



INFRASTRUCTURE, POWER & UTILITIES

+ Lifting-The-Barriers Roundtables

PRELIMINARY PAPER

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ASEAN ECONOMIC COMMUNITY: INFRASTRUCTURE, POWER AND UTILITIES

The Network ASEAN Forum 2013 brings regional business leaders together to understand and help shape ASEAN economic integration to achieve the goals of the ASEAN Economic Community 2015 (“AEC”) which envisages an ASEAN that is physically, institutionally and socially connected. However, from an infrastructure standpoint, many ASEAN countries still lack the key infrastructure to support economic growth and social well-being. Further, the imperative to invest in infrastructure comes at a time when many governments are highly indebted and face competing calls on their scarce resources.

The roundtable on Infrastructure, Power and Utilities will discuss the size of the infrastructure gap faced by ASEAN countries and the ways to achieve an improvement in productivity and deliver savings of 40% - through selecting projects more carefully, delivering them more efficiently, and getting more out of the existing assets as an alternative to building new ones. As private sector involvement will be critical to supporting individual ASEAN countries achieve their infrastructure aspirations and the overall AEC goals, focus will be on what additional measures can be undertaken by private sector companies in helping to close this infrastructure gap.

The objective of this document is to serve as a pre-reading material for the Roundtable Session on Infrastructure, Power and Utilities and covers the following areas:

- **Part 1. The infrastructure imperative for ASEAN** providing an overview of infrastructure trends of ASEAN countries within the context of the ASEAN Connectivity Master Plan;
- **Part 2. Barriers to achieving the goal of an integrated ASEAN** including challenges faced in planning, financing and delivering infrastructure within and across countries;
- **Part 3. Rethinking how governments and the private sector** get more, better quality infrastructure to meet the infrastructure imperative

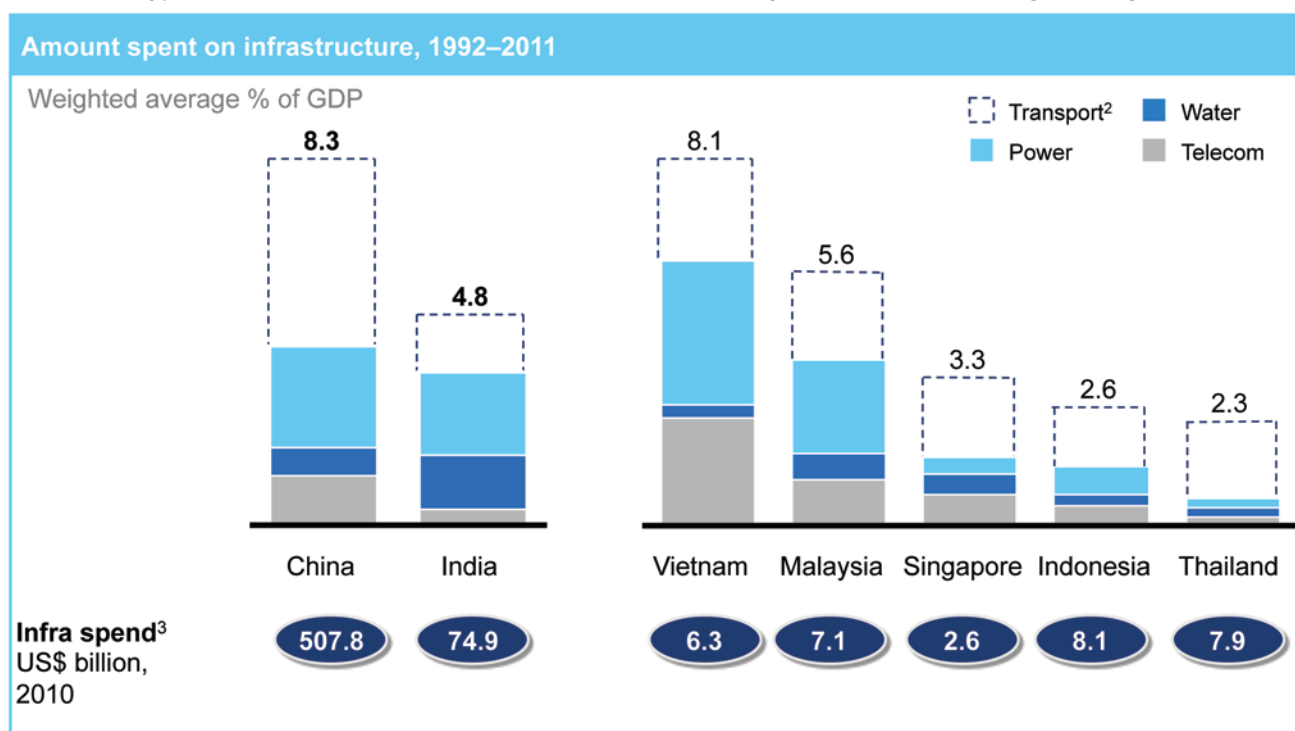
PART 1. THE INFRASTRUCTURE IMPERATIVE FOR ASEAN

Historically, ASEAN infrastructure investment accounts for an average of 3 percent of GDP each year, slightly below the global average of 3.6 percent. Majority of this infrastructure spending has now shifted to developing economies, with China and India being some of the largest investors. Exhibit 1 outlines infrastructure spending power, water and telecom, showing the substantial variability in investment levels between the different ASEAN countries. Beyond

the utilities, there have been large investments in real estate as well as transport infrastructure over the last decade. For example, Malaysia's Economic Transformation Programme included investment in a MRT system in Kuala Lumpur and the Greater Klang Valley. Vietnam is considering upgrading its rail transport system, including a high speed rail connecting North and South Vietnam.

EXHIBIT 1

Historically, ASEAN countries have substantial variability in infrastructure spending



1 Percentage of 2010 world GDP generated by the 86 countries in McKinsey analysis

2 Theoretical estimate for transport in ASEAN countries based on multiple reports and average of equivalent countries in database

3 Excludes transport infrastructure expenditure for ASEAN countries

SOURCE: IHS Global Insight; GWI; IEA; ITF; McKinsey Global Institute analysis, IMF, World Bank, Ministry of Transport

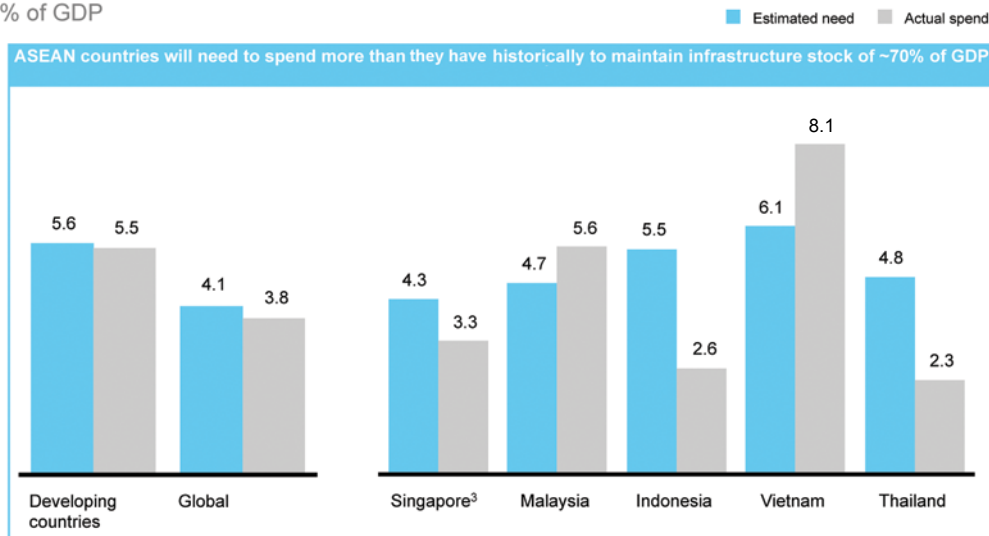
McKinsey's report on infrastructure productivity shows that, with a few exceptions such as Japan, the value of infrastructure stock in most economies averages around 70 percent of GDP. Infrastructure stock refers to the financial value of physical infrastructure assets (for example, kilometres of road, number of airport runways). The ASEAN countries will need to spend more than their historical investments in infrastructure in order to meet this 70 percent rule of thumb for infrastructure stock (Exhibit 2). We estimate that at least US\$ 2.4 trillion will be required from 2013 – 2030 for ASEAN countries to meet the recommended 70 percent rule of thumb. Further, if less-developed economies are to meet their human development

needs such as making safe drinking water, basic sanitation, and power widely accessible, they will need to invest substantially more than this baseline estimate. While in absolute terms, Indonesia leads ASEAN countries in infrastructure spend at US\$ 8 billion per year, this represents a mere 1.3 percent of GDP spend, well below the required amount. On the other hand, Vietnam and Malaysia are closest to their infrastructure spending target to meet the 70 percent benchmark.

EXHIBIT 2

Using the 70 percent rule of thumb, infrastructure investment in ASEAN would need to rise to keep pace with other countries and needs by 2030

Infrastructure spending
% of GDP

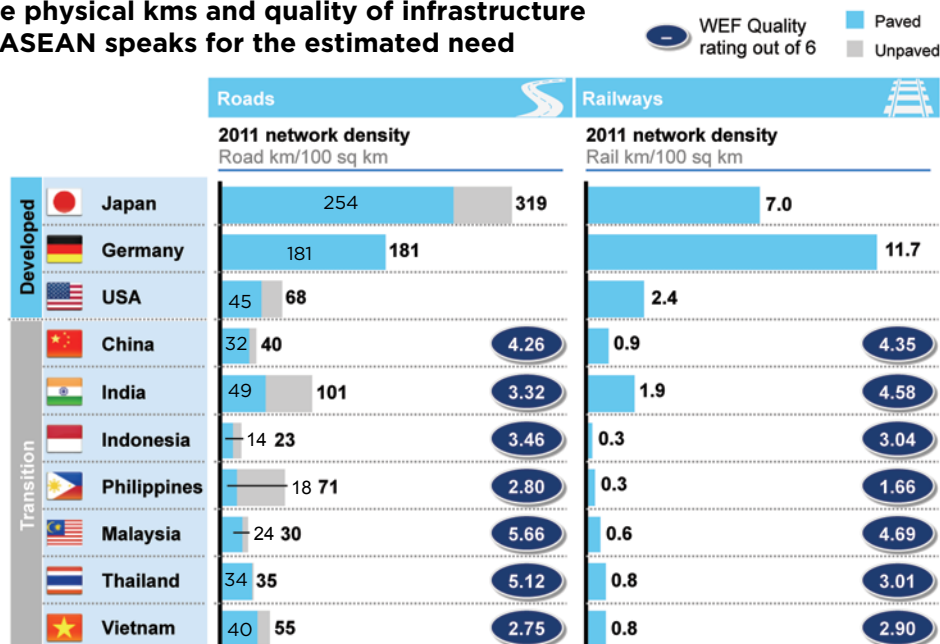


1 Estimated need based on projected growth, 2013–30
 2 Weighted average annual expenditure over years of available data, 1992–201
 3 Includes only public sector infrastructure investments

SOURCE: ITF; GWI; IHS Global Insight; Perpetual inventory method, OECD, 1998; McKinsey Global Institute analysis

EXHIBIT 3

The physical kms and quality of infrastructure in ASEAN speaks for the estimated need



SOURCE: CIA Factbook; Infrastructure Africa, World Economic Forum Survey 2010

The ASEAN Connectivity Master Plan envisages major cross-border infrastructure linkages in roads, rail, power and gas valued at almost US\$ 600 billion during 2006-2015, according to indicative estimates by ADB in 2008. The underlying intent and objective of the master plan is to position a more “connected” ASEAN that can leverage lower transport and transaction costs as well as consolidate into a commerce hub. The physical connectivity part of the plan encompasses the hard infrastructure in transport, communications and energy as well as the associated regulatory frameworks

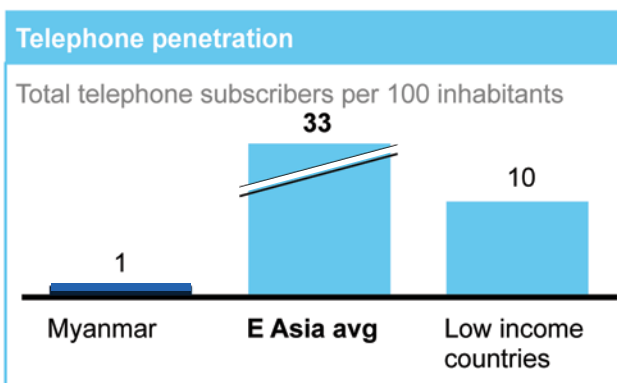
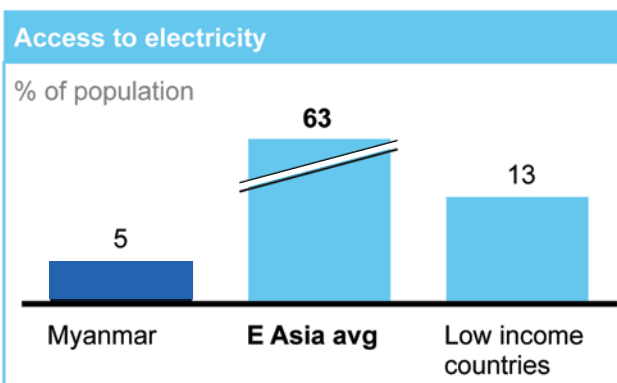
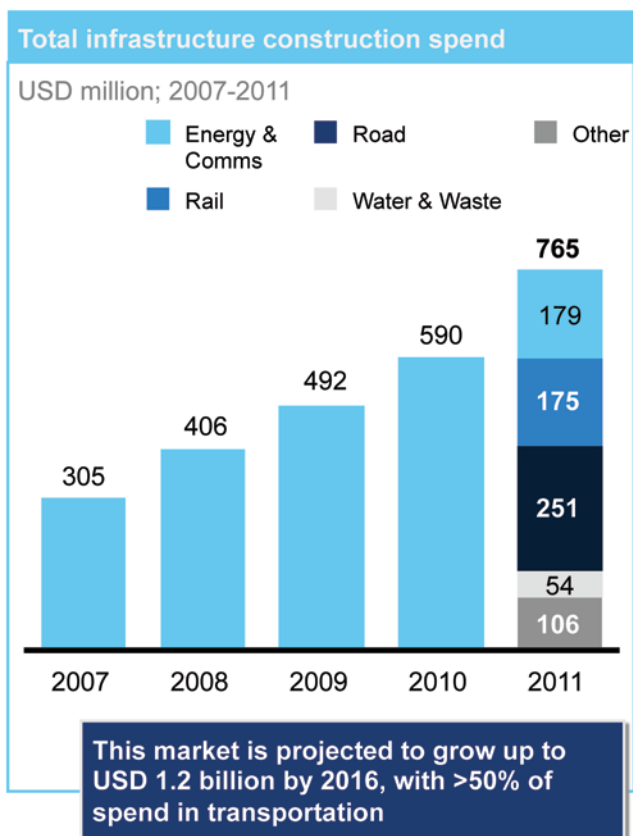
required. Example projects that have been launched under the master plan include the ASEAN Highway Network, Singapore Kunming Rail Link, Trans-ASEAN Gas Pipeline, ASEAN Power Grid memorandum, and other initiatives for greater energy security and sustainability in the region. However, before these cross-border linkages are implemented, it is important to note that individually, many of the ASEAN countries lag significantly behind that of developed economies on the required infrastructure, such as airports, roads and rail (Exhibit 3).

BOX 1A. MYANMAR

The current infrastructure market in Myanmar is very small, with 2011 spending estimated at US\$ 800 million. Majority of the historical investments have been in energy, communications, and transport (rail, road)

projects; this spend is expected to only grow slowly to US\$1.2 billion by 2016, according to a report by Timetric in 2012.

The current infrastructure market in Myanmar is very small



SOURCE: "Infrastructure Construction in Myanmar to 2016", Timetric, June 2012

This level of spending falls short of the huge infrastructure needs – about 74 percent of Myanmar's population lack access to power and basic infrastructure, less than 7 percent of the population have a mobile phone, while only 1 percent have a wire connection. The dearth of infrastructure is evident from basic indicators, such as electric power consumption, telephone penetration, and access to water and sanitation (Exhibit 5). Myanmar's infrastructure is significantly below the average in East and South-east Asia as well as other low-income countries. In 2011, the Ministry of Communications pledged to add 30 million mobile connections in 5 years; however, this has been hampered by lack of public funds and poor infrastructure.

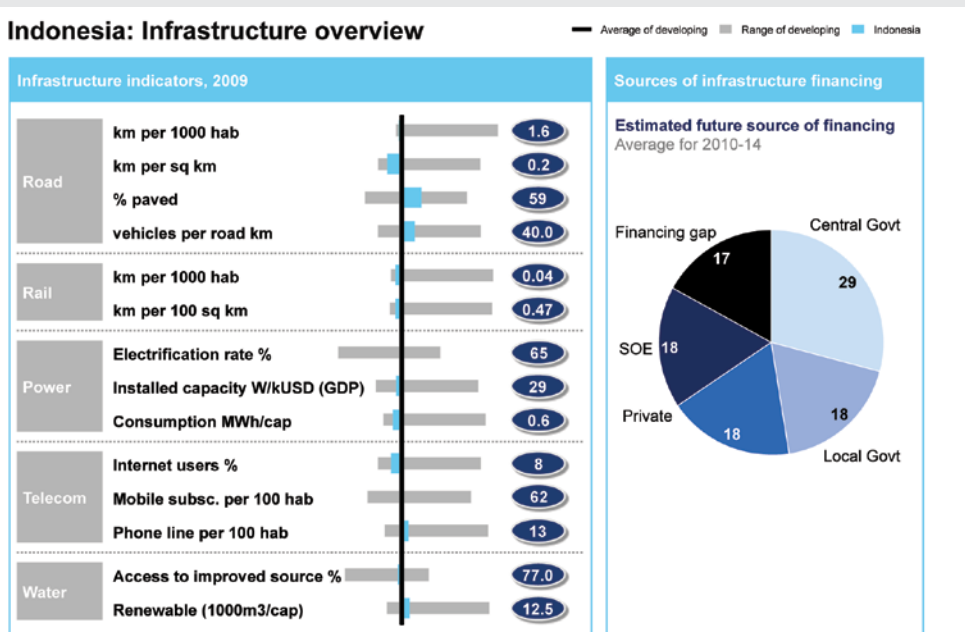
Several multi-billion dollar megaprojects are being planned by the government. Examples include the US\$ 50 billion Dawei special economic zone in close

collaboration with the Thailand government, Sittwe port on the Indian Ocean, and an industrial zone at Kyaukpyu. Private sector companies and other Asian governments have moved quickly since 2011 to offer debt relief and financing, with Japan leading the way. Thailand raised its foreign-direct investment in Myanmar (currently second to China) with PTT and other large Thai firms looking to invest in construction, refining and electricity. The country needs to move quickly and build infrastructure that can spur economic development and commerce, especially given its strategic location and immense potential.

BOX 1B. INDONESIA

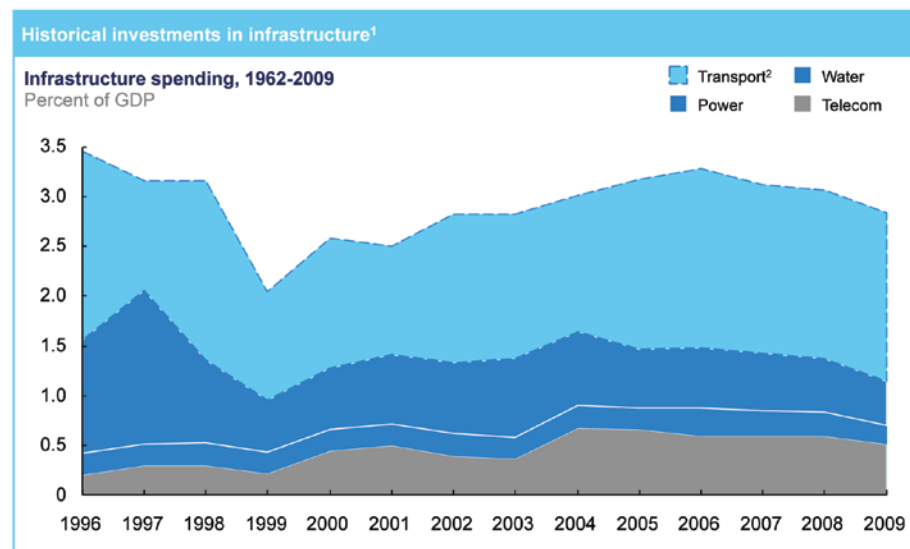
Indonesia's infrastructure challenge is the key impediment to reaching a potential GDP growth rate of 8 per cent, according to Standard Chartered Global Research 2011 report. The government has repeatedly acknowledged that Indonesia needs around US\$ 30 billion annually (4 per cent of GDP) in infrastructure investment for the next 5 years. Along several infrastructure indicators, Indonesia falls short or is just about at the average for developing countries. Land infrastructure is concentrated on the island of Java, home to about 60 per cent of the population; a road network that needs to be at triple its current capacity has seen limited expansion in the last decade.

The government has begun to address these challenges in several ways, including setting up a national inter-ministerial committee for the acceleration of infrastructure projects. Law and regulation changes as well as new initiatives are being instituted to enable faster infrastructure development. Examples include the "fast-track" electricity development programmes (2006), private sector participation in electricity (2009), and most recent land acquisition law (2012). Government spending on infrastructure in nominal terms has been on the rise, but it has consistently stayed well below 2 per cent of GDP. While these enablers are in the right direction, they have been inadequate in catalysing the infrastructure development that the country so desperately needs.



SOURCE: McKinsey Global Institute analysis

Indonesia: Historical patterns in infrastructure spending



¹ The asset classes that have data available for Indonesia

² Theoretical estimate of transport expenditure based on several reports

SOURCE: Indonesia's Ministry of National Development Planning – Infrastructure Development Strategy in Indonesia

The World Economic Forum's (WEF) annual survey on business across countries highlights well-developed infrastructure as a key pillar for country competitiveness. The WEF survey indicates significant variability in the quality of existing infrastructure across ASEAN countries – while Singapore ranks 3rd globally for its world-class infrastructure, other countries, such as Philippines, Vietnam and Indonesia have a much farther way to go.

Most estimates of global infrastructure do not account for either the additional cost of making infrastructure more resilient to the effects of climate change or of lessening the impact of infrastructure on the environment. Large sections of infrastructure around the globe have not been hardened against rising sea levels and more frequent extreme weather events. The tsunami that hit South-East Asia in December 2004 damaged or destroyed houses, buildings, roads, bridges, and other physical infrastructure. In Aceh,

Indonesia alone, the estimated costs of infrastructure damage was US\$ 1.4 billion. Additional infrastructure to address growing demand can often threaten fragile ecosystems and pose new design and engineering challenges that will add further cost to ensuring they pass the tough environmental scrutiny. The environmental costs of infrastructure development in some developing countries have already reached an estimated 4 to 8 percent of their GDP, with the effects falling disproportionately on the poor.

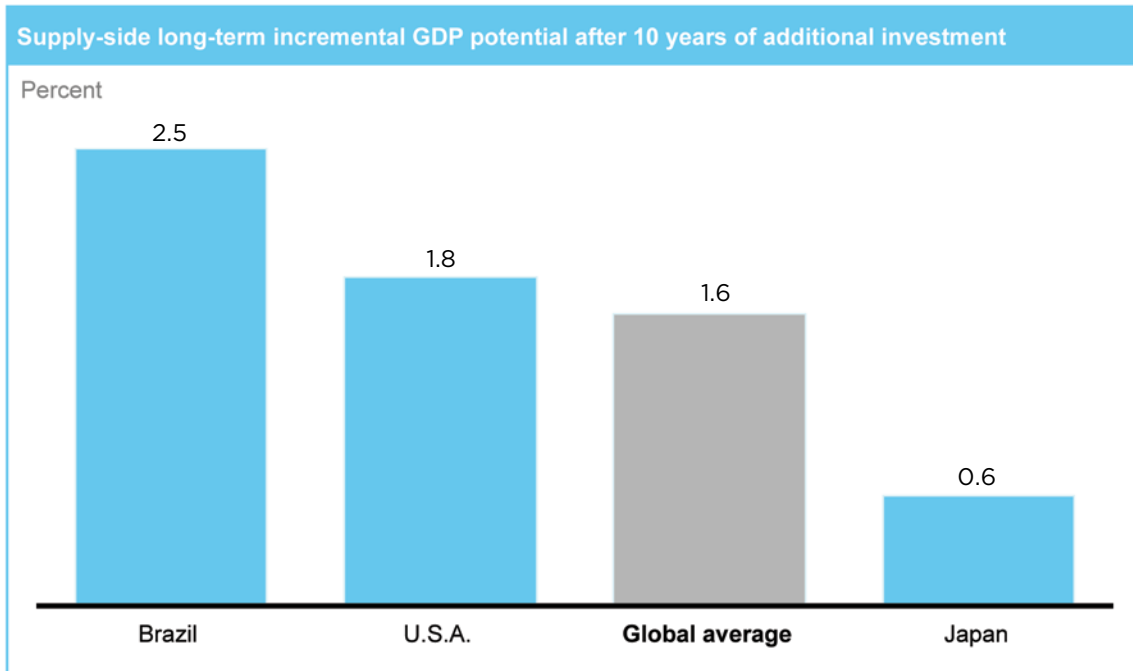
Infrastructure investment can have a sizeable economic impact when delivered well (Exhibit 4). Sustained infrastructure investments over multiple years can have a multiplicative impact on GDP potential, which tends to be disproportionately higher in developing economies. However, making uninformed or no investment can be extremely costly from a socio-economic perspective.

EXHIBIT 4

Infrastructure investment can have sizable economic impact

GDP impact of increasing infrastructure investments by 1 percentage point of GDP

ESTIMATES



SOURCE: McKinsey Global Institute

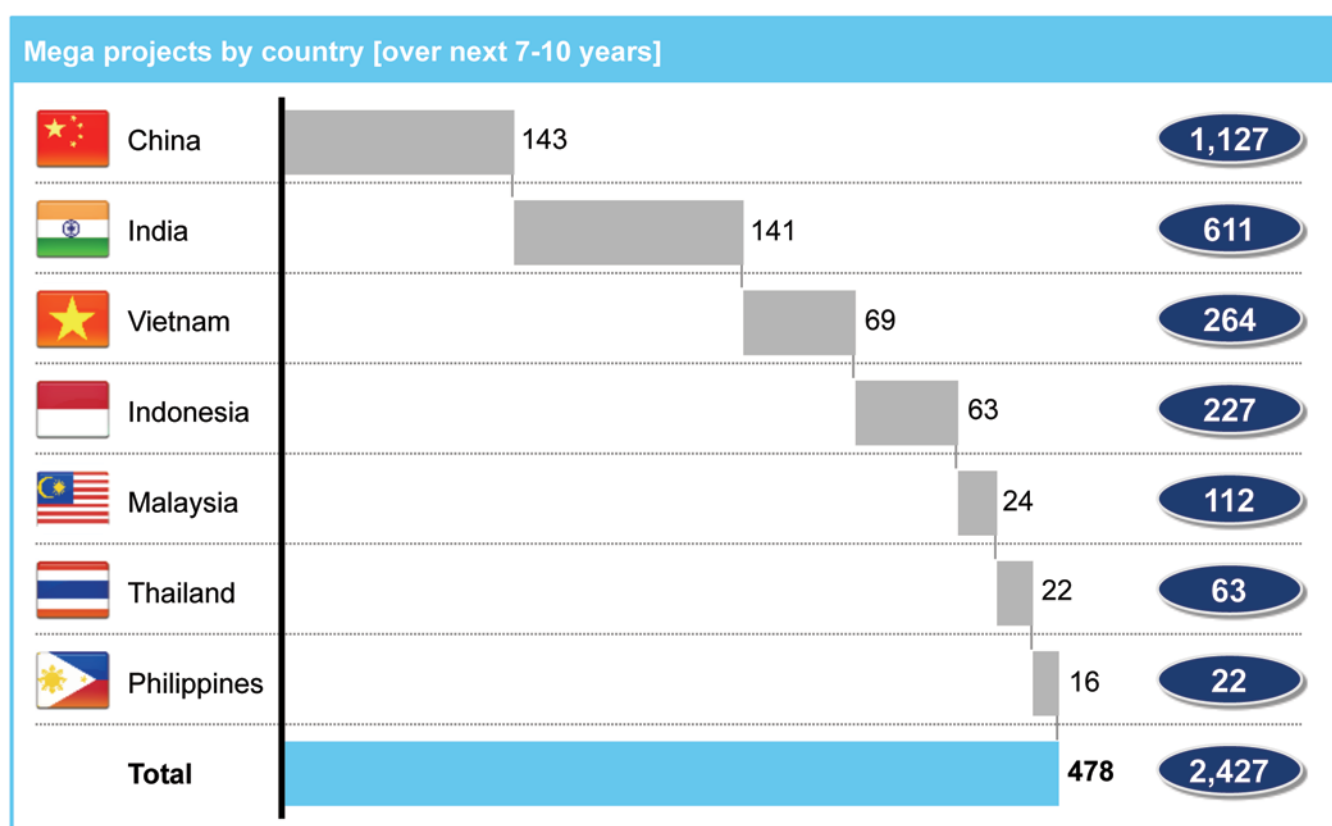
The quality and extensiveness of infrastructure significantly impacts economic growth and reduce income inequalities. For example, transport and telecom infrastructure enables connectivity with less developed and rural communities, thereby increasing access to economic activities. ASEAN countries need to individually and collectively review their infrastructure portfolio to appropriately plan for the

required infrastructure that can catalyse economic development, and subsequently raise the productivity of the entire region. A review of the planned megaprojects across Asia for the next decade paints an encouraging picture – ASEAN countries are estimated to contribute to 30 percent of the pipeline (Exhibit 5). The governments and private sector in these countries must come together to make these projects a reality.

EXHIBIT 5

The future sees ASEAN contributing ~30% to the megaprojects pipeline in Asia

xx Total value, (USD billion)



SOURCE: BMI; Infrastructure Journal; McKinsey analysis

PART 2. BARRIERS TO ACHIEVING THE GOALS OF AN INTEGRATED ASEAN

Failure to meet the infrastructure needs of ASEAN could stifle growth in GDP and employment around the world and compromise a range of human development efforts in less-developed ASEAN partners.

Infrastructure is a rare “win-win” that generally boosts overall economic productivity in the long run and creates jobs in the short term, the latter being of significant importance given the current employment challenges and excess construction capacity in many countries.

The McKinsey Global Institute report on Infrastructure Productivity suggests that an increase of infrastructure investment equivalent to 1 percent of GDP could translate into an additional 3.4 million direct and indirect jobs in India, 1.5 million in the United State and 700,000 in Indonesia. In addition to supporting growth and job creation, infrastructure investments lead to improved health, education and social outcomes. For example, in the Indian state of Assam, a 1 percentage point increase in the electrification rate, resulted in a 0.17 percentage improvement in the literacy rate, suggesting that complete rural electrification of the region could raise the literacy rate to 74 percent from 63 percent.

However, simply sustaining the level of infrastructure investment within the ASEAN countries will be challenging, much less delivering on the large-scale cross-border projects envisioned in the ASEAN Connectivity Master Plan. There are four significant barriers to delivery; fiscal pressures that limits direct public investment, the lack of a robust pipeline of projects that can be financed by the private sector, uncertain local regulatory and permitting processes which cause delays and the lack of a strong institutional framework to enable effective coordination.

CHALLENGE 1. FISCAL CONSTRAINTS

Many governments face years of fiscal consolidation and “deleveraging” to bring public debt down to more manageable levels. In ASEAN today, many countries face high debt to GDP ratios such as in the case of Malaysia (53 percent), Philippines (51 percent) and Vietnam (45 percent). In addition many countries face the challenge of gradually removing huge subsidies from the government budget such as in the case of Indonesia where petrol and electricity subsidies take up around 20 percent of the government budget.

In this environment, there are difficult choices that need to be made between infrastructure investment and other pressing priorities including education, health care, and the social services, and other benefits, which are a particular concern in economies where rising cost of living is a major issue, particularly for the lower income groups. We have already seen a link between rising deficits and falling infrastructure spending (Exhibit 6). Between 1980 and 2003, annual investment in infrastructure fell by 0.2 percent of GDP across EU nations. In Latin America, the reduction was 0.8 percent of GDP.

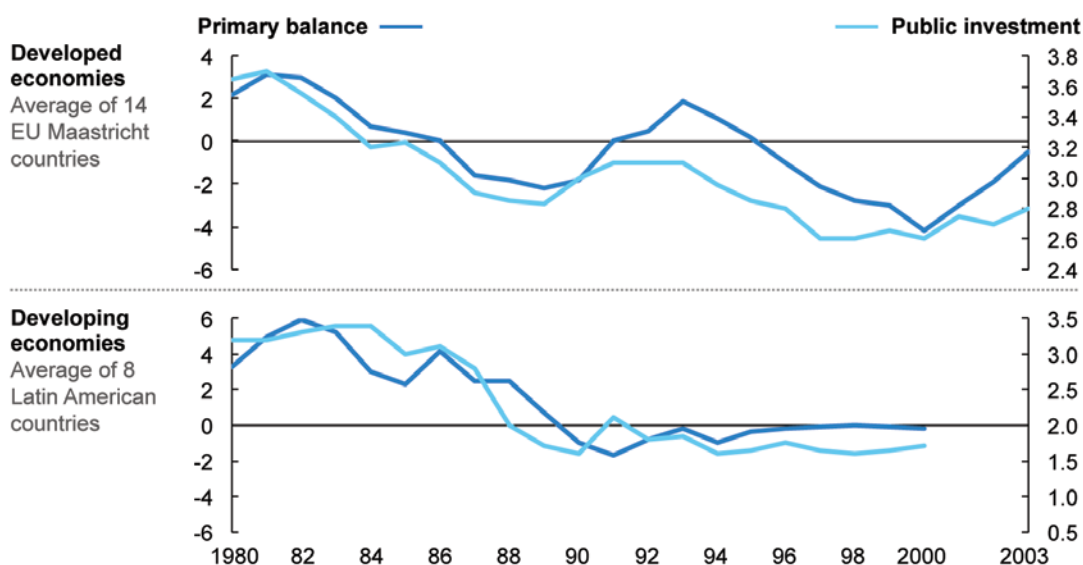
Part of the challenge is that most governments apply cash-accounting standards that do not sufficiently differentiate between long-term investment that adds to a country’s balance sheet or generates savings over the long term, and near-term consumption. This cash-flow-oriented accounting overlooks the value of public assets, future income, and the inter-temporal dimension of solvency. It often forces countries to finance the build-up of infrastructure through tax increases and leads to under-investment in times of fiscal constraints. Very few governments subscribe to the notion of a national balance sheet.

EXHIBIT 6

Infrastructure investment has historically suffered when deficits are rising**Primary balance and public investment trend**

Observed period, 1980–2003

% of GDP



NOTE: Not to scale.

SOURCE: Calderón and Servén (2004); Fitch database; World Development Indicators; McKinsey Global Institute analysis

Some policy makers, commentators, and infrastructure experts have held out the hope that increased private financing, particularly from institutional investors such as pension funds, insurance companies, and sovereign wealth funds, will help address the growing need. Indeed, these funds are attracted by the fact that life cycles of infrastructure assets often match the long-term nature of their liabilities and the growing investor confidence in ASEAN countries such as in the case of Philippines which was recently granted its first investment grade rating. In addition, public-private partnerships (PPPs) and privatization of state-owned assets are often viewed as an important part (and in many cases, the majority) of the solution to address infrastructure funding shortfalls. However, governments are often poorly prepared to tap into private financing due to unclear allocation of risk and returns between the public and private sector, and often lack the legal, regulatory and institutional frameworks that are a critical pre-requisite for successful PPPs, as discussed in the following section.

CHALLENGE 2: LACK OF INVESTOR-READY PPP PROJECT PIPELINE

Many ASEAN countries have launched portfolios of PPP projects to tap into private financing, such as in the case of Thailand, Indonesia and Philippines. As an example, Indonesia estimates that more than US\$ 150 billion will be required for new infrastructure with only 15 percent financed by the public sector, and the remaining relying on PPPs. To encourage investor participation in a range of water, ports and airport projects, Jakarta is embarking on a European road show to market these projects to potential investors. In another example, the Philippines has prepared over 16 PPP projects worth more than US\$ 4 billion, but has only successfully bid out two. The lower than expected success rate for PPPs across ASEAN can be attributed to a wide variety of factors including poor project selection, lack of sufficient preparation for the private sector to adequately assess the viability of the project and disagreement over the allocation of risk and returns between the public and private sectors.

Many poorly conceived projects have been approved “because benefit-cost ratios presented to investors and legislators were hugely inflated, deliberately or not,” according to Bent Flyvbjerg, professor and chair of major programme management at Oxford University. “Competition between projects and authorities creates an incentive structure that makes it rational for project promoters to emphasize benefits and de-emphasize costs and risks,” Flyvbjerg notes.

McKinsey's experience in helping governments rationalize infrastructure project portfolios confirms the need for projects to be more clearly linked to national priorities and more accurately evaluated in terms of their system-wide costs and benefits. Some of the root causes of poor planning and decision making include the failure to link infrastructure planning to broader social and economic goals, routine under-estimation of costs and over-statement of benefits, the pressure to allocate resources to cater to narrow political interests, and, in the most extreme cases, the damaging impact of corruption on the selection of projects.

Often PPP projects which are offered to the private sector investors do not come with the necessary level of information that is required for the investors to make a fair and accurate assessment of the project's viability. For example, Independent Power Products (IPPs) in Indonesia are often required to identify the land upon which the plant will be built and conduct extensive due diligence such as site surveys, soil investigation and environmental impact assessments in order to arrive at a cost estimate. This often results in investors pricing in high risk premiums due to the lack of information, a duplication of efforts across bidders or a long drawn out tender and negotiation processes. Best practice PPPs typically have clearly defined scope and boundaries (such as the site identified and ideally already purchased) and provide the private sector with sufficient level of information in a comprehensive information memorandum to allow them to competitively price their offers – ultimately reducing the price tag to the public sector and consumers.

Another cause of PPP failure is the inability of the public and private sector to agree on the allocation of roles and responsibilities (and hence risk and returns). Lack of clarity on policies around market structure, pricing and subsidies and ownership and finance can lead to delays in implementation as the private sector is unable to accept the initial terms laid out for PPP projects. For example, the Indonesian government, under pressure from investors, ultimately introduced a series of implicit and explicit financial guarantee packages for IPP projects in order to ensure that the projects can successfully achieve financial close. In another example, Malaysian toll road PPPs evolved over time transitioning from explicit revenue guarantees (on traffic volume and price) to price guarantees for later concessions. This negotiation of assigning risk and returns across the public and private sectors is critical because the terms that are agreed on upfront need to be upheld over the life of the PPP concession which can last decades.

CHALLENGE 3: COMPLEX EXECUTION DUE TO REGULATORY AND INSTITUTIONAL INEFFICIENCIES

Securing regulatory approvals usually consumes a significant portion of a project timeline—often many years and, not infrequently, longer than the time it takes to actually construct a piece of infrastructure. The necessary involvement of various stakeholders such as environmental interest groups, local administrative authorities, communities, and businesses and property owners can further slowdown already complex and bureaucratic government procedures. Such regulatory and institutional inefficiencies, coupled with judiciary systems which do not always enable an efficient recourse for the private sector, are a major hindrance to both public and private sector investment in infrastructure.

One of the most often cited examples of such regulatory hurdles is that of land acquisition. In Indonesia, minority land owners can hold up the land acquisition process and land speculation upon the news of infrastructure development often drives up land prices – this has been identified as one of the major barriers to infrastructure development. To resolve this, Indonesia introduced a new law which provides for a process of land acquisition that will take less than two years from planning to implementation. In Malaysia and Singapore, similar laws allow the government to acquire land for projects that are deemed to be in the public interest and the government assumes the responsibility for acquiring the land.

Nevertheless, these processes can and should be shortened significantly. Best practice in issuing permits involves the rigorous prioritization of projects, clear roles and responsibilities, transparency on performance, and time-bound process steps (including time limits on public review). Even in cases where accelerating approvals is not a critical priority from a pure impact perspective, the improved process and timeline predictability is often greatly valued by the stakeholders involved, and may therefore be justified on these grounds alone.

CHALLENGE 4: INEFFECTIVE GOVERNANCE SYSTEMS

The effective delivery of services in many areas of economic and public life must happen within a framework of well-defined systems. When health care, national security, or finance systems function well, they boast effective coordination between the critical actors such as health-care providers and insurance companies (“payors”); a clear division of labor between policy and execution, as in civilian oversight of the military; and clarity on the roles of the public and private sectors—in financial services, between central banks and private financial institutions, for instance. When such systems lack these characteristics, they become dysfunctional and unproductive.

In the case of infrastructure, the system often functions poorly. Indeed, too few people in the public and private sectors regard infrastructure as a system at all but rather think in terms of single projects. We believe that this is at the root of the sector’s weak productivity. Upgrading the infrastructure system is all the more vital given the special characteristics of the sector.

Until sound infrastructure systems are in place, countries will continue to fund the wrong projects, place the wrong priorities in the wrong areas, and fail to meet the needs of their people. Today, there are typically multiple authorities, agencies and ministries involved covering different sectors of infrastructure such as roads, rail, ports and water and different functions such as financing or contracting. The governance of these systems has not advanced in many places. Among the few exceptions are Singapore’s Urban Redevelopment Authority, Land Transport Authority and Development Planning Committee that work together seamlessly to translate national priorities into plans, goals and individual projects that are entirely consistent with one another.

In addition, there is typically not a clear separation of technical and political responsibilities – the balance between politicians and technocrats needs to be right. Policy makers should set overall aspirations and the strategic direction – making the call between investment in roads rather than hospitals, or vice versa. Experts need to determine how best to meet those overarching goals and evaluate, as well as execute, the projects. Leaving delivery to independent institutions tends to be much more successful.

Finally, the effective planning, delivery and operations of infrastructure requires people with the right skills and capabilities at each step of the value chain: urban planners to conduct feasibility assessments and manage stakeholder involvement, financial and technical analysts to create cost-benefit analyses;

engineers to scope and design projects; project managers to oversee EPC or EPCM firms; lawyers to manage contracting and bankers to advise on financing. The lack of capability and capacity in these areas is commonly cited as one of the major barriers to delivery – particularly for the private sector. As long as governments under-invest in these capabilities, the outcome in a competitive market for talent is predictable – poor oversight of projects, assets that commonly cost billions of dollars and long term contracts that will be deemed unfavourable on hindsight.

BOX 2. QUESTIONS FOR ROUNDTABLE DISCUSSION

Overall

- Are there any other barriers you have observed in planning, construction and operations of infrastructure across ASEAN markets?
- Of all the barriers discussed, which do you think are the “show stoppers”? Which do you think are relatively easier to address?

Fiscal constraints

- How can the private sector play a larger or more proactive role in funding critical infrastructure?
- How should the public sector prioritise infrastructure needs, in an environment of scarce resources?

Lack of investor-ready PPP project pipeline

- How can governments provide more transparency over infrastructure needs to allow a private sector response?
- What are the common failures typically observed in private public partnership infrastructure projects?

Complex execution due to regulatory and institutional inefficiencies

- What are the key bottlenecks typically faced in project approvals (e.g. contract award) and project execution (e.g. financing)?
- What are the implications of such delays on the project from a financial and operational perspective?

Ineffective governance systems

- Is there a clear separation between technical and political decisions in your infrastructure market(s)? Why or why not?
- Is there clarity over the roles and responsibilities of various agencies involved in decision making and execution?
- Do the ASEAN markets have sufficient capacity and expertise to deliver on the infrastructure needs, from both a public and private sector perspective?

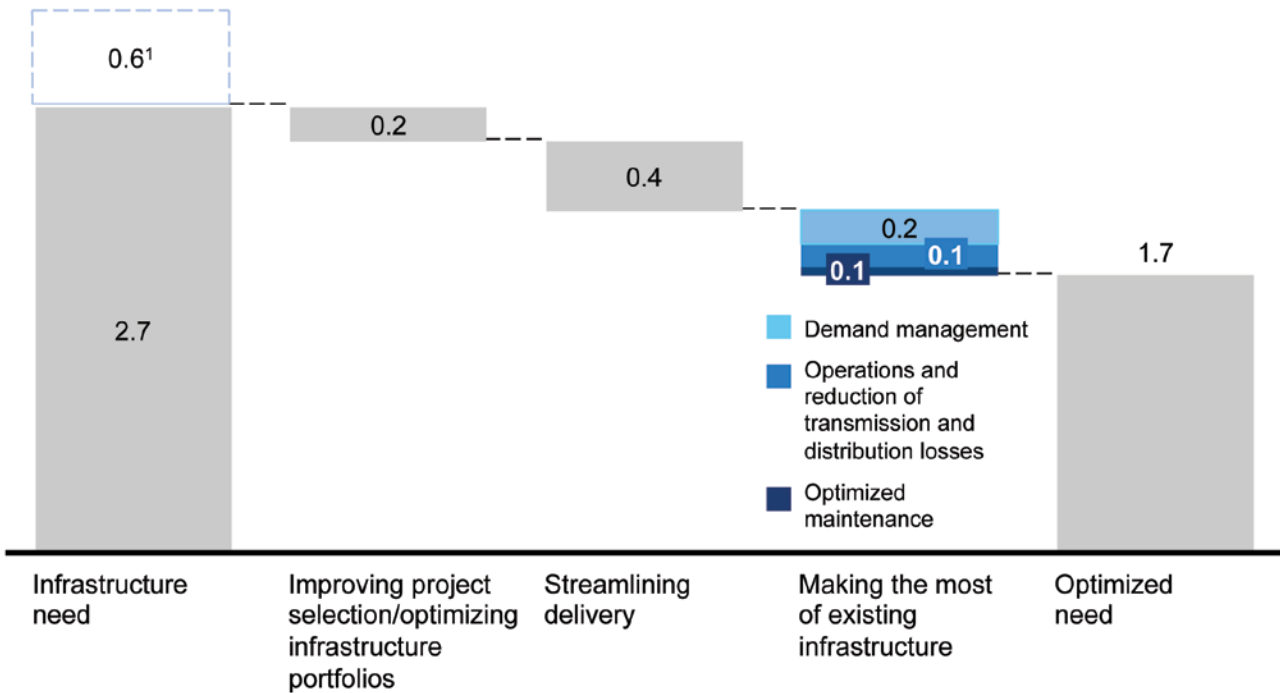
PART 3. RETHINKING HOW ASEAN CAN MEET ITS INFRASTRUCTURE IMPERATIVE

A recent McKinsey Global Institute Report has found that by scaling up best practice in selecting and delivering new infrastructure projects, and getting more use out of existing infrastructure, nations could obtain the same amount of infrastructure for

40 percent less — or, put another way, deliver a 60 percent improvement in infrastructure productivity. Over 18 years, this would be the equivalent of providing \$48 trillion (excluding telecoms) of infrastructure for \$30 trillion globally, a savings of \$1 trillion a year (Exhibit 7). This estimate is based on a review of more than 400 case studies of best practices—over 100 of which have quantified the savings they have achieved—and a subsequent global extrapolation of their impact.

The \$1 trillion-a-year infrastructure productivity opportunity Global infrastructure investment need and how it could be reduced

Yearly average, 2013–30
\$ trillion, constant 2010 dollars



1 Telecom investment need beyond the scope of this paper.
SOURCE: McKinsey Global Institute analysis

Achieving these productivity gains will not require ground breaking innovation, but merely the application of established and proven practices from across the globe. The potential to boost productivity is so large because of failings in addressing inefficiencies and stagnant productivity in a systematic way. On the whole, countries continue to invest in poorly conceived projects, take a long time to approve them, miss opportunities to innovate in how to deliver them, and then don't make the most of existing assets before opting to build expensive new capacity.

In many countries, the process of selecting, building, and operating infrastructure—and the governance systems that could force improvements—has not changed for the better in decades. In the construction sector, for instance, labor productivity has barely moved for 20 years in many developed countries despite steady and significant gains in the productivity of other sectors.

All too often, a surprisingly stable status quo persists in which inaccurate planning and forecasting lead to poor project selection. A bias among public officials to build new capacity, rather than make the most of existing infrastructure, is common, leading to more expensive and less sustainable infrastructure solutions. A lack of incentives, accountability, and capabilities as well as risk aversion has prevented infrastructure owners from taking advantage of improvements in construction methods such as the use of design-to-cost and design-to-value principles, advanced construction techniques, and lean processes. Infrastructure authorities frequently lack the capabilities necessary to negotiate on equal terms with infrastructure contractors, rendering them unable to provide effective oversight and thereby drive performance.

McKinsey's research finds that pulling three main levers can deliver the potential savings.

LEVER 1. IMPROVING PROJECT SELECTION AND OPTIMIZING INFRASTRUCTURE PORTFOLIOS

A review of global best practices indicate that one of the most powerful ways to reduce the overall cost of infrastructure is to optimize infrastructure portfolios—that is, simply to select the right combination of projects. All too often, decision makers invest in projects that do not address clearly defined needs or cannot deliver hoped-for benefits. Equally often, they default to investments in additional physical capacity (for example, widening an arterial road into a city) without considering the alternatives of resolving bottlenecks and addressing demand through, for instance, better planning of land use, the enhancement of public transit, and managing demand. Improving project selection and optimizing infrastructure portfolios could save \$200 billion a year globally. To achieve these savings, owners must use precise selection criteria that ensure proposed projects meet specific goals; develop sophisticated evaluation methods to determine costs and benefits; and prioritize projects at a system level, using transparent, fact-based decision making.

For example, to guide its selection of transit projects, the government of Singapore has a clear metric: to support its broad socioeconomic goal of building a densely populated urban state, any project must contribute to the specific objective of achieving 70 percent use of public transit. In Chile, the National Public Investment System evaluates all proposed projects using standard forms, procedures, and metrics, and rejects as many as 35 percent of all projects. The organization's cost-benefit analyses consider, for instance, non-financial costs such as the cost of travel time, and a social discount rate that represents the opportunity cost for the country when its resources finance any given infrastructure project. Final approval rests with Chile's finance ministry, which allocates funding based on a combination of these cost-benefit analyses and national goals.

LEVER 2. STREAMLINING DELIVERY

Streamlining project delivery can save up to \$400 billion annually while accelerating timelines materially. Speeding up approval and land acquisition processes is vital given that one of the chief drivers of time (and time overruns) is the process of acquiring permits and land. In India, up to 90 percent of road projects experience delays of 15 to 20 percent of the planned project timeline because of difficulties in acquiring land. England and Wales in the United Kingdom have, for instance, implemented one-stop permitting processes. In Australia, the state of New South Wales cut approval times by 11 percent in just one year by clarifying decision rights, harmonizing processes across agencies, and measuring performance. Both the United Kingdom and Australia have implemented special courts to expedite disputes over land acquisition. A key source of savings in project delivery is investing heavily in early-stage project planning and design. This can reduce costs significantly by preventing changes and delays later on in the process when they become ever more expensive. Bringing together cross-functional teams from the government and contractor sides early in the design process can avoid the alterations that lead to 60 percent of project delays.

Owners can structure contracts to encourage cost-saving approaches, including design-to-cost principles that ensure the development of “minimal technical solutions”—the lowest-cost means of achieving a prescribed performance specification, rather than mere risk avoidance. Contractors can also be encouraged to use advanced construction techniques including prefabrication and modularization—facilitated by having the appropriate standards and specifications—as well as lean manufacturing methods adapted for construction. Strengthening the management of contractors, a weakness of many authorities, can also head off delays and cost over-runs.

Finally, nations should support efforts to upgrade their construction sectors, which often rely heavily on informal labor (a situation that often contributes to corruption), suffer from capability gaps and insufficient training as well as from ill-conceived regulations and standards, and under-invest in innovation. Enhancing construction industry practices is necessary to raise the productivity, quality, and timeliness of infrastructure projects.

LEVER 3. MAKING THE MOST OF EXISTING INFRASTRUCTURE ASSETS

Rather than investing in costly new projects, governments can address some infrastructure needs by getting more out of existing capacity. We estimate that boosting asset utilization, optimizing maintenance planning, and expanding the use of demand-management measures can generate savings of up to \$400 billion a year. For example, intelligent transportation systems for roads, rail, airports, and ports can double or triple the use of an asset—typically at a fraction of the cost of adding the equivalent in physical capacity. Reducing transmission and distribution losses in water and power (which can be more than 50 percent of supply in some developing countries) often costs less than 3 percent of adding the equivalent in new production capacity and can be accomplished significantly faster.

Maintenance planning can be optimized by using a total cost of ownership (TCO) approach that considers costs over the complete life of an asset and finds the optimal balance between long-term renewal and short-term maintenance. By one estimate, if African nations had spent \$12 billion more on road repair in the 1990s, they could have saved \$45 billion in subsequent reconstruction costs. To optimize maintenance programs, nations should assess and catalog needs. London, for instance, has a 20-year model for pavement deterioration. Denmark has reduced the expense of maintaining its roads by 10 to 20 percent by adopting a total cost of ownership approach.

Finally, governments need to make more aggressive use of tools and charges that allow them to manage demand. Advances in technology are broadening the range and improving the effectiveness of such demand-management approaches. To fully capture the potential of demand management, governments need to take a comprehensive approach and use all available tools. The city of Seoul, for example, is dealing with congestion by combining improved bus operations, access restrictions, and electronic fare collection with an integrated traffic management system. Congestion pricing, widely regarded as the most effective measure to reduce congestion and reduce the need for capacity additions, especially in advanced economies, can be paired with intelligent traffic solutions to achieve even greater benefits.

BOX 3. QUESTIONS FOR ROUNDTABLE DISCUSSION

Overarching theme

- How can we work together across ASEAN to overcome these barriers?
- What can we learn from each other?
- How can we facilitate more cross-border partnerships?
- What are the forms of these potential partnerships we can strike across ASEAN (both public and private sector) to tackle these issues?
- Who should champion this, in countries and across ASEAN?

Improving project selection

- How does the private sector play a bigger role in helping the public sector select the projects that optimises use of the country's resources?
- What forums are available today to enable that public-private sector dialogue?

Streamlining delivery

- How do we lift the productivity levels of infrastructure delivery (e.g. construction, design, O&M)?
- What best practices have we observed in other markets?
- What incentives or frameworks should be put in place to encourage this or penalise non-performance?

Making the most of existing infrastructure assets

- How do we better deploy technology across aging infrastructure to improve capacity and utilisation?
- Are there opportunities for ASEAN countries to "leapfrog" in terms of infrastructure development by leveraging technology (e.g. mobile phones versus fixed networks)?
- What research or incentives should be put into place to enable this to happen?

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