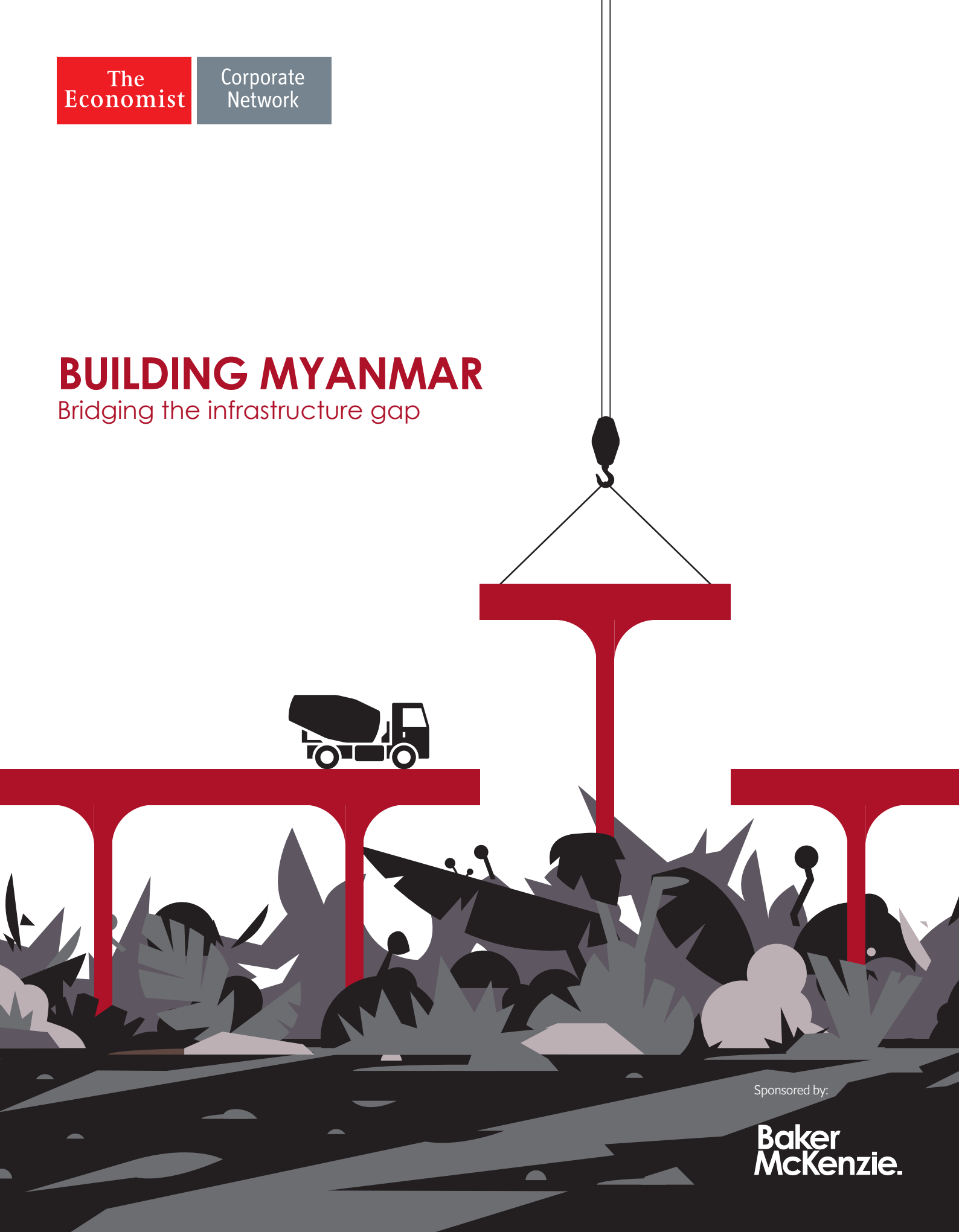
The Economist Corporate Network

BUILDING MYANMAR

Bridging the infrastructure gap



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Preface

Building Myanmar: Bridging the infrastructure gap is an Economist Corporate Network (ECN) report, sponsored by Baker McKenzie. The ECN performed the research and wrote the report independently. The findings and views expressed in this report are those of the ECN alone and do not necessarily reflect the views of the sponsor.

Andrew Staples and Pamela Qiu were the editors. Wai Lam of The Economist Group prepared the cover image, design and layout of the report.

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October 2017

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INTRODUCTION

Infrastructure investment is the key to Myanmar's continued growth

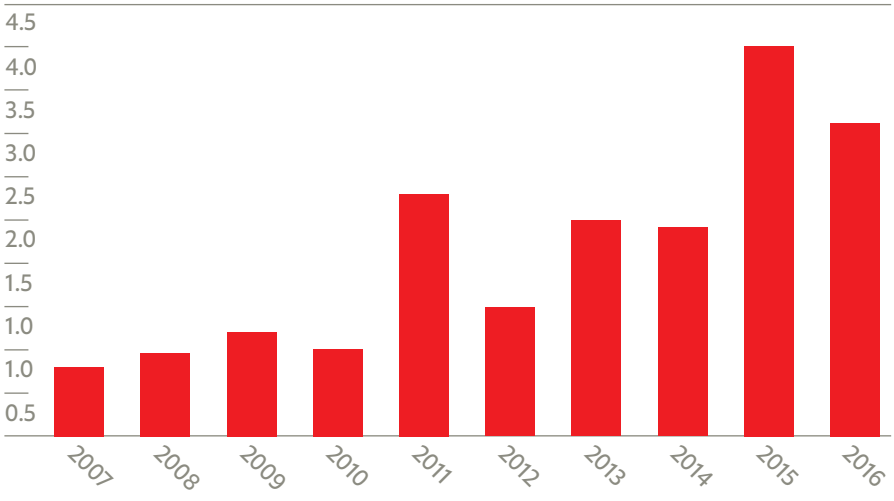
Since 2012 to 2017 Myanmar's economy has grown rapidly, expanding by an average of 7.5% a year, according to The Economist Intelligence Unit. Given its low starting point following decades of isolation, Myanmar can probably rely on catch-up growth to sustain expansion rates of above 7% for several years into the future. Faster and more sustainable growth, however, will depend on the country's ability to move beyond least-developed country status and create the necessary conditions for growth. These include improving agricultural productivity, investing in labour force development, enhancing the business environment and reforming financial institutions and legislation, among others. Perhaps the most important requirement for a positive economic trajectory, however, is improved infrastructure. Modern infrastructure—whether power, water or transport—remains scarce across Myanmar, and will be a bottleneck to faster economic growth in the coming years. Without massive investment from the government, development finance institutions (DFIs) and the private sector, the growing infrastructure gap will put the brakes on Myanmar's economy.

Following the opening-up of Myanmar in the early years of this decade, there was a burst of initial exuberance about the country's economic potential given its large population, rich natural resources and underdeveloped labour force. Foreign investors were eager to capitalise on what many saw as the last frontier market in South-east Asia (see figure 1). However, over the past five years that exuberance has been tempered by the realities of transitional government, ongoing conflicts (such as that observed in Rakhine state[1]), a challenging and confusing regulatory environment, and poor infrastructure. However, the opportunities that once made Myanmar seem attractive have not disappeared. Within the infrastructure sector, there remains both a significant need for international investment and, for investors with patience and flexibility, the possibility of healthy returns.

This paper provides a starting point for an understanding of several key infrastructure sectors in Myanmar. It

[1] While the situation remains challenging and volatile, at the time of publication (October 2017), The Economist Intelligence Unit assessment is that the ongoing conflict in Rakhine state is unlikely to spread to the country's political and commercial capitals, and is therefore unlikely to significantly impact Myanmar's economic outlook.

Figure 1: Foreign direct investment
US$bn



Source: The Economist Intelligence Unit

offers an overview of the current status and recent trajectory of the power, transport and telecommunications sectors, identifying areas of risk and opportunity for investors seeking to engage more closely with the country.

Myanmar: Annual data and forecasts

GDP[d]		**2016**[b]	**2017**[c]	**2018**[c]
	Nominal GDP (US$ m)	65,765	68,397	73,800
	Nominal GDP (Kt bn)	82,924	93,959	107,748
	Real GDP growth (%)	6.4	7.2	6.7
Expenditure on GDP (% real change)[d]				
	Private consumption	3.5	4.0	5.0
	Government consumption	4.0	4.5	6.0
	Gross fixed investment	10.0	12.0	11.5
Population and income				
	Population (m)	52.9[a]	53.4	53.9
	GDP per head (US$ at PPP)	5,766	6,234	6,736
Prices and financial indicators				
	Exchange rate Kt:US$ (av)	1,235[a]	1,363	1,438
	Consumer prices (% change; end-period)	6.6[a]	9.3	7.3
	Lending interest rate (av; %)	13.0[a]	14.0	14.5

[a] Actual. [b] Economist Intelligence Unit estimates. [c] Economist Intelligence Unit forecasts. [d] Fiscal years (beginning April 1st of year shown).
Source: The Economist Intelligence Unit.

POWERING A NATION

Over the next decade demand for electricity is expected to increase fivefold

Despite having abundant electricity-generating resources, Myanmar has some of the world's lowest electrification and electricity usage rates. This has caused major problems for its citizens, 65% of whom lack access to the national grid, and for industry, which must rely on expensive back-up generators. In 2013 Myanmar's per-head electricity consumption was 156 kWh. This compares unfavourably to its South-east Asian peers, such as Laos (506 kWh), Vietnam (1,285 kWh) and Thailand (2,426 kWh). Myanmar had total demand for electricity of 11,252 GWh in 2015, with the commercial capital, Yangon, accounting for 44% of that demand.

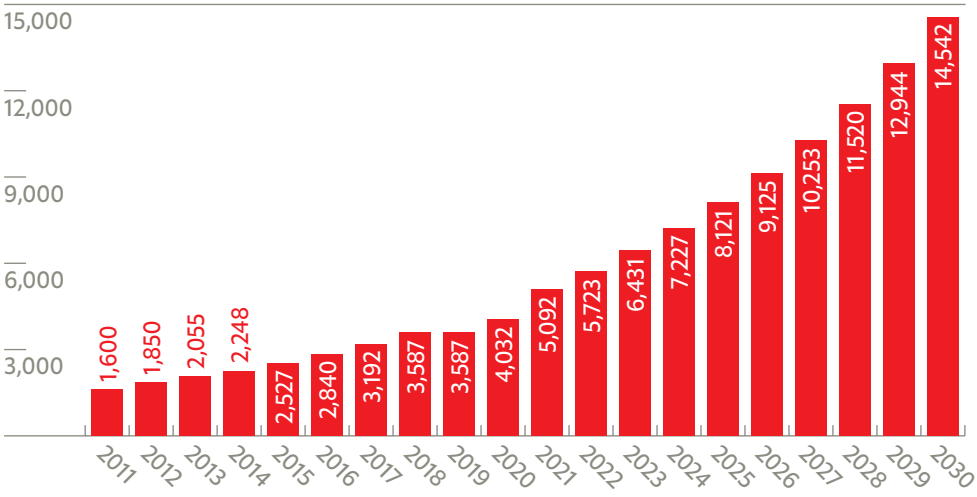
According to the Asian Development Bank (ADB), electricity demand grew by 9.8% a year between 2000 and 2012, and demand growth is expected to accelerate as electrification expands and industry develops further. Although the development of planned hydropower sites, new gasfields and large renewable sites could allow Myanmar to meet its electricity requirements in future, the next ten years are likely to see major shortfalls as demand for power outstrips peak generation capacity.

SOURCING ELECTRICITY: HYDROPOWER, GAS AND WHAT ELSE?

Myanmar's current installed electricity generation capacity is approximately 5 GW, although peak capacity is just 2.5 GW, reflecting the need for rehabilitation to improve performance and bring

Figure 2: Electricity demand forecast

MW

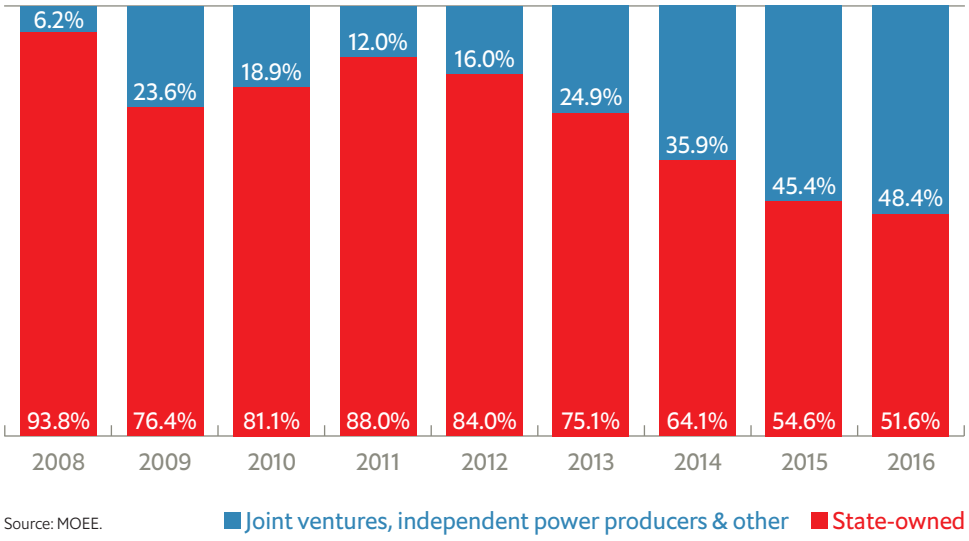


Sources: Ministry of Electricity and Energy (MOEE); Japan International Co-operation Agency (JICA).

plants closer to their designed output. With peak demand reaching 2.5 GW in February 2016 and growing rapidly, Myanmar clearly needs to increase its generation capacity rapidly. Over the next decade demand for electricity is expected to increase fivefold: the Japan International Co-operation Agency (JICA) predicts that demand will reach just under 15 GW by 2030 (see figure 2).

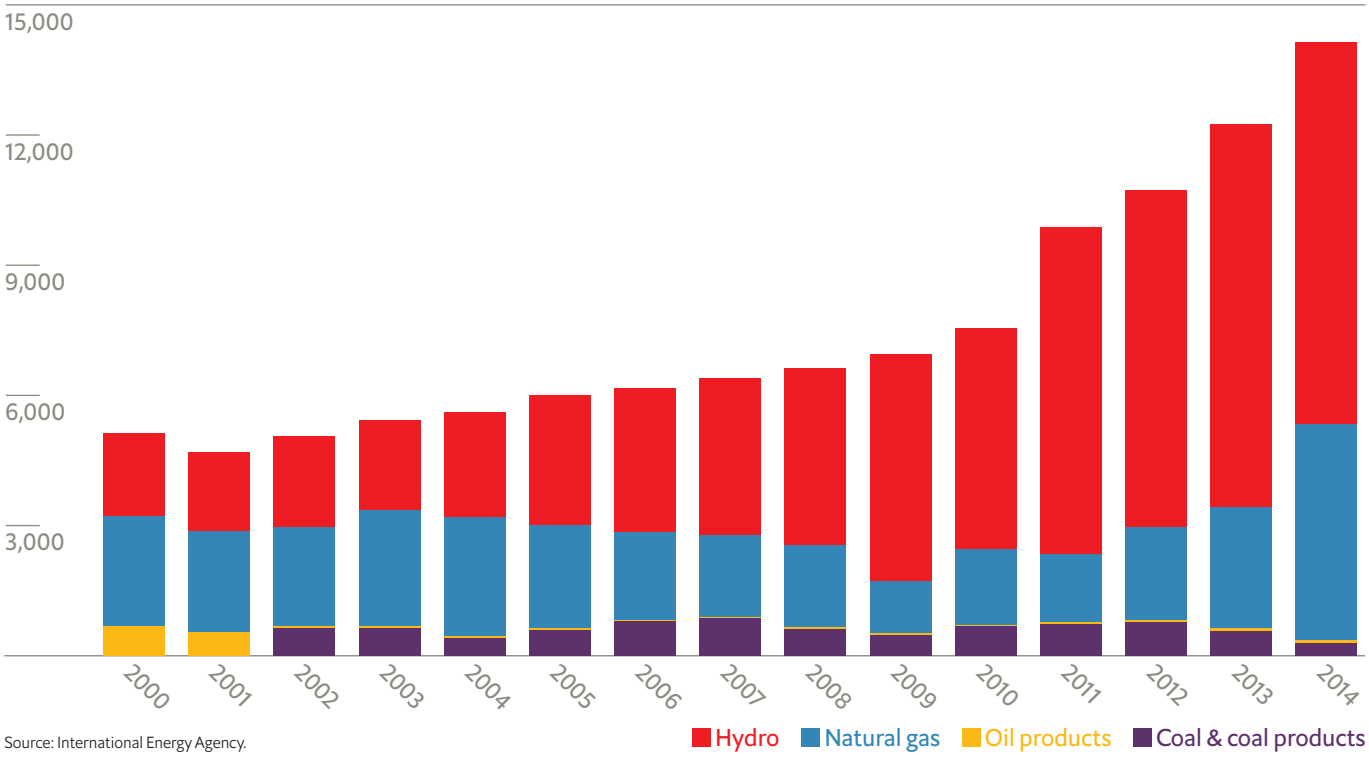
Electricity generation has historically been financed, constructed and operated by what is now known as the Ministry of Electricity and Energy (MOEE) with limited private-sector involvement.

Figure 3: Development of private sector power generation



Source: MOEE.

Figure 4: Myanmar's electricity generation by source
Electricity output (GWh)



Source: International Energy Agency.

Nonetheless, the ministry recognises that it lacks the funds and management capacity to meet future demand with state-owned plants and is encouraging both domestic and foreign build-operate-transfer (BOT) power plants. As shown in figure 3, the private sector now accounts for approximately 50% of all generated power, up from less than 10% ten years ago.

A RICH HYDRO RESERVE

Myanmar has some of the world's largest hydropower reserves, with estimates indicating the country's rivers could produce over 40 GW. Currently, dams provide approximately 60% of Myanmar's power-generation capacity (see figure 4), although its contribution has declined as new and refurbished gas plants come online. Twenty-six active hydropower plants run by the MOEE provide an installed capacity of 3,181 MW, but peak capacity is much less. A further five are being constructed by the government, including several mega-dams (over 1,000 MW). However, all are facing construction delays.

There are as many as 45 other dam projects of various sizes proposed by a range of domestic, international and joint-venture companies. These dams range from small run-of-the-river projects to massive mega-dams along the country's eastern Salween River that have sparked significant local protests. For many of these projects, the key sticking point has been the challenge of getting construction agreements or power purchase agreements (PPAs) signed under the new and comparatively inexperienced National League for Democracy government, which took office in 2016. The MOEE also appears to be waiting for the results of the Strategic Environmental Assessment for the Hydropower Sector by the International Finance Corporation (IFC) before committing to new contracts.

GAS: A LONG-TERM SOLUTION, A NEAR-TERM CRUNCH

Since the early 1990s offshore gasfields have both provided crucial foreign-exchange earnings and

THE NEIGHBOURING SUPERPOWER

For decades China was one of only a handful of outside investment sources for Myanmar. Since the reform period, it is no longer as dominant but still remains the country's largest assistance provider and investor. The Chinese government views Myanmar as a strategic buffer zone for India and increasing Western activity in the region, and as a vital port connection for its land-locked south-western provinces. Chinese and Myanmar leaders met at the Belt and Road Forum in May 2017, with China eager to get approval for both planned projects and to propose new ones.

China has built oil and gas pipelines from Myanmar's western coast to Yunnan, both of which are now operational. The former connects the Shwe gasfields directly with power plants near Kunming, while the oil pipeline means that China is no longer dependent on the Strait of Malacca: tankers offloading in the Bay of Bengal help to secure China's access to petroleum.

Many of the largest planned hydropower sites are run by the Chinese, including the likely to be cancelled Myitsone Dam in Myanmar's northernmost state. Several other projects are highly controversial as they involve damming the currently freely flowing Salween River.

Finally, a Chinese state-owned infrastructure developer, CITIC, is in contract negotiations to develop Myanmar's third special economic zone, Kyaukpyu, not far from the pipeline terminus on the Bay of Bengal. The project will include a large industrial zone and a deep-water port and will solidify China's presence in Myanmar's Rakhine state. In the long term, China plans to build a railroad along the pipeline route, further deepening the Belt and Road Initiative's connection to Myanmar.

In addition to these directly funded projects, the Chinese-led Asian Infrastructure Investment Bank is looking to support infrastructure projects in Myanmar, with a focus on both power and transport.

fed gas-fired power plants in southern Myanmar. However, production at these fields is declining, and there is limited contractual ability to increase domestic offtakes from more active fields. Fields under development will not be ready for well into the 2020s.[2] Myanmar, therefore, faces a ten-year shortfall of gas supplies even as gas remains a cornerstone of all existing plans to meet growing electricity demand. To fill this gap, the government has endorsed plans to import liquefied natural gas (LNG) for power generation. In March 2017 the MOEE announced that it planned to put a contract out to tender to build an LNG terminal that will provide the bulk of Myanmar's gas-for-electricity supply until development of new offshore gasfields is complete.[3] The proposed project would also include a LNG power plant and a pipeline carrying gas to Yangon.

Downstream, Myanmar produces 1,919 MW from gas turbines, accounting for 35% of total electricity supply. There is a mix of government and privately run plants. Gas-fired plants have also received support from DFIs given the clear opportunities for refurbishment of existing plants and the comparatively uncontroversial nature of gas as an electricity source compared with hydropower and coal. The 225-MW Myingyan plant—under construction by Sembcorp, a Singaporean company, and financed by a range of DFIs (including the IFC, ADB and the Chinese-led Asian Infrastructure Investment Bank) and several commercial lenders (Clifford Capital, DBA Bank, DZ Bank and OCBC Bank)—will be Myanmar's most modern gas-fired plant.

The DFIs' plan is for Myingyan to act as a demonstration project for future independent power producer BOT contracts.[4] Two other gas plants (200 and 106 MW respectively) are under construction in the south-eastern Tanintharyi region and in Yangon, while a further PPA is being negotiated for a 76-MW plant in Bago, north-east of Yangon. A number of existing plants have been earmarked for renovation.

There is clearly a need for further development of new gas-fired plants, but until an LNG terminal is confirmed, it will be difficult for investors to justify pursuing new gas-generation projects until a sustainable gas source is determined. In this sector Myanmar could look to South Africa as a model. Although further along the development spectrum, South Africa is investing in gas-to-power generation reliant on imports at the same time it is exploring its own offshore-gas potential. The investment in power plants, at a time when imported gas is inexpensive, provides both an efficient way to meet electricity demand and an immediate domestic market for when the offshore gasfields are ready to begin production.[5]

WHAT ROLE FOR THE REST?

The opportunities to generate electricity using coal and renewables (primarily solar and wind) are mixed. Although coal could be a cheap and relatively rapid stop-gap measure to increase available power, Myanmar lacks domestic coal suitable for power generation. Plans for several plants are being developed, notably by Japanese power giants, and several may get built; but the expense of importing coal combined with the reluctance of DFIs to finance coal-fired plants mean that their role in Myanmar's electricity mix will be limited. Further, a recent presentation by the MOEE stated that all coal projects were suspended.

There is a lack of data regarding on- and offshore wind opportunities, although several companies have signed Memoranda of Understanding (MOUs) with the government and are currently collecting data on available wind resources. Solar has great potential given the long dry seasons across much of Myanmar. The former government signed two PPAs with solar developers at the very high rate of 12

[2] The fields Yadana and Yetagun, operated by Total (France) and Petronas (Malaysia), respectively, are on the decline. Zawtika and Shwe, operated by PTTEP (Thailand) and Daewoo (South Korea), respectively, do not allow for expanded domestic offtake without contract renegotiation. Woodside (Australia), Shell (UK/Netherlands) and others are in early exploration drilling for their wells off the Rakhine coast.

[3] Matsui, M. "Myanmar to solicit bids for its 1st LNG terminal", March 14th 2017, *Nikkei Asian Review*.

[4] Gilmore, S. "AIIB invests in Myanmar", October 3rd 2016, *Myanmar Times*.

[5] For more on the South Africa case see Baker McKenzie's September 2016 brief, *The Rise of Gas to Power*.

Myanmar has some of the world's largest hydropower reserves, with estimates indicating that the country's rivers could produce over 40 GW

US cents per kWh. These plants, with a target installed capacity of 300 MW, are expected to have initial phases finished by the end of 2017. A further 990 MW of solar projects (across three sites) are in the MOU phase, although any PPA price is likely to be significantly lower. Solar energy producers can also consider the growing trend for corporate PPAs, or projects that are financed directly through long-term contracts with the private sector and which are therefore not affected by tariff or subsidy issues.

GETTING ELECTRICITY HOME: THE GRID CHALLENGE

Myanmar's electricity grid is limited and old. Although many lines are in good condition, the reliance on smaller lines (230 kV) leads to losses over long distances and there is a lack of relay substations.

POWER SECTOR INVESTMENT RISKS

As described in the box on the new government (on page 10), decision-making processes have slowed over the past 18 months. The Ministry of Electricity and Energy (MOEE) has not signed any new power purchase agreements (PPAs) and few projects have moved forwards since the 2015 election. Although the slowdown is partially due to the challenges of transferring control to a long-term opposition party and its caution surrounding projects approved by its predecessors, there are several other issues that add risk to investing in Myanmar's power sector.

First, all aspects of electrification have historically been carried out by the government and there is little experience with public-private partnerships within the MOEE. Although the relevant departments are now encouraging investment from development finance institutions and private players, there are few instances to serve as models for implementation. Inexperience negotiating PPAs or working with large, often foreign, investors on financially complex projects has contributed to the lack of progress.

The MOEE also faces capacity challenges similar to those within all Burmese ministries. First, there is a bureaucratic culture that does not encourage lower-level decision-making, a tendency that has worsened under the new National League for Democracy government, and which has led to bottlenecks and delays. Second, the MOEE suffers from a shortage of staff and equipment—and from an inability to pay for more of both. Although the political leadership is aware of these issues, these are structural challenges that will take time to address and will require patience from investors engaging in the near term.

Finally, there are risks surrounding mismatched expectations between the government and those proposing power-generation projects. The government has very limited ability to finance power plants—which is partially why it encourages independent power producers (IPPs) to propose their own. However, given that Myanmar remains a challenging place to finance infrastructure projects, IPPs frequently approach the government with an expectation of at least token investment, a sovereign guarantee or some other risk-sharing arrangement. To date, the government has been reluctant to take these steps, resulting in IPPs unable or unwilling to secure the finance without government support, while government counterparts search in vain for completely independent power suppliers. There are projects which have been able to overcome this risk, with the Myingyan gas-fired plant and other smaller plants clear examples. But new entrants to Myanmar's electricity sector should be prepared to address these challenges head on or risk a frustrating relationship with the MOEE.

The country's first 500-kV line between Mandalay and Yangon is being constructed by four separate national donors. In Yangon, there is an urgent need to upgrade the existing 60-kV system that is especially limiting for industrial areas. In the next three years the city's power needs are expected to double from 2015 levels and the transmission network is woefully underprepared. Nationwide, the grid is simply unable to absorb significant load increases: turning on a medium-sized hydropower plant could cause the entire grid to fail. The government reports transmission losses of just 5%, but experts believe that these are consistently and significantly underreported.

Less than 35% of Myanmar has access to the national grid. The National Electrification Plan (NEP) includes goals of 50% electrification by 2020 and 100% by 2030, both of which are highly optimistic targets. The World Bank is providing US$300m to assist the implementation of the NEP, but the roll-out is progressing slowly.

Yangon's power needs are expected to double in the next three years from 2015 levels

THE TARIFF QUESTION

Distribution is managed by three state-owned enterprises (Electricity Supply Enterprise, Yangon Electricity Supply Board and Mandalay Electricity Supply Board), which are also responsible for tariff collection. The government provides heavy subsidies for household electricity, with the result that prices in Myanmar, at about 3 US cents per kWh, are among the lowest in South-east Asia. In general, the cost of household electricity to the government is at least double what it charges consumers for (the amount paid by the government varies, depending on the energy source). Meanwhile, Myanmar's industrial sector pays rates similar to those in neighbouring

A NEW GOVERNMENT JUST NOW BEGINNING TO FIND ITS FEET

Over its first 18 months in office, the slow pace of decision-making by the National League for Democracy (NLD) government was a key challenge for all investors, regardless of sector or origin. It has been a common challenge at all levels of government with various effects. As the country's most senior policymakers focused on the peace process, there was limited leadership attention on economic matters. A much-heralded announcement in July 2016 disappointed observers as it was just a series of bullet points. A full economic policy has yet to be released and observers remain concerned that uncertainty about the NLD's priorities could slow economic growth. That said, recent presentations by key economic advisers, including Sean Turnell, who advises state counsellor Aung San Suu Kyi directly, attributed the slowdown to a need to get spending under control and said that a renewed focus on economic growth was on its way.

At ministerial levels, it is apparent that they have less autonomy than their predecessors and many also lack technical capacity. This has had two effects. First, many more ministerial decisions are being made by the state counsellor or by the President's Office (which is largely controlled by Aung San Suu Kyi). Second, where ministers lack technical capacity they have at times been sidelined by senior civil servants, who are a combination of technocrats and hold-overs from the previous government.

Further down the bureaucracy, the tendency of junior civil servants to refer decisions upwards has increased. This means that dealings with the government take longer, sometimes by as much as 50%. For example, getting authorisation for foreign technical experts to visit project sites, especially in peripheral areas, can now take as long as six weeks.

countries (up to a maximum of 11 US cents per kWh). Yet, industry groups have expressed a willingness to pay more for increased reliability.

The government's newly formed Tariff Working Committee has acknowledged the need to adjust and expand the two-tiered consumer system to ensure that heavier users are paying more, with government subsidies restricted to the poorest citizens. Increasing rates on the upper tiers by 1 US cent per year for three to four consecutive years would put average tariffs at a rate approximately equal to Thailand in a country with much greater generation potential than its eastern neighbour. This gradual tariff increase would greatly increase the attractiveness of many proposed power-generation projects.

OPPORTUNITIES: FOR THE PATIENT AND THE INNOVATIVE

The prospects for investing in Myanmar's power sector are not as clearly visible as they were in 2013, when an abundance of optimism surrounded both hydropower and gas. The challenges detailed above have since worn down that enthusiasm. Nonetheless, there remain significant opportunities for investors equipped with both patience and innovation.

Within the hydropower sector, several stalled mega-dam projects, such as Myitsone in the north, may never recover. Dams above 1,000 MW had been where large international infrastructure developers had focused, but they are now the targets of increasingly vocal opposition. At the same time, the appeal of medium-sized (100-500-MW) dams previously appeared limited, but are making a comeback as, despite being somewhat less commercially attractive, they offer significantly reduced political and social/environmental risk. The government has encouraged projects of this kind and there are dozens of potential sites across the country.

For particularly innovative investors, alternative sales models are possible, with dams selling directly to nearby industrial or tourism power users.

Until Myanmar's future supply of imported LNG is clear, additional new-build gas-fired power stations are unlikely to be feasible. However, once that future is secure, LNG power plants will form the backbone of Myanmar's medium-term effort to meet increased demand. In the longer term, the gasfields off the Rakhine coast, if they prove commercial, will provide necessary gas supplies for existing and new plants.

The cost of solar-powered generation has fallen significantly in recent years and, with some increase in current tariffs, solar plants located across Myanmar's central dry zone present significant opportunities. The experience of two 150-plus MW projects currently under construction (Green Earth Power and ACO Energy)[6] should be monitored as demonstration projects.

Summary points

- Demand for electricity is expected to increase fivefold over the next decade.
- Myanmar has the potential to meet its electricity requirements but needs significant investment in generation and distribution infrastructure to do so.
- Following a policy shift, the government now encourages domestic and foreign investment in the energy sector, and private-sector actors now account for approximately 50% of all generated power.
- The National Electrification Plan envisions goals of 50% electrification by 2020 and 100% by 2030.

[6] Shin, A. "Thai firm signs 300-MW solar deal", May 20th 2016, *Myanmar Times*.

GETTING GOODS AND PEOPLE WHERE THEY NEED TO GO: TRANSPORT INFRASTRUCTURE

The second-largest country by area in South-east Asia, Myanmar's geography would present transport infrastructure challenges even for a developed nation: rugged hills lining its border areas and occupying most of the north, a long coastline frequently broken by rivers and a large delta area. Ground transport had traditionally focused on the north-south corridors dictated by the three river basins and hill range that divide Myanmar vertically, while water transport, especially down the Ayeyarwady River, was the primary trade route.

Under military rule, however, transport infrastructure fell into disrepair and has received little support for upgrades or expansion beyond a few very public projects. As a result, costs associated with logistics are high and Myanmar's logistics performance index score is well below that of its neighbours and the East Asia and Pacific average (see figure 5). Although all forms of transport infrastructure are in need of investment, for non-DFI actors opportunities exist primarily in road and air transport.

Myanmar's geography would present transport infrastructure challenges even for a developed country

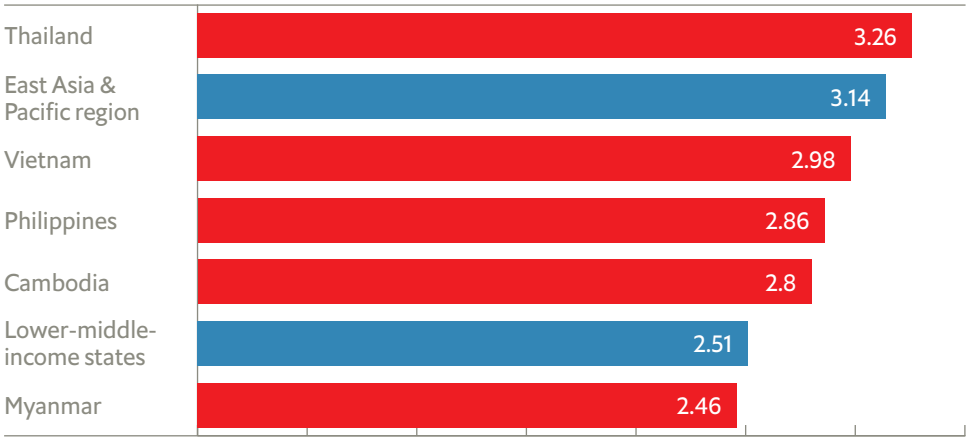
THE ROAD CONUNDRUM: LOW QUALITY BUT UNDERUSED

Myanmar has a relatively extensive road network, but the vast majority of roads are both of low quality and underused. Just 20% of the country's roads are paved, a figure that compares unfavourably to Thailand, Vietnam or the Philippines (see figure 6). Until restrictions on used-car imports were lifted in 2012, the road network was mostly able to handle the low-traffic density. However, over the past five years the number of cars on the road has grown dramatically, causing congestion issues in Yangon and degradation of the national road network.

Unlike in the electricity sector, private construction and management of roads is a well-established tradition in Myanmar. The first road BOT contract was signed in 1996 and the practice expanded under the military government. Almost 20%, or 5,545 km, of paved roads are currently operated under BOT contracts with privately administered tolls financing maintenance.

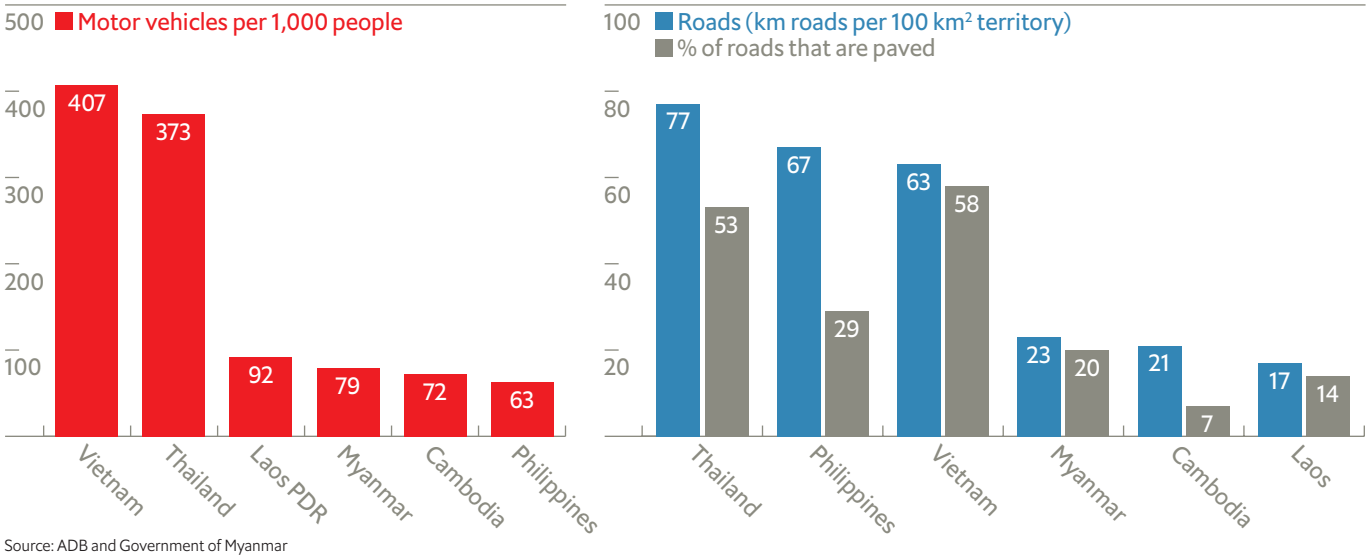
Recognising that modernisation of the trunk road network will be needed to ensure Myanmar's continued economic growth, a number of DFIs

Figure 5: Logistics performance index, 2016
Score



Source: World Bank.

Figure 6: Road transport and infrastructure



Source: ADB and Government of Myanmar

and national donors are currently engaged in road projects. The South Korean government has funded a masterplan for an arterial road network. The ADB's main project is funding an extension of the Asia Highway that will eventually connect the Thai capital, Bangkok, to Yangon , while the Japanese government has a range of road projects, including several bridges and roads, in the commercial capital. Further reforms to encourage investment in Myanmar's north-south corridors are required, particularly the Yangon-Mandalay highway (currently off-limits to commercial traffic), while the main road link to China, the Mandalay-Lashio highway, remains a major bottleneck.

As at June 2016 the Yangon region is home to 70% of Myanmar's 476,679 registered cars. There is an urgent need for investment targeting both roads and bridges in order to alleviate the city's congestion, but there is a lack of government planning which has limited both DFI and investor efforts to identify investment opportunities. The construction of expanded roadways, including elevated highways, and improving access to the city via bridges to the south, east and west are likely to be included in long-term planning. In July 2017 the IFC announced that it was making "good progress" with the Ministry of Construction regarding an elevated toll road, although the proposed route and any potential timeframe are still unclear.

THE AIR OPTION

Myanmar has over 20 active airports with scheduled flights during the dry season. Three international airports at Yangon, Mandalay and the national capital, Naypyidaw, are capable of handling larger planes, while most other airports are serviced only by smaller French-Italian ATR-72s that make up most of the domestic fleet.

In 2013 the government awarded a 30-year, US$100m contract to renovate, operate and transfer the Mandalay airport to a joint venture comprising one Burmese firm (SPA Project Management, part of the Serge Pun business group) and two Japanese providers (Mitsubishi

[7] Part of the East-West Economic Corridor project.

and JALUX). The first phase of Naypyidaw International Airport was completed in 2011, although long-term plans call for a significant expansion and construction of a second runway and an expanded terminal building which would increase its annual capacity to 10.5m passengers. Yangon International Airport is undergoing a US$150m expansion that includes two new terminal buildings (one international and one domestic). Both the Yangon and Naypyidaw airport work was done by Asia World, Myanmar's largest construction conglomerate.

As the Yangon airport is inherently constrained by its built-up surroundings, planning for a new airport at Hanthawaddy, some 80 km north-east of Yangon, was announced in 2001 but remain stalled until 2012. In 2014 a Singaporean-led group was named the developer of the site, which include a terminal complex that is able to handle 12m passengers per year in the first phase, rising to 30m in phase two. The first phase will cost US$1.5bn and is scheduled to begin operations in 2020, yet as at September 2017 there is little evidence of construction. Further, given its distance from Yangon's centre and the city's congestion problems, the proposed airport will require a dedicated highway and/or railway, the plans for which remain unclear.

Myanmar's regional airports are much smaller and are underdeveloped from both a passenger-capacity perspective and in terms of safety and efficiency. In late 2016 the Department of Civil Aviation submitted a plan to its minister for private companies to renovate and run regional airports. Since then there have been numerous and frequently contradictory statements in the media regarding regional airport development. However, nothing has been formally announced by senior figures in government. The most likely airports to be targeted for improvement are near major or growing tourist sites, including Kawthaung near the Myeik Archipelago (where Serge Pun is reportedly seeking IFC support to expand the airport) and Heho Airport near Inle Lake.

TRANSPORT SECTOR INVESTMENT RISKS

Efforts to invest in Myanmar's transport infrastructure face a range of risks. Some, like ministry capacity, are analogous to those faced by power sector actors. However, there are several risks particular to transport.

First, there is the vested-interest challenge. Myanmar's largest conglomerates, many of which are privately owned but have historic links to the former military government, have large a presence in the transport infrastructure sector. Most have a construction arm, many have existing road build-operate-transfer (BOT) contracts and almost all have their own airline. These firms can be problematic partners for international investors, and many were either on the international sanctions list or remain led by so-called politically exposed persons. At the same time, they continue to dominate the sector and present an obstacle to market entry.

Then there are challenges associated with the contracting systems. For example, the current road BOT system often fails to deliver either a reliable return to the investors or strong service provision to road users. Contracts are for 40 years, with flawed enforcement mechanisms and generally poor performance. Further, while some roads deliver a healthy return, others are underutilised and companies face annual losses. As a result, and despite user payments estimated by the Asian Development Bank (ADB) at US$120m per year, few BOT contracts are viable for external financing and, again according to the ADB, they "appear to hamper the modernisation of the road network where it matters most."

Finally, there is a lack of comprehensive planning that can deliver a unified vision for Myanmar's transport infrastructure and that of its important subnational transport hubs. As responsibility for transport infrastructure is split between the Ministry of Transport and Communications and the Ministry of Construction, there are also issues of inter-departmental co-ordination to consider. In Yangon, the Yangon Master Plan developed by the Japan International Co-operation Agency under the previous government has been jettisoned—so while the city government continues to be active, it does not yet have a new a strategic plan guiding its efforts.

WATER & RAIL: HISTORIC CORNERSTONES IN DISREPAIR

Myanmar's rail network requires significant improvement, but there is currently little scope for private investment given limited returns and the challenges of implementing successful public-private partnerships (PPPs) in the rail sector. The JICA has an ongoing project to develop the Yangon-Mandalay route and the sector is likely to continue to rely on grants for renovation. The ADB's recent policy note on rail infrastructure concurs, but also said that the Yangon Circular Line (the country's only commuter

Yangon International Airport is undergoing a US$150m expansion

rail system) could have PPP potential if it was spun off as a separate business unit and subsidised by the Yangon regional government.

Inland water transport (IWT), particularly freight, has a long history in Myanmar, but inland ports and connections to international docks in Yangon are in disrepair. The government has recently announced that it will rehabilitate a number of inland ports along the Ayeyarwady. Plans remain in the early stages and it will require extensive government and donor support before freight IWT is an attractive opportunity for investors. Localised solutions, such as the upcoming Yangon Water Taxi, have more potential but are likely to require subsidies that the government cannot afford.

Myanmar's only international port terminals are located in Yangon, both at the Thilawa special economic zone (SEZ) and near the central business district. In the medium to long term, the government plans to move all port facilities out of central Yangon and the Thilawa port will become the country's main export hub. Additional deep-water ports are planned for the Dawei and Kyaukpyu SEZs, on the south-eastern and western coasts, respectively. However, as these sites remain largely greenfield, it will be several years before any ports are constructed, let alone be operational.

TRANSPORT OPPORTUNITIES: DEPENDENT ON GOVERNMENT ACTION

Three main categories of opportunities for investment in transport infrastructure exist but all are reliant on government action to reform existing practices. First, and dependent on the reform of the BOT system, Myanmar's growth trajectory and rapidly expanding traffic levels will provide significant opportunities to invest in the trunk road network.

Second, the development of regional airports, especially those located in tourism hotspots, has already received government acknowledgement as an important step in developing both the tourism and transport sectors. In addition, existing plane and cargo handling services across the country are in significant need of technological support and investment.

Finally, urban transport infrastructure, especially in Yangon but also in Mandalay, presents opportunities whether in local/commuter rail, road and bridge projects, or alternative transport options (Yangon's recent water-taxi tender is an operative example). The Yangon government's overhaul of the bus system has been a focus of local political debate as it moved from an anarchic market of private operators to a PPP system. However, the accompanying reduction in both the number of buses and bus routes has resulted in significant criticism of Yangon's chief minister, Phyo Min Thein, and his government, as has concerns around a direct US$51m tender to two Chinese firms that provided 1,000 new buses in June and July 2017.

Summary points

- Opportunities for non-DFI actors in transport infrastructure exist primarily in the road and air transport subsectors.
- The private construction and management of roads is a well-established tradition in Myanmar, although just 20% of roads are paved.
- Myanmar has over 20 active airports but only three (Yangon, Mandalay and Naypyidaw) can accept larger planes.
- Inland water transport, particularly freight, is an attractive opportunity for investors.

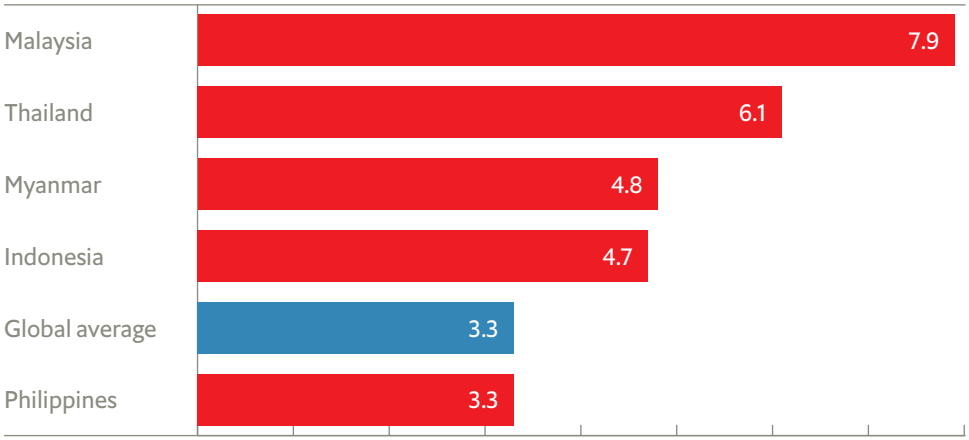
MYANMAR'S MOST POSITIVE STORY: TELECOMS

Prior to the reform period, Myanmar had one of the world's lowest rates of connectivity: active SIM cards were measured in the thousands and there was very limited internet access. This has changed virtually overnight and Myanmar now has more than 50m active SIM cards, as well as the region's fastest mobile internet speeds (see figure 7). At Yangon's second TEDx conference this year, an entrepreneur, David Madden, described Myanmar as "the world's best technology test market". Nevertheless, while the mobile revolution for most of Myanmar's citizens is being realised, much of Myanmar's telecoms infrastructure remains in need of development.

A MOBILE BOOM

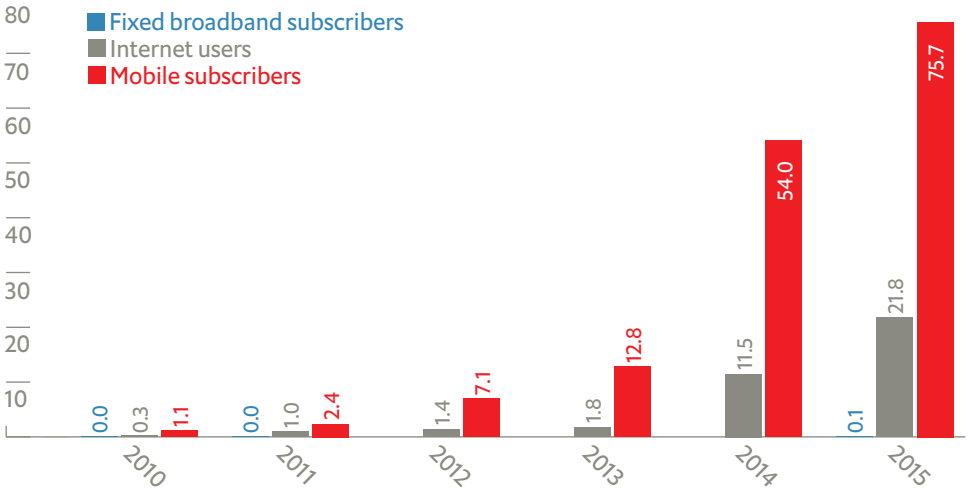
In 2010 SIM cards were only available on the black market for as much as US$1,500, far out of reach for almost all Burmese citizens. In 2013 the government took two important steps towards reform. First, it held a tender for mobile licences, won by Norway's Telenor and Qatar's Ooredoo, which both entered the market in 2014 with the requirement that they build networks across the country. Second, it developed a US$2bn deal with two Japanese technology suppliers, KDDI and

Figure 7: Mobile internet speeds
Speed (Mbps)



Source: OpenSignal survey for November 2016 to January 2017.

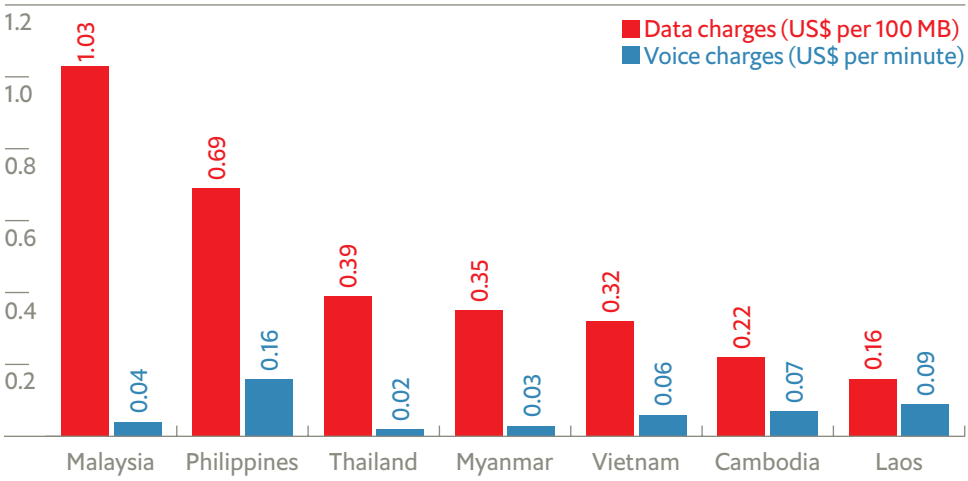
Figure 8: Telecoms access
Number per 100 citizens



Source: International Telecommunication Union.

There are 50m registered SIM cards in a country of 54m people

Figure 9: Telecoms costs



As at February 2015.
Source: *International Journal of Advanced Research in Management.*

Sumitomo, to partner with the state-run provider, Myanmar Posts and Telecommunications (MPT), in an effort to modernise and improve services. Within months the price of a SIM card had dropped to US$1.50 and millions of Myanmar's citizens were purchasing their first mobile phones.

Mobile access and usage have since expanded rapidly, with the additional benefit that, for many users, their first phone is a smartphone. According to Telenor and Ooredoo, 80% of local users have a smartphone as their first phone.[8] As a result, in June 2017 the Myanmar Computer Federation estimated that 90% of the population has access to a phone with internet capabilities, while figures from the International Telecommunication Union for 2015 (latest available data, see figure 8) indicate that 75% of the population are mobile users.[9]

There are currently 50m registered SIM cards in a country of 54m people—MPT leads with 23.2m subscribers, followed by Telenor (18.8m) and Ooredoo (8.1m) [10]—while 3G coverage has expanded equally fast: all three telecoms firms claim 3G coverage of more than 90%. Costs in Myanmar are competitive with other parts of South-east Asia (see figure 9), with 100 MB of data costing an average of 35 US cents, compared with 40 US cents in Thailand and US$1.02 in Malaysia.[11]

The government recently approved a fourth telecoms licence for Mytel, a joint venture between Viettel (a Vietnamese military-owned telco) and a local consortium. [12] While it will face stiff competition entering the market so late, Mytel has announced that it will focus on underserved rural areas and will be price-competitive, and Viettel has experience taking on established telecoms firms in Cambodia and Haiti.

OVERCOMING LIMITED PHYSICAL INFRASTRUCTURE

The mobile expansion has overcome what was a very limited infrastructure base. In 2014 the IFC calculated that 17,300 telecoms towers were needed to reach the government's target coverage of 70% by 2017, and only hundreds then existed. Current industry estimates suggest that 11,700

[8] Härkki, J. "Telecommunications sector in Myanmar", January 20th 2017, Export Finland.

[9] Heijmans, P. "The unprecedented explosion of smartphones in Myanmar", July 10th 2017, *Bloomberg Businessweek*.

[10] Eleven Myanmar, "Telenor launches 4G in Yangon", June 16th 2017.

[11] As at May 2015. The price in Myanmar has since decreased slightly.

[12] Nyunt, A.K. "Mytel to target rural areas and compete on price", January 17th 2017, *Myanmar Times*.

towers have been agreed with a concentration in Yangon, Mandalay and Naypyidaw, with over 8,000 constructed. There are eight tower companies in Myanmar, the largest of which is Irrawaddy Green Tower with 2,900 sites. Another company, Apollo Towers, was the first Burmese firm to receive financing from the Overseas Private Investment Corporation, a US government agency, with a loan of S$250m in 2016.

Beyond mobile, Myanmar's telecoms sector faces several structural challenges, chief among them being a limited fibre-optic network and narrow connectivity to the global submarine cable system. Wired internet connections in Yangon remain expensive and slow, lagging behind newly introduced 4G, and the rest of the country is notably worse (with the exception of Naypyidaw). As a result, broadband penetration is less than 2%. Until 2013 Myanmar's only international connections were one submarine cable landing and terrestrial connections to Thailand and China. All three telecoms providers have since developed additional terrestrial links, but subsea cable access remains limited. At least two additional subsea lines are under development, with the first (a connection to the regional SEA-ME-WE 5) expected to be completed by the end of 2017.[13]

MORE MOBILE AND FIBRE: KEYS TO THE FUTURE

Telecoms infrastructure investment opportunities are focused on two main areas: supporting the expansion and further development of the mobile network, and developing the fibre network. As many as 10,000 additional towers are required to provide Myanmar with full coverage, while further development work to upgrade the existing 3G network to 4G is just beginning. Construction of new towers will become more technically and logistically challenging as the focus moves to the most remote corners of the country. Development of the fibre network is in the comparatively early stages, and opportunities exist to develop both national-level corridors as well as to improve Myanmar's global connectivity.

Summary points

- Myanmar's population is enjoying a mobile revolution, but telecoms infrastructure is in dire need of development.
- Telecoms infrastructure investment opportunities are focused on expanding the mobile network and developing the fibre-optic network.
- Opportunities exist to develop national-level corridors as well as improve Myanmar's global connectivity.

[13] Frontier Myanmar, "Myanmar's connectivity catch-up", February 1st 2016.

FOCUS ON OPERATIONAL RISK

The Economist Intelligence Unit provides quantitative and abstract operational risk analysis and ratings for 180 countries. The operational risk model on which these ratings are based comprises 70 indicators covering ten categories of risk. Indicators are scored in a range from 0 (no risk) to 4 (severe risk). Indicator scores are aggregated to yield a category score, in a range from 0 to 100, where 100 is most risky. The overall score is the average of the 10 category scores.

Companies can use these ratings to assess a country's operational environment as it pertains to their specific activities. Myanmar's risk profile, as recorded below, reflects its developing-country status and it is important to remember that what might present an unacceptable risk to one company may also present an opportunity to another.

Myanmar risk measures	Current score	ASEAN average
Overall assessment	**61**	**43**
Security risk	44	38
Political stability risk	55	47
Government effectiveness risk	81	59
Legal & regulatory risk	82	53
Macroeconomic risk	40	18
Foreign trade & payments risk	61	39
Financial risk	67	45
Tax policy risk	44	31
Labour market risk	61	51
Infrastructure risk	78	49

Note: 100=most risky.
*Compared with previous quarter or latest assessment
Source: The Economist Intelligence Unit, August 2017.

Assessment for Myanmar:
Black=unchanged*
Green=improvement*
Red=deterioration*

OVERALL ASSESSMENT FOR MYANMAR

Business operations in Myanmar remain challenging despite its democratic transition and economic internationalisation. Parts of the country's border regions are still off-limits owing to long-standing conflicts between the army and ethnic-minority armed groups. The election in 2015 was relatively free and fair, unlike the fraudulent exercise in 2010. The National League for Democracy (NLD) secured comfortable majorities in both houses of parliament. Ambitious economic reform will continue under the NLD, but the military retains significant political influence, a fact that is likely to hamper the party's efforts on more democratic reform. Government effectiveness is blighted by corruption, and the judiciary lacks capacity and independence. The military's mismanagement over the decades has left a legacy of structural economic issues. Some aspects of foreign trade still face controls and the tax regime is in a state of flux. Skilled labour is in very low supply and infrastructure gaps are immense.

INFRASTRUCTURE RISK IN MYANMAR

Myanmar's underdeveloped infrastructure, the result of severe mismanagement, poses risks to businesses. In speeches to foreign audiences, the NLD's leader, Aung San Suu Kyi, has stressed just how far behind the country is compared with its peers: major investment is needed in roads, power and water supplies. Owing to the poor state of roads and the lack of petroleum stations outside the major cities, the distribution network is heavily reliant on waterways. Internal air transport is limited and subject to safety concerns. Telecommunications are improving, with mobile-phone services being driven by the involvement of foreign firms, but such services remain unreliable and costly outside the major cities. Similarly, internet access is available in major cities but is slow and expensive. Electricity is not in constant supply, even in urban areas. Nevertheless, infrastructure development is a key business opportunity for firms whose plans dovetail with the government.

Infrastructure risk measures	Score
Port facilities	3
Air transport facilities	2
Retail and distribution network	4
Telephone network	3
Road network	3
Power network	3
Rail network	4
IT infrastructure	4
Natural disaster economic risk	4
Cyber security, preparedness	1

Note: indicators are scored in a range from 0 (no risk) to 4 (severe risk).
Source: The Economist Intelligence Unit, August 2017.

CONCLUSION

The need for investment in Myanmar's infrastructure is clear and the inherent attractiveness of the country as an investment destination remains. It has plentiful natural resources and a large population that is rapidly becoming more connected and increasingly able to spend a small amount of income on electricity, transport and mobile access.

At the same time, the challenges laid out here are significant: a government that needs more decision-makers, requires greater technical training and capacity building, and has little experience with international investment accompanying a range of geographical and political/security (especially for power-generation) issues.

All these risks can be mitigated through strong market research, comprehensive due diligence, responsible local partners and an awareness of the country's political reality.

In conclusion, Myanmar continues to offer great opportunities, but only for investors who are patient, strategic and innovative. Forging agreements with the government or the construction process itself may take longer than they do with regional peers. Investors must be strategic in the sense that Myanmar is changing rapidly and investors must plan for both the present and what the local economy will look like after a decade of catch-up growth. And they also must be innovative to find the right scale and type of power plant, transport system or connectivity hub that is able to maintain support from local communities which feel newly empowered. Large-scale projects can present political challenges that cause further delays or even cancellation. Opportunities for successful, sustainable investment in Myanmar's infrastructure development will be present for years; identifying them will require work, but the results will be worth it.

Investors need to be patient, strategic and innovative

SUMMARY OF KEY ISSUES AND ACTION POINTS

- Myanmar's positive economic trajectory is threatened by a massive infrastructure need that the government does not have the resources to meet alone. Although slow to start, the National League for Democracy government is working to encourage outside investors.
- Accompanying the opportunities are risks, including government capacity and the current lack of strategic vision for infrastructure development. Mismatched expectations between the government and investors are a further risk to be managed.
- The country has major hydro reserves, and combined with large natural-gas fields they will meet longer-term expectations. However, it faces a medium-term (five to ten years) inability to meet electricity demand.
- Large-scale power generation (1-GW+ hydropower, 3-GW+ coal and gas) projects have become controversial domestically, but many opportunities remain for investors interested in mid-sized power projects.
- Myanmar has experience with road build-operate-transfer (BOT) models. Although current contracts are archaic and the system requires reform, a new BOT system would allow for significant trunk road improvements and be an attractive investment opportunity as Myanmar's road traffic increases nationwide.
- While national airport development is currently under way, regional airport rehabilitation is needed to deal with expected increases in tourism traffic. Myanmar also requires extensive investment in air transport support services.
- Myanmar continues to offer great infrastructure investment opportunities, but only for investors who are patient, strategic and innovative. At the same time, the challenges are significant but risks can be overcome through strong market research, comprehensive due diligence, responsible local partners and an awareness of the country's political reality.

The Economist Corporate Network

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