INDIA ECONOMIC STRATEGY TO 2035 NAVIGATING FROM POTENTIAL TO DELIVERY



INFRASTRUCTURE SECTOR

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SUMMARY

- Urban development and transport infrastructure are the two segments of the Indian infrastructure sector that present the best opportunities for Australia. Given the differences in the nature of the opportunities this chapter examines them separately.
- The urbanisation of the world's largest rural population brings enormous opportunities and challenges. India's urban population is expected to reach 640 million by 2035.
- The opportunities for Australia are not in building cities or roads, but rather in financing and other service areas.
- Out to 2035, improvements in city planning and growing disposable incomes could enable more user charges – such as toll roads – to increase revenue generation for infrastructure developments.
- Improving transport infrastructure is critical to the liveability of India's cities. It is also central to India's productivity and the competitiveness of sectors such as agriculture and manufacturing.
- Transport is expected to attract the majority of infrastructure investment in India out to 2035. The need for capital is immense. Issues around land acquisition and dispute resolution could keep the sector from reaching its potential.
- The Indian Government is actively seeking foreign investment to finance its large-scale rail and road connectivity projects, with the creation of new investment vehicles and financing models. It is also beginning to improve regulatory clarity and reduce execution risk through policy reform.
- De-risked brownfield assets in the transport sector represent the clearest investment opportunities for Australia. There are also export opportunities for Australian expertise in areas such as port logistics, infrastructure financing, road safety, heavy haul transportation, multimodal logistics and architectural design and engineering.
- Urban development and associated infrastructure investment is a major source of growth for India. Urbanisation drives demand for inputs across sectors (such as metallurgical coal and iron ore for steel production) and shapes India's use of energy. The Indian Government is focusing on improving basic services such as sanitation and housing. Water management is a serious challenge, with most of India's large cities already facing water shortages on a daily basis.
- Australia can provide expertise in niche services for smart cities development including urban planning, transport management, road safety, water and sanitation and waste management.

Part A: Transport Infrastructure

1.0 THE MACRO STORY

KEY JUDGEMENT

India's transport infrastructure is inadequate to meet current needs, and the needs of 2035 will be much greater. It has a corresponding appetite for investment and services to improve the sector. The Indian Government is prioritising regulatory reforms to attract more foreign investment. Out to 2035, there are potential opportunities for Australian investors and Australian suppliers of niche services and technology in transport.

1.1 The scale and key structural drivers of the sector

India's population growth and economic development requires improved transport infrastructure, including through investments in roads, railways, and aviation, shipping and inland waterways.

Capital is the key to advancing India's transport infrastructure

- India will require investments of over USD4.5 trillion by 2040 for the development of its infrastructure, according to the Economic Survey 2017–18
 - of this, India will be able to meet about USD3.9 trillion, leaving a \$526 billion deficit
- a key goal of India's suite of regulatory reforms is to attract more foreign investment into the sector, including through new investment vehicles and innovative financial instruments
- by 2030, transport is expected to attract over 60 per cent of infrastructure investment in India.¹²

In some parts of India, developers are also employing user charges and value capture mechanisms such as taxes and betterment levies to finance infrastructure projects

- while these mechanisms have not gained ground as systematic instruments of revenue generation, there appears to be a growing confidence in investor markets that these mechanisms will bear fruit as the sector develops
- for instance, the Macquarie Group deal in March 2018 utilises a toll-operate-transfer model under the National Highway Authority of India investment vehicle.

A breakdown of the scale of the infrastructure capacity and demand for segments of transport infrastructure follows.

ROADS

India's road quality is generally low, despite India's roads carrying 90 per cent of passenger traffic and 65 per cent of freight

- road density is high but the length of surfaced roads is low at 61 per cent (compared to Russia at 70 per cent or China at 67 per cent)
- most highways are narrow, congested, and poorly surfaced
- there is poor access to rural areas; 40 per cent of India's villages do not have access to all weather roads.

The Government of India has a range of projects to improve road infrastructure

- the National Highways Development Projects, which require investments of up to USD170 billion
- the Bharatmala project, stretching from India's western to eastern land borders
- the Northeast Express Highway (1,300 km express highway in northeast India).

AVIATION

Air traffic is expected to experience double digit growth well beyond 2020, at which point India will become the world's third largest aviation market (behind China and the United States)

- passenger traffic is forecast to multiply by four times and cargo traffic by six times in the next twenty years; India's existing airport infrastructure is underutilised
 - of the 449 airports or airstrips in India, commercial airlines are operating at just 61, with the remaining unused or only occasionally used⁶⁵
 - » but of those 61, several are under strain and at capacity
- many Indian airports have widely recognised deficiencies in areas such as ground handling, night landing systems and cargo handling
- the maintenance and repair operations market is expected to grow at 6.7 per cent per annum to reach \$5.7 billion in the next 10 years from the current size of \$3.1 billion⁶⁶
- growth of India's aviation industry would have cross-cutting benefits for tourism
 - around 97 per cent of tourists arrive in India by air.

SHIPPING

India has unrealised potential in shipping, with 7,500 km of coastline and 14,500 km of navigable or potentially navigable waterways.

More than one billion tonnes of cargo was handled across over 200 ports in India in 2015 with maritime logistics accounting for 90 per cent of international trade by volume and 72 per cent by value. $^{\rm 67}$

Despite the cost-efficiency of coastal and inland water transportation, India's ports tend to be small, lack draft for larger vessels, and are inefficient

• with an average 4.5 day turn-around time, versus one day in China and 1.2 in the United States.

Port links to road and rail connections are poor

- between 2015 and 2025 the Indian Government's SagarMala project is set to provide over \$80 billion to infrastructure for ports and coastal shipping in India
 - the focus will be on enhanced connectivity through road, rail and inland waterways, and port development and modernisation.

RAIL

India's railways play a major role in affordable transport of passengers and cargo across the country

- it is one of the largest networks in the world with 7,216 stations; 92,000 km of track and 1.3 million employees
- Indian railways carried eight billion passengers and transported over one billion tonnes of freight in 2017–18
- however, most major corridors are facing severe capacity constraints and there are safety issues.

The Ministry of Railways plans to improve and expand the rail network, renew the train fleet, and improve passenger safety. It plans to invest up to \$170 billion over the next five years, with the largest proportion aimed at network expansion and decongestion, and safety.⁶⁴ Investments are also planned for station redevelopment and the dedicated freight corridor between Delhi and Mumbai. The Government of India is seeking greater private investment through:

- allowing 100 per cent FDI in railways for construction, operation and maintenance of suburban corridor projects, high-speed train projects, railway electrification and signalling, among others
- encouraging the development of new investment vehicles such as the Railways of India Development Fund to attract long term investment from global institutional investors.

MULTIMODAL LOGISTICS

Intermodal freight planning and optimisation in the transport infrastructure sector is lagging and inefficient transport logistics constrain the competitiveness and productivity of the Indian economy

- cold-chain logistics are underdeveloped, affecting trade in perishable food and vegetables and other agriculture commodities and impacting farmer income^{xxv}
- as part of its Logistics Efficiency Enhancement Programme, the Ministry of Road Transport and Highways plans to build 35 multimodal logistics parks (logistics hubs aimed at reducing costs and aggregating distribution and storage) funded through special purpose vehicles formed by state and central governments and the private sector
- the Ministry of Road Transport and Highways also proposes the formation of a multimodal company that will bring together disparate ministries to jointly plan and coordinate on logistics
- the implementation of GST should simplify and quicken transportation across borders and stimulate supply chain segments.

AUSTRALIA'S COMPETITIVE ADVANTAGE

Australia has world class transport infrastructure services with one of the world's most developed logistics networks.

Australian businesses have specialised expertise and regulatory models in niche areas of design and construction, port logistics, maintenance efficiency services in heavy haul rail, multimodal freight logistics, road safety and design and engineering.

We have a large pool of investable capital, a demonstrated history of leveraging public private partnership models and expertise in developing value capture mechanisms and user charges

• Australian companies Macquarie, CIMIC and Linfox have experience working in India on infrastructure and logistics projects that other Australian companies can draw on.

1.2 How the sector will likely evolve out to 2035

If implemented effectively, India's suite of ambitious policy changes could spur growth and opportunity in the sector as foreign investment increases. Innovations in transportation technology – including autonomous driving technologies, high-speed trains, and the rising popularity of shared transport options – could fundamentally change India's infrastructure needs out to 2035 in ways that are currently difficult to predict.

Four general trends will shape the sector out to 2035.

DEMOGRAPHICS

Rural to urban migration and a growing middle class will drive up infrastructure needs as more pressure is placed on public transport infrastructure and more cars go on the road.

GOVERNMENT FOCUS ON SECURING FUNDING

Policy changes in recent years, such as user charges, the advent of Invest India and new types of investment vehicles to attract investment and facilitate infrastructure will stimulate growth across transport modes, potentially improve capacity and efficiency, and contribute to economic growth [see Chapter 2: The Investment Story].

^{XXV} India has fewer than 10,000 refrigerated vehicles, while it needs 62,000 vehicles. India also needs 70,000 pack houses with pre-cooling and dispatch for onward transportation; as at 2015 there were only 250.

CASE STUDY: MACQUARIE: THE LARGEST FOREIGN INVESTOR IN INDIA'S NATIONAL HIGHWAYS

India is seeking trillions of dollars of capital investment to build the transport infrastructure vital to its economic growth. Roads carry most passenger traffic and two-thirds of freight, but highways are in need of further investment. India is focused on improved connectivity and an Australian firm is a partner on the journey.

Australia's Macquarie Group brings capital and world-leading expertise in managing infrastructure partnerships. It was the first foreign investor to acquire controlling stakes in Indian roads and is now the largest foreign investor in the road sector in India.

Since 2008, the group's infrastructure asset management division has committed more than \$3.2 billion in India. This includes winning the bid for concession agreements worth approximately \$2 billion to manage almost 700 km of Indian national highways over the next 30 years, under India's new asset recycling financing model. Macquarie started in India by acquiring a minority stake in a holding company for seven operating toll roads, and has grown to have majority control in 13 roads. In managing these roads, Macquarie has implemented many sector firsts, including:

- rigorous focus on health and safety practices leading to reduced workplace accidents
- optimal capital structure and lower interest rates through refinancing initiatives
- engaging with all stakeholders, especially with the National Highways Authority of India and local communities, in continued evolution of road concession frameworks.

Macquarie is also investing in a series of community road safety initiatives designed to educate and raise awareness among Indian drivers to reduce accidents, injuries and fatalities. This is one of many community initiatives supported by Macquarie.



TECHNOLOGICAL ADVANCES IN TRANSPORTATION

Technological advances in transportation such as autonomous vehicles will have an impact on infrastructure requirements and might divert investment from traditional infrastructure

- fast train technology projects which could potentially capture traffic that would otherwise go to the aviation sector
- better asset management technologies
- innovation in road construction technology and materials.

INCREASED FOCUS ON SAFETY AND SUSTAINABLE DEVELOPMENT

Increased focus on safety and sustainable development including in India, will drive demand for safer traffic management technology, research, and know-how. Green and sustainable investment and financing parameters are of increasing importance to overseas investors. This will likely place pressure on quality, performance and assessment of Indian infrastructure projects.

2.0 OPPORTUNITIES FOR PARTNERSHIP

KEY JUDGEMENT

There are opportunities for investment in India's large-scale transport infrastructure developments. There will also be export opportunities for Australia's expertise in transport infrastructure services and technology as well as projects adjacent to the development of India's transport infrastructure, including railway station modernisation. Australia can learn from Indian investment in experimental transport technologies.

2.1 Export opportunities

Table 6 highlights Australia transport infrastructure export opportunities out to 2035.

TABLE 6: TRANSPORT INFRASTRUCTURE EXPORT OPPORTUNITIES OUT TO 2035

		Australia's strengths	Opportunity in India
Investment	Capital	Australia's funds management sector has over \$2.7 trillion under management Experience with municipal bonds, infrastructure financing, PPP models, asset recycling and infrastructure privatisation	Explore de-risked brownfield investment opportunities, for example in road toll-operate-transfer models
Services and solutions	Development	A leader in technologies in rolling stock and train brakesDevelopment of PPP models that de-risk investments and recycle assetsExpertise in road safety, driver education and regulation including vehicleProvide specialised services and solutions to Indian infrastructure developers and operators: 'Below-rail' services such as planning and design, infrastructure construction,	
	Operation and maintenance	A record of innovation in heavy haul transportation projects Established services in infrastructure maintenance and operation in sectors such as toll roads operation, airport operations and transport logistics Award-winning architectural expertise in redesigning train stations and maintenance facilities Technology in specification, development and optimisation of traffic signal systems; development of standards; noise and environmental monitoring systems; automated check-in solutions; road, bridge and pavement asset management systems A world leader in port logistics and planning; easily exportable expertise covering messaging and message brokering, port logistics and operations Expertise on Indian Ocean research with a focus on ports and coastal sustainability	 facilities, systems and technologies 'Above-rail' services such as operation, maintenance and training (technical, safety and environment), inspection, fault detection, train loading, and in-motion weighing solutions India Railways project to redesign 400 train stations Road safety consultancy to highways, railway and smart city projects Design and engineering services for complex projects in railways, dams, bridges, and major pipelines Business services in setting up modal logistics parks in India Port development and multimodal logistics

2.2 Collaboration

Investing in India presents a range of challenges [see Chapter 2: The Investment Story]. As with other sectors, investment risks in the transport infrastructure sector can be mitigated by collaborations and local partnerships

- partnering with state governments or construction companies to develop public private partnership models
- engagement with early-stage investment funds, such as InfraCo Asia, to develop projects through the early, high-risk stage
- collaboration between Australian and Indian public and private sectors can help develop mutual understanding of capabilities
 - for example, Australian expertise in regulatory development resides in the public sector while the private sector controls assets under management
- service and technology providers could look to join transport infrastructure projects through partnership with the Indian Government, third country providers or private sector developers.

2.3 Investment

Investment in Indian transport provides a diversified asset class and geography for Australian investors, especially for those seeking higher returns than those available in more developed markets

- India's road, rail and aviation sectors are widely projected to be the fastest growing components of Indian infrastructure in the short to medium term
- the Government of India's desire to attract investment into the transport infrastructure sector has seen the development of new investment vehicles
 - Macquarie is the first investor to take up the National Highway Authority of India's introduction of a toll-operate-transfer asset-recycling model for infrastructure financing
 - India's quasi-sovereign National Investment and Infrastructure Fund is establishing itself as one of the main channels of investment into Indian infrastructure, as is the Railway Infrastructure Development Fund.

There are also opportunities for India to invest in Australia's large and growing pipeline of big infrastructure projects

- this requires ongoing promotion of Australia's investment strengths: security, low insurance premiums and high productivity due to supporting technology and infrastructure
- greater foreign infrastructure investment brings in a broader base of technical skills and lowers the cost of tenders for the Australian Government.

3.0 CONSTRAINTS AND CHALLENGES

KEY JUDGEMENT

Despite gradual improvements, the sector remains fragmented. This creates inefficiencies from planning and funding to construction and maintenance. The Government of India is particularly focused on funding for greenfield investments whereas Australian institutional investors prefer de-risked brownfield investments in traditional infrastructure, such as road and rail.

3.1 The policy and regulatory environment

CHALLENGES COORDINATING POLICY

India's transport policy environment is fragmented between modes (roads, railways, shipping, airways) and levels (central and state) of government, with responsibility for infrastructure investment planning, policy making, regulatory supervision and financing strategies sitting with various departments and agencies. This can create complications for intermodal linkages between roads, railways, ports and airports.

LAND ACQUISITION ISSUES

Land acquisition issues are a roadblock to infrastructure development, with potential disputes and resistance from local communities on land value leading to project delays, cost escalations, disputes and litigation. Successful land acquisition reform would stimulate infrastructure investment and increase opportunities.

DISPUTE RESOLUTION

Disputes in land acquisition and contract implementation are often protracted with unfavourable outcomes for investors. The government is seeking to institutionalise dispute resolution mechanisms in infrastructure projects.

3.2 Skills, infrastructure and other constraints

Few Australian companies have experience delivering infrastructure projects offshore.

THE RISK/RETURN RATIO

Due to relatively higher rates of risk compared with other markets, investors in India require a high rate of return. This reduces the number of commercially feasible projects.

LACK OF AUSTRALIAN INTEREST

Australian investors have historically enjoyed good returns domestically and, with a few exceptions, have shown limited appetite for foreign investment in general and Indian investment in particular.^{xxvi}

^{xxvi} But this trend is starting to shift as the economic outlook changes towards more direct investment in Australia. More than 40 per cent of superfund investments are in equities (second highest among OECD pension markets), with returns expected to decline. These funds may eventually seek alternate investment options, including in India, as Indian investment options build a stable track record.

INTERNATIONAL COMPETITORS

Major economies, with large funds at their disposal, are operating in the Indian infrastructure sector

- Japan is providing long term concessional loans for greenfield investments
 - including through a 2017 proposal for a USD19 billion fast train linking Ahmedabad and Mumbai

4.0 WHERE TO FOCUS

While there is a demand for investment and transport infrastructure services across India, Australia's focus is best placed on states and cities where local governance and policies are favourable to foreign investment and established Indian partners can be sought. Central ministries play an important role in planning and funding of transport infrastructure, while states play a large role in implementation, construction and maintenance of transport infrastructure.

4.1 Which states

Tamil Nadu, Rajasthan and Uttar Pradesh will see most brownfield road projects in the short term.

Maharashtra, Andhra Pradesh, Madhya Pradesh and Bihar are seeing greenfield roads development in the short term, presenting brownfield opportunities in the medium to long term.¹² • Singaporean companies are developing an IT park, and planning the new Andhra Pradesh capital, Amaravati.

LOW INTEREST RATES AND HIGH LIQUIDITY PUSHING UP PRICES

In the near term, low interest rates and high liquidity have pushed up the price for high quality brownfield assets and pushed down yields.

Madhya Pradesh will attract significant investment in infrastructure sectors over the next decade due to a large industrial land bank, and favourable policies.¹²

Uttar Pradesh, New Delhi, Haryana, Rajasthan, Gujarat and Maharashtra will see investment in infrastructure as part of the USD90 billion infrastructure Delhi-Mumbai Industrial Corridor (with financial and technical support from Japan).⁶⁸

Maharashtra has proposed transport infrastructure projects worth \$20 billion. The state is focusing on developing roads, rail, ports and airports, presenting opportunities for roles in design, technology, professional services and consultancy.

Part B: Urban Development

1.0 THE MACRO STORY

KEY JUDGEMENT

India's urban populations will grow substantially out to 2035. Without significant investment, India's urban infrastructure gap will continue to widen. India has major, nationwide programs underway and an appetite for investment and expertise. Australian service providers have competitive advantages in niche areas of Indian demand.

1.1 The scale and key structural drivers of the sector

DEMAND FOR URBAN DEVELOPMENT

India's urban population is growing rapidly and placing immense pressure on its cities

- each year, about 10 million people move from rural areas to towns and cities
- this rural migration, combined with urban population growth, means India adds an urban population equivalent to three Los Angeles each year⁶⁹
- by 2025, India will have 69 cities with a population of one million or more⁶⁹
- by 2035, India's urban population is expected to reach 640 million.

India's urban infrastructure lags behind economically comparable nations and requires significant investment to upgrade existing, and create new, infrastructure

- India's cities already face traffic congestion and pollution, infrastructure deficits, governance problems and suffer from poor connectivity to essential services
- together, these factors impede commerce, limit employment opportunities and hamper the health of citizens.

SNAPSHOT OF RESIDUAL DEMAND FOR URBAN INFRASTRUCTURE AND SERVICES

Table 7 provides a snapshot of residual demand for urban infrastructure and services.

TABLE 7: RESIDUAL DEMAND FOR URBAN INFRASTRUCTURE AND SERVICES

Infrastructure	Service Demand
Urban water supply	No Indian city receives piped water 24 hours a day, seven days a week 71
	47 per cent of households have individual water connections
	Average duration of water supply in urban areas is one to six hours per day
	Around 40 per cent of available water in India is unusable for any purpose 70
Sanitation	No Indian city has a sewerage system covering its entire population
	4,861 cities lack even partial sewerage networks
	37 per cent of urban households are connected to open drainage; 18 per cent are unconnected and have no access to toilet facilities
Affordable housing	There are 65 million slum dwellers in India according to 2011 census data
	At current rates 38 million urban housing units will be needed by 2030
Waste	Waste collection services cover 70–90 per cent of needs in major cities, but less than 50 per cent in smaller cities
	Less than 30 per cent of solid waste is segregated
Road safety	Although India has about 1 per cent of the world's vehicles it accounts for more than 10 per cent of global road fatalities ⁷²

Of these key urban infrastructure deficits, water deserves particular consideration

- India is likely to face a water security crisis before 2030, when demand is projected to outstrip supply
- around 50 per cent of urban water demand will remain unfilled in 2030¹²
- the water in nearly half of the country's interstate rivers has been assessed as unfit for any purpose due to pollution⁷⁰
- agricultural production already uses 80 per cent of India's water, is depleting groundwater levels and will continue to increase to feed the growing population
 - this will leave less water available for urban domestic use
- India therefore has a dire need for more efficient water use and management.

INDIAN PLANNING FOR URBAN DEVELOPMENT

The Government of India recognises the urbanisation challenges it faces and has introduced policies and campaigns in an effort to manage the development of cities. The most notable programs are discussed below.

100 SMART CITIES MISSION

India's 100 Smart Cities Mission was launched in June 2015 and has committed Central Government funding of \$9–11 billion and will be matched by state governments

- the Smart Cities Mission is focused on providing core infrastructure, decent quality of life and sustainable environments in five segments – security, transportation, water, energy and solid waste
- the funding it provides is seed money to attract financing from other private and multilateral sources

- States and local bodies will have equity stakes in projects and are expected to attract private capital
- the plans are expected to be implemented through Special Purpose Vehicles, which will be structured to be more flexible than traditional government funding mechanisms
- the Asian Development Bank is providing assistance to some Smart Cities programs in India, including in water and waste management.

ATAL MISSION FOR REJUVENATION AND URBAN TRANSFORMATION

Atal Mission for Rejuvenation and Urban Transformation is a nation-wide initiative aimed at improving provision of basic services such as water supply, sewerage systems, storm water management and urban transport

 the Central Government has allocated over \$9 billion, mainly for project funding.

HOUSING FOR ALL

The Housing for All project has ambitious targets for building housing for low income groups in urban areas by 2022.

SWACHH BHARAT MISSION

Swachh Bharat Mission is the main program driving the campaign to make cities cleaner. It aims to introduce modern solid waste management, improve sanitation and enable private sector engagement.

INFRASTRUCTURE PROGRAMS

In public transport, the government has committed to expand metro lines and operationalise bus transit systems.

In road safety, the central and state governments of India have allocated a considerable budget to work with international companies to adopt new technologies and services.

For water, the Central Ministry of Water Resources, River Development and Ganga Rejuvenation has a comprehensive National Water Policy.

AUSTRALIA'S COMPETITIVE ADVANTAGE

As a highly urbanised and liveable country, Australia has significant expertise in urban infrastructure design and development

- Australian cities regularly feature at the top of world liveability
 - Melbourne ranked first in 2017 for the seventh consecutive year; five cities rank in the top 20.

Australia's capability and competitive advantages include:

- urban, precinct and building planning
- infrastructure sustainability and green building standards, policies and rating systems
- innovative water resource management, industrial and urban water recycling and treatment systems
- waste management
- intelligent transport systems and transport orientated design
- urban road design and road safety systems
- infrastructure financing expertise
- building, operating and maintaining social infrastructure.

1.2 How the sector will likely evolve out to 2035

Out to 2035, large-scale growth in urban populations will put ever greater demand on India's urban infrastructure. New technologies will enhance transport systems and improve urban management efficiencies. Water scarcity will get worse before it gets better.

Several trends will shape the sector:

- Rapidly growing urban populations will increase demand for urban development and place additional pressure on India's cities by 2035
 - urbanisation will be unevenly distributed, with four states – Gujarat, Kerala, Maharashtra and Tamil Nadu expected to be 60 per cent urbanised by 2030¹²,

compared with a national average of around 40 per cent.

- New financing instruments could emerge, including those under the Smart Cities Mission, drawn from a mixture of central, state and international funding. Indian cities' fiscal and technical capacity to raise funds could also increase out to 2035. The introduction of indicators such as credit ratings for cities could help the municipal bond market develop.
- Municipalities will strengthen their ability to finance infrastructure through better uses of value capture mechanisms and land taxes.
- Water scarcity will drive up infrastructure needs and operating and maintenance expenses. New models for water resources management, water infrastructure development and waste water management will be required to meet the needs of urban consumers, agriculture and industry.

- New technologies in transport are on the verge of becoming more widely adopted including shared mobility systems (such as Uber and Ola), electric vehicles (the Indian Government has a policy to increase their adoption), and autonomous vehicles
 - these developments will likely contribute to greater transport efficiency and reduced rates of pollution as well as creating the need for new infrastructure, including parking and charging.
- Urbanisation will shape other sectors, defining the types of opportunities India will present to Australia
 - urban construction will enhance the need for commodity inputs such as coking coal and iron ore
 - India's appetite for skills development, and decisions for energy networks and agribusiness logistics will be determined by the surrounding urban environment.

2.0 OPPORTUNITIES FOR PARTNERSHIP

KEY JUDGEMENT

Australia will generally have better prospects in services exports than equipment supply, contracting or end to end project development and delivery.

2.1 Export opportunities

SERVICES EXPORT OPPORTUNITIES

Given the lower risk inherent in a services-export approach, this could be the most promising model for Australian businesses seeking exposure to India's urban development.

Unlike other sectors, the nature of prospective opportunities in urban development are unlikely to change significantly from the near to the long term.

PROSPECTIVE OPPORTUNITIES IN URBAN DEVELOPMENT IN INDIA

Table 8 provides a snapshot of prospective opportunities in urban development in India.

CASE STUDY: SYDAC: SIMULATION TRAINING TECHNOLOGY SECURING SAFETY FOR INDIAN RAILROADS

Think of trains in India and an immediate image is conjured up of overcrowding with people hanging out of doors and windows and sitting on the roof. But the Indian Government is determined to improve its vital rail networks.

South Australian technology company Sydac Pty Ltd won a \$30 million contract to provide Government-owned Indian Railways with driver training simulators – the largest contract of its type in the rail industry anywhere in the world.

Sydac is a leading developer in simulation technology and software and this contract is its first foray into the Indian market.

The four-year contract includes an eight-year maintenance agreement and marked the culmination of a six-year effort to break into the Indian market and an extensive tendering process.

"Our focus will be on providing the thousands of drivers with simulated training using 12 full-cab rail simulators in 12 cities, including the main centres of Mumbai and Kolkata" Managing Director Dermot Dixon says.

Each simulator uses the latest computer visualisation technology to immerse trainees in a 'real life' driving experience that replicates their on-the-job environment. Sydac will also provide virtual modelling of the various electrical and diesel locomotives used around the country and simulate 2,100 km of tracks for training sessions.

Dixon's advice to anyone considering the Indian market is to understand that the Indian Government places a high weighting on the commercial price of a project. He also stresses the importance of understanding India's business culture and in particular the way that the hierarchical social structure is reflected in the business world. Patience and personal relationships are also key.

"There is no doubt that the rewards are there, but major projects take time to come to fruition. We factored in a long gestation period and ensured we had a strong commitment to pursue the deal, knowing there would not be any payback in the short term. This all comes back to being patient and not being too aggressive in dealing with the Indian Government – pressure doesn't work and you have to let the process play out in its own time."

Sydac is confident of continuing to be a valued partner for Indian Railways going forward, particularly as it has committed to spend 350 Crore (AUD70 million) on new simulators by 2021, with additional expenditure of equivalent value expected to follow on from this initial investment.



TABLE 8: URBAN DEVELOPMENT EXPORT OPPORTUNITIES OUT TO 2035

	Australian competitive advantage	Opportunity
Water	Water resource management	Provide services to urban local bodies to control flooding, reuse storm water, assess and clean up waste water and prevent water contamination
		Provide specialised technology and services to the industrial and energy sectors in water resource management, water recycling and treatment systems and desalination
Transport	Intelligent transport systems Road safety	Provide strategy, planning, design and engineering for traffic management systems to help reduce congestion and improve road safety Provide road safety training to government authorities, emergency response teams and medical care in India
Waste	Waste management services	Deliver end to end waste management to urban local bodies and industries in waste-to-energy, compost systems, carbon management and landfill management
Financing	Financing consulting	Australian banks and financial services providers can provide expertise in issuing municipal bonds or green bonds as well as asset recycling, privatisation and public-private partnerships [see Chapter 10: Financial Services Sector]
Planning	Master planning	Master planning, inspection, assurance and environmental impact assessment

Of these, there are three areas of particular promise for Australian business.

TECHNOLOGY AND SERVICES IN WATER MANAGEMENT

Australia is globally competitive in optimising water use through integrated water management systems and technology, water planning, recycling and desalination. The Australian Water Partnership brings together Australian water sector expertise to support collaboration with Indian entities and multilateral organisations.

EXPERTISE IN END TO END WASTE MANAGEMENT

Australian companies offer expertise in total waste management services for solid, liquid and industrial waste, including in partnership with government. Company expertise ranges from solid waste recycling, waste-to-energy techniques, managing landfill, through to nuclear waste management.

TECHNOLOGY AND SERVICES IN TRANSPORT SYSTEMS

Australia has expertise in intelligent transport systems, such as traffic signalling, noise and environmental monitoring systems, automated check-in solutions, ramp metering and managed motorways.

2.2 Collaboration

Establishing joint ventures with Indian or foreign partners can provide lower risk opportunities for Australian companies entering the Indian market.

WATER MANAGEMENT

- Engagement on water management requires government to government collaborative frameworks, some of which Australia already has in place with India, including a MoU on water cooperation between Australia's Department of Agriculture and Water Resources and India's Ministry of Water Resources, River Development and Ganga Rejuvenation.
- Australia should diversify engagement from river basin management into sectors such as urban planning to align with Indian priorities such as Clean Ganga and Smart Cities.
- Currently there are state-state^{xxvii} partnerships in water resources, which could become a model for engagement in other areas of urban services at a state to state and city to city level.

CLEAN UP THE GANGES PROJECT

- Prime Minister Modi has placed a high priority on the large task of cleaning up the Ganges River.
- Australia could contribute to this project, not just in terms of its water and river management expertise but also by contributing ideas on how the Smart Cities agenda and the Ganges agenda can be brought together.
- Ideas such as public private partnerships, the sale of land adjacent to the Ganges in return for smart urban development and anti-pollution measures could draw on Australian expertise and could even be part of a broader international project.

ROAD SAFETY

- Improving urban road safety requires policy and regulatory engagement.
- There are opportunities for engagement on road safety strategies and action plans at national and state level including to develop institutional strengthening, capacity building and traffic management.
- There is scope for more collaborative research and development for crash investigations, accident analysis and prevention, behavioural and social issues, trauma and emergency care.
- There is demand for mid-level training programs for Indian police officers, executive leadership programs, road safety audit training, driver training, emergency training and heavy vehicle driver training.

2.3 Investment

- Opportunities for Australian investors lie predominantly in de-risked brownfield urban development projects.
- Australian companies may prefer to participate in projects backed by multilateral banks to mitigate contract risks.
- Australian companies could also invest in Indian developers or urban service providers, rather than specific projects, to acquire local expertise and indirect exposure to growth in this sector.

^{xxvii} Such as in Rajasthan, where South Australia has established a centre of excellence in water resource management.

3.0 CONSTRAINTS AND CHALLENGES

KEY JUDGEMENT

Urban development has been constrained by governance and financing issues, as well as limited urban planning, distortions in land markets and a stringent regulatory framework for governing land use and management. Many of the challenges and constraints are common to other types of infrastructure. Indian central and state governments are implementing a range of reforms, but change will be incremental.

3.1 The policy and regulatory environment

India's Ministry of Urban Development is responsible for developing policy guidelines, legislative guidance, sectoral programs (for example, sanitation and water supply) and technical and financial assistance to the states.

A complex legal and regulatory management framework is a deterrent to private capital and constrains urban development. This is changing but is currently characterised by:

- restrictive land use and governance frameworks
- poorly structured public-private partnerships to finance projects
- fragmentation of responsibility and implementation across different agencies for service delivery and financial management.

3.2 Skills, infrastructure and other constraints

LACK OF ACCOUNTABILITY BY CITY LEADERS

Most cities in India are run by a municipal corporation. Other bodies which manage utilities and transport do not typically sit under a clear structure of accountability. Mayors of Indian cities are elected by the municipal body, usually for only one year, and have insufficient authority to direct efforts towards a common goal.

This contributes to poor planning, governance and transparency and limits capacity to implement complex infrastructure projects.

FINANCING CHALLENGES

Funding for the Smart Cities initiative is contingent on state governments matching the funding provided by the centre. Some states are not in a position to do this and are reluctant to pay for third party consulting services.

While new value capture mechanisms will help, the limited capacity of Indian cities to issue bonds and the lack of a strong municipal bond market means it is difficult to raise large-scale infrastructure financing. International funding for projects through alternate vehicles is therefore a key aspect to generating additional large-scale infrastructure development in India.

Other countries are able to offer more attractive financing terms and use this to facilitate entry of their local businesses into large Indian urban development projects (a 'Country Inc' approach). It is not the way Australia does business and nor do we recommend that Australia change tack. However, there is considerable scope to partner with such initiatives where Australian companies have demonstrated expertise which could add value

- Singapore is partnering with the state government of Andhra Pradesh to build the new state capital, Amaravati, as a smart city
 - Singapore proactively engages in facilitating participation of its companies in Indian urban development opportunities, including providing financing and technical assistance
- France has announced an investment of \$2.5 billion in three smart city projects (Chandigarh, Nagpur and Puducherry).

AS WITH OTHER SECTORS, A DIFFICULT BUSINESS ENVIRONMENT

- Infrastructure service and material procurement processes are not transparent and are vulnerable to corruption.
- Indian companies dominate civil construction projects due to their lower costs. Foreign companies typically provide consulting and technology/products, limiting opportunities for large-scale commercial engagement in the sector.
- Contract enforcement, including payment certainty and risk-sharing remains a challenge.

Foreign companies may therefore prefer to participate in projects backed by multilateral banks for greater security of payment.

4.0 WHERE TO FOCUS

The Central Government plays a coordinating and monitoring role, despite urban development being a local responsibility

• the Ministry of Urban Development is the lead agency but a multitude of other national bodies operate in this sector, including in water and road management.

For specific urban development projects, Australian companies should consider targeting states and municipalities with robust finances (for example, good credit ratings for bond issuance), a good track record of infrastructure implementation and success at attracting private funding

- states that meet these criteria include Andhra Pradesh, Maharashtra, Rajasthan and Gujarat
- cities that meet these criteria include those going through the process of creating municipal bonds and getting credit rated
 - some cities such as New Delhi Municipal Council at AA-, Vizag (Andhra Pradesh) at AA+, and Pune (Maharashtra) at AA have higher ratings than India's BBB⁷³ country rating
 - these cities are also taking forward substantial urban development programs.

RECOMMENDATIONS

54. Increase the priority of engaging India on urban water management

To date, most of Australia's government to government engagement has focused on delivering technical capacity building initiatives in river basin management, water accounting and hydrologic forecasting, with ad hoc funding from the regional aid program. This has served to consolidate our reputation in India as an effective water manager and trusted partner.

- 54.1 Diversify efforts of the Australia-India Water Partnership to align more overtly with India's policy missions and campaigns, including Smart Cities Mission and Atal Mission for Rejuvenation and Urban Transformation
 - continue to explore opportunities to bring Australian expertise in water resources management to build India's volumes and quality of water for use in urban areas
 - seek to partner with third countries' or multilateral development banks' smart city projects to deliver urban water management projects.
- 54.2 Support a partnership between Australia's Cooperative Research Centre for Water Sensitive Cities and India
 - this could include exchanges, secondments and scholarships between city/state urban water planners, exploring water sensitive cities solutions linked to existing infrastructure projects and developing an urban water research cluster.
- 54.3 Work with the Indian Government on ideas and models for cleaning up the Ganges River, including exploring private sector driven funding models. This project would link to the Smart Cities agenda and to public private partnerships
 - including a proposal from the Australian private sector which has been submitted to Prime Minister Modi on a unique private sector driven funding model to clean up the Ganges River system and which is worthy of serious consideration.

55. Build further government and business engagement on infrastructure and refine messaging about Australia's capabilities

- 55.1 Convene an Australia-India Infrastructure Council as a forum for collaboration between government and the private sector from both countries, including at the state level, providing:
 - a platform for the exchange of expertise in infrastructure financing and guidance on how companies identify opportunities, mitigate risks, and develop appropriate entry and exit strategies to investing in India
 - a mechanism for sharing regulatory expertise, potentially through the joint development of a policy roadmap
 - this could include sharing Australian expertise in infrastructure financing including value capture and user charges, in issuing municipal bonds or green bonds, and in 'Toll-Operate-Transfer' and 'Build-Operate-Transfer' models
 - support for state government engagement, given a large proportion of the expertise in regulation, implementation and management of transport infrastructure sits at the state level in both Australia and India
 - share Australian Governments' asset recycling and privatisation experiences
 - this represents a practical way to respond to India's infrastructure priorities and potentially open up opportunities for Australian funds seeking brownfield infrastructure investment opportunities.
- 55.2 Engage with Indian national and state regulatory authorities on smart infrastructure standards
 - work with Indian cities to establish common standards for rating green buildings
 - Australian contractors could then seek to upgrade and retrofit buildings to more efficient standards.
- 55.3 Engage with target states to deliver capacity-building on development and implementation of public private partnership projects.
- 55.4 Use high level visits and trade events to promote Australian capabilities in the urban development and transport infrastructure sectors
 - leveraging Australian cities' high 'liveability' brand
 - this will also expose Australian businesses to the opportunities in India
 - use sister-state or sister-city relationships and MoUs to provide a platform to generate networks and commercial opportunities for Australian companies.

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- 55.5 Continue Austrade's approach to position Australia for strategic subcontracts in India's Smart Cities Mission that best match Australia's skillsets and are commercially viable
 - including facilitation of municipality-to-municipality links
 - targeting sub-sector areas of Australian strength such as waste management and smart urban transport systems.
- 55.6 Continue working towards liberalisation of air services arrangements between both countries to ensure they can take up commercial opportunities as they arise.
- 55.7 Ensure commercial opportunities presented through the development of India's aviation infrastructure are visible to Australian contractors and investors.

56. Become a lead partner on road safety for several target Indian states

- 56.1 Build on existing partnerships and establish further information partnerships with Indian road authorities
 - supporting industry to work on government and private sector projects, including partnering with third parties and international investment agencies.
- 56.2 Consider sponsoring Australian providers to provide mid-level training programs
 - for Indian police officers, executive leadership programs, road safety audit training, driver education and training, emergency training, capacity building and technical training and heavy vehicle driver's training.

57. Pursue trilateral partnerships for infrastructure development in India

Seek to pair Australian capabilities with third parties' capacity to deliver large projects in India

- explore joint options with Japan, Singapore and France
- Australian firms could bring services in transport systems, water and waste management and the partner brings concessional finance and contracting services
 - including for joint direct bidding for Smart City projects.

58. Pursue collaborative opportunities with India for development of ports and seaborne trade

- 58.1 Explore opportunities to work with India and other international partners to develop marine transport infrastructure and connectivity within the broader Indo-Pacific region
 - this could include engagement on port design and development through regional forums such as Indian Ocean Rim Association, and utilise Australian research expertise through the Indian Ocean Marine Research Centre and University of Western Australia's Oceans Institute
 - this could also include exploring options with the World Bank Group to collaborate on their support of Masala Bonds.
- 58.2 Fund a project to look at long term efficiency in sea trade between major partner container ports in India and Australia
 - replicating the Asia-Pacific Model E-port Network project which exists in the APEC context
 - gain a clearer understanding of the drivers of freight flows
 - support supply chain connectivity exploring options for e-port connectivity.