

AMP Capital

Quarterly Infrastructure Research Report

Edition 7 - August 2011



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Overview

Welcome to the seventh edition of the AMP Capital Global Infrastructure Report which surveys infrastructure projects announced during the period from January to March 2011.

Our survey shows that the impact of stimulus spending in developed economies may be slowing, while China continues to be the leader of infrastructure development globally.

Transport projects, which have high leverage to gross domestic product (GDP) growth, continue to lead in overall spending, while in Europe and the US, conventional and renewable power generation projects have stalled due to the underperformance of these economies. Energy projects announced in this period predate the Japanese nuclear emergency, so the impact of policy changes on energy mix in countries such as Germany is not yet apparent.

It is also too early to determine if initial poor performance of the Shanghai to Beijing high speed rail project will further dampen Chinese enthusiasm for these types of prestigious, high cost projects.

In our lead article, we look at issues associated with public private partnerships (PPPs) in developed economies. In many areas, such partnerships are the logical alternative to full privatisation and can provide both a useful degree of deleveraging of the public sector and better value for money for consumers. However, achieving the necessary degree of risk transfer to the private sector to achieve deleveraging is proving more difficult than first thought.

We welcome your feedback. Should you have specific queries please contact Warwick Mancini or Greg Maclean.

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Public Private Partnerships

Introduction

In our quarterly report titled 'Infrastructure in the Post-GFC World', we suggested that high levels of public debt in the developed world make PPPs more acceptable to governments. In the twelve months since this prediction, our surveys have indicated an increase in PPP activity, especially in countries such as Germany and the US, where previously they were relatively uncommon. This suggests that governments have been reluctant to give up control of service delivery, as would be required under full privatisation, but may see PPPs as a means of achieving both better value for money in project delivery and a reduction in government borrowings.

Despite the success of PPPs in many countries, there is, as yet, no consistent view across governments of how to measure the benefits of these arrangements. This goes a long way to explaining the uneven acceptance of PPP structures in developed economies. Additionally there can be problems associated with managing the transfer of economic risk from the public to the private sector and these problems threaten to limit the penetration of this efficient means of asset delivery.

This paper attempts to outline the underlying rationale for PPPs and the difficulties in achieving an equitable degree of economic risk transfer to the private sector. It proposes an alternative PPP structure, which by separating the asset ownership risk from delivery and operations overcomes many of these problems.

Types of PPPs

While governments have contracted to the private sector for many years, the new generation of PPPs generally requires the private sector to take a greater exposure to project outcomes than traditional contracting methods. This may include the transfer of asset management risk and even economic demand risk to the private sector. PPPs can be structured around almost all levels of service delivery and risk transfer.

The following table, which is by no means exhaustive, attempts to cover the range of risk transfer that can be achieved under various PPP structures. Full privatisation, as can be seen, is the ultimate expression of a PPP, in which governments cede control to the private sector.

The Spectrum of Public Private Partnership Risk Transfers

Definition & policy	Design & construction	Commissioning	Funding	Operations	Maintenance	Economic performance (Ownership Risk)	Customer interface	Examples
								Traditional Delivery by Public Sector
								Pain/Gain Share against Target Saving
								D&C Limited Proving Period
								D&C Extended Proving Period
								Design Build Operate (DBO)
								Availability Based BOO
								BOO with Economic Risk Share
								BOO with Full Economic Risk Transfer
								Full Concession, such as Eurostar
								Privatisation

Public Risk
 Private Risk

Source: AMP Capital; SAHA

Excluding privatisation, key features of infrastructure PPPs include:

- The government's ability to retain responsibility for service delivery whilst being able to contract to the private sector, providing appropriate assets and services to meet an agreed level of risk transfer from the public to the private sector.
- The obligations of both parties are governed by long-term contracts, avoiding the need for economic regulation. Contract terms may include pain and gain sharing provisions, for example floors and caps on demand risk, as well as penalty provisions for poor performance.

- Projects may be sponsored by federal, state or local governments and their agencies.

PPPs have previously been used for the development of projects where risks can be clearly defined and ring fenced, for example a road or bridge. This does not mean that they could not have a broader scope, as demonstrated by the French water industry. In France, municipalities have contracted out the entire operating responsibility, including capital development and customer interface for water supply and waste water disposal to the private sector for many years. It has taken the private sector companies many years to build up the required level of expertise to undertake such contracts.

While the potential scope of PPPs is wide, a project can only be considered off the government's balance sheets when the majority of economic risk has been transferred to the private sector. This is illustrated in the following chart.

Public Debt Deleveraging Potential

Definition & policy	Design & construction	Commissioning	Funding	Operations	Maintenance	Economic performance (Ownership Risk)	Customer interface	Examples	Sector Balance Sheet
								Traditional Delivery by Public Sector	Public
								Pain/Gain Share against Target Saving	Public
								D&C Limited Proving Period	Public
								D&C Extended Proving Period	Public
								Design Build Operate (DBO)	Public
								Availability Based BOO	Public
								BOO with Economic Risk Share	Public or private
								BOO with Full Economic Risk Transfer	Private
								Full Concession, such as Eurostar	Private
								Privatisation	Private

Public Risk Private Risk Public balance sheet Private balance sheet

Source: AMP Capital

In the current climate of high public debt, many common PPP structures, including availability-based schemes, will probably not assist in public debt deleveraging. Indeed, the government is the natural owner of assets like public schools and hospitals, which means that there is no way of transferring the 'ownership' risk of these assets to the private sector. In this case, PPPs may still be the preferred method for delivery and ongoing operation of such projects if value for money can be shown.

Governments are not necessarily the natural owners of assets such as railways, roads, ports, airports and water supplies. PPPs structured around such assets could offer governments the opportunity to both de-leverage their balance sheets and save on development and operational costs.

Looking forward, we anticipate a general trend for governments to increase the risk transfer to the private sector to enable deleveraging of their balance sheets, while not moving to full privatisation of these assets. This may require the development of new models of PPPs.

Value for money

Before entering a PPP, governments will typically employ a value for money test¹, which attempts to compare the cost to the community of the proposed PPP against public sector delivery of equivalent assets.

For example, assume a government proposes a 'build, own and operate' (BOO) model for two PPPs for two separate projects, both with development costs of around \$1 billion. A BOO structure offers a government the potential for financing the projects off balance sheet.

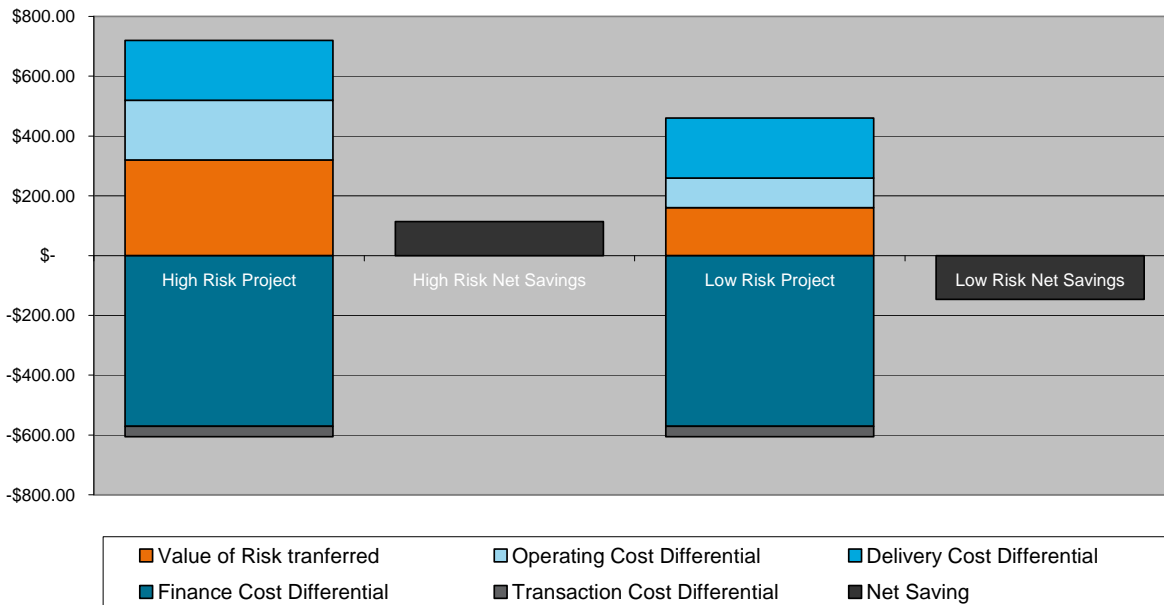
If the first example project has a high exposure to ongoing operating risk as a result of the net present value (NPV) of forecast operating costs exceeding the development costs, the government might require the private sector to accept a share in the risk for this project. An example of a project that could fall into this category would be a seawater desalination plant.

In the second example project, the government offers a long-term contract to lease the majority of an asset, such as, a hospital, subject to certain asset performance criteria. The private sector developer can add additional capacity at its own risk, although it is mostly exposed to the asset management risk, i.e. the cost of providing utility services and maintaining the building, once it is developed. Consequently the NPV of this risk exposure is low relative to development costs.

Factors to consider in the comparison of example projects are:

- The value of the financial and operational risk that is transferred to the private sector. This will tend to be proportionately higher for projects with a higher operating risk and/or high asset development risk. In our first example, this could represent a significant transfer of future demand and operational risk to the private sector. In the second example, demand risk is largely taken by the public sector, with the private sector ensuring that the assets are maintained in conditions fit for the use it was built for. This represents a much lower level of risk transfer.
- The value of any overall savings on operating cost as a result of a better alignment of the design with operational requirements. In effect, this is the benefit that highly experienced private sector operators can bring to the project. In both examples it is assumed that the private sector can deliver a 20% saving.
- The value of any overall savings on development costs, as a result of better aligned design and operational requirements. In both examples it is assumed that the private sector can deliver a 20% saving.
- Transaction costs relating to the cost to the government (time and money) to run the PPP tender process. In general, these costs have typically been higher than in a traditional public sector tender process¹, however, this may result from the relative immaturity of PPP tender processes, rather than any inherent conceptual issues.
- The net impact of funding cost differences. The scenario shown in the following graph assumes that the lower notional government cost of borrowing is used in these project comparisons after adjustments have been made for taxes paid by the private sector.

Value for money test Face value of public funding



In the above scenarios, the private sector is at a significant disadvantage when it comes to funding costs. This means that the project will only pass the value for money test if the delivery and operational cost savings exceed the disadvantages in funding costs. From the above considerations, it can be seen that:

- The greatest benefit of private sector involvement is likely to relate to savings in delivery and operational costs.

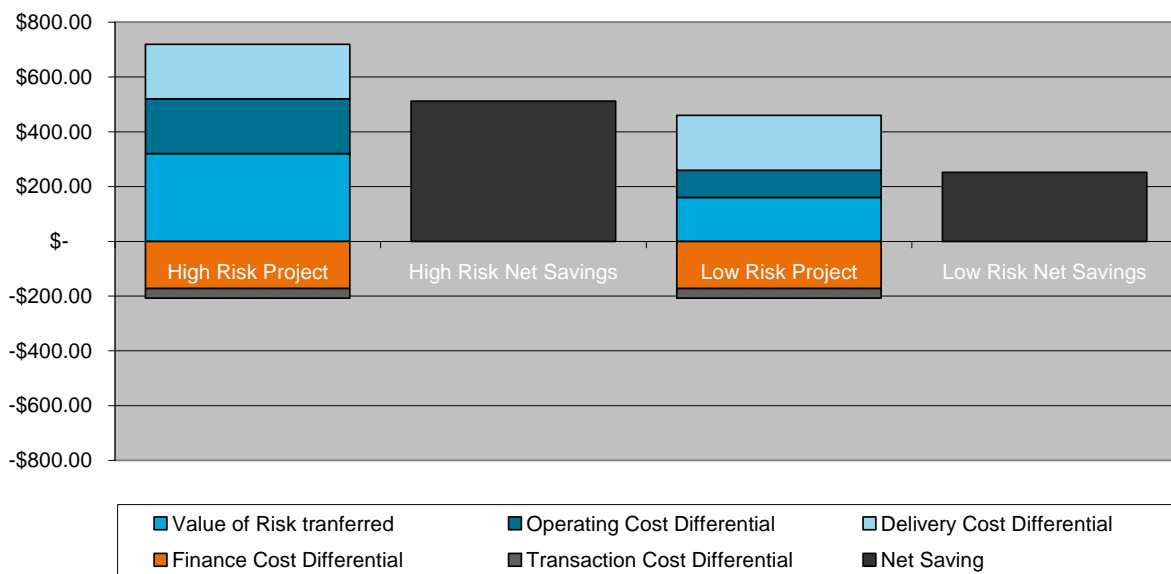
- In higher risk projects, the increased operating savings show a clear advantage for BOO projects compared to the public sector development of the same project. Risk transfer is sufficient for the project to be considered off balance sheet.
- In lower risk projects, despite equivalent delivery savings, the net benefits are insufficient to justify a BOO scheme.

The government could continue with the project as a 'Design, Build, Operate' (DBO) style PPP, which will provide development and operational savings, or as a public sector project. In both cases the ownership of the asset remains with the public sector. If public funding has not been approved, the project is likely to face significant delays.

On the other hand, an economic argument can be made that the BOO tender process simply reveals the true cost of the project, irrespective of the funding source². An application of average government costs of borrowing does not, therefore, adequately measure marginal risk posed by a specific project. On a risk adjusted basis, there should be no difference between the public and private sector funding costs applied in the comparison.

If this approach is applied to our two sample projects, it can be seen from the following chart that a BOO scheme would also now be attractive for the lower operating risk project. The project can now be delivered on time, bringing forward its community benefits.

Value for money test True value of public funding



This philosophical difference in the treatment of the funding cost differential, in large part, explains the very uneven penetration of PPPs in different markets. In countries like the UK, Canada and Australia, where the PPP process is established, there is acceptance of the equivalence of funding costs and PPPs are applied over a broad range of projects and risk profiles.

Private sector delivery performance

The previous examples assumed that the private sector can offer significant savings in the delivery and ongoing operations of the assets. We will explore if this is true.

In 2008, the University of Melbourne published a detailed comparison³ of the delivery performance of Australian PPPs versus traditional delivery methods. The study was designed to ensure that the projects

analysed were representative and the findings were statistically significant. The total sample of 67 projects was subdivided into the following categories:

- Social infrastructure projects: 32
- Transport projects: 23
- Sustainability projects (water, energy and waste): 8
- Information Technology (IT) projects: 4

The results were also compared against the performance of projects in the UK.

The key results of the study were:

- Over the time periods considered, PPPs delivered projects for a price that was far closer to the expected cost than projects produced in the traditional manner. Based on the inter-quartile percentage for the period from initial project announcement to the actual final cost, PPPs were 31.5% better than traditional projects.
- PPP contracts had an average cost escalation of 4.3% post contract execution compared to traditional projects that had an average cost escalation of 18.0% for the same period. PPP projects provided far greater cost certainty than traditional contracts and there was little variation in cost of a PPP project after the contract was signed.
- Australian traditional projects had a better cost performance than UK projects with 43.3% of traditional Australian projects being completed within 5% of the expected cost compared with only 27% of UK traditional projects being completed within budget.
- From announcement of a project to the date when it was commissioned, PPPs and traditional projects were delivered with the same confidence in the likely overall time performance.
- During the period prior to project execution, PPP projects were delayed on an average rate of 14.8%, however, once PPP projects reach financial close there was, on average, a further 2.6% delay rate to these projects.
- Predictions of the duration to reach commissioning were optimistic for traditional projects, with estimates of duration being on average 18.1% early at budget and 19.4% early at contract execution.
- An average of 25.9% of projects incurred delays during the construction phase of traditional contracts, making them 23.3% worse than PPPs in this regard. These delays could be attributed to:
 - initial optimism;
 - required changes after contract signing to achieve the government's requirements; and/or,
 - uncertain contractual terms or risk allocation.

The relative time and cost of PPP projects and traditionally procured projects are indicatively represented in the summary figures S1 and S2 below.

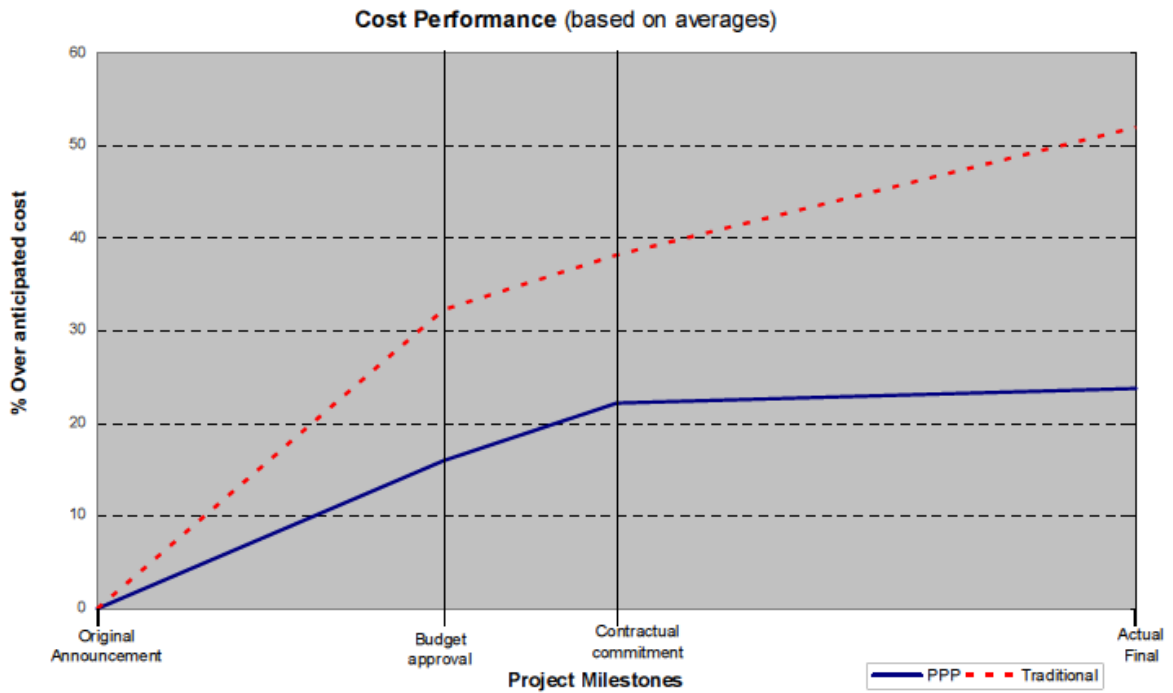


Figure S1: Cost performance over project initiation and delivery (source: Duffield 2008)

The first graph highlights overestimated project costs by governments from the inception of a project, with average development costs blowing out by more 50% over the initial estimates. PPPs provided a higher level of assurance that cost increases would be minimised by project completion. When considered on a holistic basis, Australian PPPs were shown to deliver an average saving of around 16% when signing contracts, which then grows to greater than 30% on project completion.

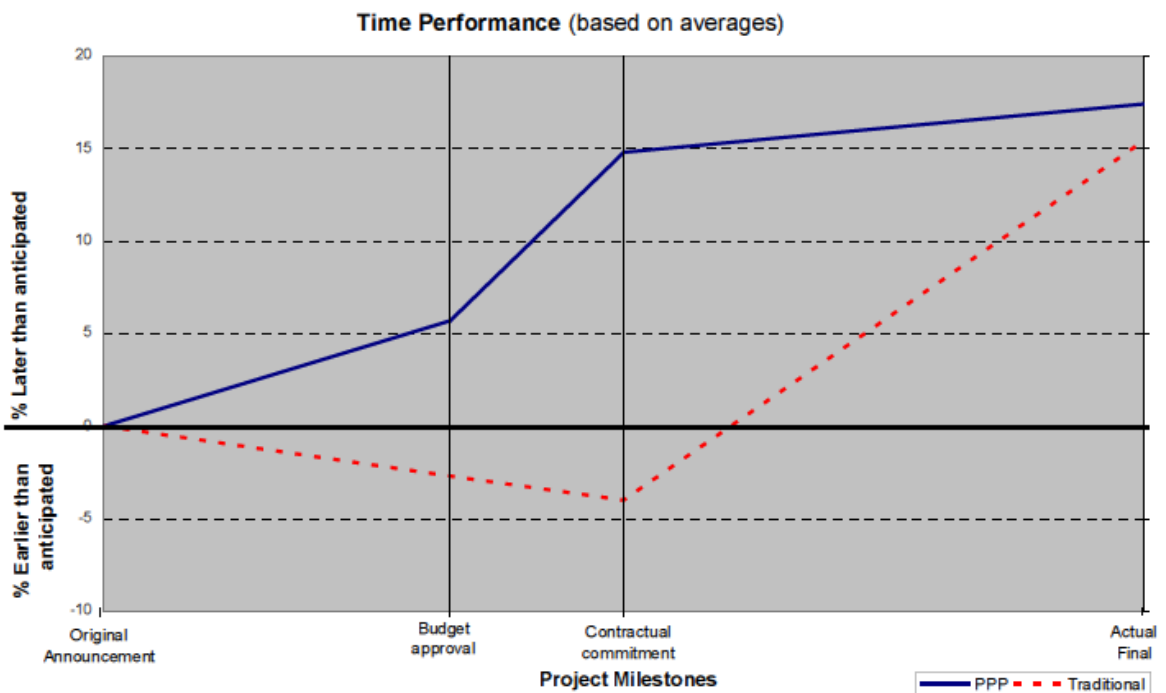


Figure S2: Time performance over project initiation and delivery (source: Duffield 2008)

The second graph shows that overall delivery timeframes are similar for both traditional projects and PPPs. The most significant delays experienced by PPP projects were between budget approval and contractual commitment. This is outside the control of the private sector and may be due to the more complex contractual nature of PPPs. It also reflects an area where significant future savings could be made by streamlining government processes. The potential time saving appears in approximately 10% of projects, which should also have significant cost saving implications.

Subsequently, the private sector made up this lost time during actual construction.

These results suggest that PPPs can consistently deliver value for money compared to traditional project delivery methods over the full range of project types, including economic and social infrastructure, even with limited risk transfer to the private sector.

This conclusion demonstrates the benefits of intense competition rather than any public sector incompetence. It suggests that public/private sector comparison on a project-by-project basis is irrelevant and some form of PPP should be the default method of delivery not the alternative.

In the UK, despite general cut backs in spending programs, the new coalition government has re-affirmed its support of PPPs for project delivery.

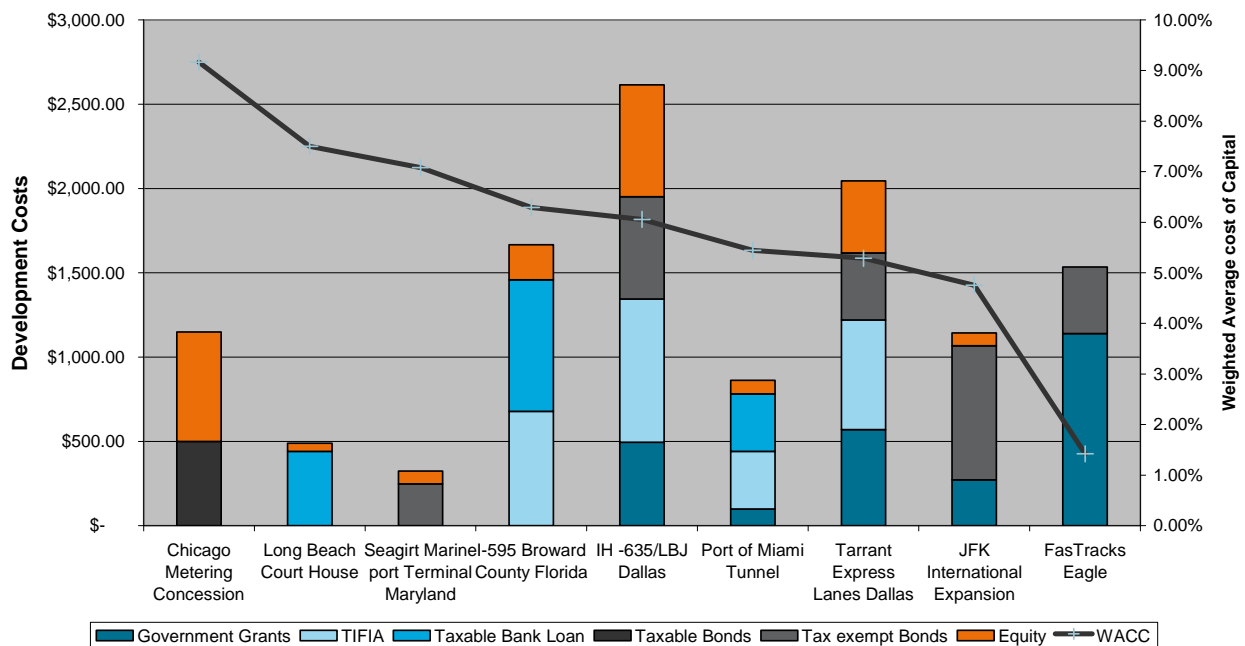
In Canada, PPPs have been particularly successful in the provision of health care and transport assets⁴.

In the US, the situation is less favourable. Currently, most infrastructure projects are funded by a combination of federal grants and low interest loans plus municipal bonds raised by local authorities. The consequence is that nominal funding costs are low by Australian and UK standards. This makes it difficult for the private sector to compete with traditional funding structures.

As indicated in a previous report⁵, President Obama is seeking to reduce the current restrictions on the private sector raising its own municipal bonds. This will make PPPs more attractive. When the private sector has been able to raise bonds for funding, it seems to have been of benefit to a number of PPP projects in the US as shown in the following graph.

Recent US PPP financing structures

Source: Barclay's Capital



The above graph shows that federal subsidies, via direct grants and application of subsidised Transportation Infrastructure Finance and Innovation Act (TIFIA) loans, together with the bonds assisted in reducing the weighted average cost of funds for transport projects. In comparison, the low-risk Long Beach Court House

project (shown in the graph above) relied on traditional funding structures, resulting in a higher notional cost of funds.

Despite this progress, PPPs are a long way from being considered 'normal' for project delivery in the US and elsewhere.

In Australia, there have been issues with some major transport projects where the private sector has accepted demand risk. The Minister for Infrastructure and Transport said "Over-optimistic patronage forecasts for certain toll road projects have been a scourge on investor confidence broadly. This has had the perverse consequence of directing scarce resources to underperforming investments"⁶.

The government sector remains enthusiastic about PPPs, and some large projects successfully negotiated in which the government counterparty has accepted demand risk include:

- Two desalination plants in Perth, (totalling A\$1.5 billion);
- Sydney's desalination plant (A\$1 billion);
- Melbourne's desalination plant (A\$3 billion); and,
- Peninsula Link Freeway, Victoria (A\$870 million).

In other countries, major issues limiting more common use of PPPs are:

- Political opposition – In many developed countries there may be significant ideological opposition to the concept of private sector involvement in the provision of public services. For example, it was only in 2005 that Germany⁷ enabled PPP legislation for the transport sector and issued four test contracts. Vinci Concessions recently delivered the first of these, which was the A4 motorway in Thuringia, one year ahead of schedule⁸.
- Public sector opposition – The public sector may be unwilling to concede that the private sector can deliver and operate projects more efficiently. Since the public sector also undertakes the value for money testing, it sits in judgment of itself. Outcomes of such comparisons could confuse an impartial observer. In some jurisdictions, bias can be embedded in the structure of the public private comparator. For example, in Victoria, Australia, the comparator requires that the private sector costs be compared against international best practice⁹. This implicitly assumes that the Victorian public sector delivers projects to this standard. The objective evidence suggests that it does not.
- The value of risk transfer to the private sector will often be understated, as discussed below.

Limits of economic risk transfer to the private sector.

Apart from providing better value for money than the traditional project delivery methods, PPPs potentially provide governments a way to deleverage their balance sheets. This occurs when the private sector takes on exposure to the economic risks of the project, such as demand risk as shown in the table titled 'Public Debt Deleveraging Potential' on page 3.

In the book *Megaprojects and Risk: An Anatomy of Ambition* by Bent Flyvbjerg, Nils Bruzelius and Werner Rothengatter, the authors analysed more than 200 projects, mainly government run, across 20 countries over 30 years. Their results showed that optimism bias from project proponents led to a consistent underestimation of costs and an overestimation of project benefits. This bias was attributed to aggressive promotion by politicians, including political interference in public processes and systemic process failures by the public service.

Optimism bias can also be seen in the 69 Australian projects in the Melbourne University study described previously. In that study, delivered costs of public sector projects exceeded their initial estimates by more than 50%.

Evidence that bias extends to patronage demand risk comes from the following road studies summarised by RBconsult¹⁰:

- In 2005 Flyvbjerg examined 183 tolled and un-tolled roads internationally and found that 25% of forecasts were incorrect by more than 40%. There was no improvement in forecasting accuracy over 30 years.

- In 2006, the US Transportation Research Board studied 26 toll roads and found that only a small number of these were within 10% of forecast usage.
- Vassallo found that on average, traffic was over-estimated by 35% on 14 Spanish toll roads in 2007.
- In 2009 Li & Hensher, found that on five out of 14 toll roads in Australia, traffic was 45% lower than predicted.

Looking at rail projects, Flyvbjerg¹¹ found that optimism bias for nine out of ten rail projects overestimated passenger forecasts by an average of 106%. For 72% of rail projects, forecasts are overestimated by more than 65%.

The risk for the private sector in taking on these projects is that they are heavily reliant on the accuracy of demand forecasts. Investment decisions are made in reliance on the accuracy of the forecasts. If the forecasts are overly optimistic, then private sector entities are exposed to the risk of losing some or all of their proponent's equity contributions.

From a public sector perspective, the shortcomings of demand predictions are less significant, as these risks might be spread over a large number of projects and governments have the ability to increase taxes to cover errors in estimates.

From a private sector perspective, a mistake can mean loss of shareholders' equity and even insolvency. Issues associated with demand risk are so significant that despite the occasional success, the classic PPP concession, with the private sector taking demand risk, is unlikely to succeed again in Australian transport projects.

Unless a solution can be found to address appropriate levels of risk transfer, the potential for PPPs to materially assist in deleveraging government balance sheets will be significantly lower.

What is the future for PPPs

In summary, the evidence to date suggests that the private sector can deliver and operate infrastructure assets at significantly lower cost than the public sector. This should mean that irrespective of the outcome of the equivalence of funding costs debate, a DBO model should become the default position for developing new public sector assets.

To fully maximise the benefits of PPPs, the risk transfer should be sufficient for the project to be off the government's balance sheet. However, difficulty in assessing demand and other economic risks can provide a significant hurdle which currently limits the potential benefits.

While there are many suggestions regarding ways to improve the accuracy of demand forecasting and project oversight, we remain of the view that the prospects for significant improvements are remote and the approval for new projects will remain highly politicised. Optimism bias, experienced in so many of the aforementioned projects, is reinforced by the structure of the PPP tender process. The grouping of delivery, operational and financial risks together rewards the party willing to take the greatest risk.

Availability-based PPP schemes have been proposed as an answer. They will certainly deliver construction savings and operational cost savings to governments but, as most of the economic risk sits with governments, these are unlikely to assist in deleveraging balance sheets. Ultimately, governments will be limited in the number of availability-based projects they can initiate before their credit ratings could be impacted. This is not a preferred outcome given infrastructure spending is an important catalyst of economic growth.

A possible way of maximising benefits, including ultimate off balance sheet financing, would be a two part tender process. The project would be initially developed on a DBO basis, where the public sector would take the initial greenfield economic risk of the project. After development and ramp up, the government would subsequently sell, or lease, the assets with brownfield development risk to the private sector in a second stage tender. This would mean that the initial development would be on the government's balance sheet but it would move off balance sheet post the asset sale. This proposed model is illustrated in the following diagram.

Proposed future PPP risk sharing arrangement

Government sponsor	Design build operate PPP	Asset ownership PPP
Greenfield economic performance risk	Construction & commissioning risk	Brownfield economic performance risk
Initial asset development risk	Operations & asset management risk	Obsolescence risk
		Residual operating risk

Conceptually the development of such a project could proceed as follows:

- The public sector develops the projects on a DBO basis, in which the successful private sector consortium is responsible for the design, construction, development and operation of the asset. Operations would include acceptance of the ongoing asset management risk, including maintenance and provision of sufficient resources to ensure maintenance of asset performance.
- The government would retain ownership of the assets through any 'ramp up' phase until the economic performance of the assets can be reasonably assessed. This may take several years after commissioning.
- The government can then either sell or lease the asset to the private sector with operation and asset management contracts in place. By removing the development, operating and demand risk from the equation, the discount rate required by the private sector should be significantly reduced when compared to a build, own, operate, transfer (BOOT) style PPP.

As a minimum, the purchaser would be exposed to:

- Any residual operating risk;
- The risk of the asset being rendered obsolete, which could be very real in the case of rapidly evolving technologies, such as communications; and
- The risk of any capital expenditure required for future demand growth that could be transferred to the purchaser, who would also therefore accept brownfield demand risk.

The government can then recycle these sale revenues through new projects.

From an investor's perspective, the proposed asset sales would provide exposure to quantifiable risks and should restore confidence in those PPPs which involve the transfer of demand risk.

References:

1. "Development of PPPs in Victoria", Maguire and Malinovitch, *Australian Accountancy Review*, 2004
2. *Financing transport infrastructure; Public finance issues*, Peter Abelson, Macquarie University, Sydney, 2010
3. *Report on the performance of PPP projects in Australia when compared with a representative sample of traditionally procured projects*, Duffield, Raisbeck and Xu, Melbourne Engineering Research Institute, 2008
4. *Infrastructure Report Q3*, Business Monitor International, 2011
5. *Quarterly Infrastructure Report No5*, AMP Capital Investors, 2010
6. "Keynote Address to the Patronage Forecasting Symposium", The Hon Anthony Albanese, Minister for Infrastructure and Transport, June 2011
7. "Current PPP-Models for German Motorways", Thorsten Beckers, Christian von Hirschhausen, and Jan Peter Klatt, 4th Conference on Applied Infrastructure Research, 2005
8. Vinci Press Release, October 2010
9. Partnerships Victoria Guidelines
10. "Error and Optimism Bias in Toll Road Traffic and Revenue Forecasts", Robert Bain, RBconsult, 2011
11. "Cost Overruns and Demand Shortfalls in Urban Rail and Other Infrastructure", Bent Flyvbjerg, *Transportation Planning and Technology*, 2007

Infrastructure update

How to read this section

In this section, we have summarised recent infrastructure activity by region and sector. We have principally considered developed economies and major emerging economies.

The four regions included are:

- Europe;
- North America, focusing on the US and Canada;
- Northern Asia, focusing on China and India; and
- Australasia, focusing on Australia and New Zealand.

The sectors are summarised in the following table.

Sector	Description
Power	New generation assets, except renewable energy.
Transmission & Distribution	Energy distribution, mainly electricity and natural gas.
Transport	All transport infrastructure, including air and sea ports, railway and road developments.
Water & Sewage	Assets associated with management of the water cycle, including collection, distribution, treatment and disposal. Irrigation projects are also included.
Telecommunications	Communications assets.
Social Infrastructure	Includes health, education and justice assets.
Energy Storage	Principally energy storage projects, including liquid hydrocarbons, natural gas and carbon sequestration. Additionally, pipelines built for carbon sequestration will be included in this sector.
Renewables	Renewable energy generation projects of all types.

To assist in analysing this information further, types of funding have been broken down as follows.

- **Investment** – This refers to situations where a traditional funding model is used for both new stand-alone developments and the development of an existing asset base. The latter represents ‘business as usual’ activities in either replacing or growing existing infrastructure assets. In general, infrastructure operators have demonstrated that they can fund the equity requirements of all but the largest of expansion projects from cash flows.
- **PPPs** – This covers all types of private sector provision of infrastructure including BOOT schemes and concessions as well as design, build and finance. From this edition on, projects involving privatised utilities, such as UK water companies, will be classified as PPPs as these represent expenditure which does not appear on the government’s balance sheets.
- **M&A activity** – While this does not represent bricks and mortar construction activity, it is a useful indicator of the appeal of the sector to investors overall.
- **Private equity (PE)** – Private investment in infrastructure assets.

This summary was developed from publically available sources and while due care has been exercised in its preparation; AMP Capital offers no warranties as to its completeness or accuracy.

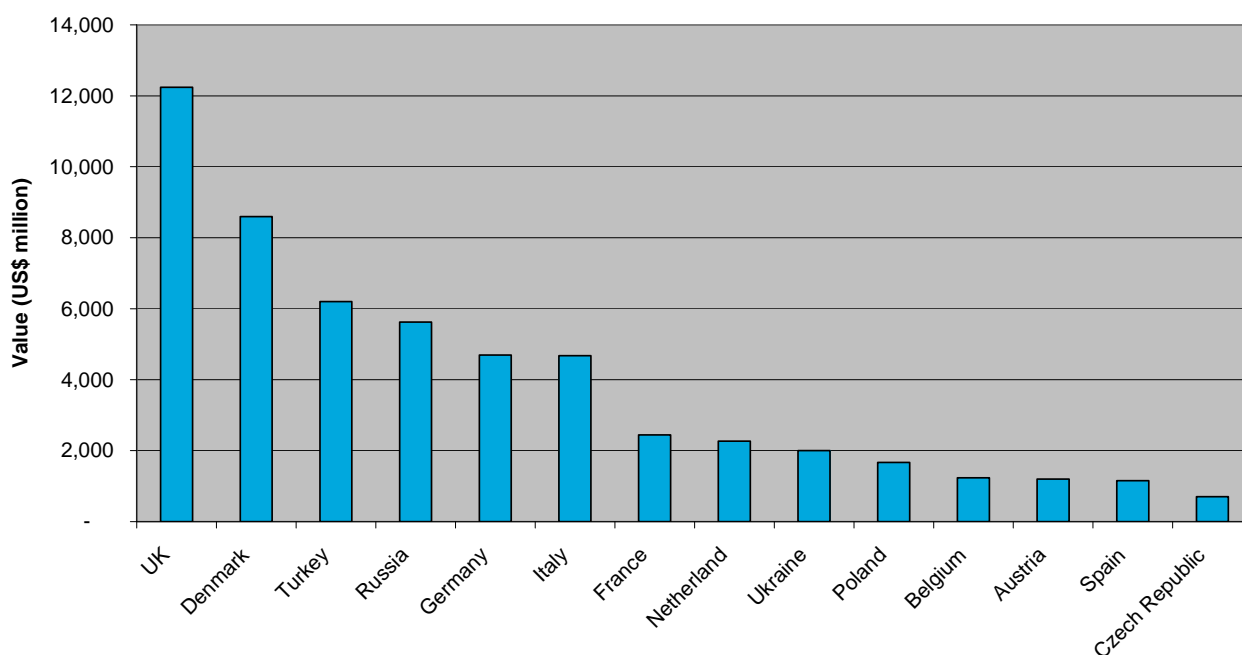
European infrastructure

The slow down in spending continues, suggesting that previous stimulus packages have run out of steam, with US\$53 billion of new construction identified in our survey. Unlike the previous period under review, there were no announcements of large-scale, high-speed rail projects. Instead, a large number of medium-sized road projects were announced. The UK currently leads the way, with a good balance between social and economic infrastructure developments.

Individual economies

Infrastructure spending by country - Europe

January to March 2011



France's construction sector appears to be returning to growth. Most of this is driven by spending on big ticket infrastructure projects, such as €32 billion to be spent over the next 15 years to upgrade Paris's transport network and the development of a 106 km canal connecting the Rhine to the Seine, which has been approved and is currently being tendered. These projects are not currently included in our totals.

Despite massive cuts in public spending in the UK, transport infrastructure has been maintained, as it is viewed as a major driver of economic growth. Social infrastructure spending, however, is expected to suffer significantly going forward.

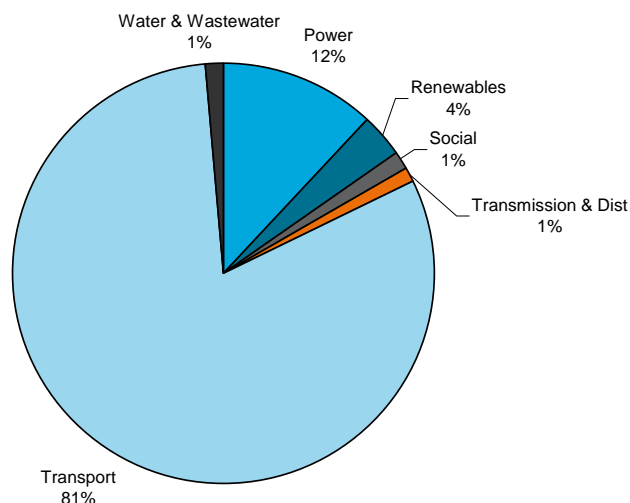
In Thuringia, Germany, Vinci has opened the A4 A-Modell motorway section, one year ahead of schedule. The contract was one of four pilot concession projects, known as A-Modell, launched by the German government in 2005. The contract is Germany's first motorway concession, carried out under a 30-year PPP. If successful, this PPP could encourage Germany to embrace more PPPs.

Denmark's spending was bolstered by the announcement that the Danish Government has given approval for construction of the 18 km Fehmarnbelt Tunnel, which will connect the country with Germany. The link is expected to cost €5.1 billion to build, with the majority of the work being paid for by the Danish Government.

Turkey also continues to announce some impressive transport projects, including a new bridge to span the Bosphorus strait.

M&A activity in the UK was weak at US\$5.7 billion. The largest deal was Arcus's take over of Forth Ports for US\$1.25 billion.

Infrastructure spending by sector - Europe January to March 2011



The Transport sector was the by far the largest spending sector in the first quarter of 2011, accounting for more than 80% of total spending, followed by the Power, Renewables and Transmission & Distribution sectors which contributed a combined 17% of total spending.

The importance of economic infrastructure proves that governments are focusing on assets which have the greatest potential to promote gross domestic product (GDP) growth.

The major projects are summarised in the table below, by sub sector.

Railways

Description	Amount (billions)
Salini Costruttori has signed a €1.7 billion (US\$2.1 billion) deal for the construction of Copenhagen's new metro line.	US\$ 2.1
The scope of work on the Cityringen project will feature a new circular line in the city centre and will include two 17.4 km tunnels and 17 new metro stations, all at 30 metres below ground level. Salini commenced construction in the first quarter of 2011 and the works are scheduled to be completed in 2018.	
Network Rail has announced that it aims to build new stations and a more efficient track layout to improve the journey on the Western route from south Wales and south-west England to London.	US\$ 1.3

Roads

Description	Amount (billions)
The Atlandes consortium, made up of Bouygues' subsidiary Colas and Spie Batignolles, NGE, Egis, as well as investment funds HSBC European Motorway Investments 1 and DIF Infrastructure II, has secured a 40-year concession contract for the development of a 105 km motorway in southwest France from the French Government. Construction is to begin in mid 2011. The motorway is planned to be open to traffic by July 2014.	US\$ 1.5
Scottish MPs have voted for a replacement for the Forth Road Bridge in Central Scotland, which will be built alongside the iconic Forth Rail Bridge and will protect this vital link in the transport network.	US\$1.5
The Ukraine will develop two new road links, including part of the E-97 European Transport Corridor. The projects will be funded by concession deals.	US\$2.5
Austria will develop the €933 million Ostergion PPP motorway project as a 32-year concession deal. This is one of the largest PPP projects currently in operation in Europe. The revenue will be a mix of availability and shadow toll payments. The package comprises four road expansion projects for 113 km of new road construction, representing a network of urban and inter-urban highways around Austria's capital.	US\$1.2
Italian company ANAS, will invest over €7 billion in Sicily's road network via a public highway concession. This includes over €2 billion in ongoing work and more than €4.1 billion of scheduled activity, featuring 20% of Italy's major road network.	US\$ 1.5
Tenders have been called for the €1.5 billion A6/A9 highway project in the Netherlands. This project requires the building of a number of tunnels, bridges and connecting highways between Almere and Amsterdam.	US\$ 2.0
St Petersburg, Russia has called for tenders for the city's Western High Speed Ring Road PPP project. In total, this project is expected to cost approximately €3.32 billion (US\$4.59 billion) and will improve transport around St Petersburg and Moscow as well as other cities.	US\$ 5.0
The Danish Government has approved the 18 km Fehmarnbelt Tunnel from Denmark to Germany. The tunnel will be constructed as an immersed tube structure and is scheduled to open for traffic in 2020. The link is expected to cost €5.1 billion to build.	US\$ 6.5
Turkey's Ministry of Transport has called for tenders for the third bridge to span the Bosphorus. How the bridge and highway will be financed remains undecided at this time.	US\$ 5,000

Power

Total investment commitment was again constrained, most likely due to subdued economic activity. The most significant project is the Selby carbon capture and storage demonstration project in Yorkshire, UK.

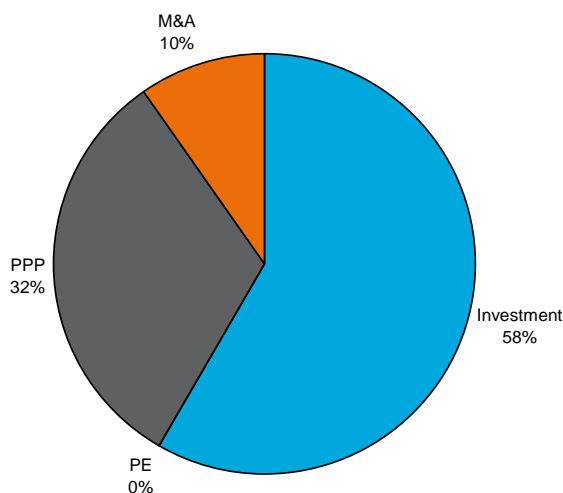
Description	Amount (billions)
Alstom UK, Drax Power and National Grid have applied for partial European Union funding for a new stand-alone, 426 MW, oxy-fired carbon capture and storage (CCS) demonstration project at an existing Drax site at Selby, Yorkshire. As part of the project, National Grid, with an offshore partner, will develop a transportation system to the southern North Sea where the CO2 will be stored, which is in line with its plans to develop a cluster of CCS projects in the Humber area.	US\$1.5
GE and Turkish firm Gama Energy have been awarded a contract by Akenerji to construct a 900 MW gas fired combined-cycle power plant in the district of Erzin, in Turkey's Mediterranean province of Hatay.	US\$1.2
Scottish Power has received the green light to construct a new 1,000 MW gas-fired power station near Hoo St Werburgh on the Hoo Peninsula in Kent, England, adjacent to the existing Damhead Creek 800 MW gas-fired power station.	US\$1.5

Renewables

While wind projects dominated in terms of value, (two projects totalling US\$700 million), seven smaller biomass conversion projects and two significant photovoltaic projects were also announced.

European infrastructure investments by type – January to March 2011

**Infrastructure spending by type - Europe
January to March 2011**



As outlined in the previous chart, PPP projects recovered strongly, particularly in the transport sector, while M&A activity was relatively slow.

North American infrastructure

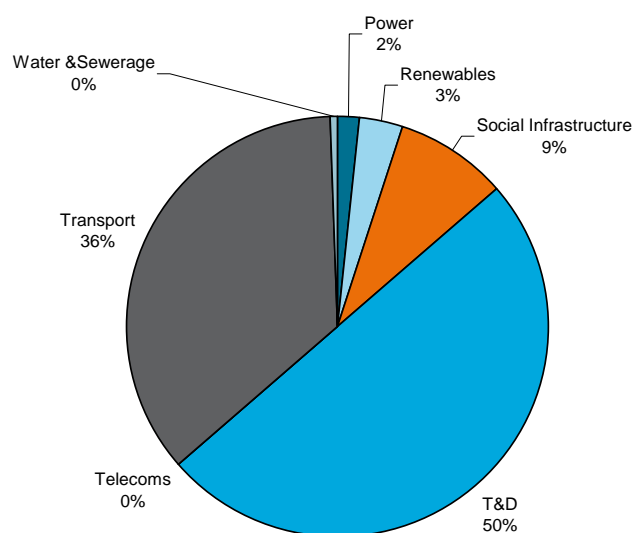
The outlook for infrastructure spending in the US in 2011 is gloomy as a result of:

- The depletion of federal stimulus programs including the demise of Build America Bonds, which funded US\$106 billion worth of investment since they were initiated according to Reuters;
- Political confrontation in Washington preventing transport infrastructure packages and possibly President Obama's plans for an investment bank; and,
- Fiscal constraints at a state level.

In contrast, Canada is benefitting from its well developed PPP policies which are delivering projects, particularly in road transport and health care.

North American infrastructure investments by sector – January to March 2011

**Infrastructure spending by sector - North America
January to March 2011**



Infrastructure spending showed a significant decrease, with only US\$42 billion of new investment identified. Spending on Social Infrastructure and Renewables was down considerably, but this was partially offset by an increase in spending on Transport.

M&A activity was strong, with a record US\$71 billion in transactions identified during the period.

The most significant projects, by sub sector, are summarised in the table following.

Roads

Description	Amount (billions)
A major project to rebuild Montreal's busy Turcot Interchange in Canada has been approved by the city council. Costing US\$3.01 billion (C\$3 billion), the work is required to alleviate congestion resulting from the large volume of traffic the interchange handles.	US\$ 3.0
In Texas, clearance operations are being carried out to make way for the North Tarrant Express, a project that consists of a series of major improvements to the I-820 and SH 121/183 (Airport Freeway) highway corridor in northeast Tarrant County. The US\$2 billion PPP project is due to be completed in 2015.	US\$ 2.0
Highway 407 in Ontario will be expanded in two stages. The highway is being lengthened by 22 km initially and then by a further 23 km section, with completion planned for 2015 and 2020 respectively. The link will be tolled to pay for the work. Details of the PPP arrangement have not yet been decided.	US\$ 2.0

Power

Activity in the traditional power generating sector remained subdued, although activity continued on a medium-scale gas fired plant. Investors appear to be cautious in the face of uncertain economic growth outcomes, with a number of previously announced coal projects being put on hold.

Renewables

Renewable projects virtually stalled after a bumper finish to 2010. Development proposals for new wind projects are now at five-year lows according to the US Department of Energy. The best hope for the sector is in the extensive pipeline of large Canadian hydro-electric projects.

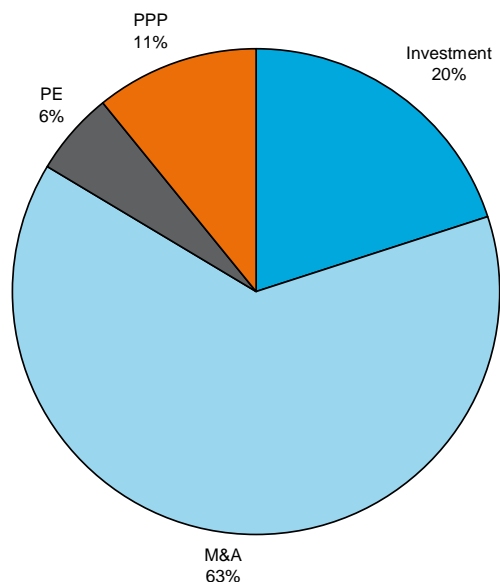
Social Infrastructure

Social Infrastructure spending remained strong, with more than US\$10 billion committed over 70 projects. The major projects are described in the following table.

Description	Amount (billions)
In Canada, the OHL Construction International and Laing O'Rourke consortium was announced as preferred PPP bidder for the Montreal University Hospital.	US\$2.2
A new hospital to be built by the Albert Einstein Health Network (AEHN) in East Norriton, Pennsylvania has commenced. The 360,000 square foot, five-story hospital building includes a separate 75,000-square-foot medical office building, 1,137 parking spaces in four parking areas and a dedicated traffic light controlling the new driveway entrance on Germantown Pike. The new building of the hospital will have 146 beds along with a US\$350 million hospital and trauma centre.	US\$0.8

North American infrastructure investments by type – January to March 2011

**Infrastructure spending by type - North America
January to March 2011**



PE investments were again strong in the US Health Care sector, while PPPs rebounded on the back of toll road developments and Canadian Health Care activity.

These projects included the extension of Ontario’s 407E, Texas’s North Tarrant Expressway and Montreal’s University Hospital previously outlined.

A highlight of the first quarter of 2011 was the large amount of M&A activity, as summarised in the table following.

Description	Amount (billions)
Federal regulators have approved a \$22 billion merger of telecommunications companies Qwest Communications International and CenturyLink, clearing the way for the merger to be completed by 1 April 2011. The merger had already won approval by 20 states as well as the District of Columbia and shareholders.	US\$22.0
AT&T has agreed to buy T-Mobile USA from Deutsche Telekom for \$US39 billion. The deal will create the largest US wireless carrier by subscribers and fundamentally alter the industry's competitive landscape. Under the deal, the companies said AT&T will pay \$US25 billion in cash and the balance in stock, giving T-Mobile's German parent an 8% stake in AT&T.	US\$39.0
US utility PPL Corporation has bought E.ON's UK energy network for £4 billion. E.ON is the second largest electricity distribution network in the UK. Bank of America, Merrill Lynch and Credit Suisse will lend the US utility £3.6 billion to help fund the deal.	US \$6.5

North Asia infrastructure

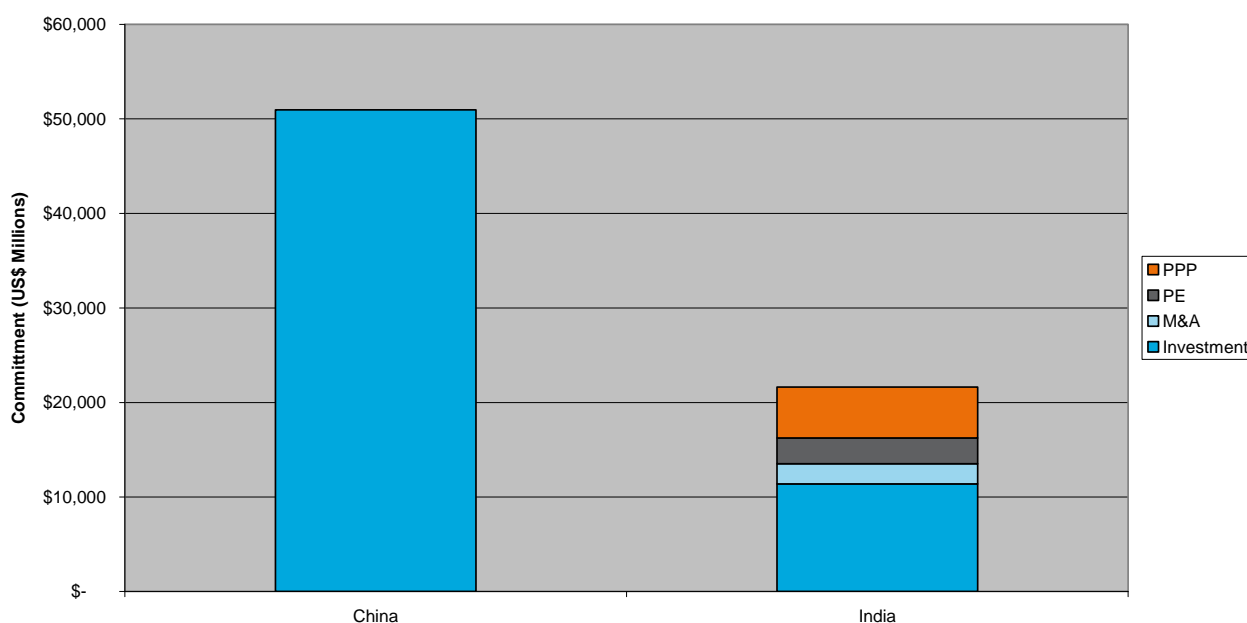
China's 12th Five Year Plan (FYP) was ratified in March, for the period 2011 to 2015. This includes targets for infrastructure investment by sector. The theme of the plan was 'inclusive growth', which means ensuring that the benefits of economic growth are more equitably spread. Some important initiatives include:

- a notional GDP growth rate target of 7%;
- promoting consumption over investments and exports;
- closing the income gap through minimum wage rises;
- increased social safety nets; and,
- a range of energy efficiency targets.

Sectors that will receive a major boost from the 12th FYP are Health Care, Energy and Technology.

New projects identified in the review period were somewhat lower than the previous period, with totals of US\$51.0 billion and US\$21.6 billion for China and India respectively. Transport was again the biggest winner.

Infrastructure spending by type - North Asia January to March 2011



M&A activities were limited to India and again relatively slow, with only US\$1.7 billion identified in the first quarter of 2011. Major projects within each subsector are summarised below.

Power

No major projects were identified but development of a number of middle ranking generation projects continued. India's ability to deliver on its energy development program remains a major concern.

Roads

In China, a slew of major road project announcements from provincial governments followed the release of the FYP. Some of these announcements should be viewed as aspirational rather than a firm commitment. As a result, we have attempted to report on projects that have confirmed start dates or are promoted by the central government.

In India, road projects continued at a slower pace with PPP arrangements dominating.

Description	Amount (billions)
In the Hebei Province, 12 highway projects worth US\$9.66 billion will commence in 2011. These new highways will add a total of 852 km to the existing road network. In addition, the authorities in the Hebei Province are detailing additional plans to continue to develop the highway network with a target set of 6,762 km in total by the end of 2015.	US\$9.7
In the Zhejiang Province, a US\$4.77 billion loan will be used to build the Wenzhou section of the Ningbo-Taizhou-Wenzhou Expressway and the Wenzhou extension section of the Zhuji-Yongjia Expressway. The syndicated loan is led by the Bank of China along with the China Development Bank.	US\$4.77
A new expressway and bridge connection will link Shenzhen, Zhongshan and Guangzhou. The project forms part of the Guangdong Five-Year Program (2011-2015) and is expected to cost US\$4.56 billion.	US\$4.6
China's Ministry of Transport will spend US\$4.55 billion on improving rural road links during 2011. By 2015 the country aims to have approximately 3.9 million km of rural roads. Over the last five years, the rural road network has grown by 527,000 km to 3.45 million km in total. This expansion has cost US\$30 billion to date to build.	US\$4.6
A deal for the Central-Wan Chai Bypass project has been agreed on by the Hong Kong Highways Department in a joint venture with Chun Wo-CRGL-MBEC.	US\$4.0
The authorities in Shenyang are planning 15 major road construction projects for the 2011 financial year. Construction work on a new highway between Shenyang and Kangping will commence in 2011, while work on the third and fourth ring roads will start in early March 2011 in Shenyang. Preliminary work is due for completion before the end of February 2011.	US\$4.7
Work is due to commence on a new highway connecting Zhong County to Wanzho. The 79 km highway will be built by the Chongqing Expressway Group and will take four years to complete at a cost of US\$1.163 billion.	US\$1.2
China's Guizhou province has major plans for highway investments during 2011 to 2015. In all, there are plans to develop 2,993 km of expressway which will require an investment of US\$82.8 billion.	US\$2.5
Jiangxi province, China, plans to carry out no less than 28 highway construction projects stretching over 2,000 km, with a total investment amount of US\$4.7 billion during 2011.	US\$4.7
The Indian Government has decided to widen the Mumbai-Goa stretch of National Highway 17 to four lanes, at an estimated cost of INR71 billion (US\$1.56 billion). The Indian Minister of State for Road Transport & Highways, RPN Singh, said the entire work would be completed by 2014 or 2015.	US\$1.6

Airports

Estimated expenditure on China's regional airport development project continued at a rate of US\$3.5 billion for the first quarter of 2011.

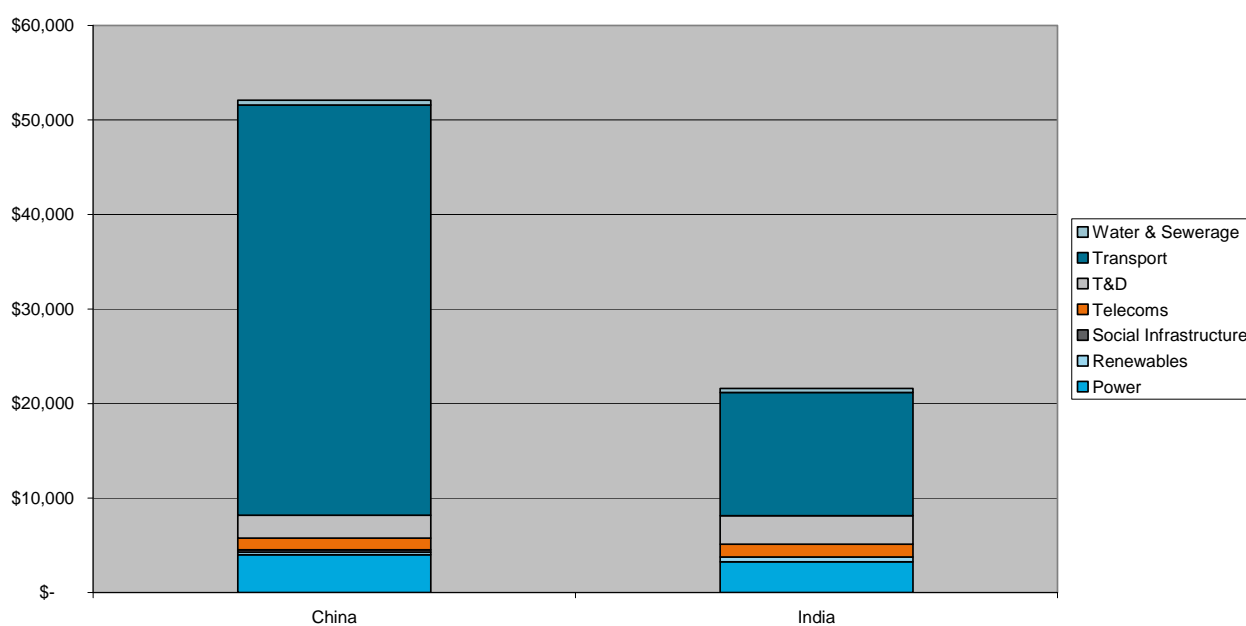
Rail

No new high-speed rail links were announced in China during this period, although significant developments of conventional rail and metro lines continued in India.

Description	Amount (billions)
The Delhi Metro Rail Corporation has commenced soil testing for the second phase of the metro project stretching 70 km, expected to be worth INR180 billion (US\$3.96 billion). The second phase of the project will include a new rail line connecting Nagavara through to Shivajinagar and Cantonment railway stations.	US\$4.0
The Indian government has approved an INR66 billion (US\$1.4 billion) high speed rail link project between Bangalore city in Karnataka and India's new international airport. The 37 km high speed rail project will have two lines on which trains will travel at a speed of 160 km per hour. It is projected to carry 11,500 passengers in each direction during peak hours.	US\$1.4

North Asian infrastructure investments by type – January to March 2011

Infrastructure spending by sector - North Asia January to March 2011



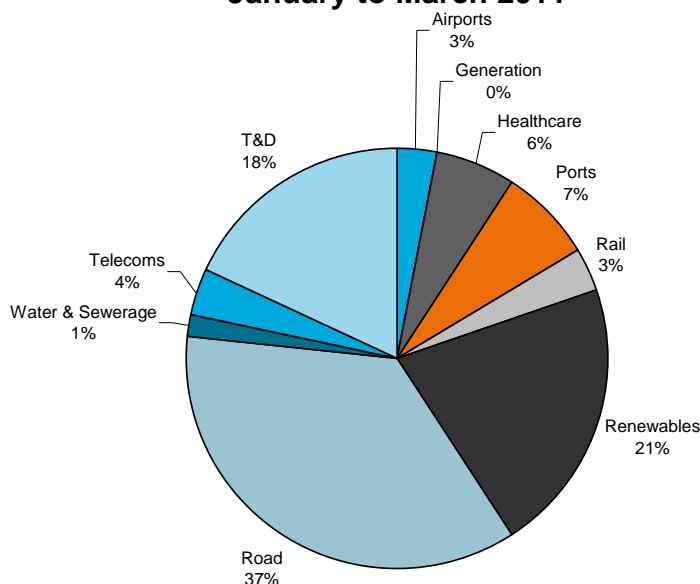
In India, PPP spending increased due to the rise in road projects. PE investment also improved, mainly in the energy sector.

M&A activity remained slow, with spending of only US\$1.5 billion. The most significant deals are described below.

Description	Amount (millions)
Private equity-owned Ascend Telecom Infrastructure and India Telecom Infra are merging their telecommunications tower businesses. The merged company will operate 4,000 telecommunications towers across India.	US\$350
GVK Power and Infrastructure has purchased a 13.5% stake in Mumbai airport. The Indian developer bought the stake from a subsidiary of South Africa's Bidvest Group for US\$287 million. As a result, it now owns 50.5% of Mumbai International Airport.	US\$287

Australasian infrastructure

Infrastructure spending by sector - Australasia January to March 2011



The cost of repairing roads, highways and bridges damaged by the recent flooding in Queensland is expected to be around A\$2.5 billion (US\$2.47 billion). The state government of Queensland has published a report estimating that repairing the damage caused by the floods will require A\$4.94 billion of spending in total between 2010 and 2013.

Overall, infrastructure spending in the region maintained its momentum, with US\$11.6 billion in new projects announced. The transport sector continued its strength, accounting for more than 60% of the total spending in the region.

In Australia, Transmission & Distribution spending continued as previously advised. This level of expenditure is expected to continue through to 2014 while the roll out of the National Broadband Network continues.

While investment in new generation capacity remains on the back burner, expenditure on Renewables continues with the announcement of some innovative projects.

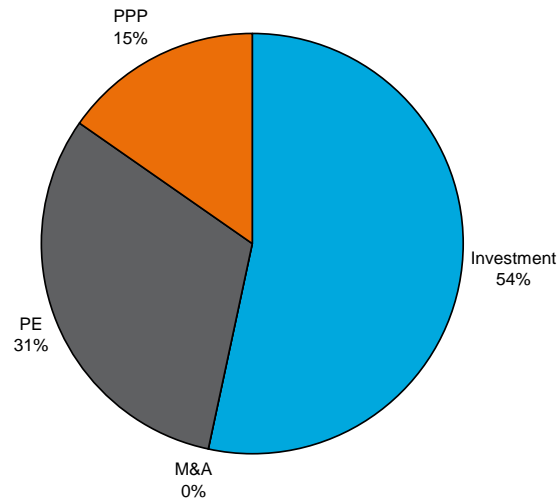
Major projects include:

- Rio Tinto's Cape Lambert Port B project, comprising the construction of a new greenfield iron ore port facility alongside the existing Cape Lambert Port, worth an estimated US\$850 million.
- Development of the Waikato Expressway in New Zealand, which will provide 102 km of continuous divided four-lane highway and a 6 km reduction in the length of SH1, reducing travel time from the Bombay Hills to the south of Cambridge. It will also connect Auckland to the key centres of Waikato and the Bay of Plenty as well as increase access between the major cities of Auckland and Hamilton and provide a new Waikato River crossing north of Hamilton. The project is scheduled to be complete by 2019 at a cost of NZ\$1.8 billion (US\$2.4 billion).
- A consortium of Spanish and Australian banks, with the Australian Federal Government's support, has agreed to finance the EnviroMission 150 MW solar tower project, to be constructed near Mildura in New South Wales. The construction cost of the project is estimated to be A\$900 million (US\$901 million) over its lifetime. The proposed tower would generate some 650 GW hours per annum.
- The Macarthur Wind Farm is being developed by a joint venture formed between AGL Energy and Meridian Energy. The project will be located in Macarthur, Victoria on a 5,500 hectare site and has

been permitted to generate up to 420 MW, using 140 x 3.0 MW Vestas turbines. Estimated development costs including transmission links is US\$1.23 billion.

Australasian infrastructure investments by type – January to March 2011

Infrastructure spending by type - Australasia January to March 2011



The PPP share of infrastructure spending was maintained at about 15% while PE investment increased as a result of the major renewable projects. M&A activity was non-existent during the quarter.