital project decisions based on immediate macro- and micro-economic conditions.

There is no simple way to do this. But to provide analytical insight that could help shape CP&I decisions, PwC asked Oxford Economics to examine the capital projects and infrastructure environment for the next five years through the lens of two opposite scenarios: a hard landing in China and a global upturn. We assessed the prospects for CP&I spending across seven regions (see Figure 1) and six key infrastructure sectors (see Figure 2) under both of these scenarios. And we offer a series of strategic and tactical recommendations for stakeholders to prepare for an unsettled landscape.

Our goal is to provide CP&I stakeholders with options for making the right decisions about capital expenditures. In our view, it is more important than ever for companies affected by CP&I volatility to understand the potential range of possibilities they could face and be sufficiently agile to respond to conditions as they change. Says Peter Raymond, PwC US and global and Americas and Asia CP&I leader, '... the challenge is how to manage through the short term so you can be positioned to grow effectively over the long term – after the uncertainty subsides'.

Figure 1. Seven regional groupings

Western Europe, North America, Latin America, Asia Pacific, Middle East, Africa, Former Soviet Union/Central and Eastern Europe

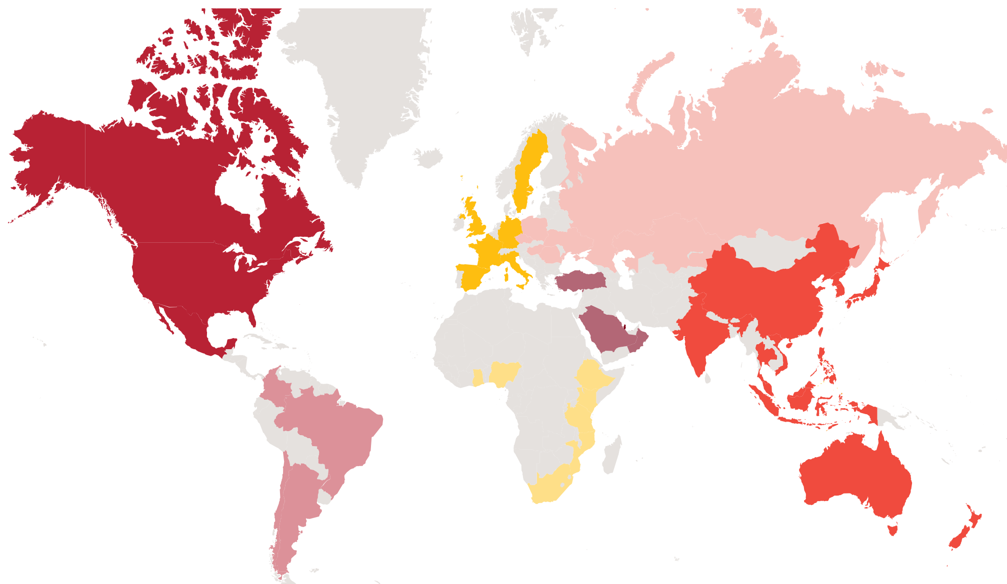
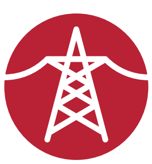


Figure 2. Six key infrastructure sectors

1. Extraction

- Oil and gas
- Other extraction (coal, metals, minerals)



2. Utilities

- Power generation
- Electricity transmission and distribution
- Gas distribution
- Water

3. Manufacturing

- Petroleum refining
- Chemical
- Heavy metals

4. Transport

- Rail
- Roads
- Airports
- Ports

5. Telecommunications

- Physical infrastructure and hardware

6. Social

- Education
- Health

Two scenarios

Oxford Economics estimates that if conditions stay as they are – what we are calling the baseline projection – capital project and infrastructure spending growth will likely remain low, hovering at about 2%, over the coming year, before inching up in 2017 and reaching about 5% in 2020. The improvement would be driven mainly by higher oil. However, even at 5% growth, infrastructure spending growth would be well below its double-digit levels before the global financial crisis. Different pictures emerge, however, under the two opposing scenarios that we examined (see Figure 3):

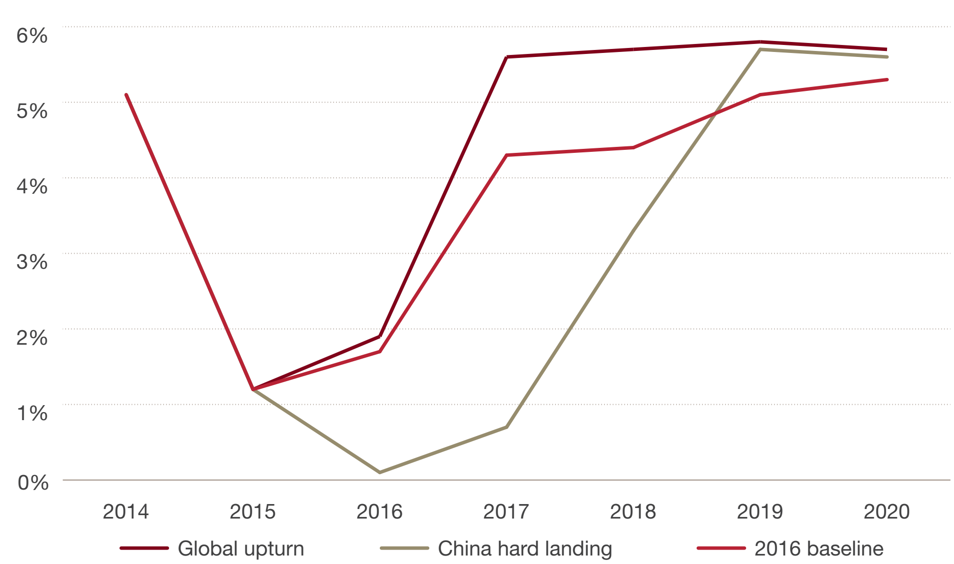
The downside

Overview

The downside scenario would be a Chinese hard landing, a real possibility considering the recent serious slowdown in Chinese GDP growth, from 14% in 2007 to half that now. To explore this and its impact on capital investments in infrastructure, Oxford Economics assumed a Chinese economic environment in which the yuan would depreciate by as much as 10%, housing sales would slump sharply, consumers would postpone new purchases and wage growth would decline. Moreover, the pressure on developers' cash flow, under this scenario, would trigger a renewed decline in Chinese house prices and a sharp fall in housing construction. Domestic and external confidence would abate, resulting in a scaling back of private investment.

Under the China hard landing scenario, CP&I spending between 2015 and 2020 would fall by 4%, and CP&I spending growth would likely hit almost zero in 2016 and pick up only slightly in 2017. In dollar terms, a China hard landing would reduce CP&I expenditures by US$1.1 trillion between 2015 and 2020 (compared to the baseline) – from US$28.2 trillion to US$27.1 trillion.

Figure 3. Global infrastructure spending growth 2014–2020



Source: Oxford Economics

↓US$1.1trn

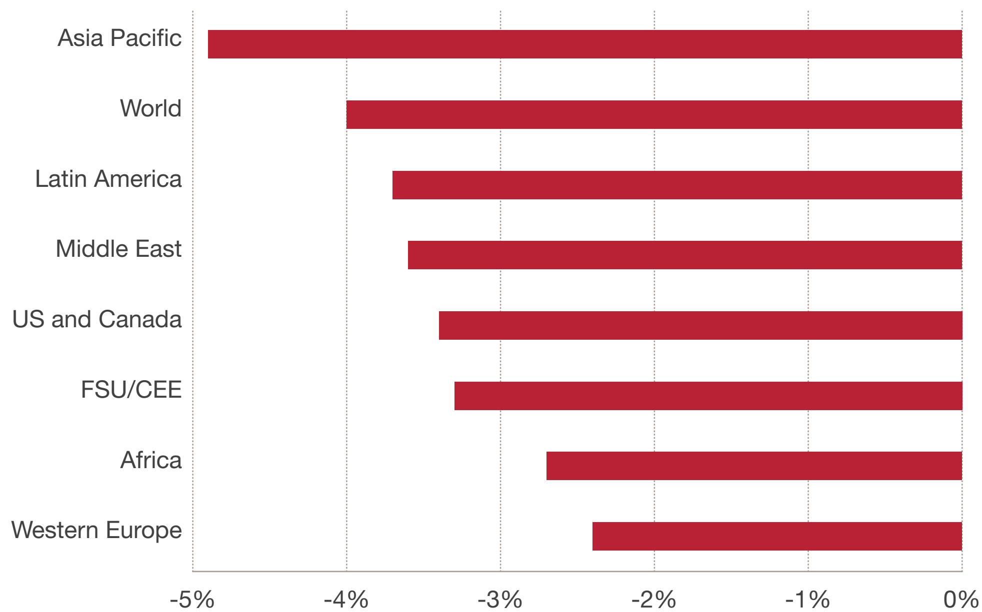
In dollar terms, a China hard landing would reduce CP&I expenditures by $1.1 trillion between 2015 and 2020 (compared to the baseline).

vs.

↑US$600bn

In dollar terms, a global upturn would increase CP&I expenditure by US$600bn between 2015 and 2020 (compared to the baseline).

Figure 4. Cumulative infrastructure spending 2015–2020, percentage difference between 2016 baseline and China hard landing scenario by region



Source: Oxford Economics

Regional view

Over 60% of the decline in infrastructure spending would occur in Asia Pacific, by far the most affected region (see Figure 4). In large part this is because of China's economic dominance in Asia Pacific. Any slowdown in China would have palpable ripple effects among its neighbors, who rely on Chinese demand for their goods and services to stimulate their economies.

On the other hand, Asia Pacific countries would not be greatly affected by lower demand for commodities and extracted materials, at least relative to other areas of the world. So, in that regard, China's hard landing would most impact regions like Latin America and the Middle East and countries like Russia, whose economies are heavily invested in exports of oil and other extracted products. Without those revenue streams, investments in public or private development projects would sharply decline.

In fact, in Latin America, the recent steep drop in commodity prices, mainly a result of current Chinese economic slowdown, has already weighed upon infrastructure spending in the region. And there is not much optimism that this will change.

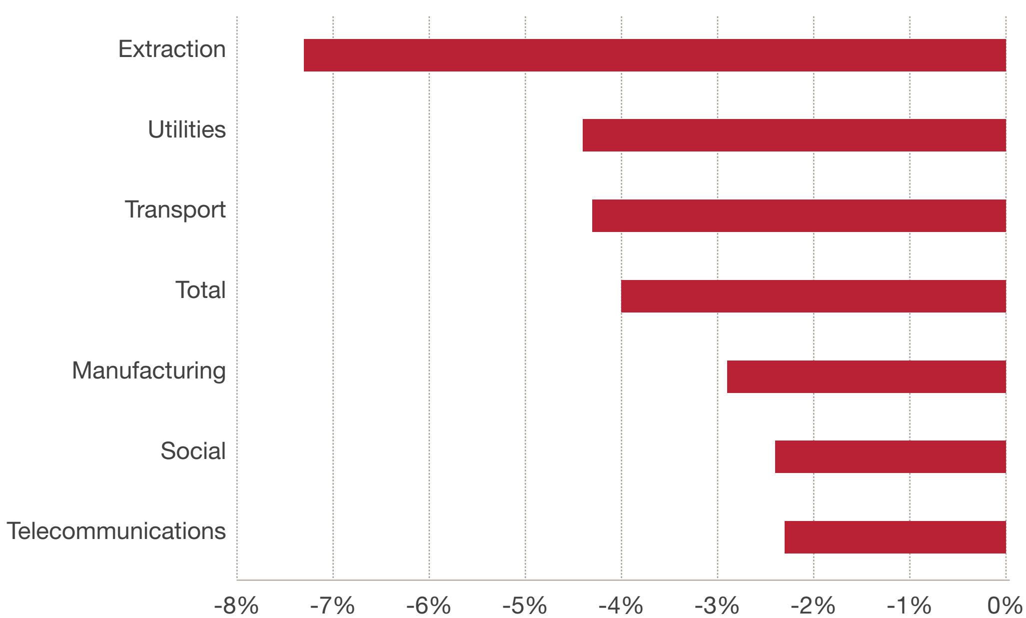
Sector view

The impact of a China hard landing would widely spread out among the key sectors (see Figure 5). Extraction would take the worst hit because weakness in Chinese infrastructure and manufacturing development would significantly slash demand for oil, steel and other commodities. Even without further economic instability in China, capital investment in extraction efforts would be diminished, a victim of depressed prices, especially in the oil patch, given that energy majors suspended some hundreds of billions of dollars of investment on new projects over the past year. This is because many upstream Independents and National Oil Companies (NOC's) have slashed capital budgets, by more than 50% from their already reduced 2015 capital budgets, and Independents are selling non-core assets to raise cash and managing capital spending within their cash flows in this leaner for longer macro-economic environment.

The forecast for the extraction sector would also likely weaken, particularly in regions such as the Middle East and Former Soviet Union/Central and Eastern Europe (FSU/CEE), which rely heavily on the extraction sector. 'Oil and gas companies are rebalancing or restacking their portfolios and have cut investments,' says Neil Broadhead, PwC UK and Europe and Middle East CP&I leader. 'They're looking to cut costs in their supply chains as well, and they are reprioritising projects based on expectations of oil and gas prices as well as progress along the project continuum'.

Transport and utilities account for about half of CP&I infrastructure spending in Asia Pacific, and these sectors would also fare poorly if conditions in China worsen. In fact, in absolute terms, transport, extraction and utilities would account for almost three-quarters of the reduction in global infrastructure spending between 2015 and 2020 under the China hard landing scenario.

Figure 5. Cumulative infrastructure spending 2015–2020, percentage difference between 2016 baseline and China hard landing scenario by sector



Source: Oxford Economics

Even without Chinese shortfalls, utilities have been under some pressure globally, buffeted by a combination of subsidy cuts in Europe for renewable energy projects; sluggish global economic and trade growth, which reduces demand for electricity; and diminished private sector thirst for capital projects in the face of a negative commodities price environment.

Similarly, investment in transport projects will likely have a rocky few years ahead no matter how global conditions turn out. Although many governments are not as wedded to austerity budgets as they were a short time ago, few are willing to open wide the coffers to fund major infrastructure projects. And in the Middle East, where transport infrastructure development has had a lot of attention and funding for the past few decades, the fall in oil prices is dampening enthusiasm for these big efforts.

And while investment in manufacturing might not take too big a hit under the downside scenario, this sector, too, may not be on firm ground. The potential scaling back of petroleum refining plants may be one problem; however, refining only accounts for around 16% of manufacturing infrastructure spending. Equally problematic, though, would be the outlook for investments in chemicals and heavy metals, which also face price constraints.

The upside

Overview

The global upturn scenario analysed by Oxford Economics assumes that recent market gloom would fade, confidence would increase, and growth would pick up in a number of economies. US investment would rise, amid renewed expansion in lending to business. And investment in Western Europe also would strengthen, supported by robust business sentiment, rising profits and increased capacity utilisation.

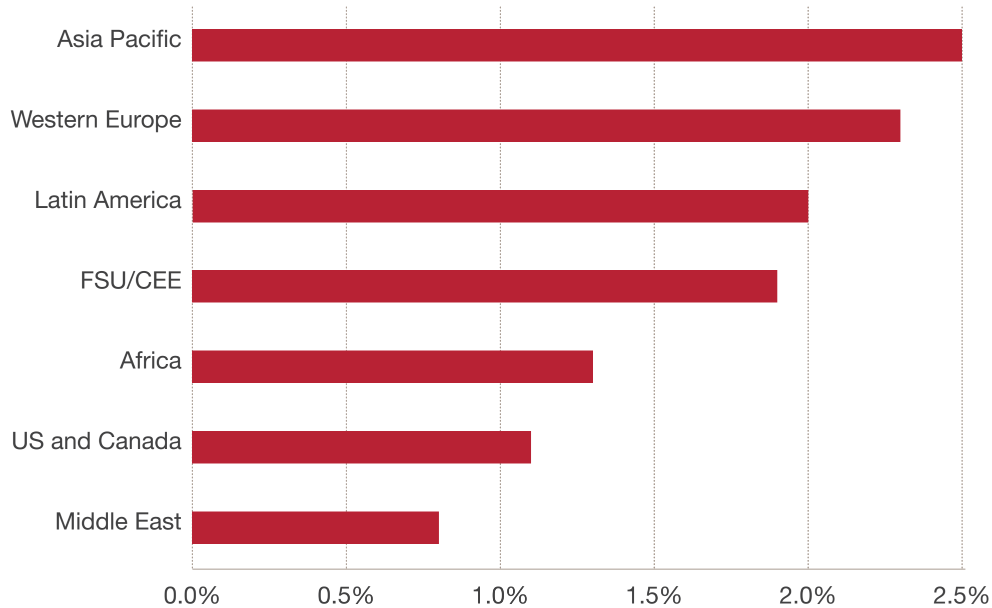
'The challenge is how to manage through the short term so you can be positioned to grow effectively over the long term – after the uncertainty subsides'.

—Peter Raymond, PwC US and global and Americas and Asia Pacific CP&I leader

Under this plot line, in some parts of the world, governments would pursue more expansionary fiscal policies. With greater confidence that bond markets will remain accommodative, countries with fiscal flexibility would increase public investment in infrastructure projects. And there would be one surprise in this scenario: with renewed economic optimism, oil production would rise more than expected under normal conditions. With more supply on hand than the baseline forecast anticipated, the global upturn scenario predicts slightly slower increases in oil prices.

In this analysis, global infrastructure investment between 2015 and 2020 would hit US$28.8 trillion, about US$1.7 trillion more than the outcome of a Chinese hard landing and US$600 billion more than the baseline.

Figure 6. Cumulative infrastructure spending 2015–2020, percentage difference between 2016 baseline and global upturn scenario by region

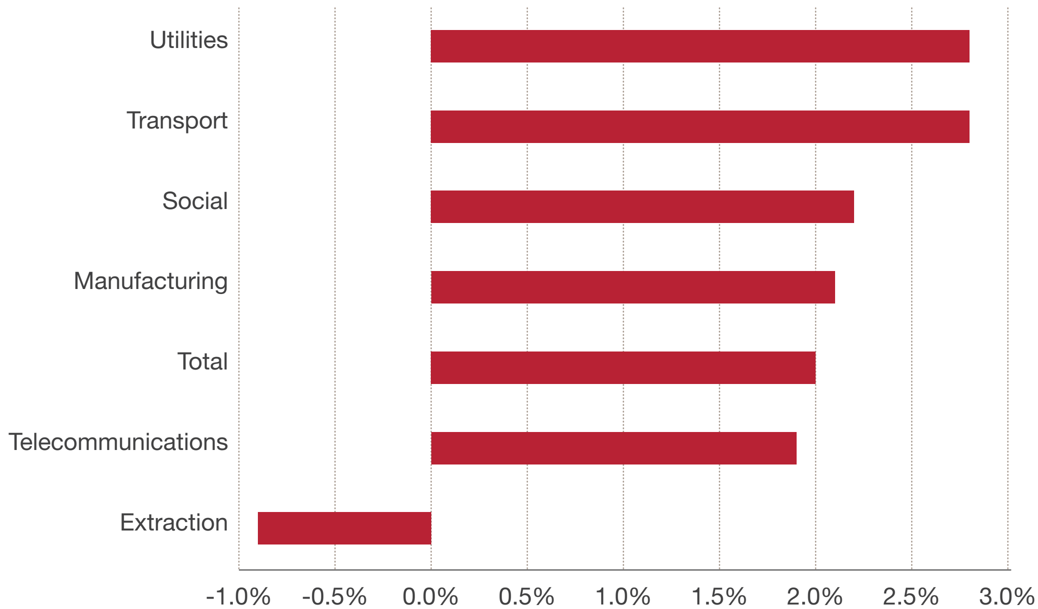


Source: Oxford Economics

Regional view

Under the global upturn scenario, the strongest beneficiary would be Asia Pacific, which could enjoy enhanced demand for the region's exports from Western economies and greater capital influx as the appetite for investing in emerging markets grows (see Figure 6). More than half of CP&I spending gains – about US$350 billion – would come from Asia Pacific. Western Europe would also see gains. The weakest improvement in infrastructure spending would occur in the Middle East, where the slower rate of recovery in oil prices would dilute the possible benefits that the region could expect from improved global economies.

Figure 7. Cumulative infrastructure spending 2015–2020, percentage difference between 2016 baseline and global upturn scenario by sector



Source: Oxford Economics

Sector view

Looking at the impact on sectors of a global upturn, Increased spending by both the private and public sectors would engineer broad-based improvements in CP&I expenditures. Utilities and transport would lead the way, reflecting greater economic activity and higher levels of business investment throughout the economy.

Similarly, and driven by stronger levels of global demand and improved economic sentiment, global CP&I expenditure in the manufacturing sector would increase to US$1.1 trillion each year by 2020, which is around US$40 billion above baseline projections. Public sector capital spending capacity would also be boosted in this upside macroeconomic scenario through higher government revenues, meaning that CP&I spending in the social infrastructure sectors, including healthcare and education, would rise to US$4.5 trillion between 2015 and 2020 (cumulatively), which is US$100 billion above the baseline expectation.

But the extraction sector would still be in for a difficult time under either the upside or downside forecasts. In the global upturn story line, the slower rate of increase in oil prices would hold back infrastructure investment (see Figure 7).

However, there is a wild card in the deck – and that is, the concept of Capital Efficiency. Capital efficiency starts with corporate strategy and requires agility and foresight to pursue, abandon, or defer capital projects. This is critical to companies, especially those in the energy sector, who are chasing margin over revenue in today's market. With this market volatility comes the demand for energy companies to adhere to stricter policies toward capital allocation and more frequent capital reprioritization decisions[2].

Also, advancements in drilling technology have already resulted in significant capital productivity increases in the past 12 to 18 months. Which means that companies can pull out of the ground the same amount of oil with half of the rigs and half of the costs. More than likely this will stoke some infrastructure spending in emerging nations with oil like Mexico and, to a smaller degree, the Middle East.

On the natural gas front, after years of expansion and significant investment, pipeline spending in the US and Canada will probably stall under a scenario in which energy prices weaken. The market is already awash in natural gas and it would take a substantial economic upturn to cut into this oversupply.

What stakeholders should be thinking about

Considering the range of possibilities that could impact capital project and infrastructure spending in the near term, stakeholders of all types – project owners, investors, governments, engineering and construction firms and multinational corporations – have tough decisions to make. They must think about which projects to shutter, which to continue, how to reduce costs, how to attract continued investment and how to raise funds to pay for the current and new investment. They must also select which regions to do business in and which to avoid. In this section, we offer some possible options to consider for each type of stakeholder to help your organisation stay agile as you navigate an ever-changing business environment.

Governments: Prioritise, streamline, renegotiate, invest, leverage

While governments face many of the same challenges as businesses in this CP&I environment, their public policy and social objectives require different responses to current economic conditions. Governments must embrace the idea of prioritising, streamlining and renegotiating but, unlike the private sector, governments often must invest when economic conditions deteriorate to boost growth and avoid recession. For example, Saudi, Kazakh and Nigerian governments, whose economies are heavily reliant on oil and gas or commodities, are considering how to balance their books and yet continue investing in much needed infrastructure to support economic growth, job creation and provide public services.

At the same time, developing a prioritised set of projects for continued or future investment is essential in order to avoid a waste of scarce public monies. Accelerate project delivery to achieve key public policy goals such as improving employment and reducing transportation costs, which in turn makes exports more competitive and import and domestic items less expensive. And take advantage of the lower costs of labour and materials to minimize the costs for existing and planned projects. This may mean renegotiating contracts with suppliers and builders, but in difficult times all

Questions to consider

As capital project and infrastructure investors, builders, owners and developers deal with uncertainty over the short term, here are some key questions to consider:

- Which projects should we continue? Which ones should we shutter or delay?
- How can we reduce CAPEX and OPEX costs?
- What sources of potential growth can we identify, both new and existing?
- What is the optimal balance between high- and low-risk investments?
- Where can we build in more flexibility to allow agile course correction as needed?
- How can we extract optimal value from existing projects?
- Which contracts should we consider renegotiating?
- Is our current portfolio of projects optimal in the current economic climate?
- What is the optimal model for public- and private-sector collaboration on a particular project?
- What are the economic and geopolitical factors that will affect this particular project in this particular country or region?
- How do we need to adapt our business model to address the effect of new technologies and the drive towards sustainability?

parties should be willing to reconsider project costs and negotiate appropriate reductions.

Governments, especially those that are cash strapped by a downturn in commodities markets and the high local currency cost of dollar-denominated debt, should consider assets sales and leases to increase revenue/income to afford ongoing investment in critically needed infrastructure. Given timelines, cost cutting and infrastructure reprioritisation, it is inevitable and necessary to balance budgets. And sometimes they must do so in short order. Innovative approaches to financing help attract capital as Mexico has shown with its energy reform policies that are intended to streamline the process for private investors and developers to collaborate with the country's energy resource businesses[3].

Another way to look at it is for governments to ask: what is the most efficient and effective delivery model if it is decided that the best future home for an asset is not in full public ownership. It is important, therefore, to consider if private and/or third party organisations can help to release more value from government's assets and functions, including through privatisation and outsourcing, generating funds for other uses.

For privately invested infrastructure projects to be viable, they need a solid revenue stream or repayment structure as well as contractual and regulatory conditions that provide

Public private partnerships – a growing opportunity

Governments are using public private partnerships (PPP) and concessions as a way of continuing to invest in infrastructure even in financially constrained periods. And investors are standing by with substantial capital for the right projects.

The World Bank is taking steps to encourage more PPPs by producing a PPP reference guide and offering certification exams on PPPs.

Recently, China released new regulations and directives governing PPP investments and launched more than 1,000 PPP projects worth US$317.75 billion[4]. This includes the ambitious 'One Belt and One Road' programme to encourage investment in countries along the 'Silk Road Economic Belt' and the '21st Century Maritime Silk Road'. Connecting more than 50 countries along corridors in Asia, Africa and Europe, the initiative is slated to provide investments in transport, energy, telecommunications and natural resource infrastructure – financed by public and private investment.

Meanwhile, PPP continues to gain momentum across Asia Pacific. Japanese Prime Minister Shinzo Abe has said the Japan International Cooperation Agency, along with the Asia Development Bank, would back PPPs to channel private-sector money and knowledge into the region's infrastructure projects[5].

In an interview with PwC, Laurence Carter, Senior Director of Public Private Partnerships at the World Bank Group, said that the World Bank is taking steps to encourage more PPPs by producing a PPP reference guide and offering certification exams on PPPs. It is also proposing standard contract clauses dealing with arbitration, step-in rights and other issues to reduce transaction costs. In addition, the World Bank is helping emerging market governments build capacity. 'The capacity constraint of governments is really the binding constraint and their associated ability to put together programmes', Carter said[6]. He added that he is encouraged by the progress of PPP programmes in such countries as Peru, Colombia, South Africa, Kenya, Bangladesh, India and China.

According to José Juan Ruiz Gómez, Chief Economist at the Inter-American Development Bank, countries will need to be much more careful in their spending choices. He recommended that Latin American and Caribbean states monitor and evaluate development programmes and prioritise those that are most effective. Between 2003 and 2015, for example, an 8.2% jump in social spending lifted a wide swathe of Latin America out of poverty while improving health and nutrition indicators[7].

'In a downturn, this is how you create jobs and economic activity – with construction of infrastructure projects and improvement of transport networks and building of utilities'.

– Mark Rathbone, PwC Singapore and Asia Pacific CP&I leader

investors with confidence about long-term returns and government commitments. Development agencies can assist with project preparation, risk mitigation and even some capital investment. And with over US$100 billion in dry powder[8] and increasing interest on the part of institutional investors, infrastructure is becoming a recognised investment asset class globally. This means that well-structured projects are attracting substantial interest and high valuations. It is an opportune time to bring good projects to market even in economies challenged by the recent global turmoil.

Furthermore, we have also observed that over time the mixed economy, including part public/part private ownership is becoming increasingly common as a stable, longer term arrangement. Indeed, there are many example of joint ventures where the private sector is introducing its commercial skills and making use of an asset which is under-utilised in the public sector[9]. (See p. 12 for more details on public private partnerships).

Project owners: Prioritise, streamline, renegotiate

Because capital projects once thought essential may no longer be viable, owners should re-evaluate their portfolio of ongoing and planned projects with the objective of prioritising activities essential to business operations and exiting or delaying projects that aren't. Portfolio optimisation tools can help with that process.

Owners also should aim to streamline current operations, reducing costs where possible and shifting resources to the highest value and most essential operations. While doing so, pay close attention to customer credit risks and optimise cash resources. At the same time, try to renegotiate current contracts with suppliers, builders, and supply chain participants – particularly since all of them have a vested interest in seeing project activity continue even with tighter margins.

In some cases, project owners may need to use this slow infrastructure development period to realign and reposition the business in a more coherent way that is more suitable for the current and anticipated CP&I landscape.

Engineering and construction firms: Improve efficiencies, renegotiate, consolidate

Engineering and construction (E&C) firms are often the hardest hit when economic conditions change. During times of strong growth, they may set aside efficient practices in the scurry to get resources and material delivered to projects. That has a harmful effect on the organisation and its ability to deal with difficult conditions. In fact, the first thing E&C firms should do in the current CP&I environment is to improve project delivery efficiency. Control schedules, deadlines and costs to remove excess expenses.

'The challenge of reconciling short-term affordability constraints with the long-term planning and delivery horizon requires vision, innovation and commitment from everyone involved.'

– Richard Abadie, PwC UK and global CP&I leader

Also prepare to face renegotiation of contract terms and pricing from major clients – and then be ready to turn around and renegotiate those terms with subcontractors and suppliers.

During challenging economic times, some E&C firms will be overextended and unable to maneuver quickly enough to avoid bankruptcy. This provides a buying opportunity for well-capitalised and well-managed E&C firms, which can use an M&A strategy to consolidate their position in the market or increase market share. In some economies, where market structures and policies largely favour local firms, this strategy offers additional opportunities for E&C firms seeking to bolster their local presence.

Investors: Rationalise, reposition

For infrastructure project investors, dramatic economic changes offer – or sometimes compel – a re-evaluation and repositioning of the investment portfolio. Projects with significant demand risk – such as airports, toll roads and extraction related investments – are likely to be the ones most exposed in difficult economic conditions.

A risk review is often needed – and relatively quickly – to assess potential exposures and risk mitigation options. This review may result in a rationalisation of positions, in which the investor seeks to reposition some existing projects through sales or other mechanisms, improve efficiencies on others, and possibly increase exposure where other investors are anxious to exit. Also, consider acquiring new positions in projects as pricing becomes more attractive.

Investors still face longstanding endemic risk problems in some emerging markets, notably bureaucracy, lack of transparency, legal and regulatory issues, and political influence peddling. An institutional investor survey by Probitas Partners found that 58% of respondents indicated less interest in emerging markets because of political, economic or currency risk[10].

Aside from global economic worries, systemic problems at the country level are also slowing momentum. To determine the best opportunities, investors are best advised to do a thorough, country-specific analysis.

Multilaterals: Expand, support

Multilateral development banks (MDBs) and bilateral donors – such as the World Bank, African Development Bank, European Bank for Reconstruction and Development, Asian Development Bank and Asian Infrastructure Investment Bank – play an important role during volatile economic periods, especially in emerging markets.

In addition to providing financial and technical assistance, development banks also bring expertise and insurance against political and other risks, so their financial involvement in emerging market projects is often necessary to attract private investors. Governments and private investors should seek out representatives from these institutions to determine what kinds of aid they can provide, while the institutions themselves can be pro-active in helping decide which infrastructure investments represent the highest economic and social returns to the country and should be prioritised and further supported.

Development banks can also encourage more private financing by taking on the role of intermediary for private investors, sources of capital and individual governments in emerging countries. The new Asian Infrastructure Investment Bank, for example, while in its early days of establishment, is not only focused on infrastructure investment but is promising more expedited processing of projects and a substantial commitment of new capital.

In describing the work of MDBs, Laurence Carter, Senior Director of the Public Private Partnerships Group of the World Bank Group, told PwC, 'We help structure projects and mitigate risk and manage market expectations. And we work with governments to make the right decisions to protect the rights of investors. There's a very strong correlation between protecting foreign investors and lenders and getting a positive response on infrastructure investment. Infrastructure is a top priority for MDBs.'

Infrastructure investment boosts short-term demand and long-term supply

[Excerpted from PwC's Global Economy Watch, May 2016]

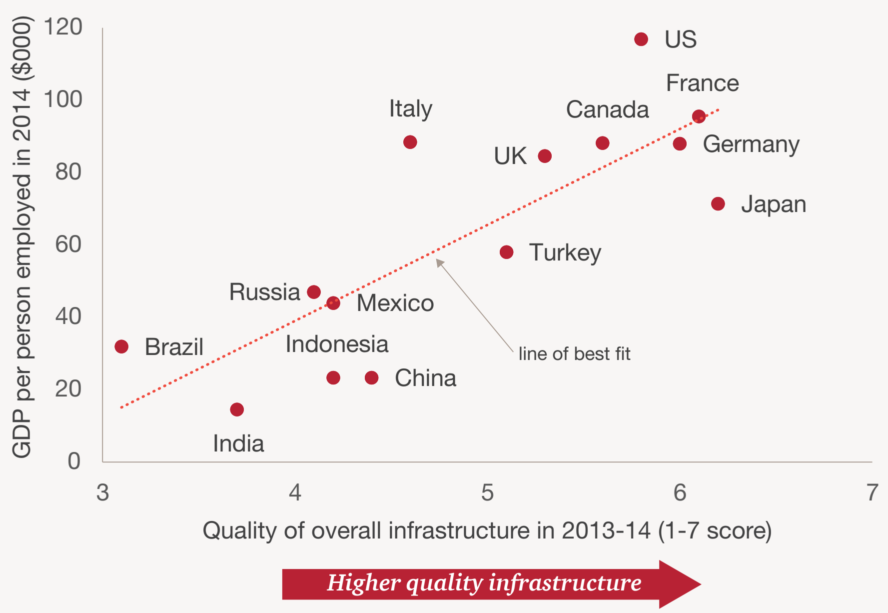
In the short-term, building or upgrading transport or energy networks can boost aggregate demand through increased construction activity and employment. In the long-term, infrastructure investment can jolt economic growth by increasing the potential supply capacity of an economy.

For example, improving transport facilities could make workers more mobile, thus making labor markets more efficient and increasing productivity. While a number of other factors influence labor productivity, including skills and technology, the chart below illustrates a strong positive correlation between the quality of physical infrastructure and labor productivity in the G7 and the E7.

One academic paper found that a single extra dollar spent on infrastructure in Canada could increase GDP by between US$2.46 and US$3.83 in the long term, discounted to present value terms*. But this money does need to be spent effectively to realise these gains.

*Source: Centre for Spatial Economics, The Economic Benefits of Public Infrastructure Spending in Canada, 2015.

The correlation coefficient between labour productivity and overall infrastructure quality is 0.81



Sources: PwC analysis, OECD, WEF Global Competitiveness Report 2014–15

The need for infrastructure remains

Regardless of which of the two scenarios – upside or downside – pans out, the overall need for infrastructure will not diminish. Certain megatrends will continue to drive growth in infrastructure spend over the medium term. These include continuing global urbanisation, the growth of emerging economies and the attendant growing middle class, technology innovation and resource scarcity.

Mark Rathbone, PwC Singapore and global partner, advises investors, builders, owners and project developers to continue to assess projects and invest because projects continue to come to market. ‘There is a pipeline’, says Rathbone, while cautioning that a project has to have the appropriate risk allocations and optimal levels of return.

Indeed, even in these volatile times, there are still opportunities for well-prepared project sponsors and investors.

‘While levels of investment in infrastructure will always be sensitive to factors such as macro-economic conditions, commodity prices, and the cost of finance, the need for essential services are constant’, says Richard Abadie, PwC UK and global CP&I leader. ‘Services crucial for basic social uplift such as housing, clean drinking water, heating, light, transport and more’.

‘Of course, spending on infrastructure will fluctuate over time’, he added. ‘This is a simple economic reality. Over the long term, the trend of increasing levels of investment in infrastructure will continue. The alternative is unthinkable and is the equivalent of entering the dark ages. The challenge of reconciling short-term affordability constraints with the long-term planning and delivery horizon requires vision, innovation, and commitment from everyone involved’.

About this report

This PwC report *Capital project and infrastructure spending outlook: Agile strategies for changing markets* – for which Oxford Economics provided research support and model analysis – looks at two macroeconomic scenarios: a potential China hard landing and a global economic upturn – and how they would affect the mid-term outlook for capital projects and infrastructure spending to 2020. The data set for this study cover 88% of global GDP and 87% of total world fixed investment spending. Infrastructure spending forecasts are broken down for seven regions and six sectors, including extraction, manufacturing, utilities, telecommunications, transportation and social projects.

Methodology: In developing this analysis, Oxford Economics used data sets to provide consistent, reliable, and repeatable measures of projected capital project and infrastructure spending globally. Historical spending data is drawn from government and multinational organisation statistical sources. Projections are based on proprietary economic models developed by Oxford Economics at the region and sector levels. The analysis was originally completed over the first half of 2015 incorporating all infrastructure spending and macroeconomic data available at that time, then partially updated in Q1 2016 to reflect the latest macroeconomic data and outlooks of the seven regions covered in the research (but no new actual infrastructure spending data was collected and incorporated), and to provide upside and downside scenarios for the infrastructure spending outlook based on Oxford Economics' Q1 2016 Global Scenario Service. The results for this report have been estimated using the following underlying data sources: World Health Organisation, UNESCO, World Bank, Annual Capital Expenditures Survey, Association of American Ports, Edison Electrical Institute, Office of Highway Policy Information, Federal Highways Authority, Department of Transportation, National Clearinghouse of Educational Facilities, Department of Education, Oxford Economics.

Endnotes

1. Capital project and infrastructure (CP&I) expenditure refers to investments in and construction of plants, equipment and infrastructure – i.e., physical capital expenditures – in sectors from manufacturing to oil and gas to transportation and telecoms.
2. PwC, *Driving capital efficiency to fuel oil and gas projects,* 2016.
3. BMI Research, *Global Industry Overview – Five Key Themes for 2016*: Infrastructure December 10, 2015.
4. 'China invites private investors to help build $318 billion of projects,' *Reuters,* May 25, 2015.
5. 'Infrastructure the Japanese way: Abe focuses on 'quality' investment for Asia', *Nikkei* report, May 22, 2015.
6. Laurence Carter interview with PwC, October 13, 2015.
7. Peter Troilo, 'MDB chief economists weigh in on China's slowdown and the poor,' *Devex*, Oct. 12, 2015.
8. Prequin, 2015 *Prequin Global Infrastructure Report,* 2015.
9. PwC, *To own or not to own: Realising the value of public sector assets,* 2015.
10. Probitas Partners, *Infrastructure Institutional Investor Trends for 2014 Survey*, 2014

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