



Indo-Pacific - Investing in the next big opportunity

**Point of view on U.S.-India collaborative
landscape across sectors**

November 2019

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Foreword

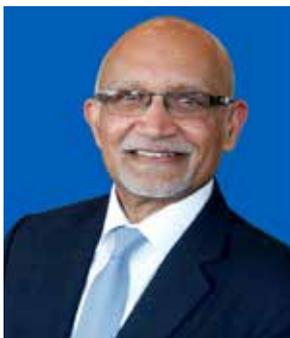
The Indo Pacific is at the forefront of global geo-strategic and economic thinking today. Japanese Prime Minister Shinzo Abe’s articulated the concept of the ‘Confluence of Two Seas’ in his speech to the Indian Parliament in June 2007; President Donald Trump noted at the APEC CEO Summit in 2017 that “this region has emerged as a beautiful constellation of nations, each its own bright star, satellites to none;” and Prime Minister Narendra Modi spoke at the Shangri-La dialogue last year of a region that is open, stable, secure, prosperous and informed by the principle of inclusivity.

The India-U.S. partnership, an equation which has strengthened notably over the years, is emerging as a significant factor in the Indo-Pacific narrative. The two countries have significantly stepped up collaboration to address international strategic issues ranging from terrorism to the changing global order. However, even while bilateral trade has grown decently over the last five years, there exists the potential to do far more in India-US business and commerce.

In the Indo-Pacific, the building out infrastructure and energy linkages is a strategically important area that can lead to a stronger bilateral trade relationship while promoting prosperity and peace in this region.

The current recalibration of trading relationships and changing economics in the region are creating a growing interest among U.S. firms to reconfigure their supply chains. Significant opportunities are thus in store for countries like India, Vietnam, Malaysia and Bangladesh.

KPMG in India is proud to collaborate with CG/LA Infrastructure to share an industry point of view on the Indo-Pacific economy and develop an outline for action-based collaboration between U.S. and India across key sectors and themes which can help deliver transformative results.



Arun M Kumar
Chairman & CEO
KPMG in India

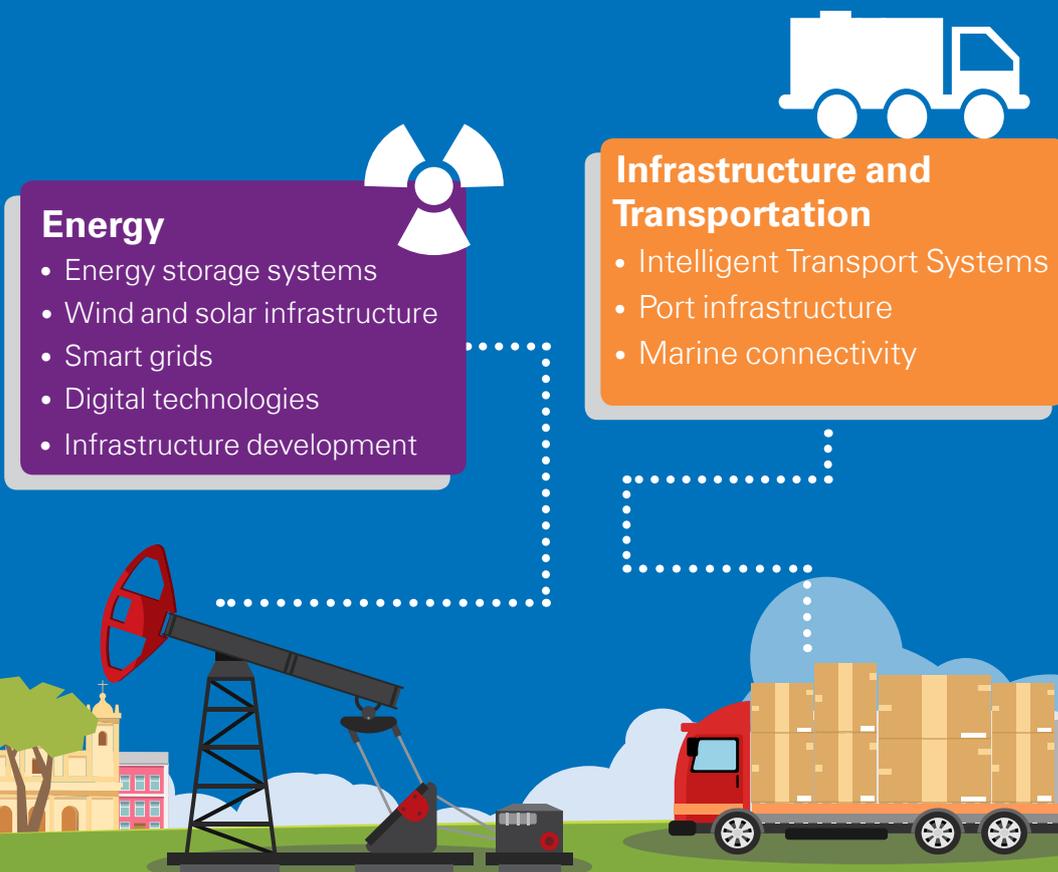
Executive summary

The ascent of the Indo-Pacific region has been driven by two distinct mega trends. First, in the realm of geopolitics, the shifting strategic equations between the U.S. and China. Second, the rise of the region as a global engine of growth, trade and innovation. The region is now a part of the world where statecraft, military planning, trade and economic policy closely intersect and influence each other.

India, with its favourable demographics, robust economic fundamentals and strong leadership is increasingly being positioned as a key stakeholder in this region. Being the world's third largest economy in terms of Purchasing Power Parity (PPP) and housing the second largest military base in the world, the country is expected to play a pivotal role in shaping the regional system. The country's multi-layered engagement with the U.S., ASEAN and Oceania countries are key enablers in ensuring a stable, open, secure, inclusive and prosperous Indo-Pacific region.

U.S. on the other hand, through its recently published Indo-Pacific strategy report of the US Department of Defence has reinforced that it is a 'Pacific nation', linked to its Indo-Pacific neighbours 'through unbreakable bonds of shared history, commerce, culture and values'. The renewed 'pivot to Asia' strategy of the U.S. and its vision of a Free and Open Indo-Pacific Partnership is echoed by India in its 'Look East, Act-East' policy.

Both India and the U.S. are increasingly viewed as natural partners in this region to help ensure a better quality of life, informed by equity of access to the global community's sustainable development goals.



Going forward, there is a need for the two governments to not just come together and act on the common goals for the region, but also for the industry, academia and civil society to channelise their collaborative efforts to

promote sustainable development and trade across the nations that commit to the development of this region.

For U.S. and India to drive collaboration in this region, developing sustainable strategic and commercial strategies across the below recommended areas will be a key way forward:

- Working through regional organisations and bilateral channels to reinforce the importance of regulatory transparency and drive integration of foreign companies in local economies
- Removing legacy issues around trade barriers
- Creating efficient models for better access to financing
- Creating environments to ensure sustainable public-private partnerships for infrastructure creation
- Developing a comprehensive strategy to promote a free and open internet
- Using digital technologies and data for empowerment as well as access to services through increased investments in setting standard for emerging technologies.

As the U.S. government outlines its approach with the new U.S. International Development Finance Corporation (DFC), this document will help further conversations around development of some of the above strategic areas, through an industry lens.



Indo-Pacific landscape and potential



Region's landscape

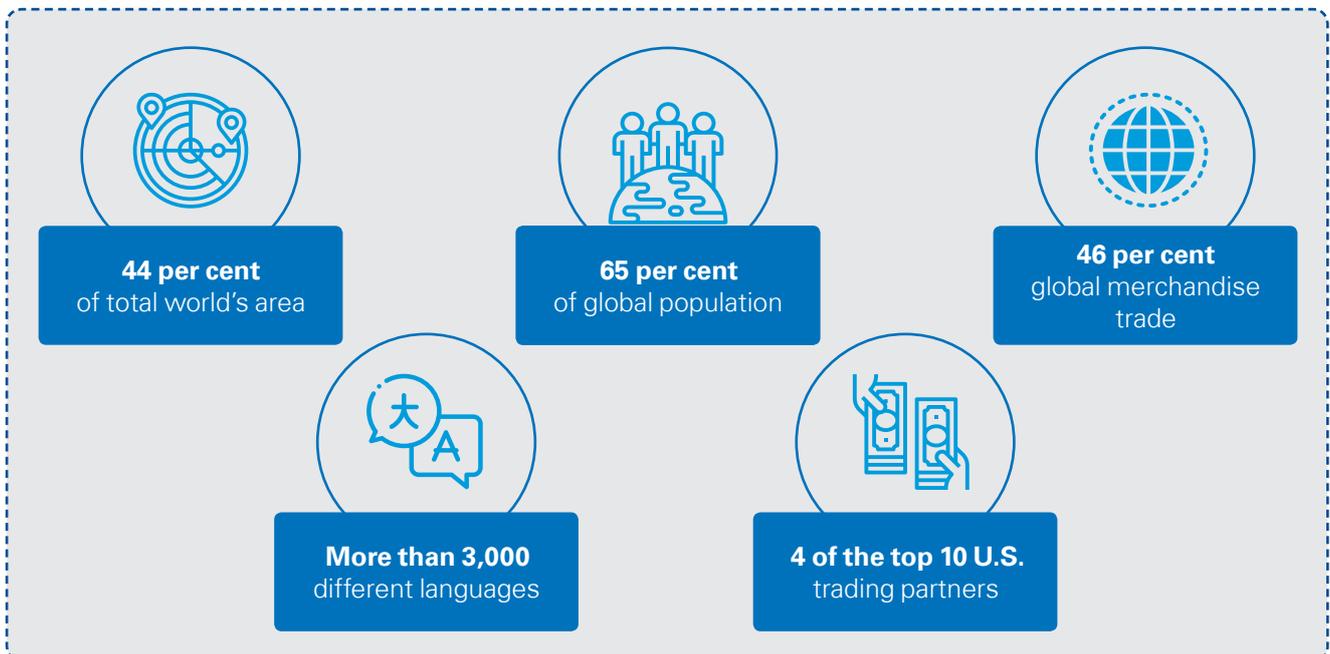
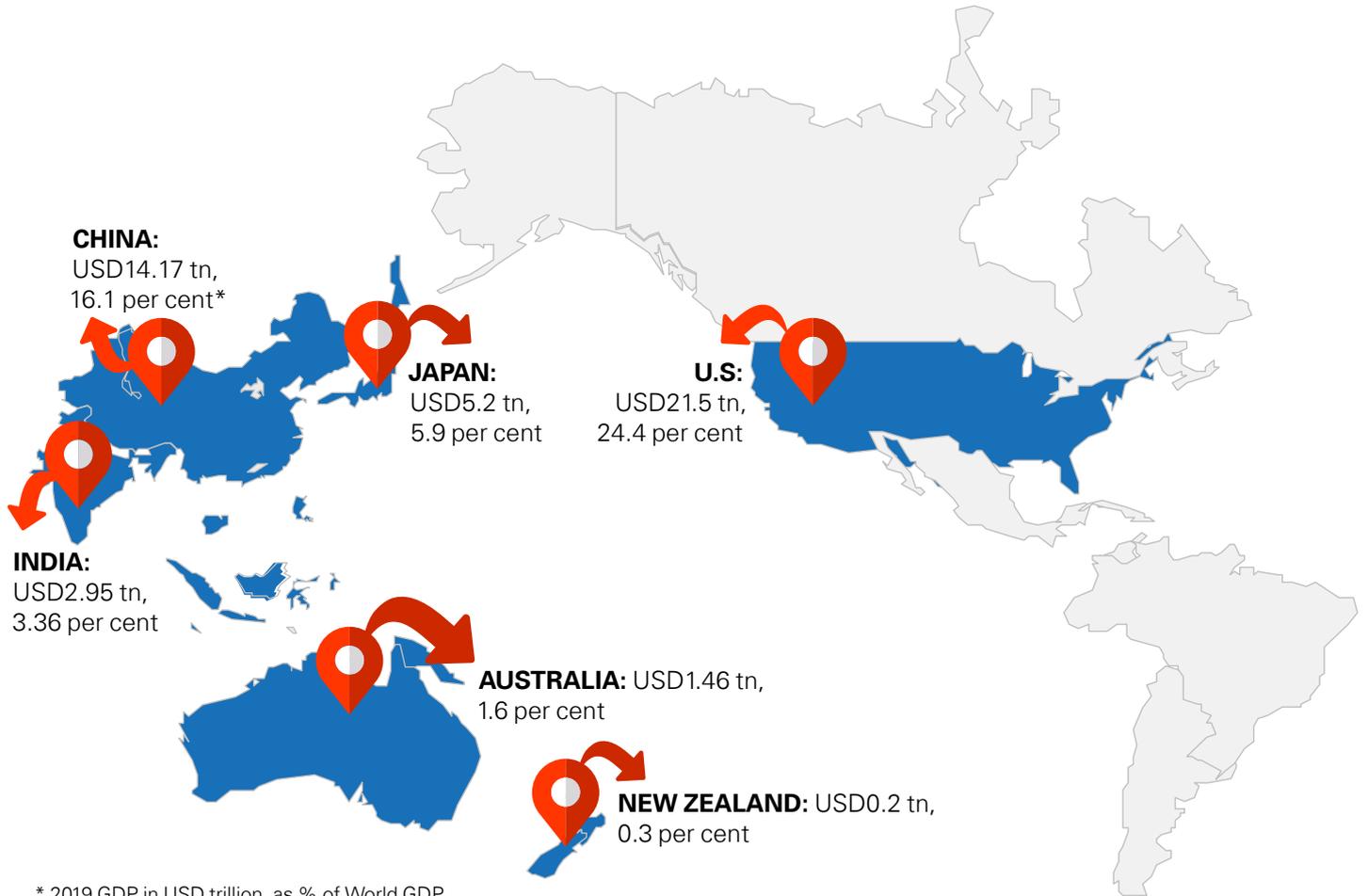
The Indo-Pacific region as an 'imagined geo-strategic space' has taken centre-stage over the past few years, on the back of the shifting currents of global trade, the emergence of new poles of global economic growth in Asia and the evolving geo-political compulsions that are all too well known.

The region comprises around 38 least developed, developing and developed countries spanning the Indian and the Pacific Ocean, encompassing half of the planet's population and 60 per cent of the world's GDP. Around 60 per cent of the earth's maritime trade flows through the waters of this region, crossing 9 out of the 10 largest and busiest seaports in the world. The region is also home to 3 of the world's largest economies: the U.S., China and Japan, as well as six of the world's fastest growing economies, including India.^{1,2}

1. Projected GDP Ranking (2019-2023), Statistics Times, Accessed on 14 September 2019

2. U.S. Indo-Pacific command website, Accessed on 14 September 2019

Indo-Pacific key economies and macroeconomic indicators

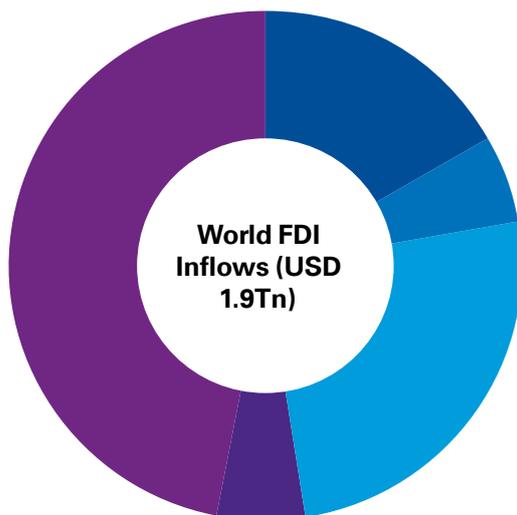


Over the last five years, the region has grown at an annual average rate of 6 per cent³ at the back of favourable demographics, increasing internet penetration and diversity in terms of socio economic development. Investment liberalisation and promotions at multiple levels are helping the region’s developing countries to generate significant Foreign Direct Investments (FDIs), especially at a time when global FDI inflows to developed countries are on a declining trajectory. The annual two-way trade of the U.S. with the region is around USD2.3 trillion, while FDI is around USD1.3 trillion⁴.

This region has also been at the forefront of implementing various trade facilitation measures in line with evolving trade dynamic, and currently possesses around 15 multilateral trade agreements, which have led to new opportunities, improved mobility and greater regional prosperity.

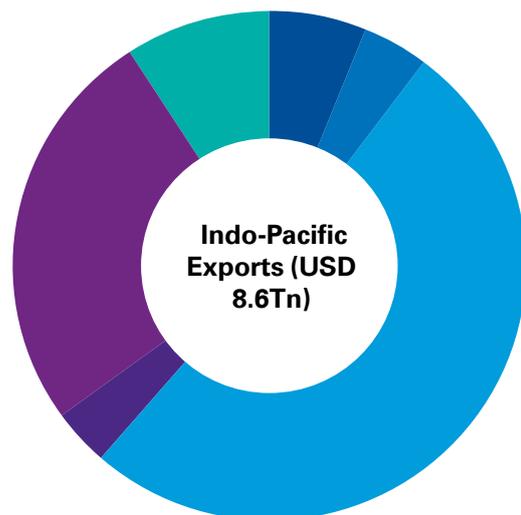
Indo-Pacific investment attractiveness and competitiveness⁵

Share of FDI Inflows as % of total world FDI Inflows



- 7.0% ● Southeast Asia
- 2.4% ● South Asia
- 10.5% ● East Asia
- 2.3% ● Pacific
- 19.6% ● North America

Merchandise Exports of Indo-Pacific Region



- 6.2% ● Southeast Asia
- 4.3% ● South Asia
- 50.9% ● East Asia
- 3.5% ● Pacific
- 25.7% ● USA
- 9.0% ● Others

* Latest FDI and trade data available for 2017

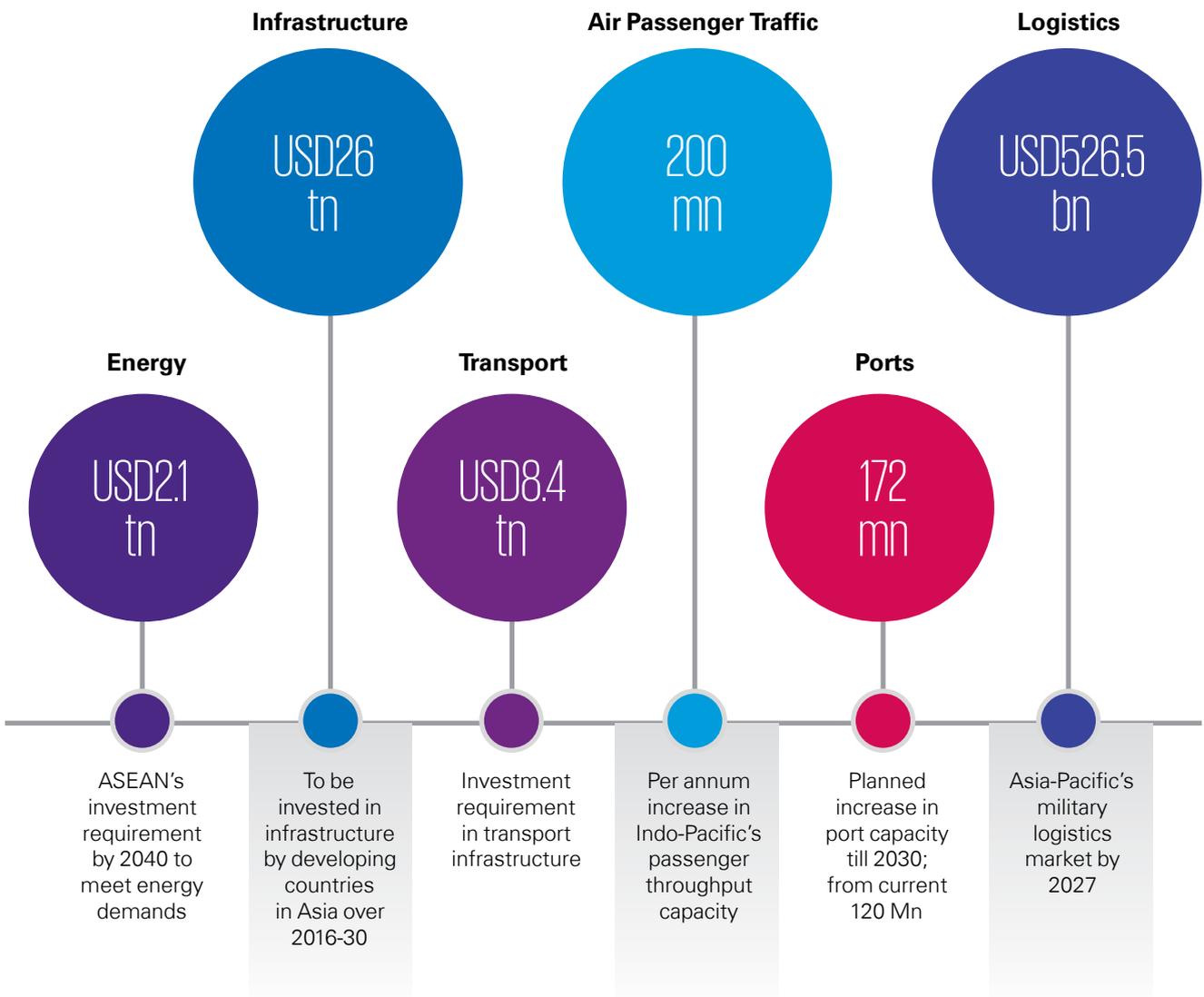
3. Advancing Economic Freedom Is the Key to Realizing America’s Indo-Pacific Vision, The Heritage foundation, 14 September 2019
 4. Indo Pacific Strategy report, U.S. The Department of Defence, US

5. Indo-Pacific Report 2019, National Maritime Foundation, Accessed on 14 September 2019

The region, is increasingly becoming one of the primary theatres of global innovation, ranging from world-class startups that are merging in India, to new-age urban governance systems in Singapore. The region is leveraging the digital revolution by utilising

ubiquitous digital connectivity, big data and new technologies to overcome traditional infrastructure deficits, enabling greater access to livelihood opportunities and education, thereby providing empowerment to all.

Potential of the Indo-Pacific region



This growing need to develop an inclusive and sustainable next generation regional socio-economic architecture is creating unique opportunities for emerging countries to not just tap the significant

opportunity across sectors but also play a larger role in steering and realising the region's potential by implementing the existing and exploring the priority areas of strategic cooperation.



Building partnerships across key sectors

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- Energy
 - Power, utilities and renewables
 - Oil and gas
- Water
- Aviation
- Defence
- Infrastructure and transportation

Energy - Power, utilities and renewables



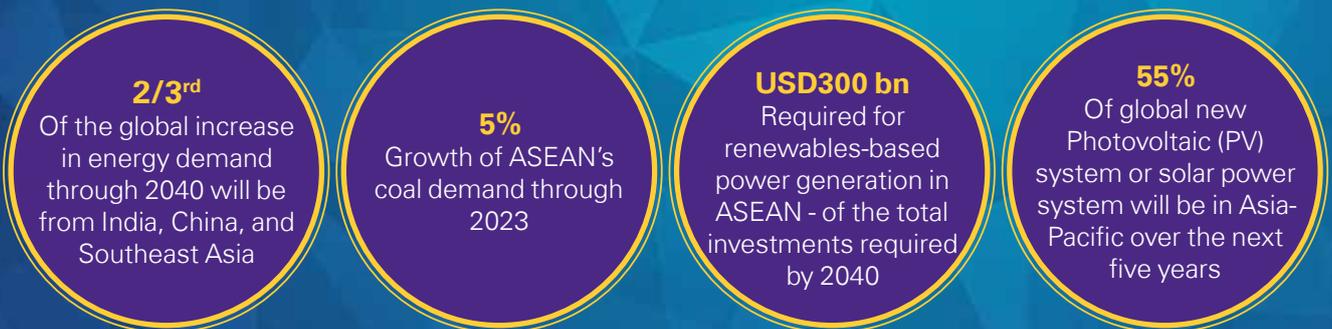
2a

The emergence of Indo-Pacific as an engine of global economic progress is expected to lead the surge in global energy demand, at the back of rapid urbanisation and population growth. However, access to energy still continues to be a major challenge in quite a few developing countries in the region. For instance, as per the data provided by the World Bank, about 20.6 per cent of the rural population in South Asian countries (approximately 883 million) are currently living without electricity. While countries

such as India have implemented rapid “Electricity for all” projects (Saubhagya scheme), there are countries such as Pakistan and Bangladesh wherein a considerable amount of the rural population are still living in areas which are unelectrified.

Some countries in the region have a long way to go in terms of energy security, requiring massive investments for building energy-related infrastructure, promoting energy efficiency and transitioning towards clean energy sources.

Expected energy demand in the region^{6,7,8}



6. Indo-Pacific Energy Markets, U.S. Department of Homeland Security, Accessed on 9 September 2019

7. Energy Opportunities under the Free and Open Indo-Pacific Vision, Center for Strategic and International Studies, 10 December 2018

8. Southeast Asian coal demand to grow at fastest rate in world, Nikkei Asian Review, 18 December 2018

Collaboration opportunities for U.S. and India

Theme	Overview	Areas of collaboration
Energy storage systems	<ul style="list-style-type: none"> • Deploying battery based energy storage systems: Remote areas of Indo-Pacific countries such as Philippines, Vietnam, Cambodia and Indonesia can leverage the experience of the U.S. and India in deploying battery-based energy storage systems in hilly terrains thereby overcoming the issue of protracted power outages during natural calamities. • Multilateral energy trading system: Linking the power grids of South Asian Association for Regional Cooperation (SAARC) countries could add 36 GW of capacity, which is expected to be more than the current supply of all SAARC members⁹, excluding India. Through this effort an estimated USD9 billion is expected to be saved annually by 2040.¹⁰ 	Technology transfer and infrastructure development
Renewables	<ul style="list-style-type: none"> • Extending U.S.-India Strategic Energy Partnership: Under-penetration of renewables in the region can be highlighted by the fact that with around 14 per cent of Asia's population and 8.5 per cent of global population, the ASEAN region represents only 6.6 per cent of Asia's renewable capacity and a mere 2.8 per cent of global renewable capacity.¹¹ India and the U.S. can leverage their existing initiative and expand to Indo-Pacific region through advanced energy solutions and technologies. • Build sustainable renewable energy strategies: Countries such as Thailand, Vietnam, Cambodia, Myanmar and Laos are updating their national energy strategies with a higher focus on renewables. In addition, Cambodia, Indonesia, Malaysia and the Philippines are moving towards competitive auctions from feed-in-tariffs for renewable projects¹². U.S. and India can assist local economies in the region build sustainable energy strategies. • Floating solar projects: These have started to gain traction especially in areas that are land-constrained and where there is a conflict around solar encroachments on farmlands. According to a report published by the National Renewable Energy Laboratory (NREL), installing floating solar projects on man-made water reservoirs can generate about 10 per cent of the country's annual electricity production.¹³ 	Infrastructure development, technical assistance, and capacity building
Smart grids	<p>Apart from few countries such as Singapore, Malaysia, Australia, Japan and South Korea, many Indo-Pacific countries have not made considerable progress in development of smart grids.</p> <p>Deployment of smart grids and meters are gaining traction in India. Both U.S. and India can collaborate on grid optimisation and play a crucial role in modernising the region's power grids, along with implementing other emerging technologies such as big data, IoT, AI and machine-to-machine (M2M) learning.</p>	Base technology transfer and localised R&D and innovation
Offsetting the rising energy demand	<p>The region can leverage the expertise of the U.S. and India in deploying LED bulbs, which has led to significant annual savings, both in terms of energy and dollars. For instance, India installed over 300 million LED bulbs throughout its length and breadth, leading to annual savings of over 38,952 million kWh, and USD2.2 billion.¹⁴</p>	Infrastructure development

9. Asian Infrastructure Finance 2019, AIB, Accessed on 25 September 2019

10. The green imperative: developing interconnected low-carbon power networks in Asia, AIB, Accessed on 16 September 2019

11. Renewables in Southeast Asia: Subsidies not required, thanks, Eco-business, 18 March, 2019

12. It's decision time for Southeast Asia as power demand soars, China Dialogue, 14 January 2019

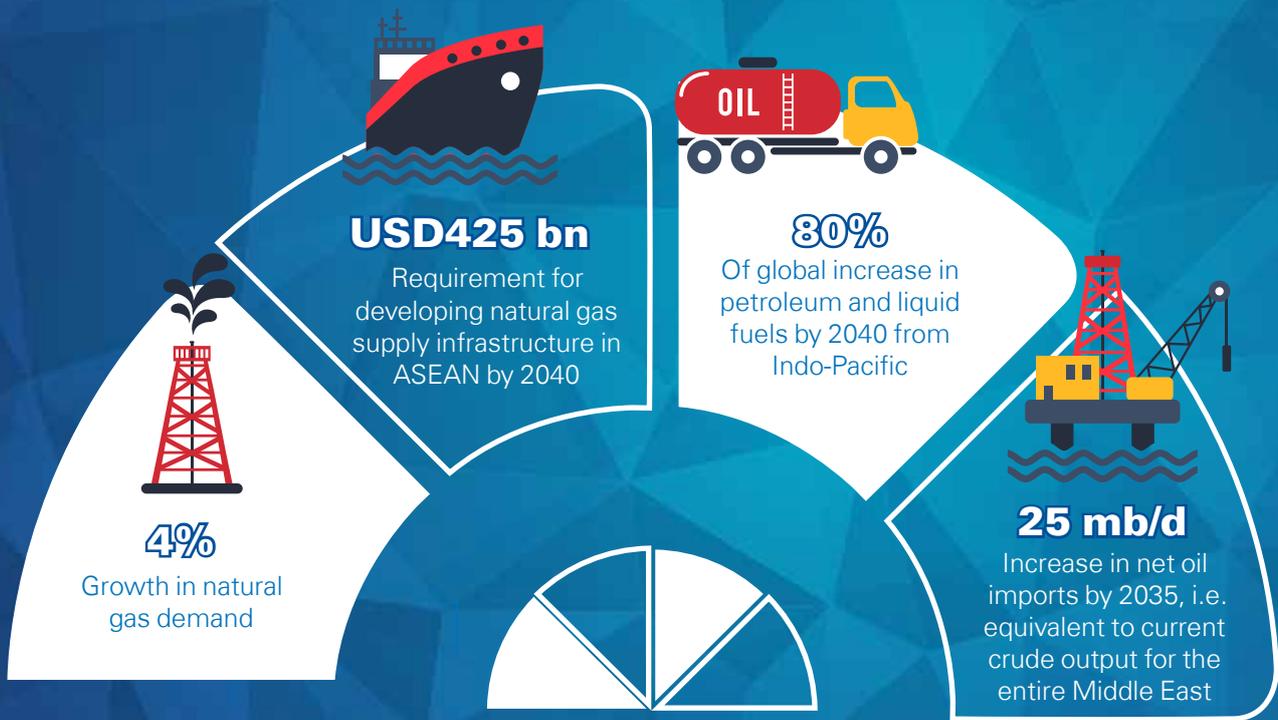
13. US Floating Solar Could Generate 10% Of Annual Electricity Production, CleanTechnica, 25 January, 2019

14. EESL distributes 30 cr LED bulbs, helped save Rs. 15K cr annually, The Economic Times, 19 May 2018

Energy - Oil and gas



2b



Demand for oil & gas in the Indo Pacific¹⁵

15. Indo-Pacific Energy Markets, U.S. Department of Homeland Security, Accessed on 9 September 2019

Collaboration opportunities for U.S. and India

Theme	Overview	Areas of collaboration
Digital transformation	Most Indo-Pacific oil and gas businesses are increasingly adopting digital technologies to enable and sustain their exploration and production aims. There exists significant opportunities for both the U.S. and India to leverage their technological expertise in employing digital transformation in the areas of real-time data analytics, seismic imaging, blockchain technology and cybersecurity solutions to address aspects of the entire value chain -upstream, midstream and downstream.	Technology transfer and implementation
Infrastructure development	<ul style="list-style-type: none"> • Developing LNG terminals: India and Japan are currently collaborating on building a USD250 billion liquefied natural gas (LNG) import terminal in Sri Lanka.¹⁶ This will help fire gas based power plants and also create considerable demand from CNG and smaller industries. India and the U.S. can collaborate on similar projects across the region, including setting up the trans-ASEAN gas pipeline, establishing an ASEAN power grid and developing a robust LNG infrastructure. 	Infrastructure creation
Technology for R&D	<ul style="list-style-type: none"> • Data analytics: New oil frontiers are being developed in countries such as the Philippines and Myanmar. The U.S. has significant experience in extraction of shale, coal seams (deposit of coal within layers of rock) and tight gas. India can collaborate with the U.S. to help new players in the Indo-Pacific region by sharing technology and research in the areas of collecting data, reporting through digital portals and finding potential locations for a gas hub¹⁷. • Localised R&D and innovation: Indian flagship oil marketing companies have state of the art R&D centres which apart from doing research in areas of lubricants, refinery processes, pipeline transport also undertake research and development in areas of new age fuels such as Bioenergy, Solar hydrogen, hydrogen compressed natural gas (HCNG), shale oil and other synthetic fuels. India can collaborate with the U.S. to provide skilled talent and localised research to the new players in the region. 	Base technology transfer and innovation
New technology to handle sulphur	The recent International Maritime Organisation (IMO) regulation to limit sulphur content to 0.5 per cent in shipping fuel from January 2020 ¹⁸ will leave regional refiners with additional sulphur. India and the U.S. can collaborate to share innovative approaches with players in the region to handle this additional sulphur, which can be used in power generation and also create opportunities for other industries such as fertilisers.	Technology transfer
In-field power generation technologies	U.S. and India can collaborate to build temporary power plants or rental power solutions that can be transported to extremely remote areas where new oil and gas facilities are being established ¹⁹ . This will help local economies optimise in-field power generation while in parallel help rationalise operational expenditure and minimise the environmental impact of their operations.	Technology transfer and adoption

16. India, Japan JV to set up LNG import terminal in Sri Lanka, Business Line, 11 January 2018

18. India's oil refiners are well positioned ahead of IMO 2020, Energy World, 13 March 2019

17. Delivering Prosperity in the Indo-Pacific: An Agenda for Australia and the United States, CSIS, 18 April 2019

19. GineersNow, September 2018

Theme	Overview	Areas of collaboration
Development of deep-water assets	The region has limited onshore oil and gas assets and with growing domestic demand, there is a need to expand operations beyond shallow-water and move to deep-water basins. An expected increase in offshore exploration will provide significant collaboration opportunities for U.S. and India to develop deep-water assets in the region.	Capacity building

Way forward

The Indo-Pacific region’s burgeoning energy demand over the next two decades presents massive opportunities for Indo-U.S. collaboration across the entire energy value chain. This can be witnessed from the recent visit by the Indian Prime Minister (PM) to the U.S., where the PM discussed on collaborating for energy security and expanding investment opportunities with U.S.-based energy sector CEOs. Also, through the Asia EDGE initiative, the U.S. has shown positive commitment to help build sustainable and secure energy markets in the Indo-Pacific region. While the U.S. could offer technological expertise, the key incentive for India is its proximity to the region and its ability to leverage the vast pool of skilled labour force.

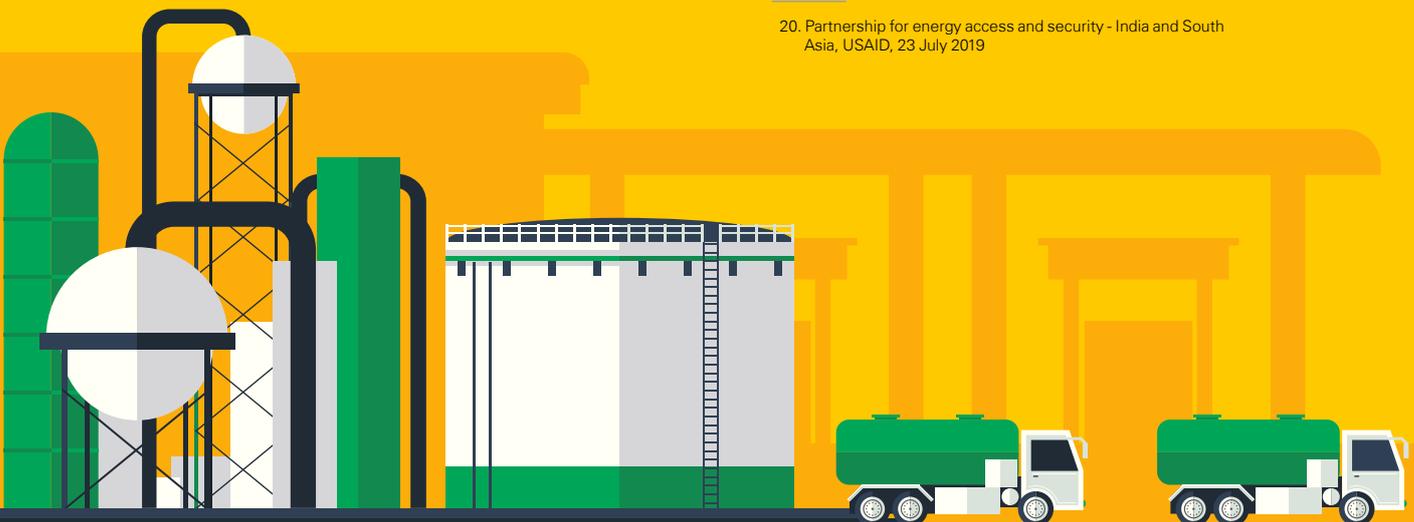
Going forward the U.S. and India should look at:

- Working in this region to catalyze new markets for batteries and other energy storage solutions that are suitable for a variety of grid and off-grid applications and deployable at scale.

- Driving growth of renewable energy by encouraging international cooperation and collaboration in areas of products manufacturing and applications that can provide advanced technologies, skilled resources as well as knowledge and management mechanisms.
- Areas for collaboration in emerging sectors such as biofuels, hydrogen energy, and blue economy (sustainable use of ocean resources for economic growth).

Oil and gas stakeholders in the region are looking for funding and technologies for process improvements and infrastructure development to help tap the full potential of the changing demand dynamics. Infrastructure investments and financing in South Asia are currently driven primarily by public money with a 3:1 or higher ratio to private financing²⁰, thereby limiting the development. There exists significant opportunities for India and the U.S. private sector firms to collaborate to help drive international investments.

20. Partnership for energy access and security - India and South Asia, USAID, 23 July 2019



Water



2c

Over the past three decades, the Indo-Pacific region has seen a rapid growth of its population and economy which has led to lifting millions out of poverty, thereby achieving the largest reduction globally in the number of undernourished²¹ and significantly improving living conditions of people.

The accompanying rise in population has, however, put increasing pressure on finite water resources. By 2050, it is estimated that food production will have to increase by 70-100 per cent to keep pace with the population. This rise in food production will significantly increase demand for water, in addition

to competing demands from industry and energy production. Further, the impact of climate change is felt principally through water.²² The early effects of climate change are already visible in the form of increasing frequency and intensity of water-related disasters like floods and droughts in the region. As per a 2015 report on water security²³, South Asia had the largest global concentration of water related risks, including severe impacts across the full range of hydrological variability (droughts to floods). Similarly, Southeast Asian countries (e.g. Vietnam) have a high exposure to flood risks.

Water overview^{24,25}



Addressing the complex challenges facing the water sector will require an integrated water resource management approach as recommended in the 2016 Asian Development Bank (ADB) report on strengthening water security in the region²⁶. Such an approach will comprise: i) an enabling regulatory environment, ii) developing strong and capable water sector institutions, iii) robust management system, and iv) investments in the sector. An example of an

enabling regulatory environment would be phasing out of free or subsidised power provided to the agriculture sector in India that has resulted in over-exploitation of groundwater resources. Of course, a one-size-fits-all approach is not recommended; interventions in each country, or for that matter each region within a country, needs to be tailored to the circumstance, strengths and challenges of that region.



Areas for intervention

The areas of interventions in the water sector, across three themes of i) food security and ecosystem, ii) climate change and iii) sustainable and inclusive economic development, are summarised in the table below.

Food and ecosystems	Climate change and resilience	Growth and inclusion
Improve water-use efficiency and productivity	Develop flood and drought preparedness and resilience	Wastewater reuse
Align cropping pattern to local water availability	Water scarcity management	Water planning and accounting
Demand management	Adaptation to impacts of climate change	Water information systems
Improve groundwater storage and quality	Use of renewable energy	Water rights and allocation between and within countries
Protect and clean up rivers		Stakeholder involvement
Reduce water pollution		Institutional development and reforms

Source: Adapted from International Water Management Institute Strategy 2019-2023

21. Reduction of undernourished people by 236 million in Asia and Pacific as per Regional Overview of Food Security, Asia and the Pacific, FAO, 2015
 22. Innovative water solutions for sustainable development, International Water Management Institute Strategy 2019-2023
 23. C. W. Sadoff et al.. 2015. Securing Water, Sustaining Growth: Report of the GWP/ OECD Task Force on Water Security and Sustainable Growth. Oxford, UK: University of Oxford.

24. Fifth Asia Water Forum Discusses Innovation and Technology to Address Asia's Water Challenges, Asian Development Bank, 2 October 2018
 25. Key environment issues, trends and challenges in the Asia-Pacific region, Economic and Social Council for Asia and the Pacific, 12 September 2018
 26. Asian Water Development Outlook 2016, ADB

Collaboration opportunities for U.S. and India

Area	Opportunities	Areas of collaboration
Agriculture	<ul style="list-style-type: none"> • Expanding the U.S.-India Agriculture Knowledge Initiative (AKI): There is scope to build upon the existing initiative, U.S. India Agricultural Knowledge Initiative (AKI), to promote sustainable use of water resources, implement biotechnological approaches, and ensure strong markets and processing chains²⁷. • Other opportunity areas including <ul style="list-style-type: none"> – Advanced weather forecasting – Satellite and remote sensing technologies – Water efficient irrigation techniques – Strategies to restore groundwater resources – Water resource management information systems 	R&D, sharing good practices, technology and implementation capabilities
Industry	<ul style="list-style-type: none"> • Cost effective effluent treatment technologies including Zero Liquid Discharge. • Control pollution of surface and ground water resources from industrial activities. • Regulatory models for industrial water supply and effluent discharge. • Promoting sustainable business practices for water conservation and better management. 	Policy and regulatory support, technology and implementation capabilities
Domestic	India and the U.S. can collaborate with municipal bodies of various countries in the Indo-Pacific region such as Nepal, Bangladesh, Indonesia, Mongolia, the Philippines and Vietnam to implement technologies/solutions such as automated metering infrastructure, leak detection systems, IT/IoT interventions for non-revenue water reduction, faecal sludge management, desalination and soil biotechnology.	Technology transfer
Capacity enhancement	<p>There is significant scope for knowledge sharing, ensuring adoption of both local traditional methods and emerging ones for water conservation, usage and efficiency.</p> <p>This in turn will involve research & development, community awareness, upskilling of governments, private operators, and end-users, and handholding assistance.</p>	R&D support, skill development and training

27. The U.S.-India Agricultural Knowledge Initiative (AKI), USDA, 21 January 2015



Way forward

India and the U.S. share a rich tradition of co-operation in many of the above areas and of demonstrating tremendous success as in the case of the Green Revolution of the 1960s. The focus of collaboration should be to ensure water and food security, mitigate the impacts of climate change and develop resilience to ensure that economic growth and inclusion are not impeded by water insecurity in the region.

Most of the current initiatives in the region are on the supply-side that focus on increasing storage and distribution capacities. There is now a need to shift focus to improve demand management through reuse, recycle and reduction in water loss and other inefficiencies and encouraging circular economies in the water-energy-food nexus to develop. This can happen through use of technology, sharing and adopting proven good practices and enhancing the local institutional capacity.

Lack of adequate financing is another constraint in the sector. Asia is projected to require investments of over USD800 billion between 2016 to 2030 on water and sanitation infrastructure.²⁸ More than 90 per cent of the current investments are through public finances.²⁹ There is a need and an opportunity to tap into private investments and capabilities to meet this massive financing need.

There lies tremendous opportunity for India and the U.S. to collaborate in the water sector in areas such as research, technology, private financing among others to address the pressing challenges facing the people of the region.

²⁸. Meeting Asia's Infrastructure needs, Asian Development Bank, Accessed on 16 September 2019

²⁹. Closing the Financing Gap in Asian Infrastructure, Asian Development Bank, June 2018

Aviation



2d

The region is estimated to drive the industry over the next two decades as the current demand is outpacing supply and leading to congestion at leading airports. For instance, 16 of the top 20 airports in Asia are operating at over 90 per cent of their capacity.³⁰ It has been estimated that Asian airports require an estimated investment of USD500 billion to handle the increasing capacity over the next two decades. There are already fifty six proposals for building new airports or expansion of existing airports in Asia with a capex of USD199 billion.³¹ Besides, not just passenger growth,

aviation and related sectors support over 30.2 million jobs in the Asia-Pacific and the number is expected to reach 44 million by 2036.³²

Over the next two decades, 16,930 new aircraft are expected to be delivered in the Asia-Pacific region thereby contributing the largest share of the global fleet at 37 per cent.³³ All of the above factors are expected to drive the demand for aircrafts and service market through 2037, thereby creating significant scope for collaboration between India and the U.S. across manufacturing, services and training.

30. Asia Airports, DBS Insights Sparx, 26 October 2018

31. Asia Airports, DBS Insights Sparx, 26 October 2018

32. Asia-Pacific's aviation industry to support 44 million jobs by 2036, HRM Asia, 5 October 2018

33. MRO universe moves to Asia, Asian Aviation, 21 February 2019

Overview of global air traffic^{34,35}



34. WATR 2018: Annual World Airport Traffic Report, Airports Council International, Accessed on 10 September 2019

35. Key environment issues, trends and challenges in the Asia-Pacific region, Economic and Social Council for Asia and the Pacific, 12 September 2018

Collaboration opportunities for U.S. and India

Theme	Overview	Areas of collaboration
Airport infrastructure	India and the U.S. can co-bid for such infrastructure projects, where India can bring in its manpower and U.S. can leverage its technological expertise.	Infrastructure development and capacity building
Maintenance repair and overhaul (MRO)	Global spend on maintenance, engineering, parts and upgrades is estimated to grow at a CAGR of 4 per cent from USD75.6 billion in 2017 to USD164.7 billion in 2037. The Asia-Pacific's share of the global spend is estimated to grow to 37 per cent by 2037 from 29 per cent in 2017. ³⁶ While established hubs in Singapore are expected to lead the market in the region, there are upcoming projects in countries such as Indonesia, Thailand, Vietnam, Malaysia and the Philippines, where India and the U.S. can collaborate on infrastructure development.	Infrastructure development
Training	Rising air traffic and an expanding aviation market are likely to create a huge gap in terms of resources and qualified pilots. For instance, Asian airlines will need an additional 261,000 pilots and 317,000 cabin crew by 2037 ³⁷ . India and the U.S. can collaborate on setting up training centres across the region to bridge this gap.	Skill development
Regional Comprehensive Economic Partnership (RCEP)	Ongoing discussions on RCEP could liberalise trade in the region. India and the U.S., in collaboration with ASEAN countries, Japan and South Korea, could build a robust air connectivity ecosystem. Increased connectivity will boost trade and enable integration of regional value chains (RCVs) with global value chains (GCVs).	Infrastructure development and capacity building
Air navigation	The GPS Aided Geo Augmented Navigation (GAGAN) system was operationalised in 2013-14 by ISRO and AAI. The constellation of three satellites along with the system (to include fail-safe mechanism) has been integrated, tested and approved for usage. The system when integrated with Automatic dependent surveillance - broadcast (ADSB) will be able to provide enhanced GPS navigation to flights operating within West Africa to Australia. It would also afford states falling within the zone enhanced GPS for navigation, location and timing based services. The system was integrated by a large U.S. company within India and has the potential to use the remaining 30 Indian Reference Station (INRES) to provide aforementioned services across the region.	

Way forward

Demand has taken off in the region's aviation industry, with passenger traffic in the Asia-Pacific expected to grow at a CAGR of 5.1 per cent over the next 20 years compared to the global rate of 3.8 per cent.³⁸ However, capacity constraints have limited the industry's ability to benefit from this boom. These constraints could be addressed by promoting regional cooperation and building partnerships with technologically advanced countries. Additionally, a comprehensive and standardised regulatory framework will ensure sustainable aviation industry growth in the region.

36. MRO universe moves to Asia, Asian Aviation, 21 February 2019

37. Aviation in full throttle at Asia-Pacific region, Gulf Times, 24 April 2019

38. Asia Airports, DBS Insights Sparx, 26 October 2018

Defence



2e

Geopolitical change in the Indo-Pacific region not only play an important role in shaping the contours of its growth and progress, but also have significant ramifications on global trade. However, multiple bilateral disputes necessitate the convergence of strategic and security interests to have a stable, peaceful and progressive region.

India is a key player with multi-layered engagements in the region. One key area that sets the backdrop of the 2+2 dialogue between the U.S. and India is their participation in joint exercises such as Cope-India (Air Force), Yudh Abhyas (Army) and Vajra Prahar (Special Forces). Apart from such areas, they collaborate in trade and the co-production of military equipment. The countries can strengthen their relationship by working towards achieving their common goal of fostering peace and security in the Indo-Pacific region.

Defence spending^{39,40}

Defence spending in Asia-Pacific at USD392 billion in 2018

India's military spending is **2nd** largest in Asia and **5th** largest in the world.

India's defence budget is expected to reach USD112 Bn by 2027 from USD45 Bn in 2019. To spend USD250 Bn in next 10 years on modernization of forces.

Japan's military spending is **3rd** largest in Asia and **8th** largest in the world.

It amounts to 0.9 per cent of the country's GDP.

South Korea's military spending is **4th** largest in Asia.

Spending likely to be USD240 bn between 2019-2023.

Australia's military spending is **5th** largest in Asia.

Targets to spend 2 per cent of its GDP on defence by 2021.

39. Defence Economic Outlook 2018, FOI, December 2018

40. Military spending is soaring in the Asia-Pacific region. Here's why, Los Angeles Times, 7 June 2019

Collaboration opportunities for U.S. and India

Theme	Overview	Areas of collaboration
Modernising armed forces	India and the U.S. can collaborate to tap into the region’s growing military spending and upgrade requirements. For instance, India has incorporated the strategy of building technology savvy smart army through a new program that will have two components: 1) arming the modern infantry assault rifle, carbines and personal equipment such as helmet and bullet proof vests; and 2) the Battle Field Management System (BMS) that includes palm top communication system and helmet mounted camera. On the other hand, the U.S. is building future military warfare systems such as laser weapons for missile defence, hypersonic missiles, robotics and AI.	Technology transfer and localised manufacturing
Military logistics support	The Asia-Pacific will lead the growth in the global military logistics market, which is estimated to grow at a CAGR of 5.2 per cent to reach USD526.5 billion by 2027, owing to large defence troops and movement to disaster prone locations. ⁴¹ India, with its regional proximity can collaborate with the U.S. for deployment and integration of military equipment and trainings for disaster management.	Technology, manufacturing and training
Training	Apart from the production and supply of military equipment, other important elements are setting up defence appropriate guidelines, training modules, maintenance support and facilitating operational integration between military and defence services. India and the U.S. can leverage their robust relationship to foster regional security.	Skill development
Defence equipment	Leveraging the existing Communications Compatibility and Security Agreement (COMCASA) to drive greater synergies on responding to defence and security developments in the Indo-Pacific region. Defence exports: India has rolled out major plans for joint development of platforms like helicopters, submarines and fighter aircrafts under the new Strategic Partnership programme, thereby providing significant opportunity for U.S. companies to set up manufacturing bases in India and also target exports out of India to other countries in the Indo-Pacific.	Technology transfer and localised manufacturing
Cybersecurity	India’s focus on developing a cybersecurity force of five lakh professionals ⁴² and U.S. cybersecurity expertise can be leveraged to curtail cyber warfare, especially when cross-border trade and regional cooperation are on the rise. Currently, most countries in the region are not adequately equipped to handle such issues.	Technology transfer and implementation

41. Military Logistics Market – Global Trends, Market Share, Industry Size, Growth, Opportunities, and Market in US Forecast, 2019-2027, Market Watch, 28 August 2019

42. Military Modernization: Transforming Strategic Outlay of India, South Asia Journal, 15 October 2018

Way forward

The cooperation between U.S. and India becomes even more significant when there are issues related to disputed territories and maritime tensions. For instance, as per public sources, India shares disputed boundaries and/or territorial issues with Pakistan and China. Similarly, in the South China Sea, China, Brunei, Malaysia, the Philippines and Vietnam have differences over maritime borders.

Therefore, to have long-term peace and rule-based order in the region, strategic defence partnerships, both at a bilateral and multilateral levels are vital. Promoting regional defence cooperation in the region, especially with blocs such as ASEAN, is the need of the hour.



Infrastructure and transportation



2f

Against a challenging global economic background, the network of transportation and logistics infrastructure forms the backbone of an economy, especially in the developing Asian countries. According to the Asian Development Bank (ADB)⁴³, developing countries in Asia need to invest about USD26 trillion between 2016-30 on infrastructure to maintain stable growth and simultaneously address climate change issues, with the transportation sector alone requiring an investment of about USD8.4 trillion.⁴⁴

The Asian road and rail transport network is poised to grow, as rapid urbanisation and environmental concerns trigger demands for modern, sustainable and smart public transport systems. However, the infrastructure for both road and rail networks vary significantly across the Indo-Pacific region, primarily due to differing population densities. The growing requirement for modern Asian urban transport infrastructure will provide engineering and technology providers a platform to develop innovative solutions for this sector.

Electrified Proportion of rail network

South East Asia - 4 percent



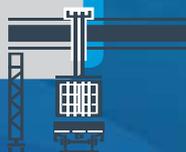
Increase in port infrastructure Twenty Foot Equivalent (TEU)

South East Asia: Additional 172,000,000 till 2030 from 120,000,000 in 2017



Increase in high speed rail infrastructure

South Asia: Additional 10,000 kms till 2030 from 1,400 kms in 2017



Expected cruise usage by 2035

4.5 million passengers



43. Asian Development Bank, 2017 estimates

44. Meeting Asia's Infrastructure Needs, Asian Development Bank, February 2017

Collaboration opportunities for U.S. and India

Theme	Overview	Areas of collaboration
Urban transportation	<p>Most economies in the region are seeing rapid expansion of their metro rail transport (MRT) and cross-border railway corridor systems, creating ample opportunities for the U.S. and India to leverage their experience in manufacturing metro coaches and public transport equipment and deploying railway infrastructure systems.</p> <p>India and the U.S. have few examples such as New York and New Delhi running an efficient public transportation system, with a combination of public/private buses and metro/subway rail system catering to the growing population. According to the infrastructure capability, U.S.-India collaboration could be in the area of development and implementation expertise.</p>	Infrastructure development, equipment supply, technology solutions (incl. FinTech) and capacity building
Upgrading port infrastructure	<p>Port optimisation: Developing and deploying technology solutions to combat congestion problems and traffic management in the existing and emerging ports in the region. Such technology solutions will enable ports to deliver high quality services despite lower scale of operations and enhance their management capabilities.</p> <p>Port efficiency: Improving port efficiency by easing congestion with a focus on cargo delivery system and Hyperloop technologies to evacuate containers.</p>	Infrastructure development and capacity building
Marine connectivity	<p>Half of the container ships globally, one-third of the bulk cargo traffic and two-thirds of the global oil shipments pass through the region.⁴⁷ Recently, India and ASEAN member nations have also taken steps to strengthen the bilateral free trade agreements.⁴⁸ With manufacturing activities increasingly shifting outside China and finding a base in ASEAN nations, enhanced maritime connectivity could be important for both India and the U.S.</p>	Supply-chain integration, digitalisation of shipping networks
Sustainable and renewables focused transportation	<p>While both U.S. and India are focussing on bringing renewables into transportation to make the processes sustainable in an environment-friendly society, there exists opportunities for both countries to help other economies in the Indo-Pacific help transition to renewables focussed transportation systems.</p>	Technology and implementation
Developing self-driving and intelligent transport systems	<p>Autonomous vehicles: Both U.S. and India could collaborate to provide technology solutions for developing autonomous vehicles and driverless mass transit systems and related transport infrastructure to help manage the densely populated cities in the Indo-Pacific region.</p> <p>Intelligent transport system: Develop modern transportation systems for traffic management, leveraging sensors, IoT, smart cameras, and analytical tools (including video analytics) to enhance the customer experience and ease of commute, optimise operational costs and facilitate coordination between public transport modes and other transportation providers.</p>	Technology transfer

47. Countries in Indian Ocean responsible for its stability, The Economic Times, 12 July 2018

48. India, ASEAN agree to review goods FTA pact, make it simpler, Business Line, 10 September 2019

Way forward

The Indo-Pacific region is witnessing rapid urbanisation and there is an increasing need to develop transport services to meet the growing demand. Sustainable development of transportation networks in countries in this region will require both a policy push and innovative technology solutions. Although government agencies in these countries are already investing in enhancing road and rail networks, policy impetus to attract foreign and private sector investments, especially alternatives to lower-quality financing could accelerate the development of transportation infrastructure.

The region could use latest technologies to boost marine trade activities by revamping existing port infrastructure and logistics around waterways. Connectivity is imperative for enhancing regional integration and collaboration with developed economies for technological and human capital in port, rail and road networks will pave the way for well-integrated waterway and inland infrastructure.



Emerging sectors for collaboration

3

- Agriculture
- Tourism
- Health and social measures

Agriculture

The Indo-pacific region underpins the global agrarian economy with most developing economies in the region having over 25 per cent employment being generated from agriculture. However, there has been a shift in employment towards industry and services⁴⁹ in recent times, which has spurred the need for rapid transformation in agricultural practices and technological interventions to increase farm productivity. Growing demand coupled with constrained arable land is leading to the need for improving productivity further with use of high yielding seeds, nutrient management, modern irrigation systems and adequate mechanisation. In this context, **U.S. expertise in developing farm equipment and high-yield crops can be leveraged to counter rising food demand, falling crop yields, diminishing manpower and limited availability of arable area.**

The increasing internet and smart phone penetration in the Indo-Pacific has opened up opportunities for farmers to access relevant information in a cost-effective manner. **Opportunities exist for U.S. and Indian organisations to help enable implementation of digital solutions focused on meeting the information and advisory related needs of marginal and small farmers in some of the countries within the region with the objective of reducing costs, minimising risk and improving productivity. Opportunities for collaboration exist in leveraging analytics to introduce precision farming by integrating field data, weather patterns and yield forecasting. Digitisation can also enable efficient farm lending, disbursal of loans, insurance payouts linked to weather, field data and help create a universal platform that integrates farmers and wholesale markets.**

Even though the region is one of the largest food producers in the world, the losses in the agricultural sector are significantly high. There is a need to develop an integrated cold-chain from farm-to-fork, dry warehouse storage and distribution infrastructure. Significant opportunities exist to develop post-harvest logistics network, standardisation of handling practices and development of a green grid corridors for perishables to help drive greater economic sustainability in the region. **The U.S. and Indian companies can play a pivotal role in supporting the development of cold-chain management technologies, modern silos technologies, freight corridors, integrated logistics network and ways to minimise food losses thereby improving price realisation to farmers.**

49. Table 2.1.6, Key Indicators for Asia and the Pacific 2018, September 2018

50. The Travel & Tourism Competitiveness Report 2019, September 2019

Tourism

With over 300 million⁵⁰ international tourist arrivals in the Indo-Pacific region (excluding U.S.) in 2018, the region is only second to Europe in terms of the travel and tourism market size. Further, the Asia-Pacific has the largest aggregate domestic tourism market in the world. Tourism has flourished in some of the major Indo-Pacific economies in recent years, thanks to the region's natural and cultural resource abundance, economic development, expansion of the middle class, increasing affordability and willingness to travel, particularly intra-regionally. Moreover, visitor exports are growing faster than merchandise exports and therefore require significant investments in the sector.

With everything working in its favour, the tourism industry in the region still faces a large gap in terms of infrastructure and information communication technologies (ICT) readiness. **Investment in physical infrastructure is required, especially transport infrastructure, urban mobility, creating tourism circuits and destination development. The U.S. and India can collaborate to bridge this gap and enhance physical and digital infrastructure for air, ground, port, and tourism services such as hotel and car rental services in the region.**

Though, the sector provides significant thrust to the economy, too much influx of tourism related activities could potentially destroy physical and social infrastructure thereby impacting economics of tourism. Hence investment in sustainability is a must. Sustainable tourism is becoming popular among all the countries in the region, **creating an opportunity for India and the U.S. to collaborate on developing eco-friendly transportation networks, infrastructure, utilities and initiatives such as developing less carbon-intensive cars⁵¹.** 'People-to-people ties' archetype is also gaining traction in the region's tourism industry. Prospects are bright for the **U.S. and India to collaborate on cultural and academic exchange programmes, where students and experts can exchange their interests, best practices and rich experience, resulting in improved skilled manpower and enhanced customer services.**⁵² Additionally, both the countries' tourism development agencies can collaborate to develop a comprehensive investment plan for high growth emerging markets in the region.

51. Leaders Discuss Role of Tourism in Asia and Pacific's Development Future, 4 May 2019

52. Fact Sheet: U.S.-India Economic Cooperation and People-to-People Ties, US Embassy Website, 7 June 2016

Health and social measures

More than a quarter of the Indo-Pacific's population is living below the International poverty line of USD3.20 a day (2011 PPP).⁵³ Since economic growth alone cannot eradicate poverty, there are ample opportunities for improving healthcare and universal education infrastructure, thereby alleviating poverty.

There are wide disparities in the per capita healthcare expenditure across economies in the Indo-Pacific region, with Bangladesh's health spending abysmally low at USD34.2 compared to Australia's spending of USD5,002⁵⁴. In most of the region's economies, the doctor-patient ratio and the bed-patient ratio is less than 1:1,000, which is very low compared to more than 3.5:1000 for developed economies of the region⁵⁵.

To bridge these disparities, **the U.S. can collaborate with India to develop healthcare infrastructure, provide skilled labour and also drive implementation of new and innovative healthcare management technologies such as IoT (assets-based tracking), artificial intelligence (record keeping and patient treatment), mobile and wearable devices (glucose monitors and heart rate monitors) and robotic surgeries (assistive surgeries, predictive diagnosis).**

On the other hand, Asia and the Pacific region together account for over 68 per cent of the global adult illiterate population⁵⁶. Given the highly skewed student-teacher ratio and inadequate infrastructure, significant opportunities exist for the **U.S. and India in the areas of setting up campuses in collaboration with regional institutes and providing joint education programmes and training courses/ certifications on classroom effectiveness.**



53. Why can't dynamic Asia-Pacific beat poverty?, UNESCAP, 5 July 2019

54. Current health expenditure per capita, World Bank, Accessed on 17 September 2019

55. Table 2.1.14: Key Indicators for Asia and the Pacific 2018, September 2018

56. Literacy rates rise from one generation to next, but challenges remain in region, UNESCO, 7 September 2018

Key enablers

4

Digital and technology

The Indo-Pacific region's economic growth is driven by favourable demographics, comprising of a young and tech-savvy population. However, the rising pace of internet adoption and digital connectivity has made the region susceptible to cyberattacks and connectivity challenges. As businesses use emerging technologies, these technological threats are affecting the investment attractiveness globally.⁵⁷ For a strong cybersecurity ecosystem, countries need to raise cybersecurity awareness and create a robust digital infrastructure.

India recently reformed its digital infrastructure to enhance connectivity in rural and underserved areas. The country can use the expertise of the U.S. in ICT infrastructure to develop smart city solutions across transportation, water and emergency communication sectors in Indo-Pacific countries.⁵⁸ While there have been synergies on this front between the two nations, there is still a long way to go to help build this 'invisible infrastructure' as a route for people in this region to overcome legacy deficits in traditional infrastructure and services. Some of the collaboration areas includes:

- Building 5G networks to deliver high-speed data and services, while ensuring cyber security.
- Establishing next-generation financial and payment systems.
- Facilitating e-commerce and trade by harmonising e-commerce rules.
- Deepening cooperation in the areas of cyber security.
- Creating common data architecture and governance to ensure secure and free flow of information.
- Expanding international data connectivity, including undersea optic cable infrastructure in the region.

The U.S. Trade & Development Agency (USTDA), through its initiative 'Digital Connectivity and Cybersecurity Partnership (DCCP)', is collaborating with the private sector and overseas sponsors for investments in cybersecurity and connectivity-related projects in the region with a funding of USD25 million⁵⁹. Through joint reverse trade missions, representatives from the U.S. and Indian technical communities can share their experiences to develop secure interconnected infrastructure, communications and data systems in the region.

57. Cyber-attacks are the biggest risk, companies say, The Telegraph, 12 November 2018

58. U.S. TDA DCCP Brief, Accessed on 19 September 2019

59. Fact Sheet: Digital Connectivity and Cybersecurity Partnership, USTDA, Accessed on 19 September 2019



Finance and funding

India and the U.S. are collaborating on funding across various sectors to evolve as prominent partners in the Indo-Pacific and international geopolitics.

India assured a funding of USD9.5 million⁶⁰ through India-Africa Economic Cooperation Fund (INAFEC) to provide technical and financial assistance in infrastructure, ICT and capacity building in private public partnerships in Africa. India is also strengthening bilateral relations with Asian countries by announcing a line of credit of USD1 billion to promote physical and digital connectivity between India and ASEAN. India is also involved in a Project Development Fund with a corpus of USD71.5 million to develop manufacturing hubs in Cambodia, Laos, Myanmar and Vietnam.⁶¹

Meanwhile, through 'Free and Open Indo-Pacific (FOIP)', the U.S. has announced investments worth USD113.5 million in the region, with a focus on digital connectivity, energy security and sustainable infrastructure.⁶² The U.S. pledged a funding of USD10 million in the U.S.-ASEAN Smart Cities Partnership programme to advance digital transformation of urban system in the region⁶³. Also, the U.S. and India together assured a USD50 million funding in Joint Clean Energy Research and Development Centre (JCERDC) to promote clean energy innovations and USD30 million to enhance smart grid infrastructure in both the countries. Both countries can leverage each other's experience and capacities in financing across various sectors within the Indo-Pacific region.

60. African Development Bank Group website, Accessed on 19 September 2019

61. ASEAN India website, Accessed on 19 September 2019

62. Advancing a Free and Open Indo-Pacific Region, 18 November 2019

63. Impact of Increased Public Infrastructure Spending on Employment and Economic Growth, Philippines



Beyond the U.S. and India

5

- Philippines
- Myanmar
- Thailand
- Vietnam
- Indonesia

Philippines

Philippines remains committed to accelerating infrastructure development to sustain economic growth and enhance the quality of life of its people. In line with its thrust to usher the “Golden Age of Infrastructure” in the country, the Philippine Government aims to raise public infrastructure spending from 4.1% of the country’s gross domestic product (GDP) in 2016 to 6.7% by 2022. For 2019 alone, the Government has programmed to spend PHP910 billion (USD17.5 billion) for infrastructure, which is estimated to equal 4.7% of GDP⁶⁴.

Transportation and connectivity remain one of the top priorities for infrastructure development. Included in the pipeline, are the rehabilitation and development of crucial airports, such as the Ninoy Aquino International Airport, Davao Airport and Bulacan Airport. Developments in the areas of railway and roads are also active. Key projects include the MRT 7, PNR South Long Haul Project, NLEX-SLEX connector road, and the Cavite-Tagaytay-Batangas Expressway, among many others.

Myanmar

According to the Asian Development Bank (ADB), Myanmar’s infrastructure gap between now and 2030 is expected to be worth \$120 billion⁶⁵. The government has indicated that immediate priority will be given to infrastructure projects to improve land connectivity and transportation links with regional economies. Given Myanmar’s geostrategic location, the development of port facilities is another attractive investment opportunity for potential investors. According to ADB’s initial assessment of the railway sector, the rail network is in a poor condition and investment in basic infrastructure, such as track renewal, replacement of sleepers and upgrading of signaling and communications systems has been inadequate.

Myanmar faces a shortage of power supply to meet the demands of over 60 million people. However, the government can only provide electricity to 38 per cent of households. Mawlamyaing power plant project is expected to generate supply of electricity for five million people, thereby contributing to the country’s National Electrification Plan (NEP) of 100% electrification by 2030⁶⁶. The Myingyan combined-

cycle gas turbine power plant is currently under development in Taungtha, and this 225-megawatt project is expected to become one of the biggest gas-fired power plants in the country.

Mandalay and Yangon city are the two hubs of smart cities in Myanmar. The New Yangon City has the advantage of being developed from scratch in a location that is not yet fully developed. Mandalay, the second largest city in Myanmar, is experiencing a rapid increase (fivefold in eight years) in vehicles. To this end, there exists significant opportunity around urban development as part of the government’s urban development plan looking ahead to 2040.

Thailand

The significant growth in infrastructure spending over the last few years has been primarily a result of the government’s increased focus in this area. The country has introduced a number of initiatives, including the development of the Eastern Economic Corridor, Thailand 4.0 (it’s Digital Economy Strategy) and a new fast-track scheme for high priority Public-Private Partnerships.

At the back of the investments in infrastructure, significant improvements have been made in availability and accessibility. The road network and electricity coverage are close to 100%. The country is now moving toward ensuring the quality of service deliveries, management, and sound regulation. E.g. in March 2018, the Thai cabinet approved a multi-billion dollar high-speed rail project that will link two airports in the Bangkok area and another in the eastern province of Rayong. However, due to political turmoil, there is often uncertainty around long-term projects. The government, as part of its Thailand 4.0 initiative, is also focussing on the Smart Cities programme, which aims to transform big cities like Phuket, Chiang Mai, Khon Kaen and Bangkok into technology hubs.

Vietnam

Over the last decade, the government of Vietnam was able to sustain infrastructure investment at 10 per cent of GDP⁶⁷ at the back of which the sector has witnessed rapid expansion of infrastructure stocks and improved access. However, despite this achievement, the country is experiencing increasing infrastructure bottlenecks which is impairing its ability

64. Impact of Increased Public Infrastructure Spending on Employment and Economic Growth, Philippines

65. <http://www.myanmarinfrastructuresummit.com/>

66. Myanmar National Electrification Project (NEP)

67. World Bank Report

to sustain high economic growth in the long term. Transport and electricity – the two most essential infrastructure activities – appear to be the weakest infrastructure sectors in Vietnam with blackouts and traffic jams occurring more frequently.

In a bid to address some of the growing challenges, the country undertook the Coc San, the megawatt hydropower project in the Lao Cai province of Vietnam that began operations in 2016. Coc San is now providing affordable and reliable power supply to 130,000⁶⁸ people, reducing the need to import expensive and unreliable power from other countries.

In 2016, the leadership released a list of projects that have been opened for foreign investments that included:-

- Upgrades and construction of roads, bridges, and railways.
- Expanding capacity and reliability of power grids in Hanoi and Ho Chi Minh City.
- Construction and development of industrial parks and complexes.
- Expansion of existing port capacity.

Vietnamese government also recently approved a new \$921 million investment plan to boost the performance of its industrial parks by 2020⁶⁹. Hanoi, Ho Chi Minh City, and Da Nang are the three cities which are targeted for smart city development under the ASEAN Smart Cities Network (ASCN) collaboration.

Indonesia

Infrastructure has generated a lot of discussions both in policy circles and within the general public. Congestion in ports has become severe with time and traffic congestion is a growing problem in most urban areas. Due to the increasing purchasing power, private cars are becoming more common. However, the growth of the number of cars outpaces the construction of new roads, resulting in frequent traffic jams in large parts in major cities and highways. The inter-city railway transport was upgraded in the 1980s but there has been little progress since then. Javan transportation backbones — the north coast road and railway system that serves the Jakarta-Surabaya corridor, has suffered greatly from both freight and passenger congestion over the recent years.

In July 2015, the Indonesian government announced their plan to build the high-speed rail system connecting Jakarta and Bandung with China's aid. A new mass rapid transit (MRT) system is also under construction; a light rail system is in development; new toll roads are being planned to alleviate traffic congestion; the port is being partially relocated, while efforts are being made to clear water drainage, reclaim land and create flood barriers in the bay north of the city.

Electricity generation per capita is only one-third of the average for middle-income countries⁷⁰. The government did try to establish contracts with private organizations to set up more power plants, but they all have been terminated due to the lack of economic viability. World Bank and the Indonesian government have estimated that the country needs to spend at least 10 per cent of its GDP on infra concerns mainly rehabilitation and repair.



68. Coc San power plant opens, Vietnam News; June 2016

69. Reasons To Invest In Vietnam, Mondaq; September 2018

70. Economic Change in Modern Indonesia: Colonial and Post-colonial Comparisons by Anne Booth; February 2016



KPMG in India's IGH capabilities

6

KPMG understands that operating in a high-risk and high-reward market often comes with its own set of complexities. Government, industry and academia are regularly confronted with an ever-changing operating environment, dealing with complex cross-border challenges to language and cultural barriers. We believe that significant opportunities require critical support that is timely and knowledge-led. Our focus is to get you the insights, through the firm's vast pool of industry professionals. Our professionals are experienced to help governments and private sector overcome barriers and create sustainable partnerships while leveraging the Indo-Pacific opportunity.

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Assisting capital project owners in successful project delivery by integrating industry experience, risk based approach and technical and financial competencies. We enable ongoing improvement, project management governance to deliver potential time and cost reductions.

Strategy and operations

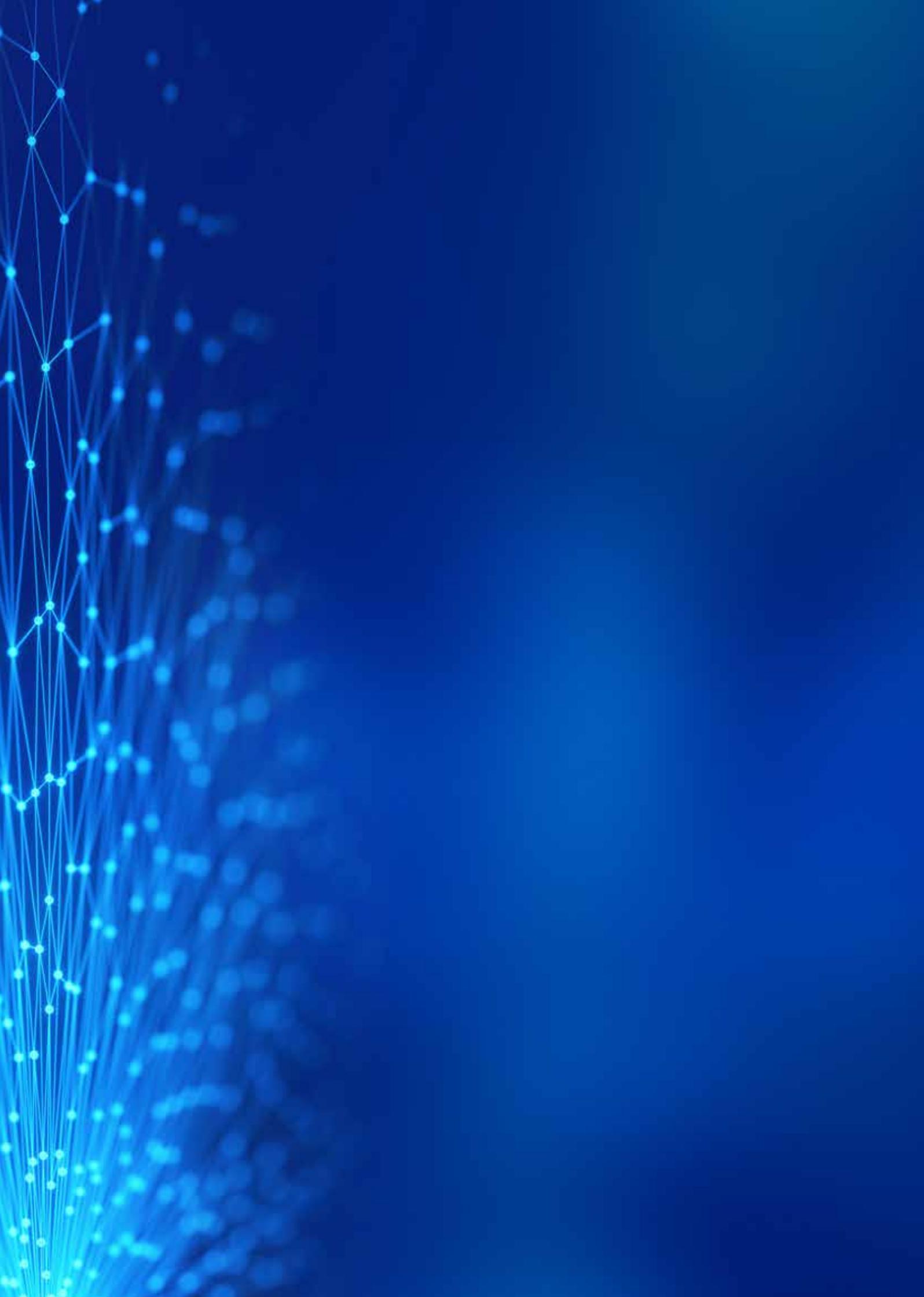
Assisting government and private sector infrastructure players to innovate, build operational efficiencies with customised approaches around strategy, business planning, organisational design, corporate planning, market assessments and feasibility studies to be future-ready.

Human and social services

Assisting governments, private sector participants, civil societies and citizen groups in business transformation, integrated service delivery, performance management, programme integrity and PPP development.

Technology and digital

Assisting government and infrastructure players in design, development and maintenance of bespoke ERP/ packaged applications, digital interventions in mobility, analytics, cloud, Geographic Information Systems (GIS), Internet of Things (IoT), etc.





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KPMG in India contacts:

Arun M Kumar

Chairman and CEO

KPMG in India

T: +91 22 3090 2000

E: arunmkumar@Kpmg.Com

Nilaya Varma

Partner and Leader

Markets Enablement

T: +911246691000

E: nilaya@kpmg.com

Elias George

Partner and National Head

Infrastructure, Government and Healthcare (IGH)

T: +911243369001

E: eliasgeorge@kpmg.com

Naveen Agarwal

Partner and COO –Tax

Partner in-charge, U.S–India Corridor

T: +911243074416

E: naveenagarwal@kpmg.com

Vinay Singh

Partner and COO

Infrastructure, Government and Healthcare (IGH)

T: +911243369001

E: vvsingh@kpmg.com

home.kpmg/in



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