BUILDING ASIA-PACIFIC'S FUTURE

INVESTING IN INFRASTRUCTURE

June 2024

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INTRODUCTION

The global trade environment has undergone massive change in just a few short years, raising broad implications for Asia-Pacific economies.

Local shortages of goods and raw materials during the pandemic encouraged businesses and policymakers alike to rethink supply chains. The "just-in-time" approach to managing inventories, parts and materials had become the norm. But as risks grew, companies increasingly sought shorter supply routes. Meanwhile, with competition between great powers intensifying, nations are driving new public investments toward factories and technology in hopes of bringing production closer to home. Authorities around the world introduced new government subsidies, tax incentives, and tariffs to bolster production and build competitive advantages in critical sectors, namely semiconductors. Economic polarization and the transformation of supply chains will create new winners and losers in global trade, touching a wide range of asset classes, sectors and geographies.

The debate over whether the world is moving toward deglobalization, or if globalization is merely taking a different form, will continue. No matter how the outlook evolves, it has become clear that many economies in Asia-Pacific are emerging as beneficiaries from this era of "near-shoring" and "friend-shoring."

> **Global infrastructure AUM stood at $325B in 2016 and is forecast to hit $1.7T by 2028**

To support burgeoning trade relationships and broader economic growth, significant investments across the region's infrastructure space—spanning transportation, housing, data centers, manufacturing, and logistics—will be required. The funding gap for infrastructure projects in developing countries worldwide stands at $1 trillion to $1.5 trillion, according to the United Nations.[1]

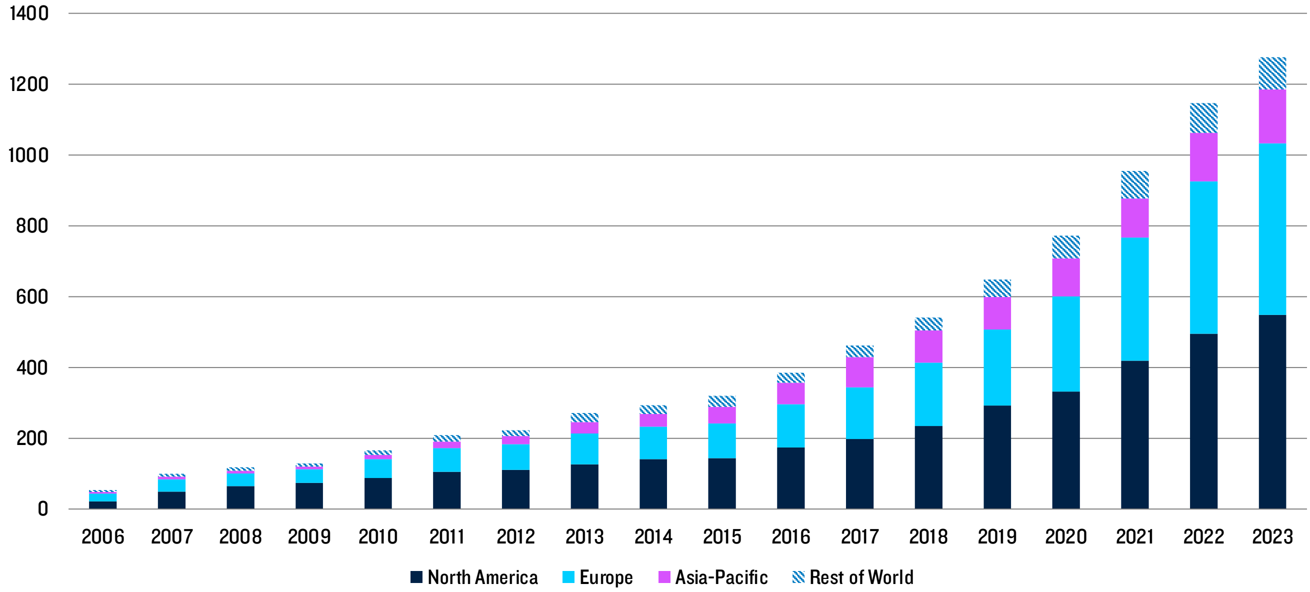
With demand for funding on the rise, infrastructure has established itself as an important alternative asset class in institutional portfolios, due in part to the long-term and diversifying nature of infrastructure investments, as well as their ability to generate steady and reliable cash flows. Global infrastructure AUM stood at $325 billion in 2016[2] and is forecast to hit $1.7 trillion by 2028.[3]

> **"The realignment of global supply chains creates a void to be filled. In Asia-Pacific, investors have to be nimble as new infrastructure needs emerge."**
>
> Magdalena Polan, Head of Emerging Market Macroeconomic Research, PGIM Fixed Income

1 United Nations Department of Economic and Social Affairs. *Closing the Infrastructure Gap*. https://financing.desa.un.org/iatf/action-areas/cross-cutting-issues/closing-infrastructure-gap. Accessed May 2024.
2 Pensions & Investments. https://www.pionline.com/article/20170131/ONLINE/170139958/preqin-private-equity-infrastructure-assets-grow-real-estate-drops-2. Accessed May 2024.
3 Preqin. https://www.preqin.com/LinkClick.aspx?fileticket=g5B8rg94lPI%3D&portalid=0. Accessed May 2024.

Exhibit 1: Infrastructure is growing as an asset class

Assets under management, by region ($ billions)*



Source: Financial Times and Preqin. Data as of June 2023.

By taking a broad view of infrastructure as an asset class, investors can unearth diverse opportunities that emerge in the next chapter of global trade. There are four underlying themes to consider when assessing the infrastructure landscape in Asia-Pacific:

1. Asia-Pacific countries have unique infrastructure needs and challenges.

Investors should not paint Asia-Pacific with a broad brush. While the realignment of global trade and manufacturing stands to impact the region as a whole, each country's needs are different and being driven by a variety of factors, such as growing cities (Sydney) and aging populations (Japan). Also, by their nature, infrastructure projects have a greater degree of sensitivity to government policy and regulations than other asset classes, which could create uncertainty over the economic viability of projects. Incentives such as subsidies and tax breaks may be fleeting as well. Investors should seek out markets that offer more predictable regulatory schemes and consider that policy shifts may occur, while avoiding investments where the economic viability is wholly dependent on subsidies. Investors must also be nimble as the geopolitical landscape changes, impacting the region in new or unexpected ways.

2. Four Ds are driving major change: demographics, deglobalization, digitization and decarbonization.

The transformation of global infrastructure will in many ways be propelled by these four forces:

- **Digitization:** The digitization of the global economy will require new data centers, e-commerce logistics, fiber networks, connectivity towers and power infrastructure. Intense demand for semiconductors lies at the center of global trade's reordering, as nations seek reliable and secure production of chips used in everything from military equipment to cars.
- **Deglobalization:** The shift toward deglobalization will require infrastructure that supports domestic manufacturing, port capacity and the resilience of supply chains. A burst of intra-Asia trade is another catalyst for infrastructure investments as economies in the region grow.
- **Demographics:** Changing demographics, including aging populations and bigger cities, will create new housing needs. After higher rates set off a "great reset" in real estate values globally, a recovery in Asia-Pacific appears close as capital values stabilize and income returns remain resilient. Investors

with dry powder may find attractive entry points as the market cycle begins to turn. Efforts to bolster lending standards in the region are contributing to growth in real estate debt—a potential diversifier for institutional portfolios.

- **Decarbonization:** The energy transition will require new wind turbines, solar farms, and charging stations for electric cars and buses. Many ports will need upgrades to export critical minerals and import everything related to renewable energy.

3. Infrastructure financing flows through both public and private markets.

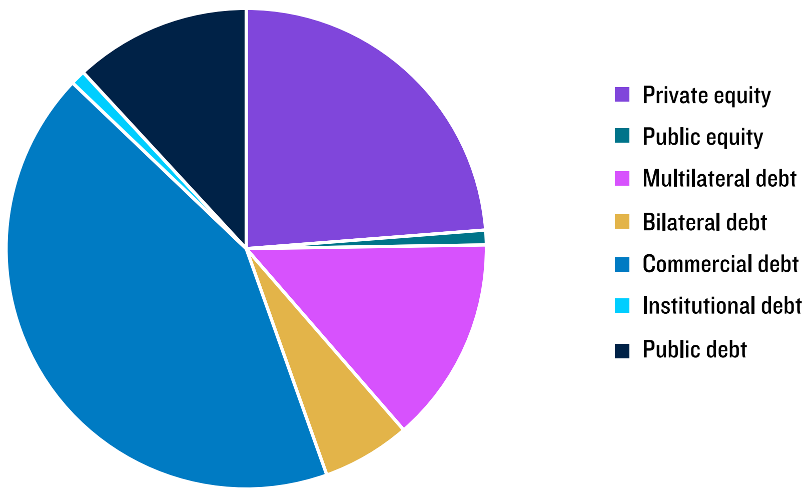
In 2023, debt represented 75% of the capital allocated toward infrastructure projects in low- and middle-income countries globally, while equity accounted for 25% of total financing. Private sources accounted for 67% of these investments.[4] In Asia-Pacific, large-scale projects and policy initiatives are relying heavily on private investments. Indonesia's government expects private capital to account for more than half of its $32 billion capital city project. South Korea unveiled a plan to accelerate infrastructure development projects through partnerships with the private sector.[5] Infrastructure can be an attractive asset class for a variety of reasons, including a maturity profile that makes sense for institutional investors who have a long-term horizon. In private credit, institutional investors may be well-positioned to meet a need for longer-term, fixed-rate infrastructure capital. Investors also have access to infrastructure and related opportunities in a wide range of sectors, such as aircraft, transports, logistics, utilities, telecommunications, mining, and construction equipment and materials.

4. Digital infrastructure is a fast-growing sector in Asia-Pacific, driven by AI and the cloud.

In the digital age, data has become one of the most critical commodities in the global economy. The advent of generative artificial intelligence (AI) has accelerated demand for hyperscale data centers, which are on pace to more than double globally over the next five years and represent a fast-growing industry in Asia-Pacific. Companies are turning to markets across the region,

Exhibit 2: Sources of financing for infrastructure projects with private participation in 2023

All figures as a percentage of total investment



Source: PPI Database, WorldBank, as of January 2024.

4 World Bank. *Private Participation in Infrastructure (PPI) 2023 Annual Report.* https://ppi.worldbank.org/content/dam/PPI/documents/PPI-2023-Annual-Report-Final.pdf. Accessed May 2024.

5 Bloomberg. (2024, February 1). *South Korea to Accelerate Projects to Aid Private Developers.* https://www.bloomberg.com/news/articles/2024-02-01/south-korea-to-accelerate-projects-to-aid-private-developers. Accessed June 2024.

from Tokyo to Sydney, to expand server capacity for AI learning models and traditional cloud computing. Concerns over data sovereignty and geopolitical risks also create a supportive backdrop for data centers. From an investment perspective, the imbalance between robust demand and limited supply could make allocating toward data centers attractive given the corresponding upward pressure on rents. A shortage of available build sites, backlogs in the search for backup generators, and high demand for advanced GPUs capable of handling AI workloads are all contributing to a supply-constrained market. Beyond data centers, there is demand in emerging markets for wider broadband access, a structural tailwind for telecommunications companies operating in the region.

With the opportunity set growing, PGIM has collected insights from investment professionals across its affiliates to illustrate the broad possibilities emerging in the infrastructure space and help investors manage risk in a fast-changing environment.

Why Asia-Pacific's infrastructure investments stand out globally

Infrastructure has arguably been an area of underinvestment in the US and Europe, where budgets have been constrained and public infrastructure such as roads, bridges and airports is more established. In Asia-Pacific, infrastructure needs are more pronounced, and the region is investing heavily in this space, whether to build new infrastructure or adapt existing infrastructure to emerging trends. The East Asia and Pacific region, defined by the World Bank to include low- and middle-income countries such as China, Indonesia, Malaysia, Vietnam and Thailand, registered a 28% increase year-over-year in private infrastructure investments across energy, transport, water and sanitation in 2023.[1] While investments in low- and middle-income nations in South Asia fell 40% from 2022, its total of $8.2 billion was the third-largest globally.

This is an opportunity that long-term investors can't ignore. Substantial amounts of capital have already flowed from investors in the US and other parts of the West—a sign that investors seek greater exposure to infrastructure assets and Asian economies, which will account for an estimated 60% of global GDP in 2024.[2] Superannuation funds in Australia have also shown strong appetite for infrastructure and the secure cash flows associated with these assets. Moreover, substantial growth opportunities exist in areas that are largely untapped in Asia-Pacific, including the privatization of unique assets such as land titles and vehicle registries.

Estimates suggest that cities worldwide will see their populations rise. Around 4.4 billion people, or 56% of the world's population, live in cities, according to the World Bank. That number is forecast to grow by one-third to 6 billion by 2045.[3] Cities in Asia-Pacific will drive this projected population boom. This will force infrastructure networks to adapt to the needs of mega-cities and add to existing challenges around housing affordability and availability. Aging populations—Japan being a prime example—are creating demand for modernized logistics facilities that can better utilize automation. Other cities such as Seoul, South Korea, have struggled with low birth rates and declining populations.

1 World Bank. *Private Participation in Infrastructure (PPI) 2023 Annual Report*. https://ppi.worldbank.org/content/dam/PPI/documents/PPI-2023-Annual-Report-Final.pdf. Accessed May 2024.
2 International Monetary Fund. (April 2024). *World Economic Outlook*. https://www.imf.org/en/Publications/WEO/Issues/2024/04/16/world-economic-outlook-april-2024. Accessed May 2024.
3 World Bank, Urban Development. https://www.worldbank.org/en/topic/urbandevelopment. Accessed May 2024.

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CHAPTER 1

AUSTRALIA

01

AUSTRALIA

Around the middle of the afternoon on January 25, 2024, as Australians neared the end of another day at work, their nation recorded an astonishing milestone. The population clock administered by the Australian Bureau of Statistics surpassed 27 million people for the first time, an estimated increase of 624,100 in just 12 months. By comparison, Australia's annual growth record was set in 2009, when the population rose by 442,500.[1]

Nearly twenty-two years had passed since the federal government issued a report projecting a far slower pace of growth, with a forecast that 25.3 million people would be living in Australia in 2042.

The surge in Australia's population plays a central role in the outlook for infrastructure across the country. Nowhere is this trend more apparent than in the housing sector, which has struggled to keep up with demand and faces a severe inventory shortage. Among those who rent, an estimated 80% of households in the bottom 20% of Australia's income distribution had payments considered unaffordable in 2016, or more than 30% of their income.[2] Meanwhile, Australia's three most populated regions—Sydney, Melbourne, and South East Queensland, including Brisbane—accounted for roughly three-quarters of countrywide population growth over three years, compounding the need for housing and other infrastructure in major cities.[3]

Rapid growth in and around state capitals will require a variety of infrastructure improvement programs.

Investing in Growing Cities

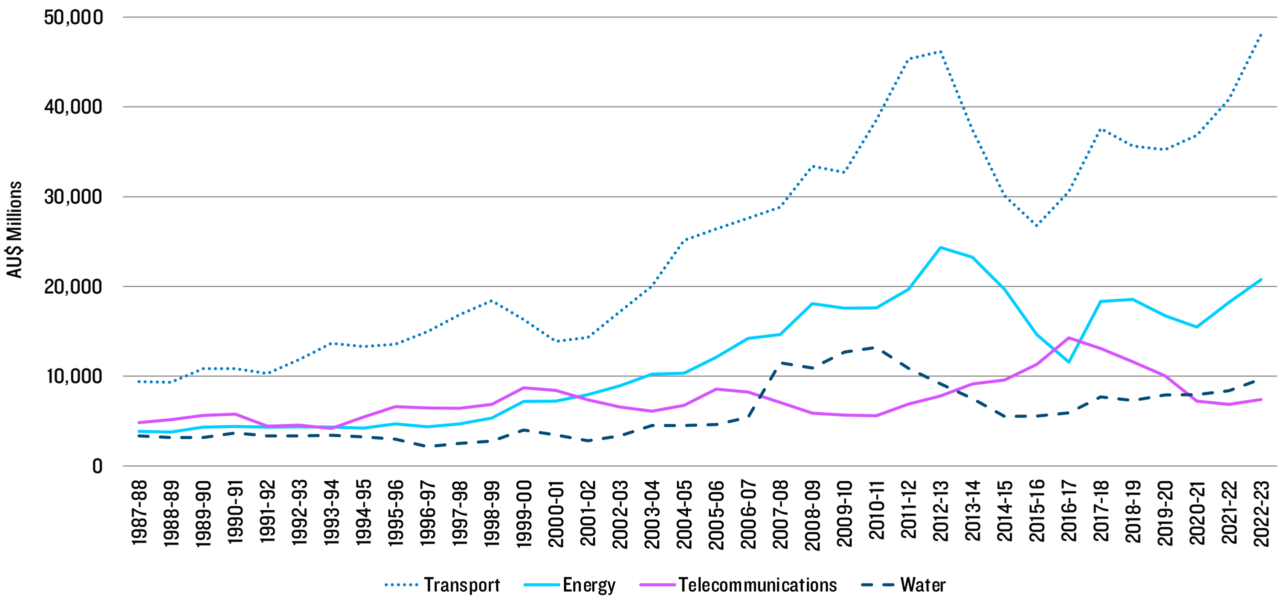
Australia invests 3.8% of GDP in infrastructure, more than the average high-income country (2.7%). Transportation accounts for 68% of Australia's infrastructure spending, while 22% goes to social infrastructure such as housing.[4]

To address the housing crisis, the Australian government has launched new initiatives to boost supply. The Housing Australia Future Fund (AU$10 billion) and National Housing Accord (AU$350 million in additional funding) are in their infancy but aim to facilitate the construction of 40,000 social and affordable homes over a five-year period. Despite a growing population, labor shortages persist and have driven up costs, complicating efforts to close the housing gap.

An expanding populace is a driving force behind transportation needs as well. Infrastructure investment activity in the transportation sector reached AU$48 billion in the 2022-23 fiscal year, the highest mark since the government began tracking the data in 1997-98.[5]

1 Australian Broadcasting Corporation. (2024, January 24). https://www.abc.net.au/news/2024-01-24/australias-population-reaches-27-million/103385422. Accessed May 2024.
2 Australian Housing and Urban Research Institute (AHURI). (2019, December 11). https://www.ahuri.edu.au/research/final-reports/323. Accessed May 2024.
3 Australian Government Centre for Population. https://population.gov.au/population-topics/topic-population. Accessed May 2024.
4 Global Infrastructure Hub, World Bank. https://www.gihub.org/countries/australia/. Accessed May 2024.
5 Australian Government Department of Infrastructure, Transport, Regional Development, Communications and the Arts. https://www.bitre.gov.au/publications/2023/australian-infrastructure-and-transport-statistics-yearbook-2023/infrastructure-construction. Accessed May 2024.

Exhibit 3: Infrastructure construction activity adjusted by chain volume index



Source: ABS, 2023. Engineering Construction Activity, Australia.

Housing, Logistics and Energy Demand

In this environment, Australia—a mature economy with established regulatory systems and financial markets—represents a broad range of infrastructure possibilities. Institutional investors also may be well positioned to meet the infrastructure sector's need for longer-term, fixed-rate capital through private credit markets. Opportunities to add infrastructure assets to the portfolio may further present themselves as superannuation funds, which have invested heavily in the sector, rebalance their own portfolios to meet yield targets.

The living sector—encompassing a wide array of real estate including student housing, nursing homes and co-living—is rife with potential. Co-living, a relatively new form of housing that has grown in popularity as an alternative to traditional apartments, has emerged as a potential solution to the affordability crisis. This may be especially appealing in metro areas such as Sydney, one of the most expensive residential real estate markets in the world. Residential housing valuations in general could be seen as more attractive in Australia than other Asia-Pacific markets, given the recalibration that transpired amid a rise in interest rates.[6]

The investment case for logistics appears strong as the population and e-commerce demand grow in tandem, driving companies to seek new warehouses that can serve major cities. The supply-demand imbalance in data centers is most pronounced in developed markets such as Australia, where land constraints in Sydney and other cities make rents favorable to investors. Traditional cloud and AI customers have soaked up existing vacancies, and AI-focused data center builds hold significant growth potential.

Opportunities may also be uncovered downstream from the energy transition, as well as from efforts to diversify supply chains and export markets. Trade activity with Japan, South Korea, Singapore and other Asian markets has accelerated, improving the outlook for domestic manufacturing. In April 2024, Australia's federal government announced a "Future Made in Australia" plan, which set aside at least AU$18 billion in incentives for renewable hydrogen, solar and manufacturing.

6 Knight Frank. (2024, March 5). https://www.knightfrank.com/wealthreport/article/2024-03-05-luxury-residential-markets-proved-resilient-in-the-face-of-interest-rate-hikes-in-2023. Accessed May 2024.

“The longer-dated asset profile and capital needs within infrastructure are well-suited for investors with a long-term focus. Generally speaking, banks are best positioned to provide shorter-term financing, but to meet the needs for longer-term, fixed-rate capital, that’s where our type of investment approach is most valued.”

William Pappas, Managing Director and Head of Core Infrastructure, PGIM Private Capital

The shift to renewable energy will benefit Australia’s mining industry. Rare earths such as lithium, copper and nickel are critical to solar panel and battery production, although it may take a few more years for demand to translate into infrastructure opportunities given the substantial capital required to ramp up mining operations. However, commodity demand will likely call for additional port capacity and other transport needs.

Investors should also be on the lookout for new sub-sectors to emerge. Australia has historically been open to privatizing assets such as physical infrastructure, and budget-conscious governments may look to monetize a wider array of assets. One example would be land titles and vehicle registries—stable platforms that could be attractive to private investors.

TRADE PARTNER	CHANGE IN TWO-WAY TRADE, 2021-22 TO 2022-23 (%)
Japan	+22.2
South Korea	+13.1
Singapore	+9.3
Malaysia	+31.6
Thailand	+25.4
Indonesia	+42.8
Vietnam	+16.4

Source: Australian Government Department of Foreign Affairs and Trade, https://www.dfat.gov.au/sites/default/files/australias-goods-services-by-top-15-partners-2022-23.pdf. Accessed May 2024.

CHAPTER 2

JAPAN

02

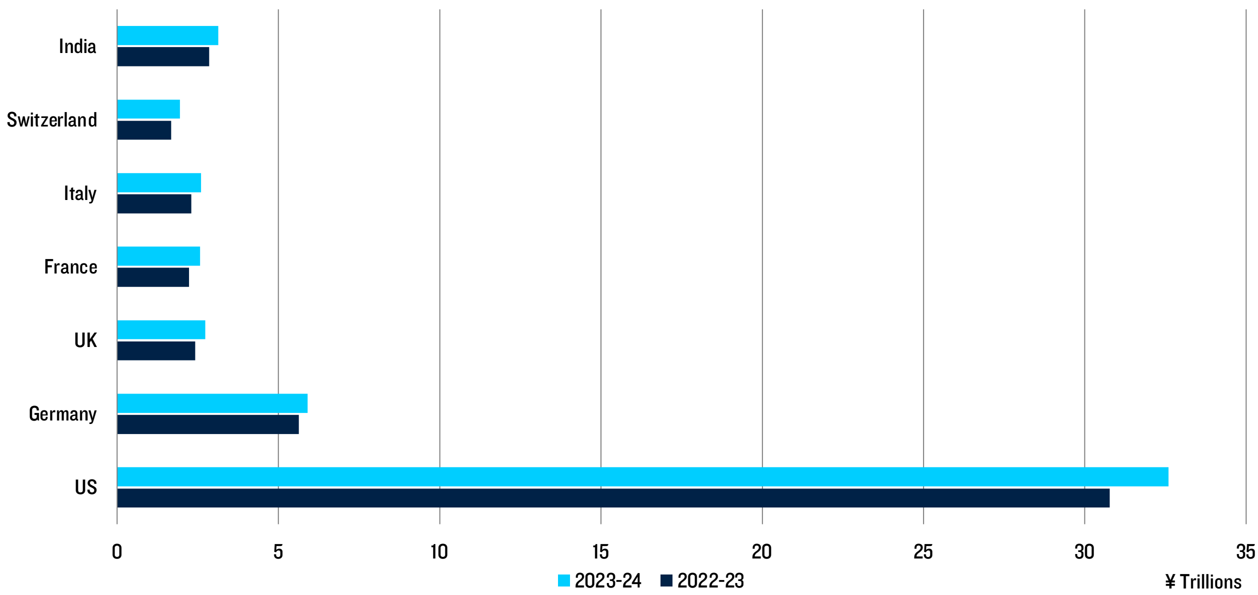
JAPAN

The Bank of Japan's decision to bring the era of negative interest rates to a close marked a milestone for an economy that has sparked investor interest across the globe. In March 2024, the BOJ raised rates for the first time in 17 years, responding to a rise in wages, inflation, and overall growth. An economic revival and optimism over corporate governance reforms helped lift the Nikkei 225 stock-market index above its previous record high, which had stood for more than 34 years.

The story playing out in Japan portends brighter days ahead for an economy that had long struggled to jumpstart growth and attract new investments. Foreign direct investment in Japan surged by 68.6% year-over-year to ¥6.5 trillion in 2022. FDI from the US was up 25.9% to ¥1.4 trillion, while Europe was responsible for ¥1.9 trillion in investment flows after recording negative net inflows in the prior year.[1]

Japan is also at the center of a changing trade environment. For the last decade-plus, Japanese companies expanded their footprint overseas—sending production and logistics facilities abroad—to diversify supply chains and alleviate labor challenges at home. Now the domestic manufacturing sector is getting a boost as chip makers and other businesses seek to onshore production, and it stands to benefit further as foreign manufacturers reroute their global supply chains. There are already signs that trade activity between Japan and countries such as the US, Germany and India is gaining momentum.

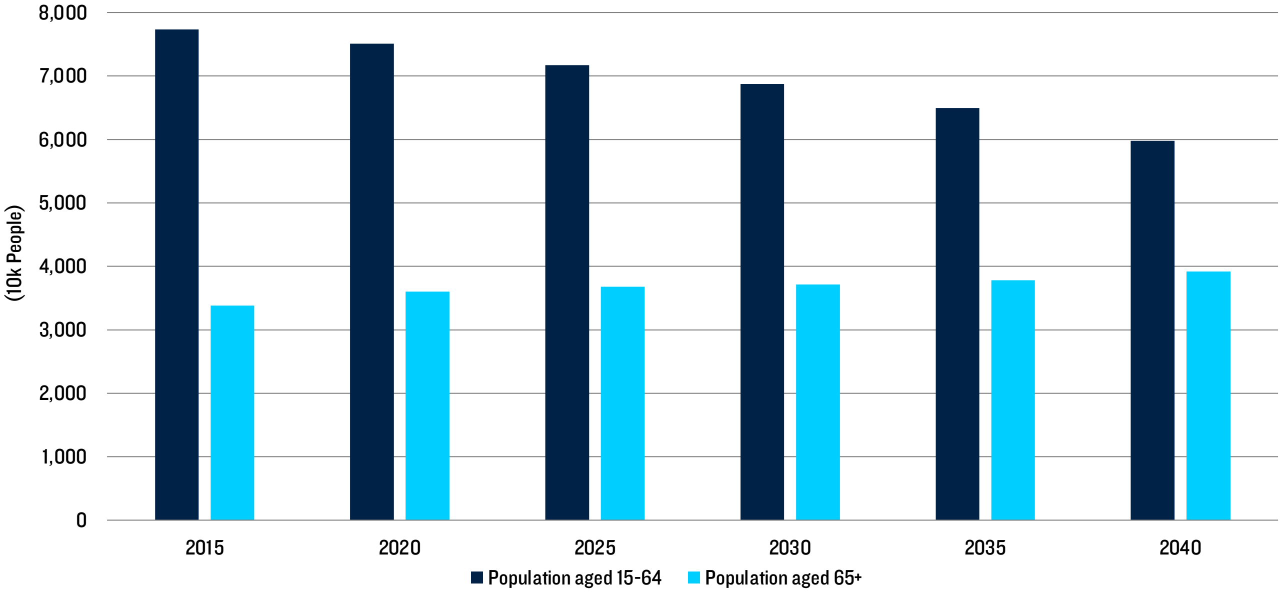
Exhibit 4: Japan sees increased trade activity



Source: Japanese Ministry of Finance. Fiscal year is from April through March.

1 Japan External Trade Organization. *JETRO Invest Japan Report 2023*. https://www.jetro.go.jp/en/invest/investment_environment/ijre/report2023/ch2/sec1.html. Accessed May 2024.

Exhibit 5: Population number forecast for the 15-64 and 65+ age groups



Source: Recruit Works Institute. Data up until 2020 based on the "2020 National Census." Data from 2025 onward based on moderate-range projections from the "Estimated Future Population of Japan (2017 Estimate)" by the National Institute of Population and Social Security Research.

Japan is not without its challenges. For one, an aging population is fueling a labor shortage while increasing healthcare and retirement costs. More than one in 10 people in Japan are at least 80 years old, and almost one-third of its population is over 65, making it the oldest country in the world.[2] Japan's labor shortage could reach 11 million people by 2040, according to one estimate.[3]

Impact of Trade Shifts and Aging Population

The transformation of global trade and Japan's aging workforce are central to the infrastructure outlook.

Looking at logistics infrastructure, labor shortages fueled by demographic shifts and new overtime rules for truck drivers have become major considerations in the location of new builds, as well as the conversion of older facilities. Companies are increasingly seeking logistics facilities adjacent to population centers or transportation infrastructure in order to access sufficient labor. A shrinking population also means that companies need modernized logistics facilities capable of implementing automation. Denser logistics networks will allow companies to shorten the amount of time that drivers are on the road, and upgraded facilities will reduce turnaround times for goods to ship.

A changing trade landscape bodes well for Japan's logistics market, as well as its ports and factories. The estimated infrastructure investment gap for Japan's ports is $20 billion, nearly triple the amount of additional capital needed in the energy sector.[4]

Public-private partnerships are a key element to Japan's core infrastructure. A 1991 law that established the Private Finance Initiative sought to encourage the private sector's involvement in building new infrastructure and has resulted in projects for schools, government buildings and family housing. Meanwhile, Japan made a legislative change in 2011 to allow private investment in public facilities including airports. Since then, Japan has embarked on an effort to privatize state-run airports, resulting in several transactions.

2 World Economic Forum. (2023, September 28). https://www.weforum.org/agenda/2023/09/elderly-oldest-population-world-japan/. Accessed May 2024.
3 Recruit Works Institute. (2023, September 26). https://recruit-holdings.com/en/blog/post_20230926_0001/. Accessed May 2024.
4 Global Infrastructure Hub, World Bank. https://outlook.gihub.org/countries/Japan. Accessed May 2024.

Outlook for Data Centers and Real Estate

Japan is also expanding economic ties with the US and Philippines through what the countries have called the "Luzon Economic Corridor," which will funnel US and Japanese investments into rail, ports modernization, semiconductor supply chains, and other infrastructure projects in the Philippines. The Japanese government has pledged additional financial support to expand its domestic manufacturing base, particularly in the semiconductor sector. Taiwan Semiconductor Manufacturing Corporation (TSMC), the world's largest chip maker, opened its first Japanese plant in February 2024, with plans to build a second facility by the end of 2027.

Other major tech companies from Amazon[5] to Microsoft[6] have pledged to invest billions of dollars in Japan to expand AI and cloud infrastructure, supporting a positive outlook for data centers. Tokyo and Osaka are two markets with substantial growth potential amid demand for modern data centers with greater energy efficiency.

While the office sector looks challenging, the return of tourism should provide a tailwind for the hospitality and retail sectors, especially in the popular destinations of Tokyo and Osaka.

Japan's real estate market as a whole is an appealing investment destination amid healthy yield spreads and market stability. Although interest rates may rise from recent levels, they remain extremely low and should continue to support valuations.

"

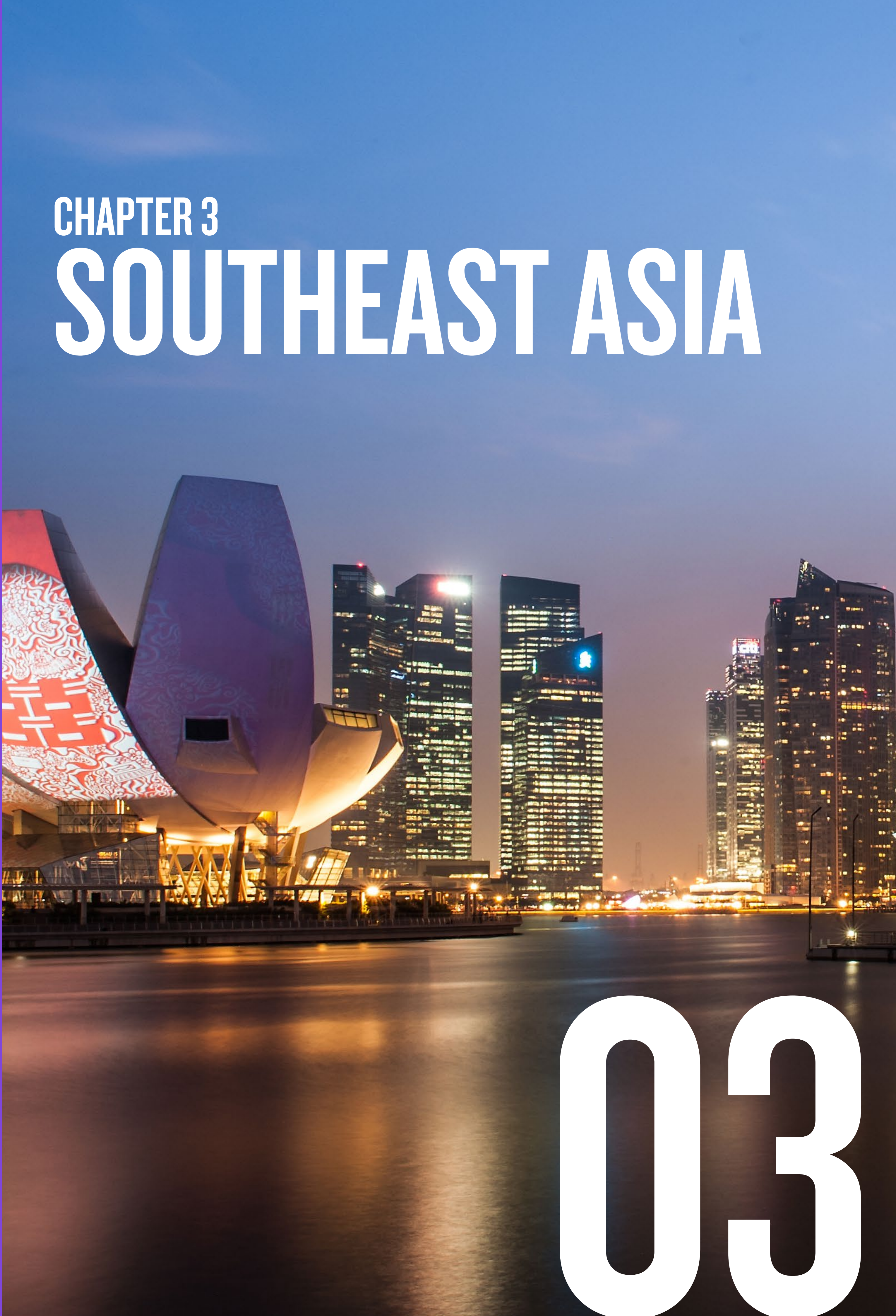
The advent of AI has really accelerated the gap between supply and demand in data centers. It is pushing demand to new markets around the globe, driving growth across Asia-Pacific."

Morgan Laughlin, Managing Director and Global Head of Data Center Investments, PGIM Real Estate

5 Reuters. (2024, January 19). https://www.reuters.com/technology/amazons-aws-invest-15-bln-expand-cloud-computing-japan-2024-01-19/. Accessed May 2024.
6 Reuters. (2024, April 9). https://www.reuters.com/technology/microsoft-invest-29-bln-boost-ai-business-japan-nikkei-2024-04-09/. Accessed May 2024.

CHAPTER 3

SOUTHEAST ASIA



03

SOUTHEAST ASIA

No more than two decades ago, Vietnam had a relatively small role to play in a vast US trade system. Today, Vietnam has positioned itself as a diversifying force in the reallocation of supply chains. Exports to the US surged by 268% from 2014 to 2023. That left Vietnam with the fourth-highest trade surplus with the US, trailing only China, Mexico and the European Union.[1]

Shifting trade patterns, the digitization of the global economy, and the quest for reliable chip production are central themes in the story reshaping the infrastructure landscape in Southeast Asia.

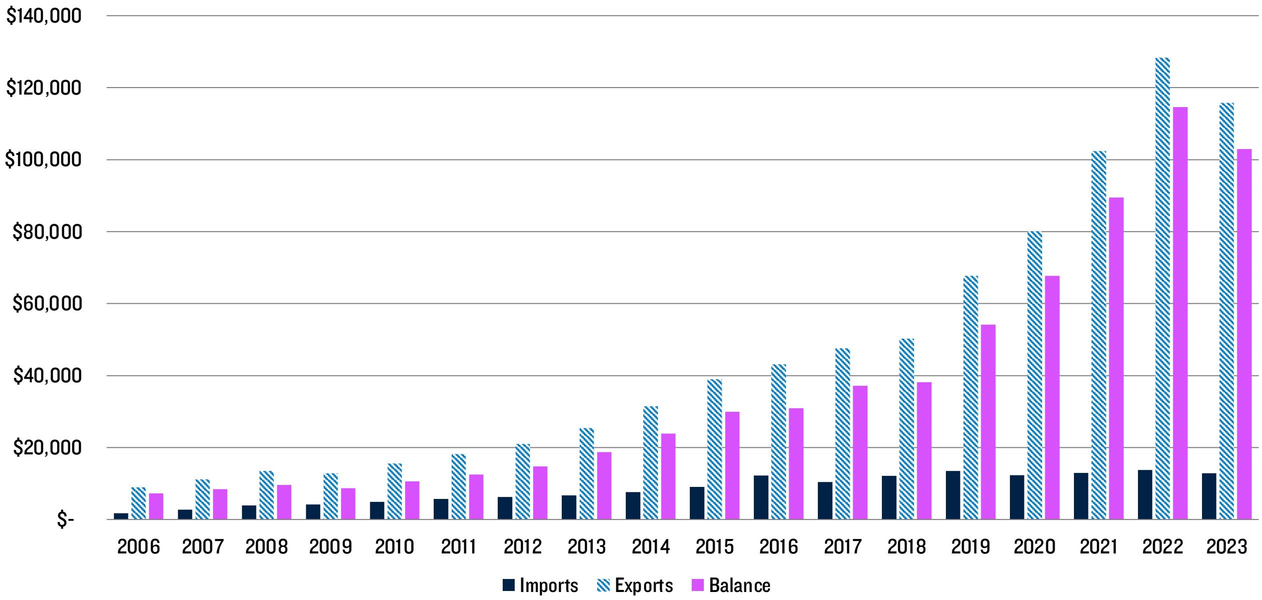
With major economies like the US seeking to reduce geopolitical risk in critical supply chains, countries like Vietnam offer a chance for manufacturers and purchasers to diversify their trade routes in Asia. Countries with an established factory sector—Vietnam is a large producer of consumer goods and electronics—and existing trade ties with the West are well positioned to capitalize on the fragmentation of the global economy, even as globalization remains embedded in many supply chains.

Tech at Center of Evolving Outlook

Perhaps no other sector illustrates the realignment in global trade better than the semiconductor industry. Amkor, a US-based company specializing in semiconductor packaging, design and testing, opened a new $1.6 billion factory in Bac Ninh, Vietnam, in October 2023. One month earlier, GlobalFoundries cut the ribbon on a $4 billion chip manufacturing facility in **Singapore**. In April 2024, Sony Semiconductor Solutions began production at a new fabrication plant in **Thailand**.

Meanwhile, Southeast Asia is a hot market for data centers, and demand from companies who want to establish large campuses is a relatively new

Exhibit 6: Vietnam's Growing Trade Relationship with US (in millions)



Source: US Bureau of Economic Analysis

1 Reuters. (2024, May 16). https://www.reuters.com/markets/us-hikes-china-tariffs-imports-soar-china-reliant-vietnam-2024-05-16/. Accessed May 2024.

> **Major cities are still growing. That will have a major impact on infrastructure because as cities grow, the infrastructure around those cities needs to adapt to accommodate that growth."**
>
> **Eduard Wehry, Managing Director and Head of Hong Kong and Asia Pacific Business Development, PGIM Real Estate**

development in the region. Supply constraints in Singapore are pushing customers to look at other markets, contributing to strong growth in places like **Malaysia**, which benefits from the availability of power and land. Singapore remains a major hyperscale market, however, with a supply-demand imbalance creating attractive rents for investors. Bangkok, Johor, Kuala Lumpur, Cyberjaya, Manila and Jakarta also continue to grow and show potential for their developability, resiliency and existing economy.

Opportunities Arising from Urban Growth

Urban population growth in major cities such as Singapore is increasing demand for rental housing to address supply shortages and affordability challenges. Opportunities also exist in a resilient office market in Singapore, where the outlook may be more compelling than other markets facing stiffer headwinds.

Office rents have been comparatively stable in Singapore's central region, falling 1.7% in the first quarter of 2024 after a 27.5% rise over nine straight quarters.[2] Offices in the central business district (CBD) appeal to a wide range of tenants, and refurbishing buildings at attractive prices can unlock additional value for investors.

One of the most expansive infrastructure projects in the world is in **Indonesia**. The country is building a new city from the ground up as it prepares to move its capital from Jakarta, a city plagued by congestion, to Nusantara, located on the island of Borneo. The project, scheduled to be completed by 2045, is estimated to have a final cost of $32 billion. The first phase involves the construction of government buildings and basic infrastructure to support an expected initial population of 500,000 people.[3]

The Indonesian government has said the bulk of the financing will come from private capital, and state funds will provide the rest. Officials aim to create new business and investment opportunities in Indonesia through the development of Nusantara, while maintaining that Jakarta will continue to serve as an economic hub once Nusantara is fully constructed in 2045. Transportation and other existing infrastructure needs will likely remain in focus.

Meanwhile, a growing tourism market presents opportunities in countries such as Thailand, where airports should benefit from a strong multiyear traffic growth trajectory fueled by outbound travel demand from China.

Across emerging markets in Southeast Asia, infrastructure projects tend to be smaller and thus may need to be financed in a way that makes them appealing to foreign investors. Debt financing for EM infrastructure assets tends to look more like structured products, as opposed to large public bond offerings that investors might find for bigger projects in developed markets.

It is also crucial for investors to take stock of emerging geopolitical and trade risks. Managing these risks will require assessing the effectiveness of each country's leadership in navigating this environment; potential legal rights and protections for those investing in infrastructure projects with lengthy completion timelines; and whether expected returns are enough to compensate investors for potential risks that alter the viability of a project.

2 The Business Times. (2024, April 26). https://www.businesstimes.com.sg/property/singapore-office-rents-central-region-fall-1-7-cent-q1-after-rising-9-quarters. Accessed May 2024.
3 Government of Indonesia. *Nusantara Capital City*. https://www.ikn.go.id/en/about-ikn. Accessed May 2024.

CHAPTER 4

INDIA

04

INDIA

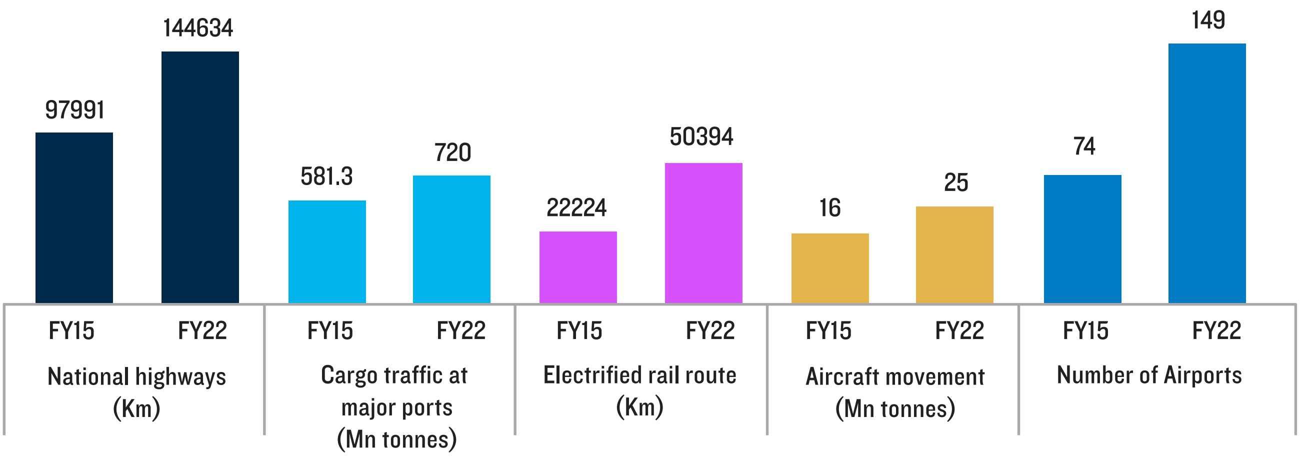
India continues to be the fastest-growing large economy in the world, according to the International Monetary Fund. Given its aggressive plans to become a developed economy by 2047 it will need all the growth it can get, and helping to lead the way will be a massive commitment to improving its infrastructure.

The World Bank estimates that by 2036, 600 million people (or 40% of the population) will be living in urban cities in India. Electrical buildout, the need for better roads and airports, and an improved rail network will all be part of the infrastructure push that will be paramount in helping India achieve its lofty economic goals. India's government continues to promote more domestic manufacturing capabilities to reduce reliance on imports, in addition to production incentives that target specific industries. It's also providing incentives for investments in domestic manufacturing such as renewable energy and batteries.

Among the many infrastructure opportunities lies in increased air traffic. For such a large country – India's population is around 1.4 billion people – the penetration rate for flying remains small. While domestic passenger traffic in China, for example, has surged, India is still on the cusp of that growth, which will require extensive buildout of the nation's airports. Expansive orders for Boeing and Airbus aircraft in recent years serves to highlight the potential.

India's rapid growth has also created a potentially attractive environment in the power sector. The projected increase in manufacturing capacity will no doubt lead to a corresponding surge in power demand, and peak power demand continues to exceed peak supply capabilities. (In fact, one concern for investors and the Indian government is whether a lack of access to power could end up limiting economic growth.) India is already the world's fourth-largest electricity consumer and third-largest renewable power producer, and with a backdrop of projected growth, companies

Exhibit 7: India's Improvements in Physical Infrastructure



Source: India Ministry of Finance, 2024-2025 budget documents. Data as of February 2024.

with a track record of execution on large-scale projects and relationships with local regulatory authorities can be attractive for investors.

India has also been a beneficiary to some degree from diversification of other nations' supply chains, particularly post-Covid, as companies in other countries looked to diversify supply chains away from China into Southeast Asia countries as well as India. One big theme resulting from China joining the WTO was global trade growing faster than global GDP, which persisted for decades. Now, global trade is undergrowing global GDP. Faster global trade allowed lower-cost products to get to consumers, which helped support economic growth in China. China now has excess manufacturing capacity in different markets and is also no longer stimulating its construction market. As a result, many industrial companies don't see the continued outsized growth in China in coming years while anticipating stronger growth in India.

Getting Past the Bureaucracy

It's true that one of the factors holding India's infrastructure growth back in the past has been concern about regulatory uncertainty and corruption. Indeed, a report released in 2015 by the World Economic Forum[1] tabbed corruption and political and regulatory risk as the biggest constraints in infrastructure development in India. But those concerns have diminished substantially in recent years, with investors citing more regulatory clarity and visibility and progress combatting political deadlock in different states.

Shifts in policy have been tricky at times, but India is a relatively stable country, albeit one with ingrained bureaucracy and many layers of government. In the past, policies emanating from the top of India's government may not have been embraced or implemented by state and local jurisdictions. Under Prime Minister Narendra Modi, that has improved, particularly as it relates to the power sector. The government's plans to improve the standard of living for the Indian population by electrifying rural parts of the country are moving along with the support of local jurisdictions that have every incentive to support such a policy. The results of India's 2024 elections mean that Modi will need to work with coalition partners to achieve political aims, but he is expected to continue prioritizing infrastructure development.

India's is a story of urbanization, electrification, and overall increased manufacturing activity. While infrastructure investing can mean different things for different investors, finding companies with long-lived, stable assets that generate solid free cash flow is vital, as is investing in countries with regulatory stability and visibility. Exposure to India could be a key differentiator for institutional investors over the next 5-10 years in what has historically been an under-invested market.

"Growth for electrical demand, airports, and the overall need for infrastructure is very high in India, and we're seeing better execution from the government enabling those growth vectors."

Brannon Cook, Managing Director and Global Infrastructure Portfolio Manager, Jennison Associates

1 World Economic Forum. (2015, November 6). *What's holding up India's infrastructure?* https://www.weforum.org/agenda/2015/11/india-infrastructure/. Accessed May 2024.

CHAPTER 5

INVESTMENT IMPLICATIONS

05

INVESTMENT IMPLICATIONS

The next phase of globalization sets the stage for emerging investment possibilities across the infrastructure landscape in Asia-Pacific.

Changes in regional demographics, a shift toward deglobalization, and the digitization and decarbonization of the modern economy will all have a profound impact on existing and future infrastructure needs. It will be crucial for investors to view the sector through a wide lens to capture opportunities in transportation, housing, data centers, logistics and energy as demand for new and upgraded infrastructure rises. As supply chains continue to evolve and infrastructure needs develop in and around Asia-Pacific's major cities, agile investors will find attractive opportunities to deploy infrastructure capital across public and private asset classes.

Investment Implications

Asia-Pacific economies are emerging as beneficiaries of a new era in global trade.

- Four Ds are driving economic change and infrastructure needs: demographics, deglobalization, digitization and decarbonization.
- Urban growth will force infrastructure networks to adapt to the needs of mega-cities, including transportation, affordable housing and e-commerce logistics.
- The imbalance between robust demand and limited supply could make allocating toward data centers attractive given the corresponding upward pressure on rents.
- By their nature, infrastructure projects can be sensitive to government policy and regulations. Investors should seek out markets that offer more predictable regulatory schemes and consider that policy shifts may occur.

AUSTRALIA

Rapid growth in and around state capitals will require a variety of infrastructure improvement programs.

- The living sector—encompassing a wide array of real estate including student housing, nursing homes and co-living—is rife with potential amid an affordability crisis.
- The investment case for logistics appears strong as populations and e-commerce demand grow in tandem, driving companies to seek new warehouses that can serve major cities.
- The supply-demand imbalance in data centers is most pronounced in developed markets such as Australia, where land constraints in places like Sydney make rents favorable to investors.
- Opportunities may be uncovered downstream from the energy transition, as well as from efforts to diversify supply chains and export markets. Commodity demand will likely call for additional port capacity and other transport needs.

JAPAN

The transformation of global trade and an aging workforce are central to the infrastructure outlook.

- Labor shortages and new overtime rules for truck drivers have become major considerations in the location of new logistics builds, as well as the conversion of older infrastructure. Companies need modernized logistics facilities capable of implementing automation.
- Major tech companies have pledged to invest billions of dollars in Japan to expand AI and cloud infrastructure, supporting a positive outlook for data centers. Tokyo and Osaka are two markets with substantial growth potential amid demand for modern data centers with greater energy efficiency.
- While the office sector looks challenging, the return of tourism should provide a tailwind for the hospitality and retail sectors, especially in the popular destinations of Tokyo and Osaka.
- Japan's real estate market is an appealing investment destination amid healthy yield spreads and market stability. Although interest rates may rise, they remain extremely low and should continue to support valuations.

SOUTHEAST ASIA

Shifting trade patterns, the digitization of the global economy, and the quest for reliable chip production are central themes.

- Countries with an established factory sector and existing trade ties with the West are well positioned to capitalize on the fragmentation of the global economy.
- Data center growth is strong in up-and-coming markets like Malaysia amid supply constraints in Singapore, which remains a major hyperscale market that offers attractive rents for investors.
- Bangkok, Johor, Kuala Lumpur, Cyberjaya, Manila and Jakarta show potential within the data center space for their developability, resiliency and existing economy.
- Urban population growth in major cities such as Singapore is increasing demand for rental housing to address supply shortages and affordability challenges.
- Opportunities exist in a resilient office market in Singapore, where the outlook may be more compelling than other markets facing stiffer headwinds.
- The bulk of the financing for Indonesia's $32 billion capital city project is expected to come from private capital.
- Debt financing for EM infrastructure assets tends to look more like structured products, as opposed to large public bond offerings that investors might find for bigger projects in developed markets.
- Managing emerging geopolitical and trade risks in EMs will require assessing the effectiveness of each country's leadership in navigating this environment and potential legal protections for those investing in infrastructure projects with lengthy completion timelines.

INDIA

Urbanization, electrification, and increased manufacturing activity are part of India's growth story.

- Electrical buildout, the need for better roads and airports, and an improved rail network will all be part of the infrastructure push that will be paramount in helping India achieve its lofty economic goals.
- Infrastructure opportunities should arise from an increase in air traffic and tourism. For such a large country, the penetration rate for flying remains small.
- Many industrial companies anticipate strong growth, and expanding manufacturing capacity will no doubt lead to a corresponding surge in power demand and related infrastructure needs.
- The government's plans to improve the standard of living for the Indian population by electrifying rural areas are moving along with the support of local jurisdictions.
- Concerns over India's policy environment have diminished substantially in recent years, with investors citing more regulatory clarity and visibility as well as progress combatting political deadlock in different states.




CHAPTER 6

INVESTMENT STRATEGIES

06

CONCLUSION

PGIM offers clients diversified solutions with global depth and scale across public and private asset classes, including fixed income, equities, real estate, private credit and other alternatives. Strategies that have a significant focus on infrastructure include:

Carbon Solutions

Jennison's Carbon Solutions takes a differentiated, comprehensive alpha-based approach to decarbonisation with a concentrated portfolio of 45-65 companies. With a global, all-cap multi-sector universe, the strategy seeks to invest across a broad range of companies, particularly where the contribution to decarbonisation and likely future growth are being underestimated.

Global Infrastructure – Listed Equities

Jennison's Global Infrastructure Strategy invests in a diversified portfolio of high-quality listed infrastructure companies that exhibit above-average levels of free cash-flow growth and whose fundamentals are underappreciated by the market. Jennison has been investing in infrastructure companies for over 15 years and is a pioneer in utility investing, managing one of the largest utility strategies in the US since the 1990s.

Global Infrastructure Debt

PGIM Private Capital manages infrastructure-focused strategies for institutional investors. The strategies invest in investment-grade and below investment-grade private debt in infrastructure sectors including renewable energy, power generation and transmission, midstream energy and transportation, social and digital infrastructure worldwide, as well as a range of other real assets concerns.

Real Estate – Data Centers

In 2023, PGIM Real Estate launched its data center strategy, investing primarily in hyperscale global data centers worldwide. PGIM Real Estate has invested in data centers with a total value of over $900 million completed in partnerships with leading data center operators, including Equinix.

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