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The Global Infrastructure Challenge

Top Priorities for the Public and Private Sectors

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Top Priorities for the Public and Private Sectors

Infrastucture is back on the agenda. Faced with the worst financial crisis since the Great Depression, governments worldwide have increased spending on public projects as part of fiscal stimulus packages designed to support economic growth.

This short-term focus does not address the fundamental economic challenges posed by the condition of the world's infrastructure. Viewing the current situation as a one-off combination of circumstances threatens to obscure the scale of the task facing governments: unless action is taken, the inadequate state of global infrastructure will certainly become a bottleneck for future growth.

However, severe budget constraints will limit many governments' ability to fund improvements, and private financing will have to fill the gap. Both the public and the private sectors must change if they are to reconcile their conflicting interests and meet the huge challenge presented by infrastructure requirements over the next 20 years.

Global Infrastructure Faces Massive Pressures

When President Barack Obama presented the salient elements of his economic-recovery plan, he emphasized the new urgency governments attach to infrastructure investment as a means of supporting growth. "We'll invest your precious tax dollars in new and smarter ways, and we'll set a simple rule—use it or lose it," he said, adding that if states fail "to act quickly to invest in roads and bridges in their communities, they'll lose the money."

In response to the financial crisis and ensuing global recession, governments have increased spending on transportation, the urban fabric, energy, water, and other public-works projects to support their economies. In the United States, public-infrastructure investments made up \$133 billion of the \$787 billion stimulus package funded by the American Recovery and Reinvestment Act of 2009. Public-spending increases made up two-thirds of total stimulus plans in the G-20 (Group of Twenty Finance Ministers and Central Bank Governors) countries, and infrastructure spending made up a big chunk of that two-thirds.

The need for infrastructure spending is not the immediate response to the economic crisis. Rather, it is the result of the inability of infrastructure worldwide to meet the forecast growth in demand.

In the United States, road traffic doubles every 28 years, but at the current road-building rate, it would take 370 years to double existing lane miles. Traffic threatens to overload much of the network in the near future. Airport runways are also under pressure, and ports on both coasts have insufficient capacity to meet demand. Lack of funding has left aging water-treatment and distribution facilities unfit to cope with rising demand and new regulations.

Economic development in emerging markets will drive increasing demand for already inadequate transportation infrastructure and utilities. In India, 40 percent of traffic is borne by 2 percent of the country's roads. Road and airport use is predicted to rise by 10 percent per year until 2030, while container traffic in India's ports is rising by 15 percent per year, threatening severe bottlenecks.

However, severe budget constraints resulting from the response to the financial crisis will limit the ability of governments, particularly those of the Organisation for Economic Co-operation and Development (OECD) countries, to fund development. Many central and local governments lack adequate financial, project-management, and operating capabilities to meet such challenges in an efficient and timely manner.

The Boston Consulting Group estimates that \$35 trillion to \$40 trillion will be required over the next 20 years to satisfy the urgent and rising need for infrastructure development globally. (See Exhibit 1.) BCG also estimates that, at best, governments will be able to fund almost half the requirement, leaving a shortfall as large as \$20 trillion to \$25 trillion.

The Infrastructure Is Already Inadequate

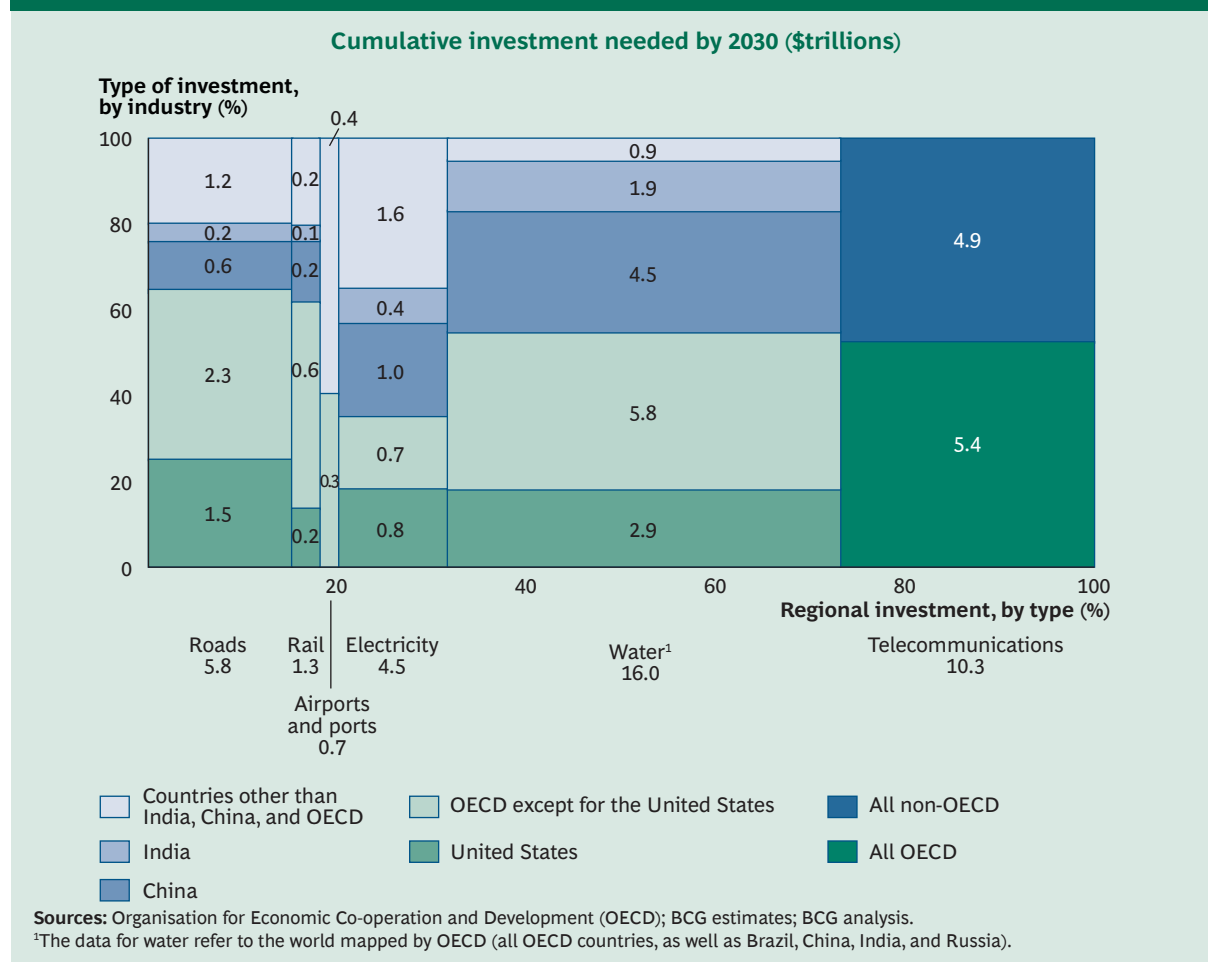
Already, the infrastructure—both its capacity and its quality—is extremely deficient in most of the developing and developed world.

Public infrastructure, which comprises the facilities that are required for the economy and society to function, is generally divided into two groups:

- ◇ The economic infrastructure required for day-to-day economic activity, such as transportation, utility, and telecommunications networks
- ◇ The social infrastructure that is considered essential for the functioning of society, such as schools and hospitals

The role of governments in providing public infrastructure is accepted because private companies are not sufficiently motivated by general economic and social benefits to build freely available infrastructure, such as roads and street lighting. However, faced with multiple spending pressures, governments in developed economies have allowed infrastructure built in the 1950s and 1960s to crumble, while growing demand and new regulatory requirements have imposed increasing strain on existing facilities. For instance, the

Exhibit 1. An Estimated \$35 Trillion to \$40 Trillion Will Be Needed to Improve the World's Infrastructure



deadly collapse in 2007 of the Interstate 35W Mississippi River Bridge in Minneapolis highlighted the state of the 600,000 U.S. bridges, 27 percent of which are deficient.

Also, the infrastructure of fast-growing emerging markets, such as China and India, is inadequate for their current needs, and it faces large increases in demand driven by economic growth, urbanization, and expanding populations.

The following are other examples of inadequate key infrastructure:

- ◇ In 2003, the Northeast United States (and Ontario, Canada) and Italy suffered power blackouts, each of which affected more than 50 million people.
- ◇ Roads linking Western and Eastern Europe face mounting congestion owing to the continuing growth of heavy-goods vehicle traffic. The cost of traffic congestion in the United States is \$60 billion to \$70 billion per year, and by 2020, much of the U.S. road network will reach its saturation point.
- ◇ The ports of Rotterdam and Antwerp have faced significant delays. In March 2007, Rotterdam sent away more than 30 ships and 50,000 containers, and, as we mentioned above, U.S. ports on both coasts are unable to meet demand.
- ◇ Serious water shortages and water-quality issues are widespread, affecting developed areas such as California and the United Kingdom. London, for example, suffered a drought in 2006.
- ◇ In China, cities and major industrial areas such as Beijing and Shanghai experience recurring electricity shortages. India's energy shortfall is 9 percent on average and 40 percent at peak.
- ◇ India has plentiful supplies of water but is extending its distribution and collection network because of health concerns. China risks water shortages, especially in its northern region, which includes Beijing.

These are only a few examples of the long-term problems that must be addressed if economic growth is to achieve its potential over the next 20 years.

Increasing Demand Will Vastly Outstrip Historical Levels

The key driver for future infrastructure spending over the next 20 years will be increased demand in both emerging and developed economies, powered by rising per capita GDP, population growth, and increased urbanization.

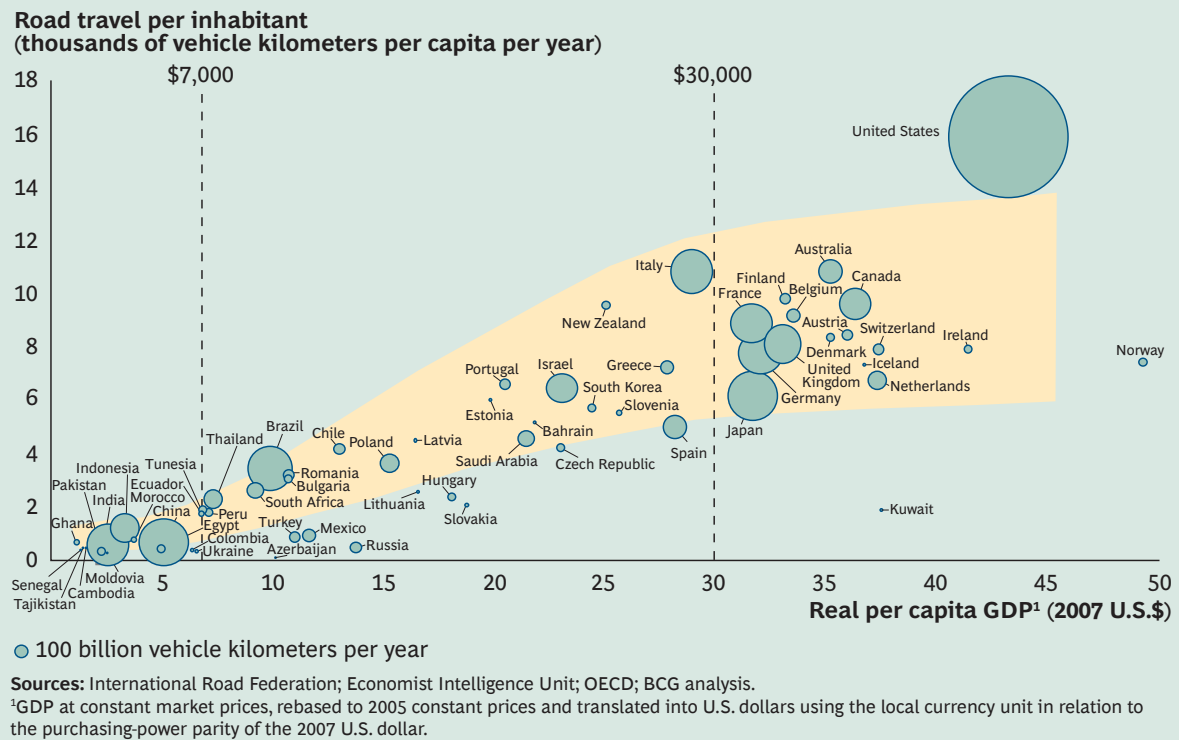
There is a clear link between economic development and demand for transportation infrastructure. For example, the number of air miles traveled per person rises in line with a nation's per capita GDP, while the means of transportation shift from bus and train to car and air. Road traffic also closely tracks per person GDP growth, and use of airports, rail, water, electricity, and ports is also linked closely to economic growth. (See Exhibit 2.)

The requirements of emerging markets will be enormous. China will make up more than 25 percent of global GDP growth in the next 20 years, and the BRIC countries (Brazil, Russia, India, and China) will account for more than 45 percent. The BRIC countries will make up more than half of the growth in road use and more than 40 percent of the growth in airport passenger traffic through 2030.

Urbanization will also put serious stress on the infrastructure of new megacities in emerging markets. For example, Delhi's massive plans for upgrading its already inadequate transportation systems and utilities reflect the expected strain of population growth from 15 million in 2005 to more than 40 million in 2030. The city's proposals include overhauling existing roads, building underground roads, developing an integrated rail and road system, and building a sewerage system that will increase coverage from 55 percent to 100 percent by 2021.

The OECD countries will require half the global investment in infrastructure, and water needs are expected to absorb half that sum as quality requirements become more and more stringent.

Exhibit 2. Increases in Road Traffic Follow the S Curve of Per Capita GDP Growth



Failure to Act Will Impede Economic Growth

Governments are spending on infrastructure to support their economies in the short term. But without the necessary \$35 trillion to \$40 trillion that we believe will be required over the next 20 years, long-term economic and social development will be hindered by serious blockages. (See Exhibit 3.)

For example, inadequate infrastructure combined with rising oil prices will constrain global trade and drive up supply chain costs for manufacturers and retailers. A recent BCG study showed that the hidden costs of logistics, such as long and unpredictable delivery times, can turn a profit into a loss.¹

Bottlenecks have been the result of slow privatization plans and inefficient infrastructure planning. The U.S. airport-privatization program struggled to take off starting in the late 1990s, partly because progress was hampered by flawed plans, public opposition, and political decisions that put a limit on private-sector involvement. Construction of necessary runways averaged ten years from announcement to completion.

Given the poor condition of the existing infrastructure and the projected increases in demand, current financial, planning, and political challenges will combine to create a global crisis in the provision of essential public projects.

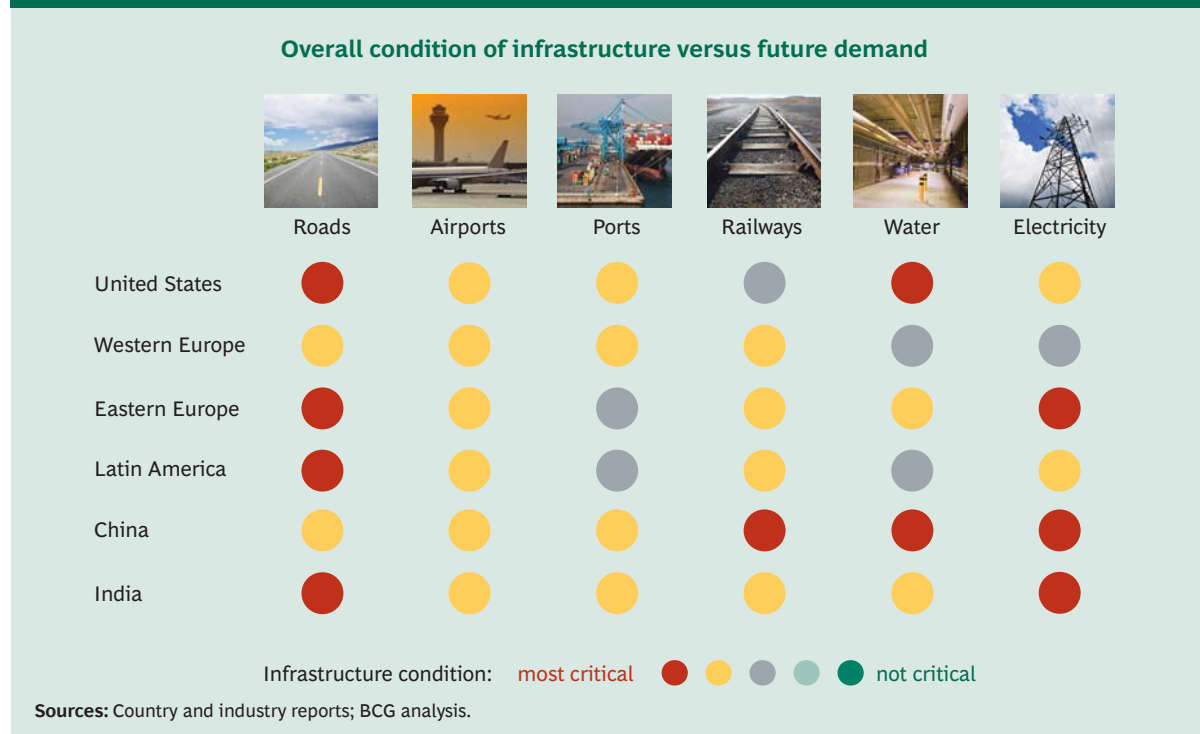
Governments Cannot Meet the Challenge Alone

Although infrastructure spending plays a major part in the fiscal stimulus packages that governments have put together to combat the recession, the cost of that support will severely hinder their ability to fund the infrastructure development needed to fulfill long-term economic potential.

Large budget deficits and public debt will constrain governments' financial flexibility, while trade deficits and net debt will limit their ability to raise funds domestically. (See Exhibits 4 and 5.)

1. George Stalk Jr., "The Threat of Global Gridlock," *Harvard Business Review*, July–August 2009.

Exhibit 3. Infrastructure Deficiencies Will Undermine Global Economic Development



BCG calculates that, at best, governments will be able to pay only about half of the infrastructure bill because of the continuing growth of public debt and interest costs that eat into public budgets. The infrastructure-funding gap, therefore, between governments' ability to pay and the estimated costs will be about \$20 trillion to \$25 trillion.

To fill the financial gap, many governments will have to involve the private sector both in the short term and over decades. While some liquid economies, such as China, will be able to fund their own needs, others facing greater constraints will require additional sources of funding. Brazil, France, India, Poland, Turkey, the United Kingdom, and the United States, to name a few, are likely to seek funding from private investors.

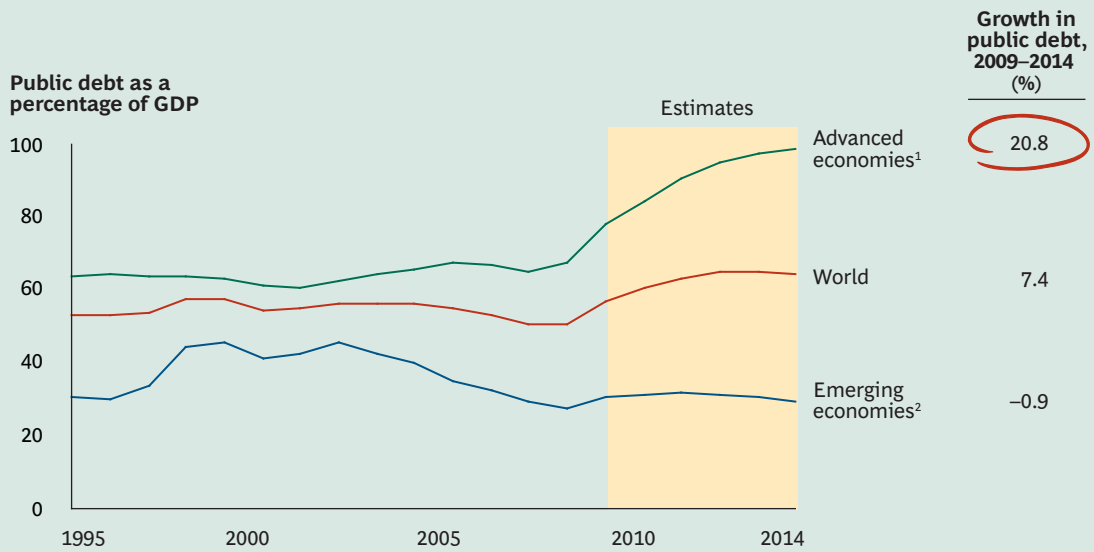
Private-sector financing should, in turn, be attracted by the opportunity to invest in public infrastructure projects with predictable long-term returns. There are two goals governments can achieve by engaging the private sector in bridging the infrastructure gap: the private sector can be a source of both *funding* and improvements to *efficiency*.

Funding includes more than additional financing from private construction companies, concessionaires, other industrial investors, and pension funds and other institutional investors. It also encompasses the development of innovative approaches such as public-private partnerships (PPPs) and, perhaps, the adoption of a model that charges the public directly.

The infrastructure gap can also be shortened by using private-sector expertise to maximize efficiency in the following ways:

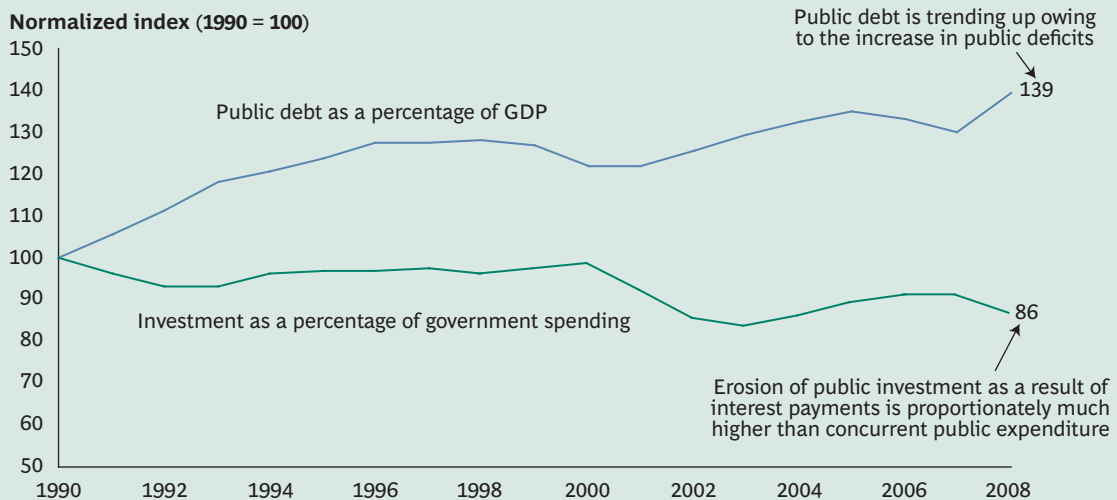
- ◇ Improving strategic planning and governance, integrating existing and new technologies, and leveraging private-sector know-how
- ◇ Reducing process length and complexity—from planning through implementation
- ◇ Improving prioritization and selection of investments

Exhibit 4. The Public Debt of Developed Economies Will Rise Strongly Through 2014



Sources: International Monetary Fund; World Bank; OECD; BCG analysis.
Note: Public debt as a percentage of GDP was calculated for country aggregates as a weighted average using U.S. dollars at purchasing-power parity.
¹Australia, Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States.
²Argentina, Brazil, China, India, Indonesia, Mexico, Russia, Saudi Arabia, South Africa, South Korea, and Turkey.

Exhibit 5. Investment by OECD Governments Fell as Deficits and Public Debt Rose



Sources: OECD Economic Outlook No. 86 database, November 2009; Economist Intelligence Unit; BCG analysis.

Solving the Problem: Turning to the Private Sector

The growth of PPPs in almost all sectors and countries has generated models that have been tested for existing and new infrastructure in both developed and emerging markets. When contracts are properly designed, private participation provides benefits for projects throughout the infrastructure delivery cycle and presents governments with opportunities to save money and reform public services.

Involvement of the private sector should, if effected properly, yield benefits for governments beyond financing. For instance, industrial companies have developed construction, project management, and

operating capabilities that governments can leverage to reduce costs and help reform public services. Payment aligned with delivery creates pressure for prompt completion, and private-sector involvement allows governments to concentrate on outcomes (through regulation) instead of service. Well-designed contracts also can improve the upkeep of assets by transferring maintenance to the private partner.

Key Infrastructure Players in the Private Sector

There are four main types of potential investors in infrastructure development, but their roles are shifting.

- ◇ *Pure concessionaires* are traditionally moderate-growth companies that generate a high proportion of their revenues from the operation of infrastructure concessions. Financially solid and experienced operators can benefit from governments' need for credible and efficient management of new infrastructure.
- ◇ *Construction companies*, both specialized and diversified, have been major participants in the past. In the short term, high debt will limit the ability of some to win infrastructure projects, particularly large privatizations. Their engineering and construction capabilities will remain important in greenfield and large "brownfield," or site reuse, projects.
- ◇ *Private-equity funds* that specialize in infrastructure raised \$250 billion from 2000 through 2009, making them significant potential participants. They will have to build operational and management capabilities to replace the high-leverage, aggressive bid prices and large tariff increases that characterized their early move into the infrastructure arena. Both public opinion and government regulators are pressuring them to reform their approach.
- ◇ *Sovereign wealth funds (SWFs)* with diversified and typically long-term portfolios managed about \$3 trillion in assets in 2008. A small but increasing percentage of this money will be invested in infrastructure, particularly in developing countries. SWFs that are overexposed to the instability of the Western financial sector will be attracted by lower-risk longer-term investments. Some will shift their focus to home markets while creating partnerships with companies when investing abroad.

In addition, pension funds had about \$17 trillion under management in 2008. SWFs and pension funds will be interested in infrastructure investments, but they will need to partner with specialized operators to compensate for their relative lack of experience and know-how in the infrastructure business.

Opportunities for the Private Sector

From a private investor's point of view, infrastructure investments offer a number of attractive common elements:

- ◇ They are backed by high levels of physical assets whose replacement cost is prohibitive
- ◇ They provide long-term stable cash flow from 30- to 99-year leases and income streams with limited exposure to markets and technology changes
- ◇ Infrastructure businesses often face lower competition
- ◇ Their assets are subject to independent regulation
- ◇ As a result, cash flows and returns from infrastructure assets have a low correlation with broader equity-market returns and offer attractive asset diversification to investors with long-term liabilities

What Will It Take to Succeed?

Private-sector involvement can bring major benefits to government efforts to improve public infrastructure. However, there are inherent conflicts between the objectives of governments and those of private businesses. To resolve such conflicts and align objectives as closely as possible, participants must develop the best possible PPP arrangements, drawing on the most advanced international examples. To do this, many public and private participants will need to adjust and improve their processes and behaviors.

The aim of a successful PPP is to build on the public and private sectors' shared desire for goals such as efficiency and safety and to reconcile tensions caused by their differing objectives. As the International Finance Corporation puts it, an effective PPP "arrangement will try to allocate the risks of the venture fairly between the private and government entities, based on each entity's ability to manage these risks and to provide rewards to each party based on the risks they have assumed."²

Changes Required of the Public and Private Sectors

Both governments and the private sector must play a part in building successful PPPs and contributing to the development of infrastructure for the collective good. The role of each is distinctive.

Governments should assume responsibility for the following:

- ◇ Strengthening political commitment
- ◇ Developing reliable regulatory frameworks
- ◇ Improving long-term planning, project prioritization, and project governance

For their part, private investors need to assume responsibility for the following:

- ◇ Going beyond financial-deal structuring to develop solid operating capabilities
- ◇ Paying much more attention to the quality of the service provided
- ◇ Being extremely selective in deal sourcing

Government Actions

For the public sector to operate effectively, politicians and the population must accept the idea of private profit generated from public assets in exchange for higher service levels and efficiency. In addition, governments must develop transparent and solid pipelines of projects to encourage the private sector to build technical and investment capacity.

Governments must also demonstrate clarity and consistency of vision and goals. In many countries—for example, Italy—differences in practices and attitudes of the various local-government bodies make it difficult for the private sector to invest with confidence. Public institutions must build and demonstrate institutional capacity adequate to handle the PPP program and deal with individual projects.

Governments seeking private-sector investment must also raise the sophistication of their PPP models and adopt best practices. They should ensure that there is an effective PPP legal framework that allows an efficient and speedy process. Today, countries such as Australia, Canada, and Chile are setting the standards for PPP models and pipeline strength on the basis of their clear commitment and record of effective execution. However, many countries, including the United States and other highly developed economies, still have progress to make if they are to emulate the best models and encourage private investment.

It is critically important that regulations on affordability, service quality, adequate capacity, and safety and security allow private operators the freedom to generate returns and make efficiency and innovation gains in a predictable regulatory environment. For example, tighter controls on the part of U.K. regulators have contributed to Heathrow Airport's poor performance in terms of growth, service levels, and prices.

In addition, investment proposals from governments are still too often motivated by short-term and sometimes-opaque considerations that lead to substandard outcomes. Governments that create open and transparent discussions on infrastructure choices and plans—and involve all the main stakeholders—are

2. International Finance Corporation, "Development of PPPs: Public-Private Partnership in Infrastructure—Legal Issues," October 1996.

still extremely rare. In this regard as well, Australia, Canada, and Chile stand out as best-practice exemplars, leaving others lagging some distance behind.

Addressing these issues, intense debates are taking place in some countries, including the United States and the United Kingdom, about the need for dedicated and largely independent bodies, such as national infrastructure banks, to increase the effectiveness of project planning and governance and to ease access to finance.

Private-Investor Actions

To identify profitable opportunities, the private sector has in the past relied too heavily on deal-structuring capabilities. These capabilities will be a reduced source of competitive advantage in the future. Instead, operational value-creation capabilities are now essential for extracting value from assets. First-class operating capabilities will be necessary to optimize operating costs and investments and to grow revenues. For example:

- ◇ A European toll-road operator was able to nearly double its EBITDA (earnings before interest, taxes, depreciation, and amortization) in ten years. Less than half of that growth was from traffic and tariffs; most of it was generated through efficiency improvements and growth of ancillary revenues.
- ◇ Nearly half the sales of one successful airport operator are linked to nonaviation revenues such as retail, car parking, accommodation, and advertising.

The more complex the asset being managed, the greater the relevance of these capabilities. This is particularly true as political and public opinion grows increasingly sensitive toward tariff increases by private-sector operators—especially when the increases haven't been justified by improvements in the level of service.

The following examples illustrate the public's close scrutiny of private-sector infrastructure operators and their need to intensify their focus on providing demonstrably good service.

- ◇ In the United States, several state authorities complain that drivers are suffering postprivatization tariff increases that are not associated with traffic or safety improvements
- ◇ In South America, a private water supplier imposed tariff increases of 30 to 40 percent before making any capital improvements, generating public riots and other negative reactions against water utilities

Especially in countries where public opinion is a powerful force, expectations of better service levels and unrest over unjustified tariff increases are growing. Just as governments must accept the principle of private profit from public infrastructure, private operators must learn to create and market service improvements.

Finally, investors and industrial companies must have strong deal-screening capabilities. It is their responsibility not to move into sectors or countries where managing regulatory, construction, and market risks is likely to be challenging.

Before making an investment, private participants must carefully assess the following aspects of the proposed transaction:

- ◇ The attractiveness and riskiness of the country, sector, and specific deal
- ◇ The transparency of the legal framework and contract
- ◇ The relevance of their own experience and capabilities to the target sector's and country's key requirements

Both the public and the private sectors must make major changes to reap the benefits of working together to meet the infrastructure challenge. In doing so, they should examine the best international examples of

PPPs and respond to the changing standards for successful—and politically acceptable—infrastructure deals.

Conclusions

The next 20 years present a global challenge: to put in place the infrastructure improvements required to support sustainable long-term economic growth. Governments, which will have to find \$20 trillion to \$25 trillion of additional financing to overcome the funding constraints created by large public deficits, will have to engage the private sector. Current conditions are creating an excellent opportunity for governments to draw on the private sector's capabilities in order to save money and reform public services.

Governments that limit their tasks to announcing new infrastructure-development plans and fail to offer acceptable risk conditions and stable PPP frameworks or to build the fundamentals for effective implementation will struggle to attract long-term private-sector participation in their infrastructure development.

Private-sector participants that do not master operating capabilities, are unwilling or unable to improve and market service quality, or do not pursue deals with manageable risk are those most likely to destroy value and undermine confidence in private participation in the provision of public goods and services.

Improving the quality of cooperation between the public and private sectors on infrastructure development is essential to support economic growth over the next two decades.

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