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APEC Economic Policy Report 2018

Structural Reform and Infrastructure

Asia-Pacific
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APEC ECONOMIC POLICY REPORT 2018

Structural Reform and Infrastructure

APEC Economic Committee

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PREFACE

The 2017 APEC Leaders' Statement highlighted the importance of structural reform for balanced, sustainable, innovative and inclusive growth, and instructed economic and finance officials to work jointly on the 2018 APEC Economic Policy Report (AEPR) on *Structural Reform and Infrastructure*. This year's AEPR is, for the first time, a collaborative effort of the Economic Committee (EC) and Senior Finance Officials under the Finance Ministers' Process (FMP).

The 2018 AEPR makes the case that ensuring quality infrastructure requires an integrated, interlinked approach across a range of policy areas. This integrated approach entails sound public sector and fiscal management as well as structural policies to facilitate private sector involvement and competition and mitigate the social and environmental impacts of infrastructure development.

Infrastructure development is imperative for sustainable economic growth and regional connectivity, but also to efforts to promote public welfare and ensure that the benefits of growth are widely shared. The Global Infrastructure Hub estimates that the APEC region's infrastructure needs will increase to USD 2 trillion per year in 2020–2025, with high needs for transport, telecommunications and energy.* Meeting this challenge will require creative solutions that draw on both public and private sector financing, and cross-APEC efforts involving the EC's structural reform agenda and the FMP's 2018 priority area of accelerating infrastructure development and financing.

Member economies contributed to the 2018 AEPR through the Individual Economy Report questionnaires and by serving on the core team responsible for preparing the report. Several economies provided pertinent case studies or suggestions to improve the report. We thank the APEC Business Advisory Council for providing the report on digital infrastructure. We also thank the Organisation for Economic Co-operation and Development (OECD) for its contribution, including providing boxes and peer reviewing the report.

Australia and New Zealand have generously provided the funding for this year's report. We would particularly like to express our gratitude to New Zealand for leading the core team, and to the core team members from: Australia; Canada; China; Indonesia; Japan; Mexico; Papua New Guinea; the Philippines; Thailand; the United States; and Viet Nam. We also thank the APEC Secretariat for its valuable advice and the APEC Policy Support Unit, which did an excellent job of managing the overall production of the report, including the drafting of Part 1. Finally, we thank the consultancy, Castalia Strategic Advisors, for their input into Part 2.

We sincerely hope that the information and recommendations in the 2018 AEPR will help APEC economies to meet their infrastructure challenges and galvanize collaborative APEC work in this area in the coming years.

Robert Logie
Chair, APEC Economic Committee

Andrew Oaeke
Chair, Finance Minister's Process

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LIST OF ABBREVIATIONS

ABAC	APEC Business Advisory Council
AEPR	APEC Economic Policy Report
APEC	Asia-Pacific Economic Cooperation
CFE	Comisión Federal de Electricidad (Federal Electricity Commission), Mexico
FCC	Federal Communications Commission, USA
FDI	Foreign Direct Investment
GDP	Gross domestic product
GFCF	Gross fixed capital formation
GHG	Greenhouse gas
ICT	Information and communications technology
IER	Individual Economy Report
IMF	International Monetary Fund
ISP	Internet service provider
MSME	Micro, small and medium enterprise
OECD	Organisation for Economic Co-operation and Development
PEMEX	Petróleos Mexicanos, Mexico
PPP	Public–private partnership
PSU	Policy Support Unit (APEC)
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
WTO	World Trade Organization

EXECUTIVE SUMMARY

In the 2017 APEC Leaders' Statement, the importance of quality infrastructure for sustainable economic growth and prosperity was recognized and the leaders pledged to promote infrastructure development in terms of both quantity and quality. This recognized that infrastructure supports prosperity both through supporting economic growth (e.g., through improving productivity and facilitating the movement of goods and people and thereby trade) and through improving other aspects of welfare (e.g., the delivery of essential services such as health and sanitation). Infrastructure can also support inclusive growth by contributing toward poverty reduction and connecting remote regions.

The 2018 APEC Economic Policy Report (AEPR) is on the topic of 'structural reform and infrastructure' and represents a collaboration between the APEC Economic Committee and the Finance Ministers' Process. The main report consists of two parts:

- Part 1 discusses infrastructure needs in the APEC region, the relationship between infrastructure and economic growth, the infrastructure challenges faced by APEC economies and the role of APEC in promoting structural reform for infrastructure.
- Part 2 discusses structural policy settings and reforms, drawing on case studies from member economies.

The annexes to the report present the case studies and Individual Economy Reports submitted by member economies. The APEC Business Advisory Council (ABAC) has also provided a companion report on digital infrastructure. The ABAC report highlights that providing adequate digital infrastructure is important for participation in the digital economy and identifies seven key conclusions relating to digital infrastructure.

The key messages from this report are as follows:

Part 1: Infrastructure Needs and the Impact of Investment in Physical and Digital Infrastructure on Growth and Connectivity

APEC economies identified a number of drivers of infrastructure needs, including: population growth; aging populations; transport and connectivity needs; the rise of digital infrastructure; the need to ensure crisis-ready infrastructure and the need to renew aging infrastructure. Many APEC economies face significant infrastructure financing gaps, estimated to range from USD 7.5 million to USD 102 billion. Given these gaps, the APEC region is expected to dominate the infrastructure investment market over the coming years, with China; Russia; and the United States estimated to have the largest infrastructure financing gaps.*

Public investment in infrastructure is traditionally important and will remain so going forward. One estimate suggests that 75 per cent of global infrastructure assets are publicly owned. There is evidence that the efficiency of public investment can be further improved to maximize the financial return as well as to strengthen the broader impact of infrastructure on economic and social development.

However, given the size of the infrastructure financing gaps, mobilization of private finance for infrastructure will be necessary for many APEC economies. To facilitate private sector investment, APEC economies have been active in undertaking reforms to legal frameworks and government procurement practices.

Aside from investing in infrastructure, governments also play an important role with regard to infrastructure as the regulator. This role arises for a number of reasons, including: infrastructure assets are often natural monopolies; infrastructure provision often gives rise to negative

spillovers such as environmental degradation or social impacts; technological change requires regulatory systems to be adaptive; and structural policy can help to ensure assets and entities maintain sufficient levels of resilience such that economies can absorb and adapt to shocks and climate change. APEC economies continue to engage in a range of structural reform policies with respect to infrastructure, including deregulating network industries, adapting regulatory systems in light of technological change and reforming institutions such as state-owned enterprises and infrastructure funding models.

Part 2: Structural Policies to Enable the Efficient Provision and Management of Infrastructure

Taking into account the considerations from Part 1, this report finds nine key outcomes that are important to promoting quality infrastructure and discusses a number of policies in relation to these outcomes. The range of policy considerations demonstrates that developing quality infrastructure to support inclusive growth requires a mix of structural policies and an integrated, interlinked approach across many policy areas. The outcomes highlighted in this report are outlined below:

- **Sound infrastructure governance and project prioritization processes** are necessary to ensure resources are allocated to initiatives with the highest value or return. Elements of governance and prioritization processes discussed include: the use of standardized investment assessments, adequate independence between assessment and operational functions, the use of long-term plans, and funding models that strike the right balance between efficiency and social objectives.
- **Fiscal sustainability** is important to ensure economies can manage risks holistically and over the long term. This is supported through the effective identification of risks and contingent liabilities, adequate fiscal buffers and insurance, and adequate *ex-post* monitoring of procurement processes.
- **The reliable operation and management of infrastructure** over its life-cycle, and sound procurement, is important to ensure asset quality and minimize costs. This can be supported by the use of governance standards such as procurement, data and asset management standards.
- **Ensuring institutional arrangements allow for private sector involvement and competition where possible** can improve affordability and efficiency and reduce fiscal burdens. Governments have implemented a range of policies to support competition, such as unbundling competitive and non-competitive elements of services; introducing open procurement processes; and reducing red tape. However, several infrastructure sectors are typically natural monopolies and hence government regulation is necessary to ensure consumers are charged prices that reflect costs for a given service level.
- **Providing an institutional environment that supports private sector financing** for infrastructure. Private sector financing can assist in filling the infrastructure financing gaps faced by APEC economies. Governments can take several steps to attract greater private sector financing, which includes: ensuring the institutional environment is stable and predictable, ensuring the legal environment supports the use of a diversity of funding vehicles as well as ensuring adequate project preparation and evaluation.
- **Institutional settings promote and adapt to technological change.** Technological change brings with it benefits to productivity and wellbeing, but regulatory systems need to be adaptable to allow change. New technology can bring widespread social

benefits, which may justify government support where financial returns are lower than net social benefits.

- **Infrastructure decisions are aligned with economic and development objectives.** Infrastructure investments can assist governments in meeting broader social goals, such as poverty reduction. In making investment decisions, the social impacts of investments should be taken into account. At times there can be a trade-off between efficiency-based funding models and social goals. Governments can use policy overlays, such as subsidies, to help address social goals.
- **The social and environmental impacts of infrastructure are appropriately mitigated.** While infrastructure provides social benefits, it may also have negative impacts on the environment and communities, and these need to be appropriately considered during decision making. Structural policies such as responsible business conduct standards, environmental standards and community consultation requirements can assist in ensuring costs are appropriately mitigated.
- **Resilience considerations are incorporated into decision making.** Resilience refers to the ability of a system to adapt to a shock and should consider adapting to slow-moving risks such as those arising from climate change and security risks. Ensuring a system as a whole is resilient requires the consideration of a range of factors in addition to the robustness of a particular asset, such as sufficient access to infrastructure in the event of a shock, community preparedness and adequate financial strength.

These outcomes closely align with the G7 Ise-Shima Principles for Promoting Quality Infrastructure Investment. A major element of an adequate policy approach is to consider all these elements in a strategic, interconnected and coordinated way.

Moving forward, member economies envisage a number of areas where APEC could continue to play a role with regard to structural reform and infrastructure, including: (1) expanding or deepening APEC's role in sharing knowledge and best practices; working with the private sector; and promoting homogenization of standards; and (2) strengthening capacity-building initiatives to improve institutional capacity relevant for the region.

Furthermore, this report notes that cross-fora and international collaboration on infrastructure has been beneficial and should continue as it allows resources and expertise to be pooled together.

INTRODUCTION

In the 2017 APEC Leaders' Statement, the importance of quality infrastructure for sustainable economic growth was highlighted and the leaders pledged to promote infrastructure in terms of both quantity and quality through adequate investment and strengthened public–private partnerships (PPPs). The leaders also encouraged further collaboration and synergies among the various connectivity initiatives as well as work that advances economic development and integration of sub-regional, rural and remote areas in the region. These efforts include the development of safe, secure, resilient, efficient, affordable and sustainable transportation systems.

The 2018 APEC Economic Policy Report (AEPR) on *Structural Reform and Infrastructure* builds on this work. It includes the following parts:

- **Part 1** presents a discussion of infrastructure needs in the APEC region and the impact of investment in physical and digital infrastructure on economic growth, connectivity and social inclusion, including a summary of key points from Individual Economy Report (IER) questionnaires. Section 1.8.2 provides a stock-take of existing APEC work on infrastructure.
- **Part 2** presents a discussion of structural reforms and infrastructure, drawing on case studies provided by individual economies. The discussion is organized under four headings:
  - Delivering value for money and quality infrastructure
  - Improving the efficiency of outcomes in infrastructure and related markets
  - Promoting inclusive growth, environmental sustainability and resiliency
  - Policy conclusions and way forward.
- **Annex 1** presents case studies provided by APEC economies.
- **Annex 2** presents the IER questionnaires completed by APEC economies.

The APEC Business Advisory Council (ABAC) has provided a companion report on structural reform and digital infrastructure.

This report aligns closely with the G7 Ise-Shima Principles for Promoting Quality Infrastructure Investment (see Section 2.1).

This report represents a collaboration between the APEC Economic Committee and the Finance Ministers' Process. Collaboration across APEC fora continues to deliver high-quality products and processes to promote best practice policies to support high-quality investment in the right infrastructure. Accelerating Infrastructure Development and Financing is one of the priority areas for the Finance Ministers' Process. Activities under this priority include: organizing a policy seminar on planning, financing and delivering quality infrastructure; developing a capacity-building package on Effective Approaches to Financing Infrastructure in APEC Economies; and exploring ways to encourage the expansion of a pipeline of 'bankable' infrastructure projects in APEC economies. The Economic Committee supports APEC's structural reform agenda, which emphasizes the three pillars of: (1) more open, well-functioning, transparent and competitive markets; (2) deeper participation in those markets by all segments of society; and (3) sustainable social policies. Continued collaboration between the Economic Committee and the Finance Ministers' Process on structural reform and infrastructure can assist in meeting joint goals across the fora.

PART 1: INFRASTRUCTURE NEEDS AND THE IMPACT OF INVESTMENT IN PHYSICAL AND DIGITAL INFRASTRUCTURE ON GROWTH AND CONNECTIVITY

Part 1 discusses infrastructure needs and financing within APEC economies, the impact of infrastructure on inclusive growth and summarizes key points from the IERs that were submitted by member economies during the development of the AEPR. It also provides a stock-take of work already undertaken by APEC on infrastructure.

1.1 INFRASTRUCTURE DEVELOPMENT IN THE APEC REGION

The term 'infrastructure' could broadly mean the following facilities:[1]

- **Transport:** roads; rail systems; airports; harbors and ports
- **Power and energy:** electrical generation units; natural gas and petroleum pipelines and distribution centers; smart transport grids
- **Water and sewage:** canals and irrigation systems; water pipelines; sewage pipelines
- **Telecom:** landline telephone systems; landline cable and broadband systems
- **Social:** public housing; schools; hospitals.

These infrastructure facilities provide essential services to the public to support economic and social activity. In addition, these assets are often distinguished from others based on key characteristics such as requiring large initial capital outlays, involving long-term contracts, being monopolistic and exhibiting regulatory dependency.[2] Such investments are important: without adequate transport infrastructure, business and logistics services will be affected; lack of water and sanitation facilities could create health hazards and affect the quality of life of many citizens; and lack of telecommunications may impede the development of inclusive digital economies. Conversely, the presence of extensive road networks, vibrant ports and adequate telecommunications systems strengthens economic competitiveness, inclusiveness and connectivity as well as increases the attractiveness of a business location to investors.

Building infrastructure facilities involves many strategic and long-term considerations given its unique characteristics of being long term, capital intensive and involving high sunk costs. Long-lived assets pose time inconsistency problems, require maintenance over their lifetime and give rise to risk management issues.

Traditionally, governments are the largest provider of infrastructure facilities. This arises as many key infrastructure assets have characteristics of public or essential goods and services, such as infrastructure required for transportation, electricity transmission, health and clean water, and because in many cases social returns exceed private returns (as infrastructure creates positive externalities). Ingo Walter estimates that among global infrastructure assets, 75 per cent are owned by the government while only 25 per cent are privately owned.[3] While private

[1] Ingo Walter, ed., *The Infrastructure Finance Challenge* (Cambridge, UK: Open Book Publishers, 2016).
[2] EY, "Infrastructure Investments: An Attractive Option to Help Deliver a Prosperous and Sustainable Economy" (EYGM Limited, 2015), https://www.ey.com/Publication/vwLUAssets/EY-infrastructure-investments-for-insurers/$FILE/EY-infrastructure-investments-for-insurers.pdf.
[3] Ibid.

involvement in infrastructure development and investment has soared since the 1990s, governments will continue to play a large and pivotal role going forward.

The decisions governments make regarding infrastructure investment have implications for economic and social development goals. Furthermore, the role of governments within the infrastructure sector as regulator is vital. This role includes initiating structural reforms to encourage and boost competition, reducing the regulatory burden within key industries (e.g., energy and transportation), regulating sectors that remain natural monopolies, encouraging innovation and setting minimum standards (e.g., environmental standards).

The private sector also has a key role in infrastructure provision and management. The United Nations Development Programme (UNDP) asserts that efficiency does not depend on a certain type of ownership (public, private or mixed); the efficiency of service provision under all ownership models depends on factors such as competition, regulation, autonomy in recruitment and salary as well as wider financial and legal institutional development.[4] However, private provision of services can in some cases improve performance and management capability.[5] This is especially so in circumstances where the average return on assets for government enterprises is lower than their private sector counterparts, for example, where government enterprises are constrained by multiple, unclear or conflicting financial and social objectives.[6]

In short, infrastructure touches on a range of government policy areas and an integrated, interlinked approach is needed across policy areas to ensure infrastructure investment does indeed best support public wellbeing in a comprehensive manner.

1.2 INFRASTRUCTURE GAPS WITHIN APEC

Based on projections by the Organisation for Economic Co-operation and Development (OECD), between 2016 and 2030, global infrastructure needs for energy, transport, water and telecommunications will total USD 95 trillion. This equates to approximately USD 6.3 trillion per annum should climate concerns not be taken into account.[7] Asia is expected to dominate the infrastructure market in the future given that it is projected to account for 54 per cent of global infrastructure investment by 2040. It is interesting to note that three of the four economies expected to contribute to a large proportion of the investment needed are APEC economies; specifically, China; Japan; and the United States.[8]

For the APEC region, the Global Infrastructure Hub estimates that investment needs have, on average, reached USD 1.3 trillion per annum for the period 2010–2015 (Figure 1.1). The figures are expected to increase by 56 per cent to an average of USD 2 trillion per annum in

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[4] Global Centre for Public Service Excellence (GCPSE), *Is the Private Sector More Efficient? A Cautionary Tale* (Singapore: GCPSE, 2015), http://www.undp.org/content/dam/undp/library/capacity-development/English/Singapore Centre/GCPSE_Efficiency.pdf.

[5] Theodore Panayotou, "The Role of the Private Sector in Sustainable Infrastructure Development", *Yale F&ES Bulletin* (*Bridges to Sustainability: Business and Government*), no. 101 (1997): 46–69, https://environment.yale.edu/publication-series/documents/downloads/0-9/101panayotou.pdf.

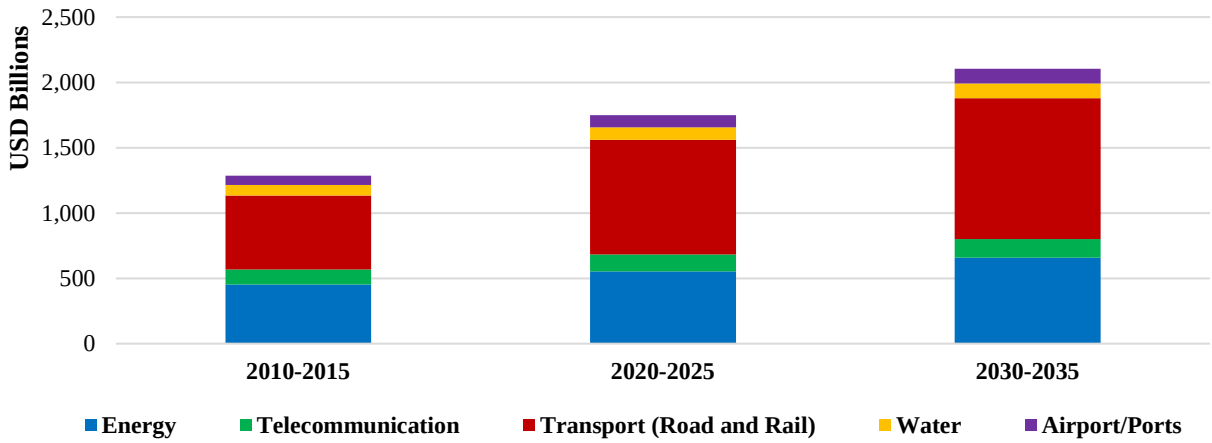
[6] Arief Budiman, Diaan-Yi Lin and Seelan Singham, "Improving Performance at State-owned Enterprises", McKinsey & Company, May 2009, https://www.mckinsey.com/industries/public-sector/our-insights/improving-performance-at-state-owned-enterprises.

[7] Organisation for Economic Co-operation and Development (OECD), *Investing in Climate, Investing in Growth* (Paris: OECD Publishing, 2017), http://dx.doi.org/10.1787/9789264273528-en.

[8] Global Infrastructure Hub and Oxford Economics, *Global Infrastructure Outlook*, accessed 6 June 2018, https://www.outlook.gihub.org/.

2020–2025.* In addition, the Global Infrastructure Hub predicts the largest investment needs to be in transport (road and rail), followed by energy and telecommunication.

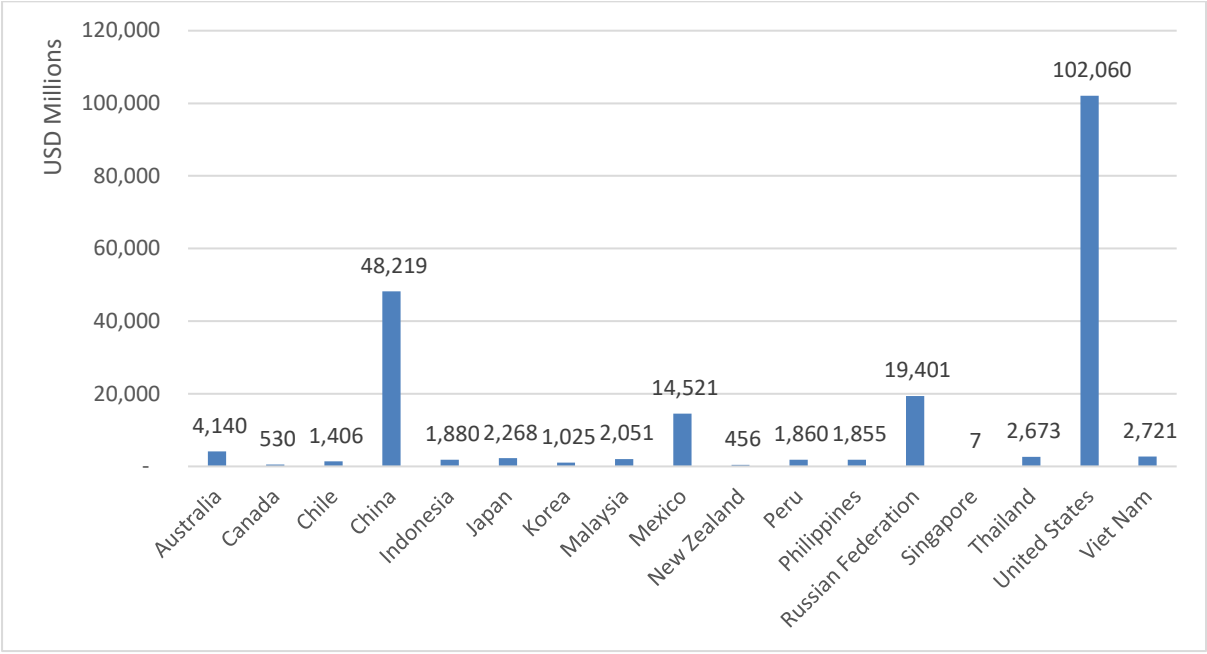
Figure 1.1: APEC infrastructure needs, 2010–2035



Note: Data from 17 economies were available.
Source: Global Infrastructure Hub – *Global Infrastructure Outlook*.

Figure 1.2 illustrates total infrastructure gap for the APEC region (energy, telecommunications, road transport, rail transport, water and airport/ports) at the economy level. Within APEC, the infrastructure gap is widespread, ranging from a low of USD 7.5 million (Singapore) right up to highs of USD 48 billion (China) and USD 102 billion (United States).*

Figure 1.2: Infrastructure gap within APEC economies in 2017*



Source: Global Infrastructure Hub – *Global Infrastructure Outlook*.

The infrastructure gap highlighted above represents untapped growth opportunities that have limited the development of economies. Additionally, underinvestment can lead to lower or deteriorating infrastructure quality, thereby affecting the quality of life and welfare of many as

a result of unproductive time spent in traffic jams, bottlenecks, days spent ill due to inaccessible health services, or disrupted work due to frequent blackouts, among others.[9]

For the case of digital infrastructure investment, the World Investment Report 2018 by the United Nations Conference on Trade and Development (UNCTAD) explained that infrastructure investments for digital development include major long-term investments in four layers of connectivity: [10]

- **International connectivity:** through fiber-optic cables (including submarine cables and terrestrial cables) to connect an economy or region to the global Internet
- **Economy-wide connectivity** ('backbone'): typically, through fiber-optic cables, used to connect points within an economy and by Internet service providers (ISPs) to access international capacity; also used to connect among operators
- **Metro connectivity:** used within a city to connect operators to each other and to connect larger customers directly
- **Last-mile connectivity:** used by ISPs to reach end users, often through wireless connections provided by mobile operators; also, through fixed connections using copper, fiber or coaxial cables.

The UNCTAD report estimates that the total investment required to build universal basic 3G coverage could be approximately USD 95 billion in developing and transition economies and USD 36 billion for less developed economies (LDEs).

Through the IERs, a few member economies provided estimates on their individual financing gaps. While there are no official estimates for Peru's infrastructure gap, one study estimated the gap to be USD 159 billion for the period 2016 to 2025, and another estimated the gap to be USD 200 billion to 2062. In the case of Canada, the infrastructure gap in the economy is estimated to range from CAD 150 billion to CAD 1 trillion (around USD 115 billion to USD 767.5 billion[11]) in 2016.[12] Indonesia has infrastructure projects listed under its National Strategic Project valued at IDR 4,796 trillion (USD 331 billion), for which it plans to get 41 per cent financing from the government budget, 22 per cent from state-owned enterprises and 37 per cent from the private sector. Similarly, China notes the significant discrepancy between the demand for infrastructure within its economy and the financial capacity of its local governments.

Apart from impeding growth, infrastructure deficits have affected business operations at the firm level. Table 1.1 shows the proportion of firms in the world that have identified infrastructure availability as an impediment to business operations. Electricity service emerges at the top of the list, followed by transportation and water. The table also shows significant improvements made by the electricity and water sector, but less so for transportation in low-income and developing economies. Infrastructure deficits seem to be less of a concern for advanced economies compared to emerging markets and low-income developing economies. However, some advanced economies have shown signs of aging infrastructure in which

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[9] Hugh Mackenzie, "Canada's Infrastructure Gap: Where It Came from and Why It Will Cost So Much to Close" (Ottawa: Canadian Centre for Policy Alternatives, 2013).

[10] United Nations Conference on Trade and Development (UNCTAD), *World Investment Report 2018: Investment and New Industrial Policies* (Geneva: United Nations Publication, 2018).

[11] Based on the current USD exchange rate. From this point onwards, for simplicity, current USD exchange rate will be used.

[12] Advisory Council on Economic Growth, "Unleashing Productivity through Infrastructure" (Ottawa: Government of Canada, 2016), 4, https://www.budget.gc.ca/aceg-ccce/pdf/infrastructure-eng.pdf.

insufficient maintenance and investment are affecting the quality of the existing infrastructure stock.[13]

Similarly, PwC conducted a survey in 2012 and 2014 that noted that comparing the APEC region over time saw bottlenecks across a range of sectors narrowing, but not as fast as businesses would have hoped (Figure 1.3).

Table 1.1: Infrastructure and economic activity

Economy	AE (Advanced Economy)	EM (Emerging Market)	LIDE (Low-Income Developing Economy)
Percent of firms: [a]			
Identifying electricity as a major constraint	14.6	26.3	39.3
Experiencing water insufficiencies	4.6	12.8	22.1
Identifying transportation as a major constraint	9.2	15.0	22.1
Number of economies surveyed	33	165	114
Change in the per cent of firms: [b]			
Identifying electricity as a major constraint	-7.2	-10.5	-9.4
Experiencing water insufficiencies	-2.7	-2.3	-5.4
Identifying transportation as a major constraint	-6.7	-2.5	-0.1
Number of survey pairs	6	48	41

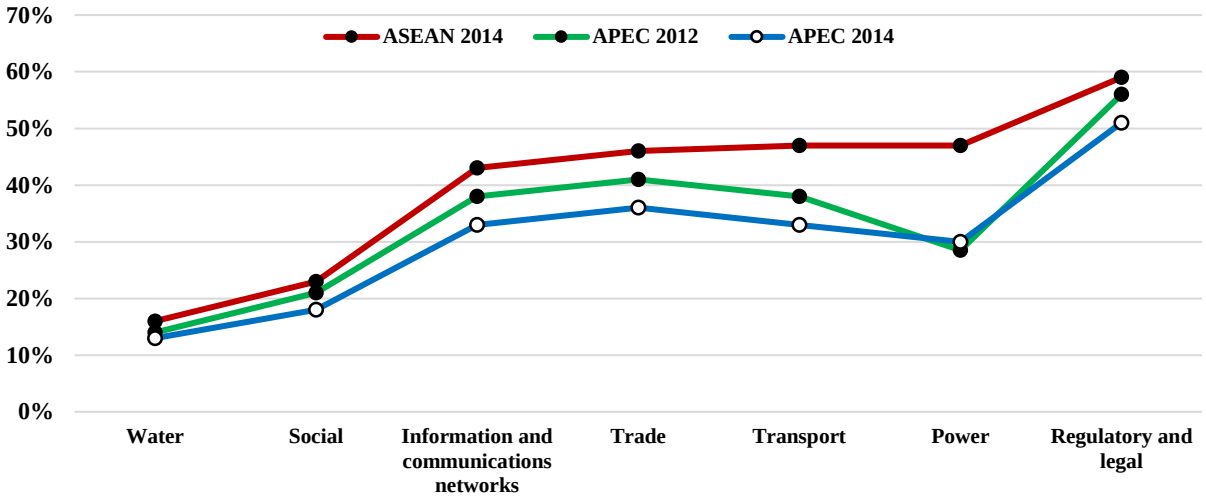
Notes:

[a] Surveys evaluated were carried out between 2006 and 2016.

[b] Reports changes between the most recent survey and the first one, starting in 2006.

Source: Daniel Gurara, Vladimir Klyuev, Nkunde Mwase, Andrea Presbitero, Xin Cindy Xu and Geoffrey J. Bannister, "Trends and Challenges in Infrastructure Investment in Low-Income Developing Countries" (IMF Working Papers, no. 17(233), 2017), https://www.imf.org/en/Publications/WP/Issues/2017/11/07/Trends-and-Challenges-in-Infrastructure-Investment-in-Low-Income-Developing-Countries-45339.

Figure 1.3: Infrastructure bottlenecks in the Asia-Pacific



Source: PwC, "Infrastructure Development in Asia Pacific (APEC): The Next 10 Years" (PwC, 2014), https://www.pwc.com/gx/en/industries/capital-projects-infrastructure/publications.html.

[13] David Egan, "Perspectives on Public Infrastructure Investment" (presentation, 18 November 2015), http://www.fmi.ca/media/765234/2015-11-18_PwCPublicInfraInvest.pdf; Nicklas Garemo, Martin Hjerpe and Jan Mischke, "The Infrastructure Conundrum: Improving Productivity", McKinsey & Company, July 2015, https://www.mckinsey.com/industries/capital-projects-and-infrastructure/our-insights/the-infrastructure-conundrum-improving-productivity.

1.3 HIGHLIGHTS FROM INDIVIDUAL ECONOMY REPORTS: INFRASTRUCTURE NEEDS

Member economies provided information on their key priorities and the drivers of infrastructure needs at the individual economy level, some of which have been highlighted as follows.

Population growth and aging population

High population growth and an aging population have been cited as key drivers toward developing transportation infrastructure and facilities. Population growth, pollution and demand for better services especially in health and education have been identified as issues affecting the future infrastructure needs of economies. While population growth is highlighted as an issue for some economies, declining birth rates is the trend for others. With these trends, the application of universal design (e.g., to increase accessibility for and support longer civic participation among seniors) into infrastructure projects will be important for economies facing an aging population, as mentioned by Canada. Similarly, Japan has implemented an act to allow integration of the universal design concept of accessibility into its infrastructure.

Transportation or connectivity needs

Transportation or connectivity needs, such as roads, highways to connect rural/remote areas, metros and airports, and energy infrastructure and facilities, were common priorities. For instance, China has highlighted needs such as infrastructure scarcity within remote areas and the uneven infrastructure levels among different regions. In response, it has implemented the 'ten in the lengthwise and ten in the transverse' initiative to increase transportation convenience for individuals. Similarly, Indonesia, having identified such gaps, has increased its budget allocation for infrastructure from IDR 177.9 trillion in 2014 to IDR 410 trillion in 2018 (from approximately USD 12 billion to USD 28.5 billion) to invest in connectivity and energy infrastructure, which has been facilitated by infrastructure provisions through PPP schemes. Malaysia is currently building an integrated needs-based transport system to enhance connectivity across transport modes and regions. It has also made efforts to improve the safety, efficiency and service levels of transport operations through measures such as road safety audits.

Russia has allocated RUB 77.5 trillion (approximately USD 123 billion) to the complex development of transportation in the next four years through the implementation of a federal program (Development of Transportation System 2018–2021) to improve the quality of roads; to modernize long-distance transportation systems (including transport routes) connecting Europe and China, and high-speed railway systems between large cities; to shorten the transit time for containers by railways from the Far East to the western border to seven days; and to increase the loading capacities of the Northwestern, Far Eastern, Volga-Caspian and Black Sea port networks and the Northern Sea Route.

Apart from transport connectivity, Thailand in 2016 established the Ministry of Digital Economy and Society to promote, develop and implement activities geared toward creating a digital economy. It has also sped up the launch of a public broadband project to lay down broadband Internet for 24,700 villages.

Crisis-ready infrastructure

Other drivers of future infrastructure needs highlighted by the IERs include disaster management/preparedness, green investment and climate change. To strengthen disaster resilience, Brunei Darussalam has built infrastructure to alleviate the regular instances of flash floods and it has been able to avoid any major disruptions and shocks. Japan has increasingly looked into developing several strategies focused on mitigating and reducing damage from natural disasters such as floods, volcanic eruptions, storm surges, coastal erosion and tsunamis. Canada's 'Investing in Canada' plan aims to ensure federal infrastructure investments reduce and minimize greenhouse gas (GHG) emissions and enhance resilience to climate change. Meanwhile, New Zealand considers resilience broadly to include shocks like earthquakes and infrastructure failure as well as slow-moving events like climate change and vulnerabilities due to dependencies within and between systems.

Aging infrastructure

Apart from increasing infrastructure provision, there is also a need to maintain infrastructure as well. Aging infrastructure leads to the deterioration of physical infrastructure and is seen as an important issue for developed economies. In tackling the issue, the Canadian federal government has partnered with the Federation of Canadian Municipalities to implement and deliver the Municipal Asset Management Program to harmonize asset management standards at the domestic level. On the other hand, Japan aims to tackle this through the development of maintenance cycles to reduce costs. This is aimed at ensuring steady execution as well as enhancing the competitiveness of the maintenance industry through hiring and training engineers and introducing new technology.

1.4 PUBLIC AND PRIVATE INFRASTRUCTURE FINANCING WITHIN APEC

This section discusses the levels of public and private infrastructure financing within APEC. There are often complexities in delineating private and public capital due to issues such as corporatization, privatization or market liberalization, which often transfers assets that are originally public capital investments into private capital. Furthermore, privately provided infrastructure is often regulated, meaning public investment is not the sole indicator of government involvement. Bearing in mind these limitations, the following sections discuss the current private and public financing levels based on the available data.

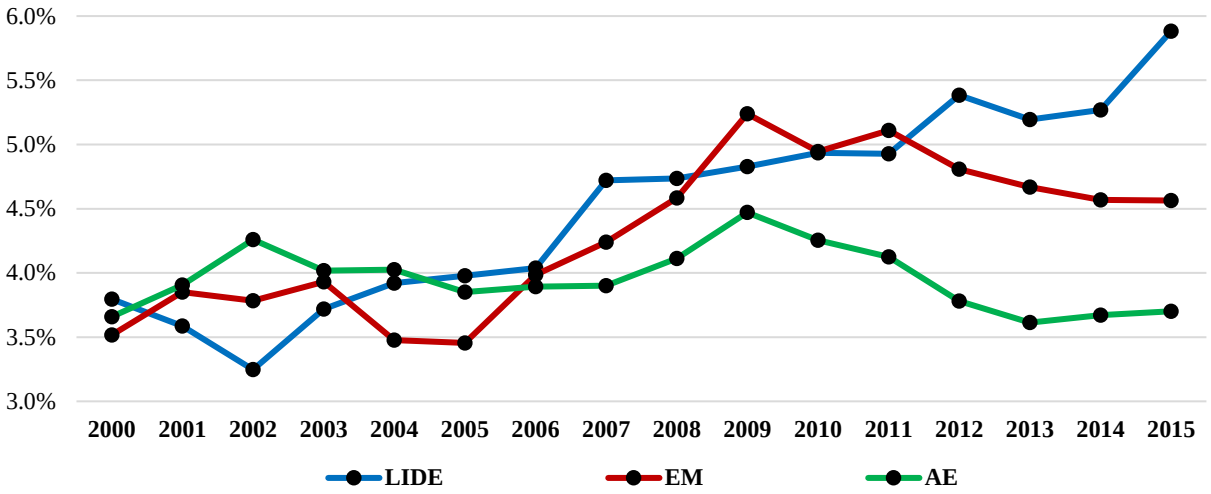
1.4.1 Current public investment levels

As shown in Section 1.2, the size and nature of the infrastructure gaps differ across developed and developing economies. For developing economies, where at least 663 million people lack access to safe drinking water and 1.2 billion people continue to live without electricity, closing the infrastructure gaps signifies a reduction of poverty and an increase in quality of life.[14] Public investment in infrastructure is important; it has been estimated that as much as three-quarters of global infrastructure assets are owned by governments.[15]

[14] World Bank, "Spending More and Better: Essential to Tackling the Infrastructure Gap", 16 April 2016, http://www.worldbank.org/en/news/feature/2016/04/16/spending-more-and-better-essential-to-tackling-the-infrastructure-gap.
[15] Walter, *The Infrastructure Finance Challenge*.

Low-income developing economies presently have marginally higher public investment to gross domestic product (GDP) ratios than advanced economies and these ratios have increased over recent years (Figure 1.4). Using the median values of public investment as a proportion of GDP from 2000–2015, low-income developing economies have seen an increase in public investment spending from 4 per cent to 6 per cent, while emerging markets experienced an increase from 4 per cent to 5 per cent. For advanced economies, the share of public investment in GDP can be seen to stabilize at 4 per cent in the same period with a declining trend noted after the global financial crisis (from 4.5 per cent in 2009 to 3.7 per cent in 2015). For the 19 APEC economies for which data were available, government capital stock per capita was found to have grown by 3.21 per cent per annum from 2000–2015.[16]

Figure 1.4: Public investment, 2000–2015 (median values, per cent of GDP)



LIDE = low-income developing economy; EM = emerging market; AE = advanced economy
Source: IMF Investment and Capital Stock Dataset, 1960–2015 (version: January 2017), data from 170 economies.

1.4.2 Current private investment levels

Private investment supports infrastructure development and contributes toward bridging the financing gap, especially during periods of strained government finances. However, for certain basic infrastructure in developing economies, the unfavorable risk profile and low return on investment may affect the ability to attract private capital easily (if at all).[17] As such, the government's role, either as a guarantor, regulator or financier (for instance, through blended finance models[18]), remains paramount.

PPPs are an important mechanism to attract private sector finance (see Box 2.9). PPP data are not comprehensive, but some studies suggest that advanced economies, in some cases, are more

[16] APEC Policy Support Unit (PSU) calculation using International Monetary Fund (IMF) Investment and Capital Stock Dataset.
[17] W. Gyude Moore, "Rethinking the Infrastructure Gap in the Poorest Countries", Center for Global Development, 16 May 2018, https://www.cgdev.org/blog/rethinking-infrastructure-gap-poorest-countries.
[18] Blended finance is the strategic use of development finance for the mobilization of additional finance toward sustainable development in developing economies, based on: "Blended Finance", OECD, accessed 19 September 2018, http://www.oecd.org/dac/financing-sustainable-development/development-finance-topics/blended-finance.htm.

likely to attract private investment through PPPs than developing economies. For example, according to a report by McKinsey Global Institute, PPPs accounted for 10 to 15 per cent of infrastructure investment spending within some advanced economies while for major developing economies, PPPs accounted for an average of 7.5 per cent of infrastructure investment.[19] Zia Qureshi notes that the private sector typically accounted for approximately two-thirds of infrastructure investment in advanced economies.[20] Table 1.2 presents data for 10 APEC economies for the period of 2000–2015 and shows that PPP investment has totaled USD 602 billion in those economies (in constant 2011 international dollars).[21]

Table 1.2: Cumulative value of PPP investment in 10 APEC economies, 2000–2015 (billions of constant 2011 international dollars)

Economies	PPP Investment	Public Capital	PPP Investment as a Proportion of Public Capital
Chile	30.80	97.6	31.5%
China	167.39	28866.3	0.6%
Indonesia	91.77	932.8	9.8%
Malaysia	62.73	1141.5	5.7%
Mexico	64.87	769.0	8.2%
Peru	22.48	130.7	17.2%
Philippines	56.20	191.6	29.3%
Russia	33.88	1143.0	3.0%
Thailand	45.78	733.6	6.2%
Viet Nam	26.07	368.8	7.1%
Total	**601.97**	**34374.9**	**1.8%**

Source: IMF Investment and Capital Stock Dataset, 1960–2015 (version: January 2017).

The World Bank found that private investment commitments in energy, transport, information and communications technology (ICT) backbone and water infrastructure within low- and middle-income economies reached USD 93.3 billion in 2017.[22] In addition, 58 per cent of total global private investment had been channeled toward China; Indonesia; Mexico; Brazil; and Pakistan (the top five). The report also observed that 30 per cent of projects received direct government support while 15 per cent received indirect government support.

[19] McKinsey Global Institute, "Bridging Global Infrastructure Gaps" (McKinsey & Company, 2016).
[20] Zia Qureshi, "The Global Infrastructure Challenge and the Role of G20 and BRICS" (in Russian and English), *International Organisations Research Journal* 12, no. 2 (2017): 164–93, doi: 10.17323/1996-7845-2017-02-164.
[21] Data from domestic sources may not be comparable with the cited IMF database. For instance, Reuters indicates that the value of China's 14,220 existing PPP projects has reached CNY 17.8 trillion (USD 2.69 trillion) by end-September 2017, which differs from the numbers in Table 1.2. See Reuters, "China Overhauls $2.69 Trillion Public–Private Projects as Debt Fears Rise", 17 November 2017, https://www.reuters.com/article/us-china-economy-ppp/china-overhauls-2-69-trillion-public-private-projects-as-debt-fears-rise-idUSKBN1DH0DE.
[22] World Bank, *2017 Private Participation in Infrastructure (PPI) Annual Report* (World Bank, 2017), http://ppi.worldbank.org/~/media/GIAWB/PPI/Documents/Global-Notes/PPI_2017_AnnualReport.pdf.

1.5 IMPACT OF INFRASTRUCTURE INVESTMENT

1.5.1 Relationship between infrastructure investment and growth

Several relationships between infrastructure investment and growth have been highlighted in the literature. For instance, Cesar Calderón and Luis Servén find that a one-standard deviation improvement in the index of infrastructure stocks and quality would raise growth by 2.9 and 0.68 percentage points, respectively.[23] On the digital infrastructure front, Harald Edquist et al. argue that the introduction and penetration of mobile broadband affected GDP growth rather than vice versa.[24] Their results suggest that a 10 per cent increase in mobile broadband penetration may cause a 0.6 to 2.8 per cent increase in GDP. The ABAC report further discusses the impact of broadband penetration rates upon GDP per capita, and policies that will enable and maximize the opportunities brought about by digital technologies.

To further explore the relationship between output per capita growth and infrastructure (public capital), the APEC Policy Support Unit (PSU) has undertaken empirical estimation by adopting David Aschauer's approach in which he investigated the importance of three types of capital (human capital, private physical capital and public physical capital) to growth in output per worker.[25] Using data from 124 economies from the period of 1970–2014 (Table 3.1 in the Appendix), the model estimates the impact of an increase in private physical capital, human capital (average years of schooling) and public physical capital on output per worker. The initial estimation finds that the implied value of the output elasticity of public capital is 0.11; hence a +10 per cent change in public capital induces a +1.1 per cent change in output. The output elasticity of private capital is 0.15; and human capital brings the largest impact with an output elasticity of 0.53.

The OECD conducted a study through a multi-annual cross-section growth regression and found that greater provision of infrastructure is associated with higher subsequent growth rates. Also, the potential impact of increased infrastructure provision is higher for economies with lower initial levels of infrastructure provision.[26] Manuk Ghazanchyan et al. acknowledge that empirical evidence on the impact of public investment on growth remains mixed: individual infrastructure projects may often generate relatively high returns on investment but their impact on GDP growth is more uncertain.[27] Nevertheless, Abdul Abiad et al. argue that, for economies with clearly identified infrastructure needs and efficient public investment processes

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[23] Cesar Calderón and Luis Servén, "The Effects of Infrastructure Development on Growth and Income Distribution" (working paper, Central Bank of Chile, 2004), doi:10.1596/1813-9450-3400.

[24] Harald Edquist, Peter Goodridge, Jonathan Haskel, Xuan Li and Edward Lindquist, "How Important Are Mobile Broadband Networks for Global Economic Development?" (Imperial College Business School Discussion Paper, no. 2017/05, London: Imperial College Business School, 2017).

[25] David Alan Aschauer, "Public Capital and Economic Growth: Issues of Quantity, Finance, and Efficiency", *Economic Development and Cultural Change* 48, no. 2 (2000): 391–406, https://doi.org/10.1086/452464.

[26] Balázs Égert, Tomasz Koźluk and Douglas Sutherland, "Infrastructure and Growth: Empirical Evidence" (OECD Economics Department Working Papers, no. 685, Paris: OECD Publishing, 2009), https://doi.org/10.1787/225682848268.

[27] Manuk Ghazanchyan, Ricardo Marto, Jiri Jonas and Kaitlyn Douglass, "Collect More, Spend Better: Public Investment in Asian Frontier Markets" (working paper, Washington, DC: IMF, 2017), https://www.imf.org/en/Publications/WP/Issues/2017/01/24/Collect-More-Spend-Better-Public-Investment-in-Asian-Frontier-Markets-44575.

(combined with economic slack and monetary accommodation), there is a strong case to increase public infrastructure investment.[28]

In addition, Walter has suggested that to achieve 6 to 7 per cent economic growth, public investment needs to be between 5 and 7 per cent of GDP and private investment between 20 and 25 per cent.[29] Using the International Monetary Fund (IMF) Investment and Capital Stock data between 1970 and 2015, the public investment (non-weighted) in APEC economies was found on average to be 5.6 per cent of GDP whereas private investment reached 17.3 per cent of GDP (non-weighted average).

However, while many economies would benefit from increased investment in infrastructure, as discussed in Part 2, it is important to ensure infrastructure projects are prioritized and subject to rigorous cost–benefit analysis to ensure resources are allocated to their best use. This underpins the need for good structural policy with respect to infrastructure. For example, the IMF has emphasized that the economic and social impact of public investment is largely dependent on its efficiency.[30] It estimates average inefficiencies in public investment processes to be approximately 30 per cent; as such, there is substantial scope for improving public investment efficiency in most economies.[31] A study by Bent Flyvbjerg et al. reveals that most cost estimates used to decide whether infrastructure projects should be built were systematically misleading.[32] In general, high public investment efficiency is associated with good institutional quality, and therefore, improving public investment management institutions brings the highest benefit for emerging markets and low-income developing economies.

1.5.2 Relationship between infrastructure investment and social inclusion (inclusive growth)

Infrastructure development plays a key role in promoting inclusive growth. Indirectly, infrastructure development creates the conditions for economic growth and job creation, enabling workers to find work and earn wages. More directly, infrastructure gives people and households access to services and economic opportunities. Infrastructure is necessary for individuals of all backgrounds (e.g., for farmers to sell their produce, workers to go to work, and students to study). Infrastructure also enables governments and the private sector to provide essential services such as education, healthcare, and water and sanitation, which contribute toward improved living standards.

Figure 1.5 presents a simple analytical framework illustrating the various channels through which infrastructure contributes toward poverty reduction. Investments in infrastructure such as roads, electricity and irrigation can improve employment opportunities and productivity in the agricultural and non-agricultural sectors. This directly contributes to inclusion by providing workers with employment opportunities and improved wages. Indirectly, improved rural

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[28] Abdul Abiad, Davide Furceri and Petia Topalova, "The Macroeconomic Effects of Public Investment: Evidence from Advanced Economies" (working paper, Washington, DC: IMF, 2015), https://www.imf.org/external/pubs/ft/wp/2015/wp1595.pdf.

[29] Walter, *The Infrastructure Finance Challenge*.

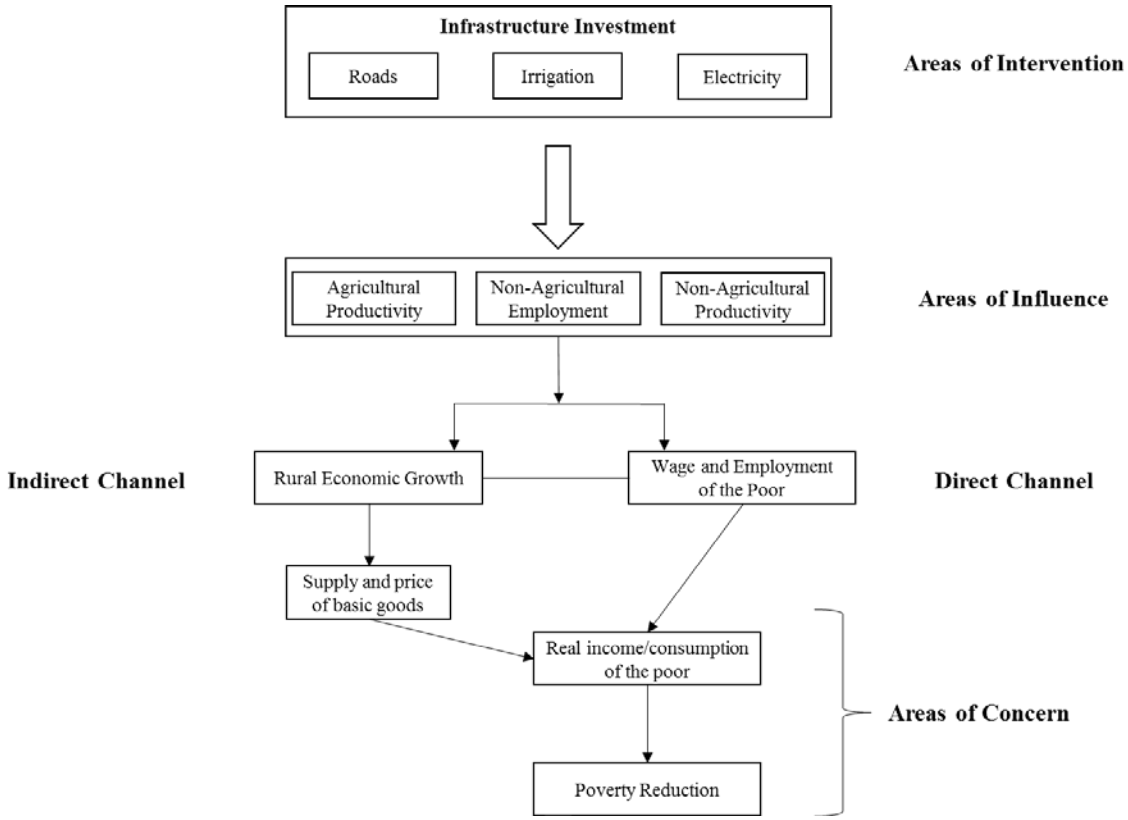
[30] IMF, "Making Public Investment More Efficient" (policy paper, Washington, DC: IMF, 2015), https://www.imf.org/en/Publications/Policy-Papers/Issues/2016/12/31/Making-Public-Investment-More-Efficient-PP4959.

[31] Ibid. In the paper, the IMF defines efficiency based on the institutional environment underpinning public investment management across four different stages: project appraisal, selection, implementation and evaluation.

[32] Bent Flyvbjerg, Mette Skamris Holm and Søren Buhl, "Underestimating Costs in Public Works Projects: Error or Lie?" *Journal of the American Planning Association* 68, no. 3 (2002): 279–95.

productivity can increase the supply of raw materials and basic goods, and reduce real consumer prices, thereby increasing real incomes. The combined effects of greater economic opportunity for workers and improved purchasing power for households contribute toward poverty reduction and higher living standards.

Figure 1.5: Linkages between infrastructure and poverty reduction



Source: Ifzal Ali and Ernesto M. Pernia, "Infrastructure and Poverty Reduction – What is the Connection?" (ERD Policy Brief, no. 13, Manila: Asian Development Bank, 2003).

These linkages between inclusive growth and infrastructure are supported by empirical research. Shenggen Fan et al. find that 3.2 individuals were lifted out of poverty in China for every CNY 10,000 (approximately USD 1,500) invested in rural infrastructure.[33] Meanwhile, the OECD shows that geographic targeting of transport infrastructure may make investments more pro-poor.[34] Additionally, Wei Zou et al. suggest that reducing transport bottlenecks improves the mobility of production factors such as labor, capital and information, thus supporting stronger economic growth and poverty alleviation in poor areas.[35] Robert Crandall et al. make the case that for every one percentage point increase in broadband penetration (equal to roughly 3 million lines), employment is projected to increase by 300,000 jobs.[36]

[33] Shenggen Fan, Linxiu Zhang and Xiaobo Zhang, "Growth, Inequality, and Poverty in Rural China: The Role of Public Investments" (Washington, DC: International Food Policy Research Institute, 2002).
[34] OECD, "Assessing the Effects of Infrastructure on Pro-Poor Growth", in *Promoting Pro-Poor Growth: Policy Guidance for Donors* (Paris: OECD Publishing, 2007), 269–71, doi:10.1787/9789264024786-25-en.
[35] Wei Zou, Fen Zhang, Ziyin Zhuang and Hairong Song, "Transport Infrastructure, Growth, and Poverty Alleviation: Empirical Analysis of China", *Annals of Economics and Finance* 9, no. 2 (2008): 345–71.
[36] Robert W. Crandall, William Lehr and Robert E. Litan, "The Effects of Broadband Deployment on Output and Employment: A Cross-Sectional Analysis of U.S. Data" (Issues in Economic Policy, Washington, DC: The Brookings Institution, 2007).

The identified linkages are supported by the PSU's estimations that investigate the elasticities of poverty headcount with respect to various variables (as shown in Table 3.2 in the Appendix). As expected, economic growth is associated with poverty reduction while population growth and a rising Gini index (an indicator of inequality) worsen poverty in an economy. Using gross fixed capital formation (GFCF) from the IMF Investment and Capital Stock Dataset as a proxy for infrastructure investment, the PSU's estimation finds that even after controlling for indirect effects through GDP growth, every 1 per cent increase in GFCF is correlated with a 0.448 per cent decrease in the number of poor people (those living on less than USD 2.00 purchasing power parity per person per day) in an economy. However, the linkage is much weaker with respect to extreme poverty (those living on less than USD 1.25 purchasing power parity per person per day), where there is no significant association between GFCF and extreme poverty reduction.

In addition, the results obtained point to the nuances in the linkages between infrastructure and inclusive growth (in this case defined as poverty reduction). People from poor households may be marginally more capable of taking advantage of opportunities opened up by infrastructure development than people from extremely poor households. It should be noted that infrastructure development is a necessary, but not sufficient, condition for inclusive growth. It needs to be coupled with other policies to realize its potential for inclusive growth. These enabling policies include increasing access to education and health services, introducing social inclusion policies that improve economic participation (e.g., non-discrimination and labor standards) and providing social protection and safety nets.[37]

Despite the linkages, an unbalanced program of infrastructure development could lead to greater inequality between geographical units within economies. Studies by Benjamin Faber and by Dan Zheng and Tatsuaki Kuroda show that disparities in infrastructure development within China contributed to greater income inequality within the economy, with production and incomes in connected cities growing rapidly while areas in the periphery lagged behind.[38] Dave Donaldson finds the same effects in India, where the expansion of the rail system was a key determinant of spatial income inequality.[39] Also, Irene Bertschek et al. find that broadband adoption is typically accompanied by a pronounced skill bias regarding workers' labor market outcomes that strongly favors highly skilled workers.[40] While skilled workers enjoy higher wages and employment rates as well as a rise in productivity as a consequence of broadband adoption, workers with lower skill levels experience higher unemployment and lower wages. These facts prove that more research is needed to find ways to reduce disparities between regions and provide people living in remote areas with better economic empowerment and living standards.

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[37] Asian Development Bank (ADB), "Infrastructure for Supporting Inclusive Growth and Poverty Reduction in Asia" (Mandaluyong City: ADB, 2012).

[38] Benjamin Faber, "Trade Integration, Market Size and Industrialization: Evidence from China's National Trunk Highway System" (CEP Discussion Paper, London: Centre for Economic Performance, London School of Economics, 2013); Dan Zheng and Tatsuaki Kuroda, "The Role of Public Infrastructure in China's Regional Inequality and Growth: A Simultaneous Equations Approach", *The Developing Economies* 51, no. 1 (2013): 79–109.

[39] Dave Donaldson, "Railroads of the Raj: Estimating the Impact of Transportation Infrastructure" (working paper, Cambridge, MA: National Bureau of Economic Research, 2010).

[40] Irene Bertschek, Wolfgang Briglauer, Kai Hüschelrath, Benedikt Kauf and Thomas Niebel, "The Economic Impacts of Telecommunications Networks and Broadband Internet: A Survey" (ZEW Discussion Papers, no. 16-056, Mannheim: ZEW, 2016), http://nbn-resolving.de/urn:nbn:de:bsz:180-madoc-414107.

1.6 HIGHLIGHTS FROM INDIVIDUAL ECONOMY REPORTS: INFRASTRUCTURE CHALLENGES

Member economies provided information on key challenges identified in their economy in regards to infrastructure provision and management, some of which have been highlighted below.

1.6.1 Lack of data availability

A lack of data has been highlighted by Canada and Brunei Darussalam as an impediment to the implementation of structural reforms and investment in infrastructure. To fill this gap, Brunei Darussalam has suggested integrating data from all relevant sectors into one platform through a cross-sectoral mechanism. Canada launched the Core Public Infrastructure survey in 2017 to improve knowledge and understanding of its core infrastructure assets.

1.6.2 Lack of inclusiveness and connectivity in remote areas

Particularly for developing economies within APEC, infrastructure delivery is impeded by geographical issues. As such, improving basic connectivity to remote areas both physically (e.g., by road) and institutionally (e.g., through connections between different levels of government) continues to be a challenge.

In Papua New Guinea, approximately 14 per cent of its population live in urban areas. As such, it faces challenges both with ensuring the availability of transport infrastructure and with securing sustainable domestic power solutions to meet its goal of delivering electricity to more than 55 per cent of households by 2025. This is further complicated by land acquisition issues, especially those relating to customary land ownership which involves ensuring the fair treatment of stakeholders (about 3 per cent of the land is available to the government; the rest is customary land).

Similarly, Brunei Darussalam has closely monitored the disparity in rural and urban development to strike a balance between the two and to promote inclusivity. It does so by ensuring that physical planners are guided by the National Land Use Master Plan 2006–2025, which specifies 26 key planning policy areas.

In Indonesia, the Ministry of Communication and Information Technology has put in place a ‘universal service obligation’ policy to improve telecommunication and information technology in rural and remote areas. Under this policy, 1.25 per cent of the total profit made by businesses in the telecommunication sector is collected to develop the telecommunications infrastructure along Indonesia’s border and in its remote and rural areas, to foster economic activities and improve the quality of education. Several projects have been funded through this scheme, such as *Desa* Broadband (Village broadband), the District Internet Service Center initiative and the development of a base transceiver station in eastern Indonesia.

Russia’s plan to reduce digital inequality aims to provide Internet at a minimum speed of 10Mbits/s to over 13,000 settlements of 250 to 500 people. It does so through the creation of access points connecting small settlements through fiber-optic lines. To further increase the accessibility of the Internet, a special program to provide free Wi-Fi to the population of those settlements was launched in 2017. At the same time, the cost of accessing the Internet is considered one of the lowest in the world thereby increasing its use and application by businesses and the public in Russia.

Canada in its submitted case study highlighted the difficulty of providing broadband infrastructure to rural and remote regions. In 2016, Canada initiated the 'Connect to Innovate' program to expand broadband access in remote and rural communities.

1.6.3 Public infrastructure congestion

Congestion of public infrastructure services has been identified within several economies in APEC and is noted to impede the movement of goods, services and people.

Canada continues to experience road congestion in large urban centers and a lack of telecommunications infrastructure in its rural and northern communities. Its trade corridors also need to be enhanced to ensure that its goods and resources can be moved to domestic and international markets efficiently. Sound asset management strategies and practices are important, particularly for provinces, territories and municipalities that operate core public infrastructure. As such, it has attempted to provide financial support to municipalities to develop these practices.

1.6.4 Technological change

Several economies mentioned the challenges of providing for, and managing the impacts of, technological change.

Australia, for example, aims to increase access to fast broadband by 2020, at affordable prices and at least cost. It sees increased flexibility in its regulation as an important enabler of this.

Korea believes that to integrate new technologies, partnerships are required between government and businesses. It has done so through comprehensive policy support to the private sector to diversify funding sources.

Similarly, Japan has increasingly applied new technology to increase the sophistication of its water management and disaster prevention efforts. It has also promoted the use of ICT to increase productivity, which has led to the development of estimation standards for ICT construction.

1.6.5 Lagging institutional structures

Regulatory challenges continue to impede the development of quality infrastructure projects due to the lack of institutional structures to tackle issues such as feasibility, risk transfer and barriers to entry. The IERs have identified that the lack of such structures leads to reduced efficiencies as well as increased cost and time. In response, economies have looked toward changing their laws to better evaluate and invest in projects.

For instance, Indonesia has focused, in relation to its PPP scheme, on applying the use of studies (e.g., value for money and environmental studies); regulating the quality of infrastructure services provided by the private party; and accelerating infrastructure market development (e.g., through viability gap funding, government guarantees and the Infrastructure Financing Fund). In addition, it has also published laws on land acquisition and established the Public Services Agency to facilitate the process.

Peru has made two legislative decrees relating to public investment, which sets out the legislative framework for PPPs by clarifying the roles of government actors. It has also introduced more risk analysis and mitigation into the business case methodology and may divert tax revenue away from overly guaranteed PPPs.

China has also introduced central–provincial government coordination to provide a more diversified fundraising model for infrastructure projects. It has implemented this co-financing model in railway construction and has made significant headway in the construction of railways, particularly high-speed railways, in the past few years.

Russia in 2015 introduced a new law on PPPs aimed at increasing private participation in infrastructure projects, including foreign investors. It also maintains a federal platform to support PPP project implementation. The platform provides investors with up-to-date information on recent PPP developments in Russia and supports the application and implementation of PPP infrastructure projects. The platform is being maintained by the National PPP Center with the support of the Ministry of Economic Development.

Chinese Taipei uses the life-cycle assessment of public construction approach where reasonability, technical feasibility and cost-effectiveness are considered in the evaluation process. It has also introduced financial reforms to the Taipei–Kaohsiung High Speed Rail in which the government has agreed to implement certain reforms, such as reversing a stock split, extending the concession period, providing capital injection and terminating the station development concessionaire in order to tackle financial issues.

1.6.6 Increasing need for quality digital infrastructure

With economies developing strongly in recent years, there has been an increase in demand for better quality and more affordable digital services. Member economies have attempted to tackle this through a range of initiatives, from improving tower infrastructure to creating new digital infrastructure plans.

Malaysia is improving their bandwidth capacity to meet expected demand. It is boosting connectivity through the High-Speed Broadband 2 and Suburban Broadband projects, and by increasing the number of towers for mobile broadband services as well as upgrading existing towers to 4G services. The capacity for high-speed broadband and data traffic will be increased through a new submarine cable system between Peninsular Malaysia and Sabah and Sarawak.

Similarly, Mexico has increased its digital penetration levels and improved the quality of its telecommunication services. Prices for telecommunication services have decreased and this has led to an increase in subscriptions, particularly in its mobile markets. Also, its foreign investment levels have increased, and this has led to the introduction of a third free-to-air television network.

The Philippines has created an economy-wide broadband plan that focuses on three strategies, namely, policy and regulatory reform; investment in infrastructure through the Philippine Integrated Infostructure (Information Infrastructure – PhII), and through the creation of local content to support broadband demand.

Under the federal Digital Economy Program, the Russian Federation has set the following goals: 97 per cent of its households and 100 per cent of its public entities connected to broadband with a minimum speed of 10Mbits/s; all cities with populations of over 50,000 people to have 4G coverage by 2024; and all cities with populations of over 1 million people to have 5G coverage by 2024.

In the United States, the Federal Communications Commission (FCC) is pursuing a number of policies to maximize investment in broadband communications infrastructure. The FCC has

launched a series of proceedings to eliminate unnecessary barriers to investment and make it easier to install wired and wireless infrastructure, which will, among other benefits, allow for the rapid introduction of next-generation technologies, such as 5G networks and services.

The report prepared by ABAC on structural reform and infrastructure discusses the importance of fixed line broadband for APEC economies (Box 1.1).

Box 1.1: Importance of fixed line broadband

A well-developed broadband infrastructure is key to enhancing the connectivity of digital economies. A higher fixed broadband penetration rate has been found to drive the uptake of cloud computing, which enables a whole suite of new digital services and technologies including the Internet of Things.

Although mobile broadband has increased in popularity in recent years, it is important to understand that the underlying data traffic for the most part is routed through fixed line broadband. This may involve long-distance transmission over an economy-wide fiber backbone and/or a submarine cable. While some mobile network-to-network traffic will remain wireless if it is local, most data traffic relies upon broadband fixed lines hidden from the view of the average smartphone user. Without fixed broadband, broadband mobile cannot be an effective driver of the digital economy, and for this reason, APEC economies need to give great attention to the ways and means to stimulate further investment in fixed broadband networks.

Models for broadband infrastructure development

Providing ubiquitous access to high-speed Internet requires substantial investment. However, there is no 'one size fits all' model for the development of telecom networks. In economies with many mountainous and inaccessible locations, such as Papua New Guinea and certain areas of Peru, and where per capita incomes are generally low, the barriers to entry are both physical and commercial.

In a geographically compact, low-lying, high-income economy such as Singapore, the commercial opportunities for telecommunications service providers are many; but even in Singapore, the capital costs of building fixed line broadband networks are too high to sustain multiple wholesale carriers. Instead the authorities in Singapore awarded the rights to a Passive Infrastructure Company (i.e., 'NetCo') to design, build and operationalize the nationwide fiber infrastructure (i.e., fiber and ducts), and an Active Infrastructure Company (i.e., 'OpCo') to design, build and operationalize the nationwide fiber network's active infrastructure (i.e., bandwidth services). Structural separation and operational separation were required of the NetCo and OpCo respectively to ensure open access and fair competition. The fixed line broadband wholesale–retail model has also been adopted in Australia and Malaysia, although in both cases, the incumbent retains ownership of the network, giving rise to cases of competitors complaining of unequal terms of access or excessive wholesale pricing giving rise to a 'profits squeeze'[a]. But in all three cases, governments have provided financial support for the network buildout, making them in effect PPPs.

In other APEC cases, such as in the high-income economies of Canada; Hong Kong, China; Japan; Korea; and the United States, multiple private carriers have invested in fixed broadband networks, providing a strong framework to support highly competitive broadband mobile markets. Of the three APEC economies in Latin America, only Chile has a competitive market in fixed broadband, while incumbent carriers dominate the markets in Peru and Mexico. Both Chile and Peru have achieved competitive mobile markets, while in 2017, Mexico's Supreme Court ruled that it is up to the regulator, not the policymakers in the legislature, to enforce the rules of competition in the mobile market.

Conclusions

Although a fixed line broadband network is much costlier to build than a wireless mobile network (even when use is made of a mix of technologies such as fixed wireless, microwave and satellite to complement fiber, especially in the 'last mile' to buildings), there are conditions that can make this commercially viable. In Hong Kong, China, for example, economies of density arise from the short distances between the clustering of premises. In Japan and Korea, population densities and thriving

retail and Internet markets sustain a high demand for long-distance transmissions, although government support in Korea was forthcoming in the early build-outs. In Canada and the United States, long distances connect the demand of major cities, but serving the rural areas remains a challenge that frequently requires additional funding.[b]

However, if favorable local circumstances do not exist, fixed broadband networks may be regarded as a natural monopoly, and will need to be regulated as such. In all the APEC economies, there is a dominant player in the fixed line market. But even in the case of Papua New Guinea, where the geographical conditions seem most hostile, there are options for a new generation of small HFS (high frequency) low-earth orbiting satellite services to provide connectivity to earth stations in highly remote regions. However, equal access regulations are still necessary to ensure competition in downstream markets such as Internet services and mobile.

Notes:

[a] A 'profits squeeze' implies high wholesale prices shrinking the retail margins of the incumbent and competitors alike, but the incumbent gains from a higher wholesale margin.

[b] In January 2018, the Chair of the FCC proposed an order to 'provide over $500 million in additional funding for cooperatives and small rural carriers'. See FCC, "Chairman Proposes over $500 Million in Funding to Promote Rural Broadband Deployment", media release, 16 January 2018, https://transition.fcc.gov/Daily_Releases/Daily_Business/2018/db0116/DO-348723A1.pdf.

Source: ABAC Report on Structural Reform and Digital Infrastructure.

1.7 HIGHLIGHTS FROM INDIVIDUAL ECONOMY REPORTS: STRUCTURAL REFORM EFFORTS

Member economies provided information on key structural reform policies they have effectively undertaken to meet the objectives of cost-effectiveness, resilience and inclusion, some of which have been highlighted as follows.

1.7.1 Promoting institutional reform

Brunei Darussalam has streamlined the construction approval process such that it only takes seven days for companies to obtain planning permission. In addition, the construction permit process has been consolidated such that it now only requires six steps.

To ensure better alignment of priorities and initiatives, Canada, under the 'Investing in Canada' plan, has moved toward establishing partnerships between different levels of government. It aims to increase the climate-resilient nature of infrastructure; improve air, water and soil quality; and attempt to reduce carbon emissions.

Mexico has modernized and consolidated state-owned enterprises such as Petróleos Mexicanos (PEMEX) and Comisión Federal de Electricidad (CFE), and this has increased investments and led to a rise in the supply of oil and natural gas. Furthermore, quality and coverage have increased with more competitive prices.

In addition to introducing the law on PPPs and municipal–private partnerships in 2015, Russia has also introduced initiative procedures and guarantees for private investors. Doing so has led to an increase in private investment from RUB 480 billion (approximately USD 6.5 billion) in 2015 to RUB 1.3 trillion (approximately USD 20.6 billion) in 2016.

Thailand carried out reforms within the aviation sector to increase their oversight of carriers and to address safety concerns highlighted by the International Civil Aviation Organization. The reforms introduced the Ministry of Transport as a regulator, and increased collaboration

between both public and private parties; and Thailand's 'red-flag' status was removed in October 2017.

1.7.2 Infrastructure project development

Indonesia has established regulations on project planning and created access to facilities to help government contracting agencies develop projects. In addition, it has encouraged improvements in the management of infrastructure under its universal/public service obligation. Leading practices are found within the National Strategic Project Development and an increased budget allocation has been directed toward infrastructure. It has also implemented regulations to support PPPs, particularly in financing and accelerating infrastructure development as well as assisting in PPP project agreements.

Russia ensures that a public audit is conducted for most projects with government participation. In 2017, an audit was conducted for all projects with a total value of RUB 3 billion (approximately USD 47.5 million) or higher. The threshold is expected to decline to RUB 1.5 billion (approximately USD 23.75 million) in 2018.

China has introduced the use of social funds in infrastructure construction to diversify the available sources of financing. This has both lowered the cost of financing and introduced better governance structures and advanced operation experience to project proponents. Through its implementation, development models have been created (e.g., 'rail + property management' or 'rail + town') that have facilitated rail transport construction.

In the United States, the Build America Bureau, launched in July 2016, is responsible for driving transportation infrastructure development projects. The bureau streamlines credit opportunities and grants, and provides access to these credit and grant programs with more speed and transparency, while also providing technical assistance and encouraging innovative best practices in project planning, financing, delivery and monitoring. The US Department of Transportation is encouraging project planners to make the bureau their first stop when thinking about accessing federal credit programs, or if they are interested in pursuing other innovative finance strategies through a PPP.

1.7.3 Reducing barriers to entry

Australia has identified reductions in red tape of AUD 4.8 billion between September 2013 and December 2015. It plans to further strengthen the reform agenda to focus on changes that enhance innovation, competition and productivity.

Brunei Darussalam has introduced alternative financing and procurement through the implementation of the design–build–operate–transfer model. It aims to increase the participation of private developers or investors to improve the quality and sustainability of its infrastructure.

Mexico has attempted to address asymmetric regulation to foster competition and has done so by removing restrictions on foreign investment in the telecommunication sector. It aims to set a legal framework to increase private sector participation through energy, tax, telecommunication and anti-trust reforms.

Thailand has enacted its Private Investment in State Undertaking Act 2013 to increase the participation of the private sector in transport infrastructure through PPPs. In addition, the economy's PPP Fast Track program has reduced red tape and bottlenecks resulting in less time required for approval, down to 9 months from the initial 25 months.

Implementing flexibility in regulation – to realize technological benefits, reduce barriers to competition in infrastructure services and deliver efficiency gains to consumers and businesses – has seen good results. APEC and the OECD have previously developed a checklist on regulatory reforms to improve capacities for quality regulation (Box 1.2).

Box 1.2: APEC–OECD Integrated Checklist on Regulatory Reform (2005)

In 2000, member economies of APEC and the OECD recognized the importance of regulatory reform to support open and competitive markets, economic efficiency and consumer welfare. As a result, they endorsed a Co-operative Initiative on Regulatory Reform at the APEC Ministerial Meeting of November 2000 with the aim to build domestic capacities for quality regulation. This initiative led to the adoption of the APEC–OECD Integrated Checklist on Regulatory Reform by the respective APEC and OECD executive bodies in 2005.

The checklist is a voluntary self-assessment tool to evaluate regulatory reform efforts, building on the knowledge of APEC and the OECD of regulatory, competition and market openness policies. It adopts a whole-of-government approach that integrates the APEC and OECD principles on regulatory reform; the three policy areas mentioned earlier; and various governance perspectives (transparency, accountability and performance). In evaluating reform efforts and the implementation of regulatory policy, it was recognized that there was a need for a flexible method in the application of the checklist that takes into account the diversity of economic, social and political environments and values of APEC member economies.

While only six economies have published their self-assessment reports based on the checklist (Australia; Hong Kong, China; Japan; Korea; Chinese Taipei; and the United States), it provides cross-border comparisons of normative frameworks and identifies good regulatory practices.

In August 2017, a number of APEC economies gathered in a workshop on Exploring Options for Future APEC–OECD Cooperation on Good Regulatory Practice and reasserted their commitment to the checklist. They acknowledged that good regulatory practices continue to be central to improving regulatory quality and delivering competitive and open markets. They recognized that the APEC–OECD Integrated Checklist remains fit for purpose and should be used more systematically. They also identified a number of areas where further cooperation between APEC and OECD economies that builds on the checklist would be mutually beneficial, including international regulatory cooperation and regulatory delivery.

Sources:

- "APEC–OECD Integrated Checklist on Regulatory Reform", APEC, accessed 12 September 2018, https://www.apec.org/Groups/Economic-Committee/Toolkit-for-Structural-Reform/APEC-OECD-Integrated-Checklist. See the latest at: APEC, "2016 Final Report on Good Regulatory Practices in APEC Economies" (Singapore: APEC, 2017), www.apec.org/Publications/2017/08/2016-Final-Report-on-Good-Regulatory-Practices-in-APEC-Economies.
- OECD, "Recommendation of the Council on Regulatory Policy and Governance" (OECD, 2012), http://www.oecd.org/governance/regulatory-policy/49990817.pdf.
- See, for example: OECD, "Regulatory Policy in Peru: Assembling the Framework for Regulatory Quality" (Paris: OECD Publishing, 2016), https://doi.org/10.1787/9789264260054-en; APEC, "Annex 3 – Report from APEC Economic Committee Workshop on Exploring Options for Future APEC–OECD Cooperation on GRP" (Singapore: APEC, 2017), http://mddb.apec.org/Documents/2017/SOM/SOM3/17_som3_025anx3.pdf.
- Compiled by the OECD.

1.7.4 Promoting inclusion

Korea has introduced an initiative to expand the broadband convergence network to rural areas and looks to construct physical subscription networks; develop services with the constructed networks; and stimulate the utilization of networks and services. Its implementation has led to an increase in household income by KRW 980,000 and has reduced cost.

China has implemented the 'boosting network coverage in every village' project to improve the inclusiveness of its information infrastructure. Thailand's Ministry of Transport is in the process of conducting a study on universal design for vehicles and transport facilities to

accommodate all groups of people including children, the elderly and the disabled. As discussed in Part 2, social inclusion has been an objective of the 'Investing in Canada' plan.

1.8 APEC'S ROLE IN PROMOTING STRUCTURAL REFORM FOR INFRASTRUCTURE

1.8.1 Potential areas of cooperation

In their IER responses, economies identified a number of areas where regional cooperation is useful to catalyze structural reform for infrastructure and improve infrastructure development, such as:

- APEC can play a role in improving infrastructure in the region by sharing and exchanging (technical) knowledge and best practices (and even failures) among members, including on topics such as infrastructure management and maintenance (e.g., the High-Level Meeting on Quality Infrastructure) and by launching a regulatory dialogue on the development of common approaches and principles for infrastructure development in APEC.
- A business hub or a center that accommodates the interests of the private sector in infrastructure development would be useful to address the infrastructure financing gap. Regional articulation of infrastructure needs could attract private infrastructure firms to the region. Additionally, there could be opportunities for creating a joint funding mechanism to allow for greater collaboration and for high-impact projects to be implemented.
- Sharing information also allows opportunities for coordination to be identified. Sharing data and key resources could be optimized through means such as capacity-building initiatives and workshops. APEC should continue organizing events to discuss the future development and challenges of sustainable infrastructure.
- Through work on standards and conformity assessment processes for ICT products and services in APEC, economies can work toward regulatory coherence and improve connectivity and interoperability. APEC can aid in achieving this by promulgating rules, norms and standards that support high-quality, sustainable and transparent infrastructure that meets stakeholder needs. Additionally, APEC could discuss ways to implement international ICT standards set by organizations such as the International Telecommunication Union. The grouping should also encourage capacity-building programs for micro, small and medium enterprises (MSMEs) to learn from successful infrastructure market players.
- Increased engagement with international organizations such as the OECD and the World Bank, which can provide APEC with technical assistance in attracting foreign direct investment (FDI), was also considered beneficial. Thus far, APEC has either collaborated or participated in several initiatives organized by international organizations such as:[41]
    - **OECD Workshop on Infrastructure as an Asset Class and Data Collection for Long-term Investment:** The thematic focus of the workshop was on data issues related to the promotion of the financing of long-term infrastructure investment and the necessity to establish environmental, social and governance as well as financial benchmarks for infrastructure investment to make the asset class more accessible to private investors.

[41] Box 2.12 further discusses APEC–OECD collaboration in respect of infrastructure financing.

- **OECD Selected Good Practices for Risk Allocation and Mitigation in Infrastructure in APEC Economies:** The report was published in cooperation with the Global Infrastructure Hub and the Asian Development Bank. It builds on the discussion among APEC economies during the APEC Seminar on Long Term Investment in Infrastructure held at Ninh Binh, Viet Nam, in 2017.
- **APEC/OECD Seminar on Infrastructure Financing:** This is part of the OECD's high-level Seminar on Enhancing the Role of Institutional Investors in Infrastructure Financing. It was held alongside APEC's Workshop on Infrastructure 2013 in Indonesia.
- **ADB Infrastructure Public–Private Partnership Pipeline Development Support:** This provides preparatory due diligence work to enable infrastructure projects and gives priority to APEC members.

1.8.2 Key APEC initiatives on infrastructure issues

Existing APEC work on infrastructure issues covers a wide range of areas and working groups. Some of the issues being addressed include reviewing and conducting capacity building on PPP regulatory and policy practices and evaluating policy approaches to support long-term financing in infrastructure, connectivity and economic inclusion.

The APEC Guidebook on Quality of Infrastructure Development and Investment was highlighted by member economies in their IERs.[42] The guidebook notes several areas that government officials and stakeholders within APEC should consider during the development of infrastructure. It mentions the power sector as one of the prominent sectors, and an APEC Guideline for Quality Electric Power Infrastructure was developed in 2016. Furthermore, the guidebook has been applied to several projects, including the Peer Review and Capacity Building on APEC Infrastructure Development and Investment initiative. Since 2016, peer review and capacity-building activities have been conducted for the Philippines and Viet Nam, and in 2018, Indonesia began participating in the Peer Review as the next reviewed economy.

To build on the achievements in APEC, in 2017, APEC agreed to upgrade the Guidebook on Quality of Infrastructure Development and Investment, with the aim to also develop a guideline specifically for the water and sewage sector (APEC Guideline for Quality of Water Infrastructure).

Member economies also mentioned that the APEC Connectivity Blueprint (2015–2025) should be implemented to ensure maximum connectivity within the APEC region.[43] Finally, close cooperation in implementing the Multi-Year Plan on Infrastructure Development and Investment (as instructed by APEC Leaders in 2013) should be continued.[44] Improved physical and digital infrastructure will also support the outcomes from agreements such as the Comprehensive and Progressive Agreement for Trans-Pacific Partnership and other international or regional initiatives.

The main initiatives already undertaken by APEC are further discussed as follows.

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[42] APEC, "APEC Guidebook on Quality of Infrastructure Development and Investment" (Singapore: APEC, 2014), https://www.apec.org/Publications/2014/11/APEC-Guidebook-on-Quality-of-Infrastructure-Development-and-Investment.

[43] "Annex D – APEC Connectivity Blueprint for 2015–2025", APEC, 2014, https://www.apec.org/Meeting-Papers/Leaders-Declarations/2014/2014_aelm/2014_aelm_annexd.

[44] "Annex B – APEC Multi Year Plan on Infrastructure Development and Investment", APEC, 2013, https://www.apec.org/Meeting-Papers/Leaders-Declarations/2013/2013_aelm/2013_aelm_annexB.

1. **Peer Review and Capacity Building on APEC Infrastructure Development and Investment (2015):** An initiative under the Committee on Trade and Investment, the peer review process aims to evaluate the laws, policies and practices in place and identify the capacity-building requirements within reviewed APEC economies according to certain criteria, particularly those related to principles of PPP best practices, life-cycle cost and value for money – based on the 2014 APEC Guidebook on Quality of Infrastructure Development and Investment. Thus far, studies of the infrastructure markets of the Philippines (road sector) and Viet Nam (road and water sector) have been implemented.[45] The reports find that while government agencies to an extent are aware of concepts such as life-cycle cost and value for money, the wider application of such concepts in the implementation and development of infrastructure projects is required. The completed reports also highlight the importance of implementing a PPP law that is competitive for the investment environment, adapts to the regular changes in the structuring of PPP transactions, as well as defines more clearly the different PPP modalities and requirements for managing and coordinating PPP project implementation. Additionally, issues of clear risk-sharing and allocation mechanisms currently limiting international investor participation are discussed.

2. **Multi-Year Plan on Infrastructure Development and Investment (2013):** The plan was initiated in 2013 to boost APEC's work on connectivity and infrastructure in the region. It aims to identify barriers to infrastructure development as well as solutions to overcome these hurdles. The four work streams covered by the plan are as follows:
   - Workstream 1: Fostering a business-friendly environment for infrastructure development and investment, through a solid regulatory framework that minimizes uncertainty and maximizes transparency and predictability
   - Workstream 2: Development and refinement of an integrated planning system mechanism
   - Workstream 3: Development of government capacity to identify and generate a pipeline of bankable infrastructure projects
   - Workstream 4: Development or further improvement of financing and funding environment to encourage long-term investors.

3. **APEC Connectivity Blueprint 2015–2025:** The blueprint aims to strengthen physical, institutional and people-to-people connectivity within the region. It contains current initiatives as well as proposes future initiatives for APEC to undertake. For the case of infrastructure, the physical connectivity aspect is of concern and involves improving the investment climate, boosting infrastructure financing through PPPs, adopting certain assessment criteria to evaluate the quality of infrastructure proposals and enhancing the application of good practices and people-centered investment for planning and implementing projects. In addition, the blueprint encourages transport and logistics facilitation by addressing trade facilitation as well as structural and regulatory reform.

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[45] APEC, "Peer Review and Capacity Building on APEC Infrastructure Development and Investment: The Philippines" (Singapore: APEC, 2017), https://www.apec.org/Publications/2017/05/Peer-Review-and-Capacity-Building-on-APEC-Infrastructure-Development-and-Investment-The-Philippines; APEC, "Peer Review and Capacity Building on APEC Infrastructure Development and Investment: Viet Nam" (Singapore: APEC, 2018), https://www.apec.org/Publications/2018/05/Peer-Review-and-Capacity-Building-on-APEC-Infrastructure-Development-and-Investment---Viet-Nam.

4. **APEC Strategy for Strengthening Quality Growth for 2015–2030:** The strategy aims to strengthen APEC initiatives with a focus on achieving the five growth attributes identified in 2010, specifically, balanced, inclusive, sustainable, innovative and secure growth.[46] Key accountability areas specified in 2015 include institution building, social cohesion and environmental impact. Infrastructure-related actions included within the key accountability areas are:
   - Facilitate growth through infrastructure development by promoting initiatives for innovative solutions, technical assistance and advisory services for raising private and public financing for infrastructure-related projects
   - Promote digital prosperity through investment in high-speed broadband infrastructure
   - Understand the environmental impact and the need to adapt to climate change through disaster preparedness and risk reduction by investing in disaster-resilient infrastructure.

5. **Cebu Action Plan (2015):** The Cebu Action Plan was launched in 2015 and provides a roadmap for creating a more financially integrated, transparent, resilient and connected region.[47] It does this through four main pillars: (1) promoting financial integration; (2) advancing fiscal reform and transparency; (3) enhancing financial resiliency; and (4) accelerating infrastructure development and financing.

   Under pillar 4, APEC has announced the creation of a Collaboration Action Plan between APEC economies and the Global Infrastructure Hub in the following areas: identifying opportunities for feedback on the Hub's tools and resources by APEC member economies as they are developed; identifying opportunities for adoption of the Hub's tools and resources by APEC member economies; providing APEC member economies with open access to the Hub's knowledge platform; and other related activities that may be agreed upon.

6. **Action Agenda on Advancing Economic, Financial and Social Inclusion in the APEC Region (2017):** The action agenda was created to further advance APEC's efforts toward achieving inclusive growth. The key pillars under this initiative include (1) economic inclusion; (2) financial inclusion; and (3) social inclusion.[48] The theme of infrastructure appears primarily under economic inclusion. Economic inclusion includes accelerating both the quality and quantity of infrastructure investment and enhancing physical, institutional and people-to-people connectivity including to areas that are underdeveloped, remote and rural.

7. **APEC work on PPP issues:** There have been several APEC initiatives related to PPPs including the APEC PPP experts advisory panel (now disbanded) and a pilot PPP center

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[46] "Annex A: APEC Strategy for Strengthening Quality Growth", APEC, 2015, https://www.apec.org/Meeting-Papers/Leaders-Declarations/2015/2015_aelm/2015_Annex-A.
[47] "Annex A – APEC Finance Ministers' Process (FMP) Roadmap/Cebu Action Plan", APEC, 2015, https://www.apec.org/Meeting-Papers/Sectoral-Ministerial-Meetings/Finance/2015_finance/annexa.
[48] "Annex A: APEC Action Agenda on Advancing Economic, Financial and Social Inclusion in the APEC Region", APEC, 2017, https://www.apec.org/Meeting-Papers/Leaders-Declarations/2017/2017_aelm/Annex-A.

that was introduced during the 2013 APEC Finance Ministers' Meeting.[49] The Asia-Pacific Infrastructure Partnership was proposed in 2010 by ABAC and endorsed in 2011 by APEC Finance Officials to enable governments and the private sector to discuss the necessary political, economic, legal and regulatory conditions to incentivize private sector investment in infrastructure.[50] Dialogues between the Asia-Pacific Infrastructure Partnership and Indonesia have identified a number of key challenges to developing infrastructure through PPPs including: creating effective institutional arrangements for internal coordination and developing a pipeline of bankable projects; strengthening the project preparation process; expanding the options for financing Indonesian infrastructure; developing local financing sources and ensuring the availability of long-term local currency funding; improving capacity to mitigate non-commercial risks; and developing robust PPP frameworks.

8. **APEC Good Regulatory Practices (2011):** In 2011, APEC leaders agreed to undertake actions to strengthen regulatory practices in the region, in particular to:[51]
   - Develop, use or strengthen processes, mechanisms or bodies to enable a whole-of-government approach in the development of regulation, including coordination across regulatory, standards and trade agencies
   - Develop, use or strengthen mechanisms for assessing the impact of regulations, which involves the effective and consistent use of the tools and best practices for developing new regulations and reviewing existing regulations
   - Implement the principles related to public consultations from the regulatory policy section of the 2005 APEC–OECD Integrated Checklist on Regulatory Reform and the 2003 Leaders' Statement to Implement APEC Transparency Standards.[52]

9. **APEC Internet and Digital Economy Roadmap (2017):** The roadmap identifies 11 key focus areas, including developing digital infrastructure in the region and achieving universal broadband access.[53] In addition, it promotes an enabling and competitive environment with pro-investment policies for the development of digital infrastructure; the development of holistic government policy frameworks for the Internet and digital economy; and coherence and cooperation in relation to the relevant regulatory approaches.

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[49] "Annex A – An APEC PPP Experts Advisory Panel and Pilot PPP Centre", APEC, 2013, https://www.apec.org/Meeting-Papers/Sectoral-Ministerial-Meetings/Finance/2013_finance/annexa.

[50] "Asia-Pacific Infrastructure Partnership", RMIT University, accessed April 2018, https://www.rmit.edu.au/about/our-education/academic-colleges/college-of-business/industry/australian-apec-study-centre/projects/asiapacific-infrastructure-partnership.

[51] "Annex D – Strengthening Implementation of Good Regulatory Practices", APEC, 2011, https://www.apec.org/Meeting-Papers/Leaders-Declarations/2011/2011_aelm/2011_aelm_annexD.aspx.

[52] "Regulatory Reform: APEC–OECD Integrated Checklist on Regulatory Reform", OECD, April 2018, http://www.oecd.org/regreform/apec-oecd-integrated-checklist-on-regulatory-reform.htm; "Leaders' Statement to Implement APEC Transparency Standards", APEC, 2003, https://www.apec.org/Meeting-Papers/Leaders-Declarations/2003/2003_aelm/leadersstmtimplapectranspstd.aspx.

[53] APEC, "APEC Internet and Digital Economy Roadmap" (Singapore: APEC, 2017), https://www.apec.org/-/media/Files/Groups/ECSG/17_csom_006.pdf.

PART 2: STRUCTURAL POLICIES TO ENABLE THE EFFICIENT PROVISION AND MANAGEMENT OF INFRASTRUCTURE

2.1 NINE KEY OUTCOMES FOR DELIVERING QUALITY INFRASTRUCTURE

This part of the report discusses structural policy settings and reforms aimed at improving the quality of investment in, and regulation of, infrastructure in order to support inclusive and sustainable economic growth. It draws on a review of the literature and the experiences of member economies as provided in the case studies and IERs.

Structural policy reform refers to policy changes related to institutional frameworks, regulation and the process of government policy design that seek to minimize barriers to market-based incentives, competition, regional economic integration and improved economic performance.

Structural policy settings include a wide range of instruments, from fiscal policy settings to competition policy. The relevance of each policy in promoting quality infrastructure that supports inclusive and sustainable growth depends on the sector and economy. This report finds that structural reforms that promote nine key outcomes have been important to APEC economies in delivering quality infrastructure. These outcomes are in addition to 'baseline' policies economies should seek to achieve, such as ensuring the rule of law and adequate policy stability and predictability. The nine key outcomes are outlined below.

- **Sound infrastructure governance and project prioritization processes:** Governance and prioritization processes have a significant role in ensuring that society invests its resources in quality infrastructure projects. Institutional structures ought to clearly define project identification and evaluation responsibilities, provide standardized approaches to investment appraisal, have efficient and fair processes to allocate project costs, have a system that guards against corruption, and include processes for stakeholder consultation.
- **Fiscal sustainability**: Providing infrastructure requires decision makers to take into consideration debt sustainability and long-term fiscal soundness to ensure spending does not exceed available funding. Some highlighted measures include independent project evaluation, greater oversight and management as well as ongoing monitoring and evaluation of post-procurement processes, as well as ensuring governments and government entities have sufficient financial buffers and identify contingent liabilities.
- **The reliable operation and management of infrastructure:** Delivering quality infrastructure requires policies that focus on the quality of the asset and the final service provided, including ensuring reliable operation over the project's lifespan. Domestic and international standards – including procurement, data and management standards – can support quality infrastructure, for example, by encouraging benchmarking between infrastructure providers to drive continuous improvement, by promoting transparency in procurement processes and by improving capability.
- **The institutional environment allows for private sector involvement and competition, where possible:** Open, competitive markets drive efficiency by promoting innovation, productivity and growth and can support affordability objectives by ensuring pricing reflects cost recovery. Structural policy can be used to promote competition. Where infrastructure sectors are naturally non-competitive, competition

regulation can improve efficiency and affordability by ensuring cost recovery-based pricing and supporting service quality.

- **The institutional environment supports private sector financing of infrastructure, including those with strong social benefits:** Infrastructure requires significant capital expenditure, and private sector investment can assist in bridging the infrastructure-financing gap facing economies, which is particularly important for projects with strong social benefits. Structural policy settings are key enablers of private sector investment; accessing greater levels of private sector financing requires a stable policy environment, the structuring of investments to generate an adequate risk–return profile and project-specific preparation to improve the bankability of projects.
- **Institutional settings promote and adapt to technological change:** Technological innovation is disrupting some traditional infrastructure sectors (e.g., the energy and transportation sectors) – with benefits for productivity and affordability.[54] Governments need to ensure that regulatory systems are able to adapt to technological change to harness these benefits, and also need to consider the benefits of new technology in funding decisions.
- **Infrastructure investment decisions are aligned with economic and development strategies:** Governments' choices as to what infrastructure to invest in, and where, have implications for the distribution of benefits throughout society. For example, the regional distribution of infrastructure investment can affect where economic growth occurs and where jobs are created. Governments should consider aligning infrastructure investment choices (including the provision of subsidies and guarantees) with development strategies.
- **Social and environmental impacts are addressed and appropriately mitigated:** Infrastructure can give rise to negative impacts to the environment or community, such as pollution, risks to biodiversity or large-scale resettlement. As such, ensuring the quality of infrastructure includes ensuring that the environmental and social impacts of infrastructure provision and management are assessed and addressed through the life-cycle of the project. Regulations, standards, consultation, community engagement and application of responsible business standards, as well as other policies, can be used to ensure that negative impacts are mitigated and addressed.
- **Resilience considerations are incorporated into decision making:** Delivering quality infrastructure means decision makers need to consider future shocks and risks – such as disaster risk, climate change, energy security risks as well as digital security risks – that could disrupt services or impose unplanned expenses. Achieving resilient infrastructure requires more than just building stronger infrastructure; community preparedness and contingent financial planning are also important.

These outcomes closely align with the G7 Ise-Shima Principles for Promoting Quality Infrastructure Investment, which consider that delivering quality infrastructure means ensuring:

- Effective governance, reliable operation and economic efficiency that takes into account life-cycle cost as well as safety and resilience against natural disasters, terrorism and cyber-attack risks

[54] "Anticipating Disruption: Technology and Infrastructure", KPMG, 30 November 2017, https://home.kpmg.com/xx/en/home/insights/2017/11/anticipating-disruption-technology-and-infrastructure.html.

- Job creation, capacity building, and the transfer of expertise and know-how to local communities
- Social and environmental impacts are addressed
- Alignment with economic and development strategies, including aspects of climate change and the environment at the domestic and regional levels
- Effective resource mobilization, including through PPP.

A major aspect of an adequate policy approach is to consider all these elements in a strategic, interconnected and coordinated way.[55] This calls for a long-term domestic strategy for infrastructure and structural reforms that transcends the various governmental and institutional structures in an economy.[56] Additionally, structural reforms should be subject to regulatory impact analysis to assess if they deliver net benefits to the economy and that all feasible options are considered.

The remainder of this part of the report discusses the above outcomes under the following headings:

- **Delivering value for money and quality infrastructure**: Achieving value for money relies on sound governance, including: requiring standardized assessments of project costs and benefits over the project life-cycle, long-term planning, adequate procurement and maintenance practices, and an appropriate funding model.
- **Improving the efficiency of outcomes in infrastructure and related markets**: Policies that support competitive markets, where workable, will improve infrastructure quality and support efficient pricing and innovation. Private sector financing of infrastructure can reduce fiscal burdens and promote innovation and affordability. Regulatory systems need to be adaptive to technology, and infrastructure investment can contribute toward the development of 'smart cities'.
- **Promoting inclusive growth, environmental sustainability and resiliency:** Structural policy for infrastructure can promote inclusive communities where all individuals can participate in and contribute to society, including in remote areas. Environmental and social due diligence are important in ensuring quality infrastructure development. Structural policy can support resilient infrastructure that can anticipate, absorb, adapt and/or rapidly recover from a potentially disruptive event.

[55] G20 and OECD, "G20/OECD High-level Principles of Long-term Investment Financing by Institutional Investors" (Paris: OECD, 2013), https://www.oecd.org/finance/private-pensions/G20-OECD-Principles-LTI-Financing.pdf.
[56] OECD, *Getting Infrastructure Right: A Framework for Better Governance* (Paris: OECD Publishing, 2017), http://dx.doi.org/10.1787/9789264272453-en.

2.2 DELIVERING VALUE FOR MONEY AND QUALITY INFRASTRUCTURE

As governments are a major provider of infrastructure, it is important that infrastructure decisions are well prioritized to deliver the highest net social benefits and best meet governments' investment objectives. This is recognized in the G7 Ise-Shima Principles for Promoting Quality Infrastructure Investment, which note the importance of effective governance for infrastructure management. This section discusses the following key elements of public sector governance models for infrastructure, which assist in ensuring effective prioritization, allocation and management of government investments:

- Project pipelines
- Long-term planning
- Procurement, operational and management standards
- Funding models.

A critical precondition to ensuring the effective prioritization of infrastructure investment is that projects are subject to an economic or financial viability analysis before being considered for implementation. Ideally, such analysis will be undertaken through a standardized process that is transparent and credible. There are a range of economic and financial techniques that can be used to appraise the viability of a project, which can be categorized as:

- **Economic evaluation (or social cost–benefit analysis):** This considers all economic benefits and costs of a project to society. A project is economically viable if it increases the net welfare of society.
- **Financial evaluation:** This focuses on revenues and expenditures to determine the financial viability of a project. A project is financially viable when the parties undertaking the transaction can do so profitably.
- **Value for money evaluation**: This considers the total return to society for a given cost to government. A project delivers value for money if it provides an adequate social return for a given cost to government.

Additionally, government expenditure on infrastructure needs to fit within fiscal constraints.[57]

For public policy analysis purposes, economic evaluation (or social cost–benefit analysis) is a very useful technique as it considers all costs and benefits. However, cost–benefit analysis should not be applied mechanically. For example, many costs and benefits are hard to quantify and the choice of discount factor affects the result. However, as well as assisting decision makers in prioritizing expenditure, a comprehensive cost–benefit analysis provides transparency and hence increases the accountability of decision makers. Value for money analysis is also useful as it provides decision makers with information on projects offering the best return for a given level of expenditure and therefore assists in allocating scarce resources.

Box 2.1 discusses the socioeconomic cost–benefit analysis. This is followed by a discussion of the four elements vital to public sector governance models (noted above).

[57] Ibid.

Box 2.1: Socioeconomic cost–benefit analysis

The socioeconomic cost–benefit analysis is the most common and comprehensive technique to estimate the benefits and costs of a project. It quantifies in monetary terms all the costs and benefits – costs and benefits that can be readily identified and valued, as well as other untraded impacts that are not typically captured in financial evaluations. These include intangible factors and externalities such as social and environmental costs and benefits while also taking account of resilience. It is not concerned with the distribution of costs and benefits and these must be judged separately.

There are different techniques available to value untraded or intangible impacts. The most common methods are:

- **Hedonic pricing:** The attribute may be traded in a related market and willingness to pay can be inferred via behavior in that market. For example, a new road project may increase noise levels at adjacent housing and affect the value of those houses. The hedonic pricing method would assess the change in house price per unit of noise level change to determine the net cost (benefit) of the project.
- **Travel cost method:** Value is inferred through the willingness to pay to travel. For example, a significant natural feature may have amenity value that is hard to assess. By surveying the distances traveled, time spent and other associated costs of visitors to the natural feature, it is possible to provide an estimate of the value that people attach to the amenity.
- **Contingent valuation:** Willingness to pay is inferred through survey techniques. For example, a natural environment resource such as a clean river can be valued by asking people directly how much they would be willing to pay for a change in the quality or quantity of the river water.
- **Benefit transfer:** This is where a non-market value established in a similar situation is used as a proxy for the cost or benefit under consideration. For example, the value of an endangered bird could be estimated with reference to studies of willingness to pay to visit a nature reserve where a different endangered bird was present.

As not all costs and benefits can be accurately captured through cost–benefit analysis, even when an attempt is made to monetize intangible factors (e.g., benefits from increased cultural integration), the final decision maker is required to exercise some judgement regarding the importance of the unquantifiable costs and benefits. These should be highlighted alongside the cost–benefit analysis along with distributional impacts.

Institutionalized stakeholder engagements can also be used to complement a cost–benefit analysis in order to ensure unquantifiable costs and benefits are considered. Such procedures help decision makers to better understand the stakeholders' specific needs and to avoid possible inappropriate investment design. Involving stakeholders in the design of infrastructure regulations also increases public trust in those projects and reduces the risk of disputes and legal challenges.

Sources:

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- New Zealand Treasury, *Guide to Social Cost Benefit Analysis* (Wellington: New Zealand Government, 2015).

2.2.1 Project pipelines

A systematic approach to the appraisal of competing projects in light of governments' investment objectives allows them to be ranked in order of social return or value for money; and enables a 'pipeline' of prospective projects that prioritizes government expenditure to be developed. This is particularly relevant at the local government level, which tends to have lower levels of administrative capacity while being in charge of more than 65 per cent of overall public investments in OECD economies.

Furthermore, a credible and transparent prioritization process applied to the set of prospective investments also reduces the risks from a private investor's perspective, as the private investor will be better able to predict future government behavior (in terms of projects that receive focus) and manage risks. For this reason, economies with credible project pipelines can be expected to attract more private investment at a lower cost.

How could structural policy support it?

Infrastructure governance models can support project prioritization in the following ways:

- Establishing formal processes that ensure investment and *ex-ante* risk assessments of infrastructure projects take place on a systematic and transparent basis (e.g., based on the standardized appraisal techniques discussed earlier). This ensures transparency in the economic, financial and social case for decision making.
- Ensuring investment assessments are conducted by a different organization from the agency implementing a project.[58] This avoids conflicts of interest and ensures independence in project appraisal. In several economies, this function is split between the implementing agency and the treasury or ministry of finance, who are well-placed to perform investment evaluations because of their role in fiscal stewardship. External stakeholder engagement, particularly with the potential affected communities, is also a good practice and can mitigate potential conflicts.
- Ensuring investment assessments are conducted separately from the determination of the mode of procurement (which might be via PPP, traditional procurement or another method). This ensures a project's economic value is established independently of the determination on the most effective delivery mechanism. The Australian New South Wales government has integrated this approach into their 'budget rule' (Box 2.4).
- In many economies, investment decisions are taken at the provincial or municipal level; however, the central government will have an interest in ensuring projects are prioritized across the economy as a whole. Achieving this requires infrastructure investment to be coordinated across different levels of government and priorities of central and local governments to be aligned. Robust coordination mechanisms for infrastructure policy are needed in order to ensure a balance between a whole-of-government perspective and sectoral and regional views. The OECD has developed a set of Principles on Effective Public Investment that are relevant here (Box 2.2).[59]

[58] Ibid.
[59] OECD, "Recommendation of the OECD Council on Effective Public Investment across Levels of Government" (Paris: OECD, 2014).

Box 2.2: OECD Principles on Effective Public Investment

The OECD has developed a set of Principles on Effective Public Investment across Levels of Government. This instrument groups 12 principles under three pillars: coordination, capacities and framework conditions.

Pillar 1: Coordinate across governments and policy areas

- Invest using an integrated strategy tailored to different places
- Adopt effective coordination instruments across levels of government
- Coordinate across local governments to invest at the relevant scale

Pillar 2: Strengthen capacities and promote policy learning across levels of government

- Assess upfront long-term impacts and risks
- Encourage stakeholder involvement throughout the investment cycle
- Mobilize private actors and financing institutions
- Reinforce the expertise of public officials and institutions
- Focus on results and promote learning

Pillar 3: Ensure sound framework conditions at all levels of government

- Develop a fiscal framework adapted to the objectives pursued
- Require sound, transparent financial management
- Promote transparency and strategic use of procurement
- Strive for quality and consistency in regulatory systems across levels of government.

Source: "Effective Public Investment across Levels of Government Toolkit", OECD, accessed April 2018, www.oecd.org/effective-public-investment-toolkit.

What does a good structural policy look like?

Systematic assessments of infrastructure projects

Several APEC economies have developed formal processes to set investment intentions and provide a systematic approach to prioritization, including:

- **Australia:** Infrastructure Australia is an independent statutory body with a mandate to independently assess projects and initiatives for inclusion on the Infrastructure Priority List, the authoritative list of domestically significant infrastructure investments Australia needs over the next 15 years.[60]
- **Chile:** Chile's National Public Investment System is a consolidated investment appraisal system that requires all public sector investment projects to be evaluated. The system standardizes the format to present projects and cost–benefit analyses, and there are explicit application and evaluation processes for public funds, with a General Methodology Manual as well as specific guidelines for particular project types or sectors. The National Public Investment System also sets key parameters for evaluation, including social prices such as labor supply and travel time, as well as the currency and social discount rate to use.[61]
- **New Zealand:** New Zealand has developed an investment management system to prioritize and deliver investments across the government, as discussed in Box 2.3.

[60] Australian Government, Infrastructure Australia, accessed April 2018, http://infrastructureaustralia.gov.au.
[61] Ehtisham Ahmad and Hernan Viscarra, "Public Investment for Sustainable Development in Chile: Building on the National Investment System" (Washington, DC: Inter-American Development Bank, 2016), doi:10.18235/0000431.

Box 2.3: New Zealand's investment management system

New Zealand's investment management system sets processes and rules to ensure significant public sector investments are well-managed throughout their life-cycles.[a] The system enables the government to invest more effectively to maximize public value and improve the wellbeing of New Zealanders. Conceptually the investment management system is organized into four investment life-cycle phases: think, plan, do and review. The system is led and coordinated by the Treasury's Investment Management and Asset Performance team in cooperation with other senior officials of the New Zealand government.

The complexity of the different agencies' decision-making processes requires a flexible, principles-based approach to investment management. Investment decision making is underpinned by 11 principles:

- Take considered and active stewardship of taxpayer and Crown resources over a long-term investment horizon
- Continually assess whether existing investments and assets align with the government's objectives and exit from assets, commitments or projects in development if it no longer makes sense to continue
- Balance investment across the government's interests and accountabilities when considering the make-up of the government investment portfolio
- Inform decision-making processes related to public services with information and evidence as well as analysis of the impacts of investing, not investing or divesting
- Consider the relative value of investment proposals against other proposals, to make decisions that make the best use of limited resources
- Give preference to initiatives aligned with the priorities of the government. Initiatives must be able to demonstrate long-term value and show they have strong stakeholder support and commitment
- Move resources to where they have the greatest overall effect, within the constraints of delegations and existing levers
- Accept a level of risk to obtain the benefits from investments, but the risks need to be clearly identified and managed
- Expect agencies to provide for current and future needs from within their existing baselines, and to understand: the costs of delivering their services, their medium- to long-term planning, the impact of moving resources, and the performance of investments under their responsibility
- Inform and constrain (e.g., timing and maximums) investment decision-making and management at an all-of-government level through the government's fiscal strategy and balance sheet targets
- Review, and periodically report on, the performance of the government's investment portfolio against the outcomes it wants to achieve to ensure transparency.

One of the processes that sits within the investment management system is the Better Business Case Model for significant infrastructure investments. The model is structured around the Five Case Model, which provides a disciplined approach to ensure that each of the key aspects of an investment proposal is explicitly and systematically addressed as part of the business case development process. The five cases are:

- **The Strategic Case:** This outlines the strategic fit, investment objectives and confirms the need to invest.
- **The Economic Case:** This reveals the preferred option that best meets the investment objectives.
- **The Financial Case:** This ascertains the affordability of the project.
- **The Commercial Case:** This confirms the commercial viability of project.
- **The Management Case:** This reveals the actions required to ensure the project can be successfully delivered.

Note:

[a] In New Zealand, the majority of transport investment is financed through a hypothecated fund overseen by a separate Crown entity, namely, the New Zealand Transport Authority (NZTA). The NZTA's approach to transport investment is however consistent with the broader investment management system.

Source: New Zealand Individual Economy Report.

Separating economic evaluation and procurement

The Australian New South Wales state government has formalized its approach to investment and procurement assessments, conducting them separately, through the state's budget rule. This is discussed in Box 2.4.

Aligning central and local government investment priorities

It can prove challenging to develop investment priorities for a region where multiple layers of government invest, and where coordination and a shared view of project prioritization become necessary. In New Zealand, central and local government approached this challenge when developing a transport strategy for the economy's biggest city – Auckland – by establishing the Auckland Transport Alignment Project (Box 2.5).

Box 2.4: New South Wales' budget rule

New South Wales implements a budget rule that separates the investment decision from the procurement decision on projects. This is to ensure the two decisions are being made independently and that the result of one analysis does not impact the other.

- **Investment Decision**: The purpose of this phase is to determine whether the project itself has merit. This phase comprises two stages:
  - *Cost–benefit analysis*: This stage checks if the economic benefits derived from the project outweigh the costs of the project.
  - *Prioritization:* This stage determines the ranking of the project compared to the other projects that are being contemplated, based on the results of the cost–benefit analysis.

- **Procurement Decision**: The purpose of this phase is to determine the procurement method that is optimal for the implementation of this project.
  - *Value for money*: This stage checks the financial viability of procuring the project through various methods. Procurement methods that are more financially viable are preferred.
  - *Public interest*: This checks the public interest implications of all procurement methods.

Following the decision to invest – but before the procurement decision – the project is budgeted for in an agency's forward capital budget. This ensures that:

- All potential projects compete for the same finite funds.
- The choice of procurement method is not influenced by the perceived budget impact.

If during the procurement decision, PPP procurement is found to deliver value for money, an agency's original forward capital budget for the project is converted into PPP capital payments.

Source: Compiled by Consultant (Castalia).

Box 2.5: Auckland Transport Alignment Project

Challenge

Rising levels of population growth and increased migration to Auckland have increased pressure on New Zealand's infrastructure and transport system. Expected future increases in population are likely to further intensify the need for investment in the transport system. Auckland's transport system is jointly funded by the central government and the Auckland Council. As joint transport investors, the government and council have a shared interest in ensuring value for money from their Auckland transport investments.

Reform

In 2015, the Auckland Council identified an NZD 300 million per year transport funding shortfall if its plans were to be implemented. Prior to agreeing to additional funding for Auckland transport, the central government wanted to be confident that further investment would address the region's transport challenges and provide value for money.

The Auckland Transport Alignment Project was established to align the priorities of the central government and Auckland Council in funding transport infrastructure. The project generated a report that set out a strategic approach, agreed between the central government and Auckland Council, for the development of Auckland's transport system over the next 30 years. The report aims to improve returns from transport investment over the medium and long term and has guided the development of statutory transport planning and funding documents.

Source: Summarized from the New Zealand case study in Annex 1.

2.2.2 Long-term planning

Long-term infrastructure planning is necessary to ensure that long-term costs and benefits are not overlooked in favor of upfront short-term costs. Long-term planning also better ensures that a coherent and strategic approach is taken across multiple sectors, institutions, policy areas, levels of government and community stakeholders over time.[62] Planning should include determining and prioritizing the needs and trade-offs associated with the infrastructure as well as a strategy to address these issues. The planning process must be transparent and based on clear assumptions and must take into account the views of all stakeholders.

How could structural policy support it?

A plan should set out the long-term objectives across sectors, establish a shared strategy to achieve the objectives and provide a pipeline of projects that is aligned with the strategy. The strategic plan should be politically sanctioned, coordinated across levels of government, take stakeholder views into account and be based on clear assumptions. It should also be aligned with spatial and land-use planning policies.[63]

Infrastructure planning should be linked to long-term fiscal projections and planning. A clearly articulated long-term plan will help to determine the size of required allocations in the fiscal

[62] OECD, "Towards a Framework for the Governance of Infrastructure" (Paris: OECD, 2015).
[63] OECD, *Getting Infrastructure Right*.

plan and the trade-offs with other expenditure classes. Sound fiscal planning and clear funding provisions will also help to catalyze private investment in infrastructure.

Accounting standards and asset management practices can help to ensure that the long-term condition of assets is taken into account in the planning process. Accounting standards should stipulate that the state of public assets be reported and there should be a requirement to account for contingent liabilities and depreciation.[64]

What does a good structural policy look like?

Examples of policy reform aimed at improving long-term planning include:

- **Creation of centralized infrastructure coordination teams:** Several economies have infrastructure coordination teams, either located within ministries where they can perform their functions effectively (such as finance ministries) or as standalone ministries. For instance, the Ministry of National Development in Singapore directs the formulation and implementation of policies related to land-use planning and infrastructure development. The infrastructure division sits within the ministry and is responsible for shaping the built environment in Singapore.
- **Economy-wide infrastructure plans:** The 'Investing in Canada' plan sets out a 12-year strategy to modernize Canadian infrastructure (Box 2.14). Alongside the previously mentioned Russian federal plan on transportation development, Russia is planning to develop by October 2018 a separate, focused long-term plan on the development of long-distance transport infrastructure up to 2024. Moreover, in March 2018, Russia endorsed a major strategic plan for structural reforms in infrastructure development that involves 16 aspects and instruments, including better PPP implementation, called the Roadmap on PPP Instruments Development.
- **Capital plans:** Since 2015, the New Zealand government has required long-term investment plans to be developed by agencies with intensive capital investment activity. The plans provide the strategic context and investment intentions over a 10-year horizon, including consideration of multiple scenarios to reveal the potential implications of fundamental changes in the policy, technology or social context. Additionally, New Zealand's National Infrastructure Unit publishes a regular Capital Intentions Plan covering intended infrastructure investment.[65]
- **Government accounting standards requiring whole-of-life project costing:** Korea uses life-cycle cost analysis to perform project selection. Life-cycle cost is a type of analysis that calculates all costs generated during the entire process, from planning to disposal of a facility, and finds an optimal combination. Its goal is to find the minimum investment point that constitutes a suitable balance between costs and functional aspects.

2.2.3 Procurement, operational and management standards

Standards, either domestic or international, can be used to drive the quality of infrastructure assets and service delivery. This section will focus on the role of policy and governance

[64] Ibid.
[65] New Zealand Treasury, "Infrastructure Evidence Base: Ten-Year Capital Intentions Plan 2016" (Wellington: New Zealand Treasury, 2016), https://treasury.govt.nz/sites/default/files/2017-12/2016-capital-intentions-plan.pdf.

standards in driving infrastructure quality. Section 2.4 discusses environmental and responsible business conduct standards.

International standards can allow benchmarking between economies and enable good practices to be shared and enhanced over time. Consistent standards also drive increased competition and service quality between public and private providers operating across boundaries. Infrastructure services provided by regional monopolies can be compared with one another with reference to standards.

The APEC forum provides a good opportunity for economies to consider cross-border standardization in key areas like environmental standards (discussed in Section 2.4), asset quality, procurement standards and data standards.

How could structural policy support it?

There are a number of forms of built standards that could improve infrastructure planning and management, hence improving overall quality. Management standards, such as ISO 55000, which is discussed next, can be used to establish or reinforce performance and capability expectations.

Data standards are useful when the economy wants to collect consistent sets of important data on infrastructure assets. For example, consistent information on infrastructure condition and utilization (such as data on built-asset level) helps infrastructure providers appraise performance against agreed targets, understand network interdependencies and the likely timing and cost of future investment and service needs, and make well-informed decisions. The OECD's Infrastructure Data Initiative is an example of a tool that can assist economies to collect the right data to prioritize projects and attract private investors.[66]

Standardization in infrastructure procurement approaches can improve the quality of infrastructure by making more effective use of capability, lowering costs and reducing opportunities for corruption, for example, through the creation of transactional and contractual frameworks, templates for information, and finance structures that can facilitate investment through improved transparency, security, administration and due diligence. Standardized approaches to project-level financial data can also assist in attracting private finance by providing confidence in the information provided. The OECD public procurement standards (summarized below), the G20 principles for promoting integrity in public procurement and the World Trade Organization (WTO) Agreement on Government Procurement are examples of procurement standards.[67]

What does a good structural policy look like?

Management Standards: ISO 55000 is an international standard covering the management of physical assets. It provides guidance and a 28-point requirements checklist of good practices in physical asset management. Typically, this is relevant to gas, electricity and water utilities; road, air and rail transport systems; public facilities; and process, manufacturing and natural resource industries. It is equally applicable to the public and private sector and regulated or non-regulated environments.

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[66] "Workshop on Data Collection for Sustainable Infrastructure – Infrastructure Data Initiative ", OECD, 2017, http://www.oecd.org/daf/fin/private-pensions/lti-workshop-sustainable-infra.htm.

[67] G20, "G20 Principles for Promoting Integrity in Public Procurement" (2015), https://www.gihub.org/resources/publications/g20-principles-for-promoting-integrity-in-public-procurement/.

Data standards: The Infrastructure Asset Grading Guidelines of New Zealand have been compiled to provide practical methods for assessing the condition and performance of infrastructure assets. The guidelines help determine long-term investment needs for maintaining, enhancing and extending those assets to meet defined service standards in a consistent way. This facilitates consistent approaches to asset management, and allows like comparisons for owners, managers and investors. As mentioned in section 1.5, Canada launched the Core Public Infrastructure survey in 2017 to improve knowledge and understanding of Canada's core infrastructure assets.

Procurement standards: The OECD has detailed the standards required for modernizing procurement systems to ensure the proper allocation of public resources, improve efficiency in public spending and mitigate risks such as inefficiency and corruption. The OECD Recommendation on Public Procurement reflects the following 12 main principles:[68]

- **Transparency:** Provide adequate and timely transparency to suppliers; allow free online access for all stakeholders to public procurement information, including tenders, award announcements, procurement forecasts, and laws and regulations; ensure visibility of the flow of public funds.
- **Integrity:** Apply frameworks or applicable codes of conduct (such as for conflict of interest or disclosure of information) to all stakeholders; implement general public sector integrity tools and training programs for the procurement workforce; develop requirements for internal controls, compliance measures and anti-corruption programs for suppliers.
- **Access:** Have coherent and stable institutional, legal and regulatory frameworks; deliver clear, and ideally, standardized tender documentation; use competitive tendering and limit the use of exceptions and single-source procurement.
- **Balance:** Strategically integrate secondary policy objectives (such as green growth and innovation) in procurement; employ appropriate impact assessment methodology to measure effectiveness.
- **Participation:** Develop and follow a standard process when changing the procurement system, which should include transparent and regular dialogues with suppliers and business groups; allow direct involvement of external stakeholders.
- **Efficiency:** Streamline systems, frameworks and technical processes; methods include centralized purchasing, framework agreements, dynamic purchasing, joint procurements and contracts with options.
- **E-procurement:** Use e-procurement tools (e-auctions, e-catalogues) that provide fair treatment and protect sensitive data.
- **Capacity:** Meet high professional standards by providing attractive, competitive and merit-based career options for procurement officials and promote collaborative approaches with universities and think tanks.
- **Evaluation:** Develop performance indicators and regularly assess the performance of the public procurement system.
- **Risk management:** Develop risk assessment tools and publicize strategies including red flags or whistleblower programs.

[68] "Public Procurement Toolbox", OECD, accessed April 2018, http://www.oecd.org/governance/procurement/toolbox/.

- **Accountability:** Establish clear lines of oversight and ensure internal and external controls such as audits are appropriately resourced; establish enforceable sanctions for misconduct among government and private sector participants.
- **Integration:** Combine procurement processes with public finance management, and harmonize the principles with public works, PPPs and concessions.

2.2.4 Funding models

A significant proportion of infrastructure is funded through general taxation due to its public-good nature. However, when it comes to charging for infrastructure-based services, there is a need to balance the objectives of incentivizing the efficient provision and use of assets through cost recovery-based pricing against considerations of equity of the cost burden and access across the community.

As a general principle, ensuring infrastructure costs are met by the beneficiaries, and those who most influence the costs or risks, will better ensure that the quality and cost of infrastructure provision are set at an efficient level. If the funding model sets prices below operating costs, there is a disincentive for expanding services and this may encourage overconsumption. Pricing that includes full life-cycle costs, including building, operations and decommissioning, is required to incentivize new provision and ensure consumption at levels that optimize limited resources. For some projects however, there is a tension between efficiency and considerations of equity and access.

How could structural policy support it?

For scenarios whereby a cost recovery model is used to support the efficient allocation of resources but does not meet social goals, the government can use social policies, such as subsidies or community service obligations, to meet distribution objectives (discussed further in section 2.4; Papua New Guinea's experience with community service obligations is described in Box 2.7).

There are many examples of infrastructure funding models where there are trade-offs between efficiency and distribution concerns. For example, infrastructure network regulators are often responsible for ensuring customers receive an affordable price while an efficient level of service is maintained. Box 2.6 describes these trade-offs in the electricity sector.

Box 2.6: Regulation challenges in electricity transmission networks

Efficient pricing of electricity transmission networks suggests the network should be funded by the beneficiaries, cost exacerbators, risk exacerbators or a combination of these. However, this can pose challenges when different consumers expect different quality standards because there is only one grid and all sections of society must accept whatever standard it is built to. Equally, efficient charging mechanisms can create challenges for inclusive infrastructure provision.

Different transmission pricing structures create different incentives

- Transmission pricing methodologies have variously based charges on regional peak injection and offtake (a cost exacerbator model), or connection (a beneficiary pays model), or a combination of these factors. Different incentives are created for investment in generation and transmission with different models, and different retail price structures result.

There is a trade-off between price and quality

- A higher quality standard (reliability, maximum power rating and resilience) will require higher prices to be paid. It is important for a regulator to decide what the correct balance is for society (the optimal price and quality trade-off). Since there can only be one grid and all sections of society must accept the same trade-off, some customers will pay for a grid that is unnecessarily well-built for their needs. Depending on their ability to pay, it may be justifiable to partially subsidize them.

There is also a trade-off between setting efficiency incentives and providing inclusive access

- Marginal cost pricing maximizes the efficiency incentive on the individual customer. It may also result in high connection costs for those who live further away from the grid. These customers can be in high need of access. Cross-subsidization within networks may be advantageous in certain situations to achieve social goals.

Source: Compiled by Consultant (Castalia).

What does a good structural policy look like?

Papua New Guinea has recently completed a series of state-owned enterprise reforms and seeks to implement a 'community service obligation' policy. Box 2.7 summarizes this experience.

Reforming the infrastructure funding base to reflect efficiency and fair cost allocation can be a significant task, requiring governments to undertake a thoughtful evaluation and policy reform process. Australia is undertaking significant changes to heavy vehicle road pricing through a four-phase policy process described in Box 2.8.

Box 2.7: State-owned enterprise reform in Papua New Guinea

Before the reform, nearly all of Papua New Guinea's commercial interests were managed by the Independent Public Business Corporation of Papua New Guinea, a state-owned corporation set up in 2002.

Pre-reform situation

The efficient management of its commercial investments in the state-owned enterprise sector was an area of concern for the government. The government requires effective and efficient management of the state-owned enterprises, as these enterprises are directly involved in the provision of essential

infrastructure services in sectors such as telecommunication, transport, electricity, water, finance and postal logistics.

The government had invested significantly in state-owned enterprises through direct capital funding. However, their performance (productivity level) over the years had remained relatively low. Most of them were natural monopolies in their own sectors; and outdated regulations, combined with little competition, resulted in poor performance.

Policy response

Under the 'Kumul' reform agenda, the government restructured its state-owned enterprises over the years to achieve optimal performance and generate sufficient returns on its investment.

The first attempt at reform was in 2002 with the establishment of the Independent Public Business Corporation Act and the second effort was in 2012 with minor amendments to the act. The most recent restructuring, the Kumul reform initiative, was carried out in 2015; the Independent Public Business Corporation Act was rescinded and replaced with the Kumul Consolidation Holdings Authorization Act. The new structure aims to apply corporate principles to the management of government investments, as well as improve synergy, coordination and efficiency in the government's participation in commercial activities.

The new state-owned enterprises are guided by their own governing legislation that outlines their responsibilities and roles. They operate independently in managing government investments, delivering high-impact projects and providing support to the government through dividend payments.

The government also approved for implementation an on-lending policy allowing state-owned enterprises to access financing on favorable terms from the government, to deliver high-impact infrastructure projects throughout the economy. This is how the on-lending policy is envisaged to work:

- The government receives a loan (primary loan) from a financial institution and assumes the full loan repayment obligations – both the interest and the principal amount. It then passes on the primary loan proceeds to a state-owned enterprise or a government entity that will repay only the principal loan amount to the government.
- This process allows state-owned enterprises to receive funding at favorable terms. If they were to borrow on their own, such terms would not be possible due to their low ratings and weak balance sheet. The government has better ratings than individual state-owned enterprises. The government, however, must absorb the risk of default on its own debt obligations as well as those incurred by state-owned enterprises. This arrangement is only feasible when done in conjunction with other reforms that would improve the financial viability of state-owned enterprises. Otherwise, the loss-making state-owned enterprises would be unable to repay the government in the future, but the government must pay the financial institution that it borrowed from.

The government is preparing to implement the community service obligation policy that was developed and endorsed in 2013. State-owned enterprises will be allowed to provide services at a rate that remains financially sustainable while the government will be able to meet distributional objectives by externally subsidizing the services. Financially sustainable tariffs supported by a community service obligation arrangement will allow state-owned enterprises to expand service coverage while remaining incentivized to operate on an efficient, commercial basis.

Source: Summarized from Papua New Guinea's case study in Annex 1.

Box 2.8: Heavy Vehicle Road Reform in Australia

Australia has an expansive and economically vital road network. However, it faces the challenge of rapidly rising demand and a revenue base that is unlikely to grow as fast as the expenditure needed to build and maintain the road network. Freight transport by heavy vehicles is an especially important source of demand, having more than doubled in 20 years. Australia began a long-term economic reform process in 2015. The goal is to link heavy vehicle user needs with the level of service they receive, the charges they pay and the investment of those charges back into heavy vehicle road services.

Pre-reform situation

Heavy vehicle operators contribute to road funding through a pay-as-you-go (PAYGO) system. This includes a fuel-based road user charge collected by the federal government and a registration fee for each heavy vehicle levied by state governments. The road-related revenue collected by the federal government is distributed through annual budget processes to state and local authorities who own and control highways and arterial roads (states) and smaller local roads (local governments). Total government road expenditure has been increasing at an average annual growth rate of 6 per cent per year.

Issues identified

- **The PAYGO system is a poor proxy for actual road use:** The amount a user pays for fuel use does not directly reflect the cost of providing and maintaining specific roads. Registration fees do not reflect the distance traveled by vehicles and the maintenance required on the roads.
- **There is no direct link between revenue and the road service provided**: Revenue and expenditures are controlled by different levels of government. These funding arrangements give road managers little long-term revenue certainty to plan for investments that road users might demand in the future. The lack of funding certainty also inhibits road managers from undertaking road maintenance at the optimal stage of a road's life-cycle.
- **There is no direct link between road user needs and charges paid:** Heavy vehicle users pay fees that are not directly linked to the services provided and the access they have to roads. There have been recent improvements to investment decision making, and infrastructure advisory bodies have been established in several jurisdictions. However, there is room to increase user focus, including incentivizing road providers to adjust expenditure to meet the needs of heavy vehicle users, for example, by improving heavy vehicle access to key freight routes.

Policy response

Heavy Vehicle Road Reform aims to improve efficiency by better linking heavy vehicle road use with the charges paid by heavy vehicle operators and aligning charges with investment in the road network to create the right incentives for the provision of heavy vehicle services. Governments are progressing the reform under a roadmap with four phases:

- **Phase 1**: Aims to improve the transparency of service delivery and expenditure, through expenditure plans, asset registers and improvements in the negotiating framework for users to pay for better services.
- **Phase 2:** Aims to establish a framework for economic regulation. This includes independent price regulation based on full life-cycle costs to ensure revenue can better match funding requirements into the future, and the development (in consultation with road users) of service level standards to determine the optimal level of investment in roads.
- **Phases 3 and 4:** Aim to implement funding reforms, so that charges levied will be reinvested in road building and maintenance to meet the service level standards. This also includes moving to more direct charges, comparable to those in the telecommunications, water and energy sectors. These charges would be set by the regulator based on road use.

Under phases 3 and 4, the introduction of community service obligations is being considered to support users of those roads that are unable to be provided on a commercial basis, for example, because of insufficient traffic volume.

Source: Summarized from Australia's case study in Annex 1.

2.3 IMPROVING THE EFFICIENCY OF OUTCOMES IN INFRASTRUCTURE AND RELATED MARKETS

Efficient markets are a theoretical economic optimum that, if achieved, ensures that customers receive the quality and amount of services they are willing to pay for, at prices that reflect the reasonable costs of providing the services. Competitive markets, where there are no significant externalities, will generally result in efficient markets.

However, many forms of infrastructure display public good or monopoly characteristics suggesting that the private sector will not deliver efficient outcomes without government intervention. Where infrastructure has public good characteristics (i.e., it is non-rivalrous and non-excludable), there are insufficient incentives for private provision and hence provision will need to be publicly funded. For example, members of the public cannot be excluded from the benefits of infrastructure that supports domestic defense, and this is therefore funded by governments. Additionally, infrastructure with high fixed costs and no diseconomies of scale, such as water sanitation facilities, electricity distribution and telecommunications networks, displays natural monopoly characteristics. A large supplier will be able to spread the upfront capital costs over a larger customer base than a small supplier. Unregulated monopolies result in higher prices and a lower quantity or quality of service delivery than is optimal for society. Structural policies to regulate monopolies can therefore improve societal welfare.

Technological change can be a disruptive influence in some natural monopoly infrastructure markets. Markets that have traditionally had natural monopoly characteristics can lose these due to technological changes. This section considers the implications of technological change for structural policy.

These characteristics of infrastructure provision signify that there are a number of structural policies that can improve the efficiency of the outcomes in infrastructure and related markets. This report focuses on three areas:

- Promoting competition and ease of entry
- Accessing private sector financing
- Implications from technology and innovation.

2.3.1 Promoting competition and ease of entry

Infrastructure sectors that do not deliver public goods or have monopoly characteristics are conducive to competitive private sector participation that can be either in the provision of assets or services. Structural policy can support the development of markets in such areas. Where markets have public good or monopoly characteristics, governments should identify areas where competition is possible and structural policy can delineate different services and support competition in those areas. For assets with strong monopoly aspects, governments will generally need to regulate price and quality to ensure consumers are charged prices reflecting costs and owners do not derive excessive profits.

Private sector provision of infrastructure or infrastructure services can lead to the following benefits:

- Improved affordability and a reduced need for regulation by reducing monopoly power[69]
- Lower fiscal burden of infrastructure provision, or increased provision due to increased access to finance
- More efficient, timely and innovative delivery of projects.

Competition can be enhanced through regional economic integration (an APEC goal). For example, open and fair access for international firms and investors at the stage of infrastructure planning, construction and operation can improve competition and regional economic integration thus supporting sustainable growth across the region.

How could structural policy support it?

Structural policies that can support the ease of entry into, and competition in, markets for the provision of infrastructure, or services related to infrastructure, are described in the following:[70]

- Procedures to start and operate businesses can be made simple and cheap, and regulatory barriers that favor incumbent firms reduced.[71] This can include a tiered approach, with the lightest regulations for small new firms, for example, requiring them to meet only legal requirements for safety, environmental protection or public health.
- Services related to infrastructure assets or networks can be made more competitive through structural policy. For example, competitive parts of the service in the network infrastructure can be unbundled from the non-competitive parts (see Box 2.10 and Box 2.13 for examples). Examples include the separation of electricity distribution/transmission from retail/generation. Telecommunications fixed line networks and retail services have also been subjected to structural separation or unbundling.
- Aside from mandating unbundling, structural policies can support competition in these markets by seeking to eliminate anti-competitive practices. This may include requiring that retail competitors be given access to physical infrastructure owned by large incumbent firms at a fair regulated price and/or facilitating the conditions that support switching between retail competitors.[72]
- Aspects of markets for the construction of infrastructure can be made competitive, even if the resulting asset is a monopoly asset. Facilitating competitive and transparent procurement processes provides greater certainty for the private sector parties that participate in construction tenders, hence enhancing competition. Ensuring equal access to markets by service providers and goods suppliers facilitates greater competition to

[69] Sergio A. Hinojosa, "New Issues in Natural Monopolies Regulation: The Financial Side in Infrastructure Projects through Public Private Partnership" (2001), https://ppiaf.org/sites/ppiaf.org/files/documents/toolkits/highwaystoolkit/6/bibliography/pdf/new_issues_in_natural_monopolies_regulation-the_financial_side.pdf.
[70] "Competition", OECD, accessed April 2018, http://www.oecd.org/daf/competition/.
[71] World Bank, *Doing Business 2016: Measuring Regulatory Quality and Efficiency* (Washington, DC: World Bank, 2016), http://www.doingbusiness.org/~/media/WBG/DoingBusiness/Documents/Annual-Reports/English/DB16-Full-Report.pdf.
[72] Penelope Brook and Warrick Smith, "Improving Access to Infrastructure Services by the Poor: Institutional and Policy Responses" (2001), http://web.mit.edu/urbanupgrading/waterandsanitation/resources/pdf-files/Brook-ImprovingAccess.pdf.

deliver the resulting infrastructure asset. OECD research provides both the benchmarks for APEC economies, and also the progress measures (where an APEC economy has been evaluated in the OECD work).[73]

- PPPs can be used to facilitate greater private sector involvement in infrastructure provision (Box 2.9). The APEC Finance Ministers' Process has undertaken a considerable amount of work in this area.
- Creating the right legal and institutional environment can assist in attracting private participation in procurement processes. Box 2.9 summarizes the most common hindrances to private sector participation in public procurement processes according to the World Bank's Benchmarking Public Procurement report, which looks at public procurement laws and regulations across 180 economies.

The World Bank's 2017 report on Benchmarking Public Procurement also highlights reforms to procurement processes.[74] For example, it observes that Chile is reforming its procurement processes by operating through a single web portal. As a result, Chile's government is estimated to have increased its savings from USD 180 billion in 2010 to USD 280 billion in 2012. The Republic of Korea tripled the number of bidders in public procurement tenders following the introduction of KONEPS, an e-procurement system. The system reduced the opportunity for public officials to make arbitrary decisions and lowered the cost for suppliers participating in tenders. Chinese Taipei performs well in the benchmarking report for its bid security deposits and performance guarantees in public procurement. This economy requires a performance guarantee deposit yet is flexible in allowing suppliers many options, including providing a certified check, certificate of deposit, performance bond, insurance guarantee or letter of credit.

Box 2.9: Public–private partnerships and procurement policies

Opportunities to use public–private partnerships

PPPs are a mechanism that could be used to increase the competitive provision of services from infrastructure. PPPs are long-term contracts between a private party and a government entity for providing a public asset or service, in which the private party bears significant risk and management responsibility, and remuneration is linked to performance.

Under these arrangements, governments need to think about optimal risk allocation between the public and private sectors based on who is best able to manage or bear it. For example, when constructing a road, the construction-cost risks should be allocated to the private party managing the construction process, while any political risks are better allocated to the government.

Opportunities for PPP contracts arise when the following conditions are met:

- **Output can be clearly specified, measured and enforced:** The service needs to be defined on a standalone basis. If there is a lack of clarity around what constitutes the output of the contract, or there are significant measurement issues, or there is insufficient ability by the private party to adequately influence the outcome, PPP is not the optimal solution.

[73] Isabell Koske, Isabelle Wanner, Rosamaria Bitetti and Omar Barbiero, "The 2013 Update of the OECD's Database on Product Market Regulation: Policy Insights for OECD and non-OECD Countries" (OECD Economics Department Working Papers, no. 1200, Paris: OECD Publishing, 2015); Paul Conway and Giuseppe Nicoletti, "Product Market Regulation in the Non-Manufacturing Sectors of OECD Countries: Measurement and Highlights" (OECD Economics Department Working Papers, no. 530, Paris: OECD Publishing, 2006).

[74] World Bank, "Benchmarking Public Procurement 2017: Assessing Public Procurement Regulatory Systems in 180 Economies" (Washington, DC: World Bank, 2017).

- **Private sector incentives over the life-cycle of activity create value for money:** PPPs are more suited to the procurement of a service, rather than equipment, from the private sector. Involving the private sector may result in improved performance for the following reasons:
  - *Expertise*: Ongoing provision of expertise through the delivery of services.
  - *Innovation*: PPPs can allow the private sector to offer innovative solutions and delivery options. However, private parties will need to be incentivized for these benefits to materialize.
  - *Efficiency*: The private sector, if incentivized appropriately, can be more efficient than its public counterparts. Involving the private sector can lead to lower project costs.
- **Benefits outweigh the transaction costs:** While involving the private sector can add value, it is important to ensure that the benefits outweigh the costs of entering into a PPP transaction.

Major barriers to private participation in public procurement policies

The World Bank highlights five major themes that hinder public procurement:

- **Payment delays:** Delays in payment hinder participation by private firms in the public procurement process; this applies especially to MSMEs that struggle with limited cash flow. Delays are still common across all regions, and payments are timely in only one-third of the economies measured.
- **Bid security deposits and performance guarantees:** Bid security deposits ensure serious offers and guarantee that bidders will not withdraw their bids from the procurement process in an untimely manner. These deposits should not be set so high as to hinder participation nor so low as to allow frivolous offers. Most economies have bid security and performance guarantee requirements. Nevertheless, the World Bank finds that there is scope for improvement for APEC economies in this area in order to reduce investor uncertainty (such as in providing limits on the discretion of the procuring entity regarding the amount or improving rules for the oversight of decisions to withhold a performance guarantee).
- **Digitalization of the procurement process:** Economies in all regions are implementing reforms to conduct the procurement process online. However, a wide gap remains between economies that do not yet have an online portal dedicated to public procurement and other economies that have sophisticated e-procurement platforms that offer a range of services (and economies in between that offer limited information). The lack of such a portal means that suppliers may not have access to procurement opportunities and associated information.
- **Complaint mechanisms:** A fair, transparent and timely complaint mechanism increases confidence in the procurement process because it incentivizes procurement to be carried out in an impartial and open manner. In some economies, complaints processes are not comprehensive (e.g., complaints cannot be made before a contract is awarded), limiting the effectiveness of corrective measures that the review body can take. Further, the time needed for review bodies to issue decisions differs greatly, ranging from 2 to 450 days, suggesting efficiencies are possible in some economies.
- **Time needed to resolve complaints:** Ensuring complaints are resolved in a timely manner increases the confidence of private investors in the system and incentivizes participation in public tenders. This is likely to be further enhanced with the stipulation of legal time limits. Currently, it could take anywhere between 2 and 450 days for decisions to be issued. Delays in the process are seen among high-income OECD economies as well.

Source: World Bank, "Benchmarking Public Procurement 2017: Assessing Public Procurement Regulatory Systems in 180 Economies" (Washington, DC: World Bank, 2017).

Compiled by Consultant (Castalia).

What does a good structural policy look like?

Telecommunications has undergone significant reform in multiple economies in recent decades to allow for greater competition and private sector participation, resulting in more innovative services and lower costs for consumers. Viet Nam and Mexico have both implemented comprehensive regulatory reforms in their telecommunications sector to permit greater private sector participation and they have put in place regulatory frameworks that help enhance competition. Viet Nam's experience in telecommunications reform is outlined in Box 2.10, and Mexico's in Box 2.15. Mexico has also undertaken significant reform in the energy sector to improve private sector participation (Box 2.10).

Russia has reformed its PPP laws to attract greater private sector investment (Box 2.10). Additionally, the Russian National PPP Center, with the support of the Ministry of Economic Development, maintains the federal platform supporting PPP project development, registration, assessment and implementation. The platform provides investors and government with up-to-date information on recent PPP developments in Russia and supports the application and implementation of PPP infrastructure projects, as well as publishes relevant news and analytic reports.

Box 2.10: Reforms to improve private sector participation in infrastructure provision: Viet Nam; Mexico; and Russia

Viet Nam's reform of its telecommunications sector

Until 1990, state-owned enterprises provided all telecommunications services in Viet Nam and diversity of services was limited. Low levels of access to modern telecommunications services and equipment, limited innovation and low levels of competition were features of the system. By 1995, Viet Nam had an average of only 3.8 telephones per 100 people, which was much lower than other Southeast Asian economies.

Reforms in the Vietnamese telecommunication sector broadly fell into three categories:

- **Relaxation of entry for private providers, both domestic and foreign, in the telecommunications market:** In 2001, the government opened the ISP business to the private sector and foreign investors. Viet Nam's WTO accession in 2007 was accompanied by commitments to offer market access to all WTO members on a most-favored nation basis.
- **Equitization of government-owned telecommunications providers:** In 1995, Saigon Postel, a joint stock company, was established, marking the end of government monopoly in the sector.
- **Enhancement of competition in the telecommunications market via regulatory changes and enforcement of competition law:** The Law on Telecommunications (2009) established a framework for telecommunications regulation in Viet Nam. The law incorporated the WTO membership commitments, and further provided for a regulatory authority to be established to investigate competition issues and perform dispute resolution. Meanwhile, the Competition Law (2004) classified certain telecommunications providers as wielding significant market power, making them subject to tariff regulation.

The reforms led to significant growth in the telecommunications sector. The effects of the regulatory changes were far-reaching. The reforms contributed to improved efficiency of various enterprises in Viet Nam by lowering the costs of doing business and enhancing the competitiveness of Vietnamese firms in global trade.

Mexico's reform of the energy sector

Prior to 2013, Mexico's energy sector was dominated by state-owned monopolies. Insufficient investment in energy infrastructure was creating economic costs. For example, a lack of capacity in natural gas transport infrastructure led to demand surpassing capacity at times, leading to

interruptions in natural gas supply with severe economic consequences for industrial consumers. Further, energy output was in decline even though energy demand was increasing.

In 2013, Mexico undertook a reform of the energy sector with the objectives of ensuring energy security and sustainability and building open, efficient and competitive markets. The reform sought to open up the long-closed oil, gas and electricity sectors to competition. Major parts of the reform were:

- **Electricity Law Reform**: Reforms were undertaken to help develop a competitive electricity market – including unbundling the operations of the monopoly supplier of electricity services into a number of subsidiaries in order to open the way for new players in the energy market and empowering government agencies with regulatory and market control capacities.
- **Hydrocarbons Law**: This law allowed for the private sector to participate in upstream activities in the hydrocarbons sector through a licensing system and also allowed private sector participation in activities in the oil and gas industry that were previously delivered exclusively by PEMEX.
- **PEMEX and CFE Law**: The state-owned monopolies, PEMEX and CFE (Federal Electricity Commission), were turned into 'state productive enterprises', which are expected to follow a business-driven strategy and are now required to pay dividends to the government.

As a result of these reforms, the sector is undergoing a deep transformation. There has been a significant increase in private sector participation across the entire hydrocarbons value chain representing a potential investment of USD 180 billion.

Russia's experience with reforms to incentivize PPPs

Until recently, federal-level PPP legislation in Russia did not allow for ownership of an infrastructure facility to pass from a public authority to private investors. The inability of private sector investors to own infrastructure projects limited the potential PPP arrangements that were achievable. Hence, over the past 15 years, most Russian regions adopted their own regional PPP laws to provide options for implementing PPP projects that were based on private ownership of the relevant infrastructure.

On 1 January 2016, the federal law 'On Public–Private Partnership, Municipal–Private Partnership in the Russian Federation and Amending Certain Legislative Acts of the Russian Federation' (PPP Law) entered into force. The PPP Law creates the legal framework for the use of PPP models that allow the transfer of ownership of a facility to a private investor. This gives investors the option of choosing the most beneficial form for the implementation of a PPP project and potentially increases the number of such projects that are viable.

The adoption of the new law has become a significant milestone in the development of the legal regulation of the Russian PPP sector. In 2016, when the law entered into force, the number of PPP projects in Russia surged from 873 (2015) to 2,183. Private investments in PPP projects also increased from RUB 408 billion (about USD 6.5 billion) in 2015 to RUB 1,300 billion (about USD 20.6 billion) in 2016.

Source: Summarized from the case studies on Viet Nam; Mexico; and Russia in Annex 1.

2.3.2 Accessing private sector financing

As discussed in Part 1, the gap in infrastructure provision for the APEC region between what is needed and what is provided amounts to many billions of dollars each year. The Global Infrastructure Outlook developed by the Global Infrastructure Hub (a G20 initiative) with Oxford Economics forecasts infrastructure needs across 50 economies to 2040 (including 17 of the 21 APEC economies). The 2017 report estimates that the gap between infrastructure needs and what will be spent by 2040 is USD 15 trillion.[75]

Financing constraints contribute to this gap. For example:

- Governments may be debt-constrained.
- Economies may face significant sovereign or political risk premiums.
- Private sector involvement may face barriers.
- In many developing economies, infrastructure has not developed as a viable asset class for financial institutions to invest in due to:[76]
    - Shortage of long-term domestic currency finance
    - Local banking market capacity and appetite
    - Lack of adequately developed capital and inter-bank markets
    - Unavailability of government support mechanisms (such as guarantee facilities and viability gap mechanisms)
    - Unsuitable regulatory frameworks to protect the interests of institutional investors
    - Lack of a viable project pipeline

This section focuses on the third element of the financing constraints listed above, namely, how to overcome barriers to better facilitate private sector involvement in infrastructure investment.

An important precondition for private sector participation in infrastructure investment is project bankability. Bankability refers to the willingness of capital market lenders to provide debt or equity financing to the private sector project parties. Farquharson et al. indicate that investors will undertake detailed analysis of the allocation of risks in a project and the available returns to ensure that the project company can meet its financing obligations.[77] Although the social benefits of a project may be higher than the social costs, the bankability of the project may not be assured. The financial returns from the project must be adequate to cover the private costs at a given risk level.

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[75] Global Infrastructure Hub and Oxford Economics, *Global Infrastructure Outlook*, accessed 6 June 2018, https://www.outlook.gihub.org/. Data was extracted for infrastructure needs in 50 economies and 7 sectors to 2040.

[76] Edward Farquharson, Clemencia Torres De Mastle, Edward Raymond Yescombe and Javier Encinas, *How to Engage with the Private Sector in Public–Private Partnerships in Emerging Markets* (English) (Washington, DC: World Bank, 2011), http://documents.worldbank.org/curated/en/995241468337913618/How-to-engage-with-the-private-sector-in-public-private-partnerships-in-emerging-markets.

[77] Ibid.

How could structural policy support it?

Governments must fulfil certain core functions to prepare and develop the infrastructure projects that the government is promoting so that they are attractive to the private sector and bankable. These include the following four functions:

- **Adequate project preparation:** This refers to the steps taken by a government (with advisors) to ensure the technical, legal, economic, financial, social and environmental viability of a project. A feasibility study is a common way for government agencies to ensure that a project is viable. A feasibility study can also determine the fiscal or budgetary implications of a project, including implications of project risks materializing.
- **Independent project evaluation:** Following initial project preparation, an entity independent of the government agency implementing the project should evaluate the merit in funding and implementing the proposed project. This should include a value for money assessment (discussed in Section 2.2) and the likelihood of the viability criteria from the preparation phase being met.
- **Provision of fiscal support if necessary:** Where projects provide net social benefits and meet policy objectives, but may not be financially viable, the government can consider fiscal support. Section 2.4 discusses some funding models.
- **Transaction management:** To ensure an effective transaction, the government needs to manage risk allocation and infrastructure project structuring; ensure bankability; and undertake preparation of draft contracts and management of a competitive procurement process. The transaction management function is focused toward understanding market requirements, identifying potential participants, promoting transactions and managing effective procurement.

Project implementation does not end with the above four functions. Infrastructure projects are generally long-term commitments and should be accompanied by the following three functions over the project's lifespan:

- **Ongoing monitoring and evaluation after the procurement process is finalized:** Monitoring and evaluation will help governments recognize lessons learned. These lessons can help governments improve institutional frameworks, processes and procedures for implementing infrastructure projects. The lessons could also inform project structuring to improve the likelihood of achieving value for money in the future.
- **Oversight and management to ensure value for money is delivered:** Governments have a value for money stake in infrastructure projects. Proper contract management is needed to protect the anticipated project benefits. The government agencies that contract for infrastructure projects need to enforce the contract terms, take preemptive or remedial action where performance starts to deviate from expected outcomes, and handle disputes.
- **Management of fiscal commitments to ensure fiscal sustainability:** Governments need to monitor projects to ensure that both direct and contingent fiscal liabilities are managed. Direct fiscal impacts can arise from means such as subsidy payments. Contingent fiscal liabilities could arise where risks retained by the government in a project materialize during the operation phase. Management of fiscal risks is further discussed in Section 2.4.

Well-prepared projects are a minimum; but for a project to be bankable, it must provide an appropriate financial return for the risk the investors will bear. In many situations, the total return that the private investor can receive from delivering an infrastructure service is relatively inflexible due to political and social considerations limiting the private sector's ability to charge higher than a certain rate for delivering certain services. Consideration should be given to risk allocation and mitigation.[78] For example, bankability can be improved by inducing the private party to take risks that it can mitigate or bear, but not risks that are out of its control, through means such as blended finance.[79] Requiring the private party to accept the right risks incentivizes it to perform. Allocating project financing risk to the private sector provides incentives for the private sector to minimize whole-of-life project costs and maximize project benefits, because the private sector is more invested in the project over the long term. At the same time, allowing it to avoid risks that are outside of its control enables it to accept a lower return.

Policies that deepen/broaden capital markets and reduce barriers to foreign investment; create policy stability and enforce the rule of law; and promote sound procurement practices (see section 2.2) can also assist bankability as they can reduce risk and expand the available sources of long-term finance for infrastructure projects.

What does a good structural policy look like?

Chile provides an example of a legislative approach for reducing regulatory and financial risk for foreign companies. Decree Law 600 (1974) – now repealed – protected firms from legal changes after contracts were signed and automatically compensated for exchange rate risk through an optional regime of:[80]

- Invariable income taxation at a higher than normal rate of 42 per cent for 20 years
- Invariable value-added tax and customs duties on the import of capital goods
- No variation in the mining tax for 15 years
- An alternative mechanism for calculating tax costs in a foreign currency.

Decree Law 600 was replaced by the Direct Foreign Investment Framework Act (2015). This change reflected the confidence of international investors in Chile as a stable regime. Laws applying to investments made before the act was passed were not changed retroactively, and the impact on planned investments was managed by allowing contracts under the old rules to continue to be available for a further four years. Important provisions of the foreign investment regime include the ability to freely transfer income offshore, protection from discrimination (favoring of domestic firms) and no limitations on foreign ownership of assets.

Chile also implemented reforms in 2010 to its PPP regulatory framework under Law no. 20410. This law both increases transparency and improves evaluation processes for the compensation

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[78] G20 and OECD, "G20/OECD Guidance Note on Diversification of Financial Instruments for Infrastructure and SMEs" (2016), https://www.oecd.org/g20/topics/financing-for-investment/G20-OECD-Guidance-Note-Diversification-Financial-Instruments.pdf.

[79] See for example: OECD, "OECD DAC Blended Finance Principles for Unlocking Commercial Finance for the Sustainable Development Goals" (Paris: OECD, 2018), https://www.oecd.org/dac/financing-sustainable-development/development-finance-topics/OECD-Blended-Finance-Principles.pdf.

[80] Government of Chile – Foreign Investment Committee, *Foreign Investment Statute: Decree Law 600* (Santiago: Government of Chile, 2010), http://files.chinagoabroad.com/Public/uploads/v2/v1_attachments/2012/04/dl600-english.pdf.

given to the private sector should the government make legal changes that affect the investment. Compensation for private sector parties is provided for actions by persons with public power if certain requirements are met.[81] The implementation of this reform has improved the investment environment in Chile by reducing the risks borne by private investors and has led to the implementation of several projects.[82]

China and Indonesia provided examples of reforms that facilitated private sector financing in their case studies. With respect of transport infrastructure, China has clarified the role of government funding, worked to improve the PPP model and developed alternative financing platforms. Similarly, Indonesia has carried out reforms in its PPP governance and provided financing support for the provision of infrastructure (Box 2.11).

Box 2.11: Reform of the investment and financing system and PPP governance: China and Indonesia

China: Reform of the investment and financing system facilitates transport infrastructure construction

Background and challenges

China has viewed transport infrastructure as a key driver of social and economic development. Through preferential systems and policies, China's transport infrastructure construction has seen active investment by the public sector and the private sector, including foreign investment. Before the reforms were undertaken, issues identified during the construction and development of its transport infrastructure included: poor coordination between departments, complicated approval procedures and a lack of active participation by private enterprises due to unsound exit mechanisms and poor returns. The PPP model's implementation has been impeded by an incomplete policy framework.

Reforms

China has issued 'Guidance on Deepening the Reform of Transport Infrastructure Investment and Financing' and 'Guidance on Deepening the Reform of the Investment and Financing System' in succession between 2015 and 2016, outlining the following key tasks:

- **Delineating the boundary between government and enterprise investments:** It was established that government funds should only be provided to non-operating projects while financing of operating projects should be the primary responsibility of enterprises. Government support should only be given after a series of steps have been carried out, such as scientific argumentation, approval, and budget management and information publicity.
- **Clarifying the role of investment management by the government:** This led to improved government investment management capabilities in budget management, appraisal and approval, information publicity, and process and after-event supervision. This was implemented through establishing a collaboration mechanism across the departments of transport, finance, development and reform, and domestic land resources.
- **Vigorously improving the PPP model:** A PPP policy framework was established with an operational guideline to facilitate the development of a PPP model.

[81] Government of Chile, *Public Works Concession Law and Regulations*, translation (Ministry of Public Works of Chile, 2010), http://www.concesiones.cl/quienes_somos/funcionamientodelsistema/Documents/Law_Regulations.pdf

[82] The Economist Intelligence Unit (EIU), *Evaluating the Environment for Public–Private Partnerships in Latin America and the Caribbean: The 2017 Infrascope* (New York: EIU, 2017).

- **Promoting the transformation of the transport financing vehicle:** The vehicle is no longer responsible for fundraising for the government but is to be transformed into a viable commercial entity involved in the construction and operation of infrastructure.

Impact

Between 1992 and 2008, fixed asset investment in the transport sector surged almost 30 times and a number of world-class transport infrastructure projects were successively built, including the Beijing–Shanghai high-speed railway, the Qinghai–Tibet Railway, the Beijing–Tianjin Intercity Railway and the Hangzhou Bay Bridge.

Indonesia: PPP governance structural reform and financing support for infrastructure provision

Background

Indonesia has utilized PPPs in infrastructure provision since the 1980s for a limited range of sectors. In 2005, the range of sectors that can utilize the PPP structure was expanded and complemented with other supporting policies; however, up until 2014, only one PPP project agreement signed had achieved financial close.

PPP reform

Significant structural reforms have been implemented to improve PPP governance since 2014. Some of the major reforms are as follows:

- **Better PPP governance and planning through a stronger mandate, increased capacities and robust coordination between stakeholders:** The government established the Priority Infrastructure Provision Acceleration Committee (KPPIP) in 2014 to lead and coordinate the acceleration of infrastructure development by reducing bottlenecks in the process. In addition, a PPP unit was developed within the Ministry of Finance in 2015 to manage the project development facility involved in structuring the Final Business Case and ensuring proper transaction processes. The PPP unit also manages government fiscal support and facilities for PPP projects, with the exception of land acquisition financing support.
- **Fiscal support and facilities for PPP projects:** The government has provided a robust guarantee scheme and improved financing facilities for PPP projects through various schemes:
    - Land acquisition financing support from the National Asset Management Agency
    - A project development facility to support the preparation phase and provide transaction support
    - A viability gap fund to support the creditworthiness of a PPP project and to improve affordable service provision
    - Availability payment for the provision of service, with payment directly from the government that includes capital expenditure, operational expenditure and the rate of return on investment, thus mitigating demand risks for the private sector
    - A guarantee of support to increase PPP project creditworthiness, appeal to investors and as part of risk management in PPP projects.

Source: Summarized from the case studies of China and Indonesia in Annex 1.

Accelerating infrastructure development and financing has been a key focus of the APEC Finance Ministers' Process in recent years. It represents pillar 4 of the Cebu Action Plan and, with the assistance of a range of international organizations, ABAC and other partners, the Finance Ministers' Process has advanced a number of initiatives to support member economies to take steps to develop, finance and deliver quality infrastructure. As outlined in Box 2.12, this includes working with the OECD on ways member economies can diversify the sources of finance for infrastructure and facilitate private sector investment, drawing from work undertaken in other international fora. The importance of facilitating private sector financing for infrastructure was highlighted in the October 2017 APEC Joint Ministerial Statement.[83]

Box 2.12: The OECD's recommendations to the APEC Finance Ministers' Meeting on access to finance for infrastructure

For the past few years, and with renewed focus since the global financial crisis, infrastructure investment has been a key policy objective of governments. The resulting long and slow recovery gave way to policy dialogue aimed at increasing investment as a way to build a stronger economic footing – and infrastructure development and investment has been a key element of this policy focus. In that context, the OECD has been a strong partner to its member economies, the G20 and APEC, in providing evidence-based policy recommendations and sharing best practices in infrastructure financing.

The OECD's contributions to the APEC agenda on infrastructure financing over the past few years have focused on the diversification of financial instruments for infrastructure, risk allocation and mitigation, quality infrastructure as well as good governance for infrastructure investment and development.

Private financing for infrastructure

In 2013, the OECD elaborated the G20/OECD High-level Principles on Long-term Investment by Institutional Investors. These were welcomed by APEC Finance Ministers at their 2013 meeting in Bali, Indonesia. APEC economies thereby acknowledged the importance of enhancing private sector participation in infrastructure financing and improving access to private financing for economic infrastructure. As outlined in the preconditions to the High-level Principles, mobilizing private financing also has to go hand in hand with implementing structural reforms and guaranteeing a stable macroeconomic framework. These aspects were also reflected in the APEC Multi-Year Plan for Infrastructure Development and Investment which was developed in the same year.

Continuing their determination to mobilize private investors for infrastructure development, in 2014, APEC Finance Ministers welcomed the G20/OECD report on Effective Approaches to Support the Implementation of the High-level Principles on Long-term Investment by Institutional Investors as well as the G20/OECD Checklist on Long-term Investment Financing Strategies and Institutional Investors. They further called upon the OECD, among other international organizations, to identify relevant good infrastructure practices in the APEC region.

Cebu Action Plan

In 2015, the OECD contributed to developing the Cebu Action Plan, a voluntary and non-binding roadmap aimed at (1) promoting financial integration; (2) advancing fiscal reforms and transparency; (3) enhancing financial resilience; and (4) accelerating infrastructure development and financing in APEC economies. Under the Cebu Action Plan, the OECD was further mandated to conduct a study of risk mitigation instruments available in the APEC region and to develop a set of policy

[83] "Annex A. Diversifying Financing Sources and Fostering Private Sector Involvement in Infrastructure Investment in APEC Economies" (Joint Ministerial Statement, APEC Finance Ministers' Meeting, Hoi An, Viet Nam, 21 October 2017), APEC, 2017, https://www.apec.org/Meeting-Papers/Sectoral-Ministerial-Meetings/Finance/2017_finance/AnnexA.

recommendations to improve their availability. The OECD was also mandated to extend its survey and report on the self-assessment of interested APEC economies against the G20/OECD Checklist on Long-term Investment Financing Strategies and Institutional Investors (Annex A and B of the 2015 APEC Finance Ministers' Statement).

Risk allocation and mitigation

The OECD delivered in 2017 a report on Selected Good Practices for Risk Allocation and Mitigation in Infrastructure in APEC Economies, developed in collaboration with the Global Infrastructure Hub and the Asian Development Bank, which was welcomed by APEC Finance Ministers at their meeting in Hoi An, Viet Nam. Consistent with the objective to mobilize further investment, this report provides an overview of the type of risks in infrastructure and the tools available to policymakers and regulators to help effectively manage and allocate risks among the various stakeholders. This serves the objective of facilitating the engagement of investors in infrastructure projects through the judicious use of risk mitigation instruments and techniques. Data in the report are based on survey responses from three APEC economies: Chile; Mexico; and Peru.

Diversifying financing sources

Also in 2017, the OECD assisted in the drafting of the policy statement on Diversifying Financing Sources and Fostering Private Sector Investment in Infrastructure Investment in APEC Economies, which was endorsed as Annex A to the 2017 APEC Finance Ministers' Statement. The recommendations included are consistent with those in the G20/OECD Guidance Note on Diversification of Financial Instruments for Infrastructure and SMEs, which was endorsed by G20 leaders under the Chinese G20 2016 presidency. Recommendations in Annex A cover the following areas of infrastructure financing:

- Diversified sources and instruments for the finance of infrastructure
- Institutional investors and promoting infrastructure as an asset class
- PPPs, effective transaction design and risk allocation
- Risk mitigation instruments and techniques
- Infrastructure project pipelines.

Capacity-building package

Most recently, in 2018, at the APEC Finance and Central Bank Deputies' Meeting (15–16 March) and the Senior Finance Officials' Meeting (7–8 June), it was agreed to develop a capacity-building package of tools to help APEC economies adopt measures to accelerate infrastructure development and financing. This package will comprise a selected set of effective approaches to financing infrastructure in APEC economies, including blended finance, drawing from responses to an APEC/OECD survey of policies that facilitate the implementation of the non-binding recommendations contained in Annex A. This work is currently being developed by the OECD in collaboration with Papua New Guinea's APEC chairmanship. The survey builds on a survey of effective approaches to the implementation of the G20/OECD Guidance Note on Diversification of Financial Instruments for Infrastructure and SMEs, which was launched in late 2016.

Ultimately, as called upon by APEC Finance Ministers in 2017, the OECD, in collaboration with other international organizations, is continuing to work with APEC economies on studying best practices and providing capacity building on quality infrastructure investment. This work is also well aligned with the OECD's mandate to develop guidelines and good practices on quality infrastructure, the elaboration of which is a current priority for both APEC and the G20.

Source: Compiled by the OECD.

2.3.3 Implications from technology and innovation

Technological change can enable significant improvements to the delivery of infrastructure services. Industries must be agile in searching for, or responding to, the possibilities of new technologies, to ensure the best services are delivered to infrastructure users. This is not usually a problem in competitive markets, where private companies strive for continual innovation to enable competitive advantage.

In non-competitive markets, however, incentives for firms to invest in innovation or new technology uptake are weakened through the high returns earned on existing technology and infrastructure. This can include firms with market power discouraging new technology that may benefit competitors in order to maintain their monopoly positions. Structural policies can support the uptake of technology and innovation in non-competitive infrastructure markets.

Conversely, technology is altering how competitive an infrastructure sector is. Technological change can be a disruptive influence in some natural monopoly infrastructure markets. Markets that have traditionally had natural monopoly characteristics can lose these characteristics due to technological changes. Technology can sometimes allow provision without the same high fixed costs that created the market power. The telecommunications sector provides a compelling example. Historically, the copper network was regulated as a natural monopoly with the high fixed costs of provision limiting competition in this sector. The transition to next-generation broadband technologies, however, is making the copper network increasingly obsolete. There are examples of electricity market disruption also, including the use of mini grids as an alternative to transmission, and solar photovoltaic (PV) as an alternative to transmission and distribution. Competition and other policies must therefore keep pace with changing realities: structural policy must reflect how new technologies alter the competitive structure of the market.

How could structural policy support it?

Structural policies that support competition such as those discussed earlier in this section are important contributors to technological uptake as technology is a key aspect through which firms compete. However, private firms will not always capture all the benefits from technological development and hence there may be a case for government fiscal support at times. Uptake of new technology is however hard to predict, and hence governments will need to be cognizant of future trends and not just fund current technology.[84]

Intellectual property protections, such as patents, trademarks, designs and copyright, are important to ensure the returns from technological development are captured. The World Intellectual Property Organization standards can be a useful guide.[85]

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[84] World Economic Forum, "Infrastructure Investment Policy Blueprint" (Geneva: World Economic Forum, 2014), http://www3.weforum.org/docs/WEF_II_InfrastructureInvestmentPolicyBlueprint_Report_2014.pdf.

[85] APEC, "Promoting Innovation for Start-ups: Summary Report" (Singapore: APEC, 2018), https://www.apec.org/Publications/2018/04/Promoting-Innovation-for-Start-ups.

Governments should regularly review regulatory systems and legislation, including competition policy, to accommodate new technology. Further, the regulatory system must remain flexible and ready to accommodate new technology. An example of this exists in the emergence of autonomous cars. New Zealand has an action plan to promote emerging transport technologies, including scanning all transport legislation to identify unnecessary barriers to deployment.[86] Several US states have reformed their regulatory systems to promote innovation in autonomous vehicle testing – for instance, California has expanded its testing rules to allow for remote monitoring instead of a safety driver inside the vehicle.[87]

What does a good structural policy look like?

New Zealand is updating its competition policy for the telecommunications sector and has funded the rollout of Ultra-Fast Broadband in light of new technologies. This is discussed in Box 2.13.

Box 2.13: Telecommunications reform in New Zealand

The goal of successive governments in New Zealand has been to improve access to broadband services. This culminated in the rollout of the Ultra-Fast Broadband program, a government-sponsored project to achieve over 86 per cent fiber-to-the-home coverage by the end of 2022. The program is currently at 68 per cent completion.

Pre-reform situation

Prior to launching the Ultra-Fast Broadband program, New Zealand had already conducted significant market reform in the telecommunications sector. The Telecommunications Act 2001 signaled a move from generic competition legislation to sector-specific regulation. In 2006, the government mandated local loop unbundling and the operational separation of the retail, wholesale and network arms of the incumbent monopoly (Telecom), with third parties able to access Telecom's wholesale services on the same terms as Telecom's retail arm. Despite this change, there was continued debate about whether broadband infrastructure was being upgraded at the appropriate rate, particularly around whether Telecom had sufficient incentives to invest.

Policy response to incentivize investment in broadband infrastructure

In 2009, the government launched the Ultra-Fast Broadband program, committing a total of NZD 1.8 billion to subsidize the rollout of a fiber-to-the-home network to a majority of the population.

Build–own–operate contracts were offered on a regional basis. A condition of participation in the Ultra-Fast Broadband initiative was that any company partnering with the government to provide wholesale Ultra-Fast Broadband was not allowed to also provide retail telecommunications services.

The government entered into contracts with four companies to deliver Ultra-Fast Broadband: three regional electricity lines companies and Telecom. As a condition of participating in the program, Telecom agreed to split into two companies: Chorus, a wholesaler covering copper networks and local loops; and Spark, a fixed-line retailer and mobile network operator.

[86] Ministry of Transport, New Zealand, "Intelligent Transport Systems Technology Action Plan 2014–18: Transport in the Digital Age" (Wellington: Ministry of Transport, New Zealand, 2014), https://www.transport.govt.nz/assets/Uploads/Our-Work/Documents/Intelligent-Transport-Systems-Technology-Action-plan-June-2014.pdf.

[87] Jack Karsten and Darrell West, "The State of Self-driving Car Laws across the U.S.", blog, Brookings, 1 May 2018, https://www.brookings.edu/blog/techtank/2018/05/01/the-state-of-self-driving-car-laws-across-the-u-s/.

Rural areas have been provided broadband access through a separate initiative, the Rural Broadband Initiative, which gives grants for broadband infrastructure in rural areas where Ultra-Fast Broadband is not commercially viable.

Regulatory response following the rollout of the Ultra-Fast Broadband program

The rollout of the Ultra-Fast Broadband network has meant that New Zealand faces a new set of issues to those faced when the Telecommunications Act was designed in 2001. This act was introduced with a focus on competition problems in the sector at that time, such as interconnection of competing networks with Telecom, discrimination in favor of Telecom's retail services, and low levels of competition and investment.

Today, improvements in wireless technologies have led to competition to traditional broadband through mobile networks. Further, the Ultra-Fast Broadband rollout is providing additional competition to the copper networks. This has significant regulatory implications, which are currently being addressed through an update to the Telecommunications Act 2001.

Source: Summarized from the New Zealand case study in Annex 1.

2.4 PROMOTING INCLUSIVE GROWTH, ENVIRONMENTAL SUSTAINABILITY AND RESILIENCY

Under the G7 Ise-Shima Principles for Promoting Quality Infrastructure Investment, delivering quality infrastructure includes ensuring job creation, capacity building and the transfer of expertise and know-how to local communities, as well as addressing potential and actual social and environmental impacts of infrastructure projects.[88] Further, policies that ensure access to infrastructure can serve a redistributive role in society, which can be supportive of (or a substitute for) tax and transfer schemes. The UN Sustainable Development Goals can be advanced through infrastructure investment, and infrastructure planning processes need to take account of resiliency, including to climate change impacts, over the longer term.

Inclusive growth considerations need to be balanced against value for money considerations for infrastructure projects. For example, investments in remote regions can be costly relative to investment in urban areas, but they may be necessary for social inclusion and continued development of the economy.

This section discusses considerations for infrastructure development with respect to:

- Attaining social development objectives
- Poverty reduction and job creation
- Environmental and social due diligence
- Promoting resilience.

[88] The Ise-Shima Principles are explained in Section 2.1. See also: G7, "G7 Ise-Shima Principles for Promoting Quality Infrastructure Investment" (Tokyo: Ministry of Foreign Affairs, Japan, 2016), https://www.mofa.go.jp/files/000196472.pdf.

2.4.1 Attaining social development objectives

Projects that provide net social benefits may not always be financially viable (i.e., bankable) as it may not be possible to charge for all the benefits flowing from a project. Further, at times, cost-recovery pricing may limit the access of certain groups to essential services creating a trade-off between social and economic objectives.

How could structural policy support it?

Governments can consider support arrangements (through certain funding models) to infrastructure projects offering the greatest net social benefits to society. Examples include:

- **Community service obligations:** These are non-commercial requirements for achieving identified social purposes that a business may elect not to provide on a commercial basis, or that it would only provide commercially at higher prices. An example is a government-owned electricity transmission provider required to provide transmission services to remote communities, which might not be commercially viable. This ensures access is not limited only to areas with high density or income. Universal service obligations are a type of community service obligation where the intention is to have universal provision. Public service obligations and non-commercial service obligations are similar terms (Papua New Guinea's reform, which involved implementing community service obligations, is discussed in Box 2.7).
- **Government financial support for private providers:** There are multiple ways governments can provide support to private providers where social benefits exceed profits. Governments have access to cheaper financing than the private sector. In PPPs, governments can on-lend funds to private participants to address the limitations of financial markets and to make financing cheaper. Governments may also provide guarantees to PPPs to improve their bankability by covering foreign exchange and political risks. Papua New Guinea is an example of an economy that has implemented an on-lending policy for state-owned enterprises (Box 2.7).
- **Government subsidies:** Subsidies targeting poor users will make it possible to increase access to essential infrastructure. This can be effective where privately provided infrastructure is not affordable for groups of consumers but is nonetheless considered essential. One possible solution is to provide favorable financing terms for upfront costs of connection. This can also be achieved through cross-subsidization across a network.

What does a good structural policy look like?

The 'Investing in Canada' plan and the 'Connect to Innovate' program are examples of government interventions to provide infrastructure to rural and remote communities and promote social inclusion (Box 2.14).

Box 2.14: Access to social and digital infrastructure in Canada

In Canada, infrastructure is largely developed, owned and managed by provincial, territorial and municipal governments. In recent years, all orders of government in Canada have increased their investments in infrastructure. Despite this, infrastructure demand has outpaced investments for several decades resulting in congestion in urban centers, too many Canadians struggling to meet their housing needs, insufficient and aging water and wastewater systems and a lack of basic infrastructure in many indigenous communities. Furthermore, Canada's rural and remote regions lag behind urban areas in terms of broadband coverage. Low population density and challenging terrain mean that it can be difficult for the private sector to generate adequate returns and invest in new or upgraded broadband networks in rural or remote regions.

Policy response: 'Investing in Canada' plan

The 'Investing in Canada' plan is built upon extensive research and public engagement that made it clear that Canada faces a broad-based infrastructure gap which is limiting its economic growth and Canadians' quality of life. With historic investments in social infrastructure, public transit, green infrastructure, trade and transportation infrastructure, and rural and northern communities, new federal investments will take advantage of historically low interest rates to renew Canada's infrastructure and improve the quality of life for all Canadians. Over the 12 years of the plan, starting in 2016, the government will invest over CAD 180 billion in infrastructure to achieve three objectives:

- Generate long-term economic growth
- Improve the resilience of communities and transition to a clean growth economy
- Improve social inclusion and socioeconomic outcomes for all Canadians.

Provinces, territories, municipalities and indigenous communities are key partners in developing and implementing the plan. Through the plan, the federal government's increased investment in infrastructure will be further leveraged by all orders of government to more than double the reach of the plan's funding.

The plan includes a Community Employment Benefits program. This gives additional priority to projects that increase employment for apprentices, indigenous peoples, women, persons with disabilities, veterans, youth, and newcomers to Canada, and that boost procurement opportunities for small and medium-sized social enterprises.

The Canadian government sees infrastructure investments as a means for addressing inequalities. Given this, the government will track and report regularly on the following program outcomes:

- The rate of economic growth is increased in an inclusive and sustainable way.
- Environmental quality is improved, GHG emissions are reduced and resilience of communities is increased.
- Urban mobility in Canadian communities is improved.
- Housing is affordable and in good condition and homelessness is reduced year over year.
- Early learning and child care are of high quality, affordable, flexible and inclusive.
- Canadian communities are more inclusive and accessible.
- Infrastructure is managed in a more sustainable way.

Policy response: 'Connect to Innovate' program

Successive Canadian governments have established targeted programs aimed at ensuring inclusive access to broadband infrastructure – particularly in rural and remote areas. In December 2016, the government of Canada launched the CAD 500 million 'Connect to Innovate' program. 'Connect to Innovate' is focused on expanding high-capacity backhaul to underserved rural and remote communities and also on connecting anchor institutions such as schools, hospitals and indigenous government buildings. More broadly, access to community backhaul will support fixed and mobile services to local homes and businesses at faster speeds. The goal is to provide a transformative level of service to rural and remote communities that can both support current needs and scale for long-term growth.

The 'Connect to Innovate' program has been highly successful. The program received close to 900 applications, requesting over CAD 4.4 billion in funding. To date, the government of Canada has announced funding for 139 projects in seven provinces and territories across the economy. These projects will improve connectivity in 740 rural and remote communities.

Source: Summarized from the Canada case studies in Annex 1.

2.4.2 Poverty reduction and job creation

Infrastructure contributes toward poverty reduction over the long term by supporting economic growth, including in remote areas. This is because, aside from the jobs created from

constructing infrastructure, quality infrastructure boosts productivity by improving connectivity, reducing the costs of doing business and connecting remote populations. For example, infrastructure can improve access to job markets through transport and communications infrastructure and can reduce the frictions or transaction costs that may lead to unemployment and deprivation. Agglomeration benefits can arise from this improved connectivity.

Infrastructure can also increase trade and create better commercial opportunities by increasing access to domestic and international goods and services markets. Firms that can transport goods to markets more efficiently or provide services more easily through improved connections will be more profitable. This increases income and incentivizes increased production, which supports economic growth.

In addition, better infrastructure links have the related benefit of lowering the cost of goods and services that the poor consume. For instance, the Asian Development Bank estimates that the annual investment in transport, communications and energy infrastructure in developing Asia is USD 800 billion per annum during the period 2010–2020. The estimated welfare gains from this are USD 1,616.3 billion (in 2008 prices) in 2020, or 10 per cent of projected aggregate GDP that year.[89]

How could structural policy support it?

A well-executed cost–benefit analysis (discussed in Box 2.1) should include all costs (including social and environmental costs) and benefits of an infrastructure project, including the extent to which the investment gives rise to spillover benefits that support growth in the broader economy and therefore assists in poverty reduction and job creation (including employment generation through second-order economic activity). However, the benefits of poverty reduction will not always be able to be fully quantified and hence qualitative judgement is also important.

Structural policy can distribute projects across regions and in this way impact on the distribution of benefits (see Part 1). Infrastructure can bring development with it, such as roads and communication services that improve rural–urban linkages and directly employ locals. Local content policies can ensure the local labor force benefits from job creation and capacity building.

General infrastructure funds can be established to benefit specific regions or populations that may be deprived. These can be viewed as domestic versions of international development banks such as the World Bank or Asian Development Bank, with a smaller scale and scope. These can help with institutional capability – supporting regional organizations to develop plans or feasibility studies. They can also invest in specific sectors identified as economy-wide priorities. Finally, they can act as a bank for infrastructure projects pitched to them by public and private entities – directly addressing the funding gap.

[89] Biswa Nath Bhattacharyay, Masahiro Kawai and Rajat M. Nag, eds, *Infrastructure for Asian Connectivity* (Cheltenham: Edward Elgar Publishing, 2012), https://www.adb.org/sites/default/files/publication/159325/adbi-infra-asian-connectivity.pdf.

What does a good structural policy look like?

APEC has identified many infrastructure policies that can improve urban–rural linkages and hence inclusive growth in a 2016 report.[90] Policies especially relevant to infrastructure include:

- Building a database of rural and remote geographical territories to assess and overcome development and infrastructure gaps
- Developing an environment to attract private investments and to create a virtuous cycle of savings–investment–growth–employment–income
- Promoting investment for rural–urban connectivity and access to services such as cold storage and retail markets in rural and secondary cities
- Promoting rural–urban business communication networks.

Mexico has undertaken reform in telecommunications, which has contributed to job creation and poverty reduction (Box 2.15).

Box 2.15: Constitutional reform of telecommunications in Mexico

Mexico underwent large-scale reform of the telecommunications sector at the political constitutional level to improve operations. This formed part of a wider political pact for Mexico that provided political stability to enact the contentious reforms.

Pre-reform situation

Mexico's telecommunications markets were found to perform poorly compared to their OECD peers. The telecommunications sector was characterized by a lack of competition, high prices and weak or inconsistently applied regulations. This resulted in a low rate of penetration of services and poor development of the infrastructure needed to provide them. For example, in 2012, a single company controlled 80 per cent of the landline phone market in Mexico and 70 per cent of the wireless market, while over three quarters of households lacked access to the Internet.

Policy response

In 2013, an initiative was begun to add various provisions to the Political Constitution of the United Mexican States. The provisions and subsequent regulatory and legislative changes in the telecommunications sector included:

- Creation of an autonomous regulatory body acting independently in its decisions and operation: the Federal Telecommunications Institute (IFT by its acronym in Spanish). The IFT is responsible for the regulation, promotion and oversight of the use, development and operation of the radio spectrum and broadcasting, and for access to essential inputs for telecommunications services. It is also the competition authority in the telecommunications and broadcasting sectors – with ample powers to enforce independent regulation based on evidence-driven decision making.
- Introduction of rules for bidding for new concessions for broadcasting television frequencies, including grouping at least two new television channels with economy-wide coverage.
- Elimination of FDI restrictions.
- Release of sufficient spectrum and promotion of infrastructure sharing in order to meet the growing demand for mobile broadband services.

[90] APEC, "Strategic Framework: Rural–Urban Development to Strengthen Food Security and Quality Growth" (Singapore: APEC, 2016), http://www.apec.org/-/media/Files/Groups/PPFS/4-Framework-for-RualUrban-Development-for-Food-Security.pdf.

- Determination of 'preponderant economic agents' (monopolistic entities) in the telecommunications and broadcasting sectors to allow the regulation of these.
- Establishment of measures that allow the effective disaggregation of local telecommunications networks owned by incumbents.
- Review of the current concession titles, to verify compliance with their terms, conditions and modalities.
- Establishment of Telecomunicaciones de México to have the authority and resources to promote access to broadband services, and to plan, design and execute the construction and growth of a robust telecommunications backbone infrastructure.
- Installation of a wholesale wireless service network using 90 MHz (released with the transition to digital television) in the 700 MHz band, with a target to cover 92.2 per cent of the population by 2024 guaranteed by the federal branch.

Impact

New players were able to access the mobile market, increasing competition. FDI in the sector increased from 1 per cent of total FDI before the reform to 8 per cent in 2015. Quality of service has improved, particularly broadband speeds and data volumes. Between 2012 and 2016, prices for telecommunication services significantly decreased, leading to an important increase in subscriptions, especially in mobile markets (over 50 million new mobile subscriptions to the Internet).

These reforms decreased effective poverty in Mexico by allowing the poor to access telecommunication services more cheaply, thereby leaving more income available for other purchases. The increased access also increased penetration of mobile services, which increased utility directly but also increased connectivity among the poor to the wider jobs and goods markets. From a small base, the number of people in Mexico using the Internet for online transactions has multiplied by a factor of four from 2012 to 2016.

Source: Summarized from the Mexico case study in Annex 1.

2.4.3 Environmental and social due diligence

Infrastructure can improve living standards, but there can also be negative social and environmental impacts such as displaced communities, pollution, habitat loss, inequitable outcomes, and economic or social impacts for communities. Structural policies can mitigate such negative impacts, ensure development is within environmental limits or provide adequate compensation arrangements to affected groups. Mitigation of, or compensation for, negative impacts can assist in reducing opposition to future projects that may have high benefit-to-cost ratios. Beyond that, government policies and infrastructure investment can also be aimed toward addressing social and environmental impacts that arise outside of infrastructure, such as through considering the role of infrastructure in smart city development.

How could structural policy support it?

Key structural policies aimed at ensuring that environmental and social impacts are appropriately managed are:

- Environmental regulatory standards (or safeguards) and assessments

- Requirement to assess and manage the negative impacts of infrastructure development on communities (one example is the OECD's responsible business conduct standards discussed in Box 2.16)[91]
- Cost–benefit analysis, which should include all costs, including social and environmental impacts, in order to ensure a comprehensive analysis and transparency as to impacts (discussed in Box 2.1).

Environmental regulation encompasses a wide range of measures. Minimum environmental standards and protected species legislation that infrastructure projects must abide by are important in reducing the environmental impacts of infrastructure. Examples include minimum river flow requirements for hydropower plants; or protections for endangered species that require construction to proceed in ways that guarantee habitat availability for minimum populations to continue to thrive.

Requiring an environmental impact assessment for projects affecting the natural environment in the planning stage can help ensure these standards are met. Open and free access to environmental data can help developers to plan mitigation measures and reduce the cost of environmental impact assessments. Such assessments should not be viewed in isolation; social issues should also be taken into account. For example, the loss of an adequate standard of living and livelihoods experienced by communities impacted by infrastructure development should be considered. Environmental regulation needs to be matched with sufficient institutional capacity to implement, monitor and enforce requirements.

Responsible business conduct standards are comprehensive standards aimed at helping businesses ensure that expectations on labor, environmental and human rights issues are adequately addressed. For example, a recent UN study looked at the potential human rights consequences of infrastructure projects and plans, and found that these are not addressed at a systemic level.[92] Tools exist for businesses and governments alike to address these gaps. For example, the OECD has developed guidance on social and environmental due diligence that sets out expectations for responsible business conduct (Box 2.16).

Stakeholder engagement with communities is an integral component of the identification and mitigation of negative impacts on communities and building support for projects. A structural policy should ensure meaningful stakeholder engagement at both the planning and building stages of an infrastructure project. These interactions should be based on international best practice and standards, and there should be recognition that a change in processes and plans may be needed for the continued success of the project.

Displaced communities can also benefit from effective structural policies. The European Bank for Reconstruction and Development has a comprehensive Resettlement Guidance and Good Practice document.[93] One key policy is setting up a legal framework for land acquisition. A census and socioeconomic survey should be carried out before a project begins in order to establish the existing conditions. This should include a list and map of affected plots and assets.

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[91] "Policy Framework for Investment: Responsible Business Conduct", OECD, accessed 2 July 2018, https://www.oecd.org/investment/toolkit/policyareas/responsiblebusinessconduct/.

[92] Office of the UN High Commissioner for Human Rights (OHCHR), "Baseline Study on the Human Rights Impacts and Implications of Mega-infrastructure Investment" (Geneva: OHCHR, 2017), https://www.ohchr.org/Documents/Issues/Development/DFI/MappingStudyontheHRRiskImplications_MegaInfrastructureInvestment.pdf.

[93] European Bank for Reconstruction and Development (EBRD), *Resettlement Guidance and Good Practice* (London: EBRD, 2017), www.ebrd.com/documents/environment/pdf-resettlement-guidance-and-good-practice.

This can be updated over time, but a clear cut-off date should be established for the census and survey to be completed.

Where communities do experience negative impacts, compensation arrangements can be used to ensure that affected communities are at least as well off as they were prior to the project commencing. A survey can help in designing the most appropriate compensation entitlements – monetary compensation for land or assets; lost income support; or resettlement and assistance for livelihood restoration. It also determines who is eligible for compensation – those present in the area or having legal rights to the land. Individuals should be given a choice where possible as to what kind of compensation they wish to receive, while communal assets should be replaced in kind where possible. A displacement policy should ensure this process has independent oversight, separate from the developer.

What does a good structural policy look like?

The OECD has developed a guidance on social and environmental due diligence (Box 2.16).

Box 2.16: OECD guidance on social and environmental due diligence

The OECD Due Diligence Guidance for Responsible Business Conduct provides practical support to enterprises on the implementation of the OECD Guidelines for Multinational Enterprises by providing plain language explanations of its due diligence recommendations and associated provisions. Implementing these recommendations can help enterprises avoid and address adverse impacts related to workers, human rights, the environment, bribery, consumers and corporate governance that may be associated with their operations, supply chains and other business relationships. The guidance includes additional explanations, tips and illustrative examples of due diligence.

The guidance also seeks to promote a common understanding among governments and stakeholders on due diligence for responsible business conduct. To do so, it was developed in close consultation with the Office of the United Nations High Commissioner for Human Rights (OHCHR), the International Labour Organization (ILO) and the UN Working Group on Business and Human Rights. It aligns with the UN Guiding Principles on Business and Human Rights and the ILO Tripartite Declaration of Principles concerning Multinational Enterprises and Social Policy. As such it represents a tool for business to respond to the due diligence expectations of all leading international instruments on responsible business conduct. The Due Diligence Guidance for Responsible Business Conduct was adopted by the OECD Ministerial Council Meeting on 30–31 May 2018.

The Guidance responds to the G7 Leaders' Declaration adopted on 7–8 June 2015 in Schloss Elmau, which recognized the importance of establishing a common understanding on due diligence, particularly for small and medium-sized enterprises, and encouraged headquartered and active enterprises in their economies to implement due diligence in their supply chains around the world. G20 leaders committed, in the Declaration adopted on 8 July 2017 in Hamburg, to fostering the implementation of labor, social and environmental standards and human rights protection in line with internationally recognized frameworks in order to achieve sustainable and inclusive supply chains, and underlined the responsibility of businesses to exercise due diligence in this regard.

Source: Compiled by the OECD.

ABAC has provided Box 2.17 on the role of digital technologies in developing smart cities.

Box 2.17: Digital technologies to improve sustainability in smart cities

In many APEC economies, there are cities that are on their way to becoming 'smarter'. Every smart city project has a plethora of initiatives that have either immediate or medium-term prospects of achievement, from the Internet of Things using sensors and smart meters, to electric vehicles and autonomous vehicles. The ABAC report on structural reform and digital infrastructure suggests there are another set of challenges, such as aging populations, environmental pollution and the long-run impact of climate change, that urgently need attention. While governments cannot do it all, they are in the best position to lead, and involve the private sector and local communities. For example, although China suffers from some of the worst effects of pollution and GHGs, it is also among the global leaders in green technologies and policies such as clean energy and carbon certificate trading which is designed to incentivize the use of ICT to reduce GHGs.

In Singapore, various green technologies are being used as the economy makes the transition to a 'smart nation', experimenting with everything from smart homes to self-driving automated vehicles. In Hong Kong, China, a high-level internal committee chaired by the Chief Executive, the Steering Committee on Innovation and Technology, has been set up to steer development of I&T and smart city initiatives. Also, the Smart City Blueprint for Hong Kong, China was published in December 2017 with a chapter dedicated to 'Smart Environment'. In Latin America, Chile lists 11 cities as becoming smarter;[a] and in Mexico, both Guadalajara and Mexico City have entered the lists of smart cities.[b] In 2014, Peru initiated a feasibility study on smart city development in the San Borja district of its capital, Lima.[c] More recently, Lima has sought investment from Spanish companies with expertise in smart city development.[d] In one index, over the last decade, Lima has jumped from 26th to 8th for the ease of doing business in Latin America. [e] No city can become 'smart' overnight, but every city can become smarter, and APEC economies should be well placed to create the right mix of technologies, policies and regulations, and markets, especially if APEC encourages the openness to foreign participation demonstrated by Lima.

Notes:

[a] Yessica Cartajena, "Smart Cities in Latin America" (presentation, United Nations Commission on Science and Technology for Development, 2016), http://unctad.org/meetings/en/Presentation/CSTD_2015_ppt05_Cartajena_en.pdf.

[b] Victor M. Larios, "Smart City, Smart Future: Guadalajara, Mexico", IEEE.org, 2018, https://iot.ieee.org/articles-publications/smart-city-smart-future-guadalajara-mexico.html; "Mexico City in the 2016 Smart Cities List!", *Mxcity*, 2016, http://en.mxcity.mx/2016/12/2016-smart-cities-list/.

[c] Asia Pacific Energy Research Centre (APERC), *A Study on Smart Communities in the APEC Region* (Tokyo: APERC, 2015), https://aperc.ieej.or.jp/file/2016/1/12/A_Study_on_Smart_Communities_in_the_APEC_Region.pdf.

[d] Mike Dreckschmidt, "Peru Looks to Bring Smart City Companies from Spain", *Living in Peru*, 18 July 2017, http://www.livinginperu.com/peru-looks-bring-smart-city-projects-spain/.

[e] Augusto Rey, "Lima: The Impetus of the Peruvian Capital" *UNO*, no. 29, 2017, http://www.uno-magazine.com/uno-29/lima-the-impetus-of-the-peruvian-capital/.

Source: ABAC Report on Structural Reform and Digital Infrastructure.

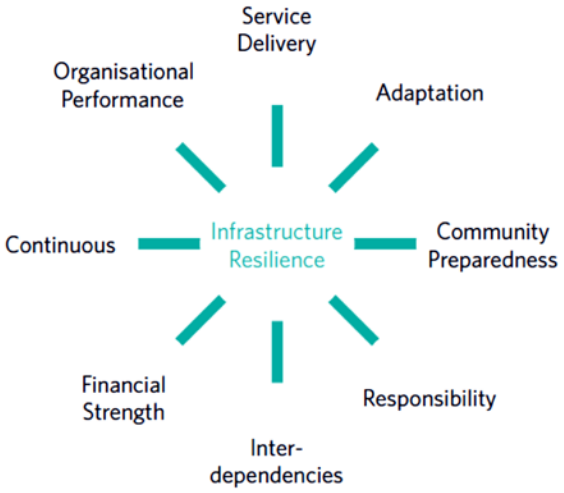
2.4.4 Promoting resilience

The United Nations definition for resilience is: 'The ability of a system, community or society exposed to hazards to resist, absorb, accommodate and recover from the effects of a hazard in

a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions'.[94]

Infrastructure resilience is broader than just preparing for and managing specific events such as earthquakes, or the technical failure of a piece of infrastructure. Consideration should be given to all potential threats to a system including the slow-onset impacts of climate change, and to thinking about interdependencies within and between systems and the impact of events on the level of service. In the circumstances of rapid digital economy development, where all infrastructural objects are becoming interconnected by ICT, special attention should be given to security in the use of ICT. In the face of these issues and challenges, the concept of resilience puts the focus squarely on the need to develop capacity to anticipate, absorb, adapt to and rapidly recover from a potentially disruptive event.

Figure 2.1: Resilience attributes



Source: New Zealand Individual Economy Report.

Increasing resilience is therefore not just about building stronger infrastructure. The role of operational changes and community preparedness and planning in mitigating the costs of hazards is vital. The attributes of infrastructure resilience are summarized in Figure 2.1 and elaborated below:[95]

- **Service delivery:** The robustness of a system in providing access to infrastructure services in adverse conditions.
- **Adaptation:** The capacity to withstand disruption, absorb disturbance and act effectively in a crisis, responding appropriately to the changing circumstances in the hazards facing society.
- **Community preparedness:** Communities' readiness to respond to a crisis in a way that minimizes disruption and danger. This could include warning systems, planning and public education.

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[94] United Nations International Strategy for Disaster Reduction (UNISDR), *2009 UNISDR Terminology on Disaster Risk Reduction* (Geneva: UNISDR, 2009), 24, https://www.unisdr.org/we/inform/publications/7817.

[95] For more discussion of resilience and these attributes, see: National Infrastructure Unit, New Zealand, "Infrastructure Evidence Base: Resilience" (Wellington: New Zealand Treasury, 2014), https://treasury.govt.nz/sites/default/files/2017-12/nip-evidence-resilience.pdf.

- **Responsibility:** Making obligations clear between different groups: owners, operators, users, policymakers and regulators.
- **Interdependencies:** The recognition that resilience in one system may rely on the functioning of another, which includes acknowledging supply chain and weakest link vulnerabilities.
- **Financial strength:** The ability of infrastructure providers (including governments) to withstand the financial losses and requirements for new investment that can emerge because of shocks.
- **Continuous:** The fact that resilience efforts need to be ongoing, recognizing that infrastructure resilience will always be a work in progress. For example, risk management plans should be revisited at scheduled dates – controlling for a changing environment and economy.
- **Organizational performance:** Leadership and institutional culture that are conducive to constantly improving resilience.

How could structural policy support it?

Disruptions to infrastructure services due to emergent and shock events reduce the benefits that infrastructure assets can provide over their life-cycle. The period after shock events may also be the time infrastructure is most valuable or necessary. For example, transportation systems that fail in extreme weather events such as hurricanes will slow down recovery after the event. Infrastructure that this applies to is called 'critical infrastructure', defined as:

> *The primary physical structures, technical facilities and systems which are socially, economically or operationally essential to the functioning of a society or community, both in routine circumstances and in the extreme circumstances of an emergency.*[96]

Critical infrastructure includes transport and telecommunication systems, electricity, water and communications systems, hospitals and health clinics, and centers for fire, police and public administration services. Access to critical infrastructure improves quality of life and saves lives. Even where these critical infrastructure services are determined to be best provided on a commercial basis in normal circumstances, the ability for them to function effectively during and following a disaster should be assured as this produces a large positive externality for society.

The benefit of building and preparing for resilience should be incorporated into business cases. However, resilience can be undervalued or not considered when undertaking an economic evaluation of new infrastructure as the risk of a hazard materializing can be hard to measure; some risks emerge slowly, and the consequences of not building for resilience might not be felt for a long time.[97] Consideration should be given, for example, to the benefit of building stronger infrastructure, or implementing mitigation policies such as those discussed next, versus the expected costs that would arise if an adverse event occurred. For example, some studies show that building disaster resilience is cost-effective compared to late humanitarian

[96] Italics added. "Critical facilities", in UNISDR, *2009 UNISDR Terminology on Disaster Risk Reduction*, 8–9.
[97] C. Gallego-Lopez and J. Essex, *Designing for Infrastructure Resilience* (London: Department for International Development, UK, 2016), https://assets.publishing.service.gov.uk/media/57d6bc5be5274a34fb00002e/Designing_for_Infrastructure_Resilience_July_2016_external.pdf

response.[98] Emergent risks, such as risks from climate change, need to be actively managed; making infrastructure resilient to climate change risks will assist economies in adapting to climate change and can mitigate any climate-related shock event (like flooding).

Structural policies can encourage providers to improve the resilience of infrastructure systems on several levels: [99]

- **Robustness:** This refers to the inherent resistance or strength in a system to withstand external demands without degradation or loss of functionality. For example, in electricity, this would include the extent to which the physical infrastructure for generation and transmission of electricity can withstand hazards and continue providing electricity normally to consumers. Regulation can help build robustness; for example, minimum building standards can be used to ensure the infrastructure remains functional under a certain level of physical stress.
- **Redundancy:** This refers to system properties that allow for alternate options, choices and substitutions under stress. For example, in electricity infrastructure, this would be having sufficient backup generation and a grid that is able to withstand a line being broken. Standards and regulations are important here. So are policies that aid coordination between groups in a sector and between sectors to provide redundancy, recognizing the interdependence of different sectors.
- **Resourcefulness:** This refers to the capacity to mobilize needed resources and services in emergencies. There are limits to how robust or redundant infrastructure can be made at a reasonable cost. For electricity, this is having the necessary expertise and parts where they are needed to respond to disruption. A slow-onset hazard may require the provision of alternative electrical service delivery rather than repeated rebuilding of current standard infrastructure. Structural policies can establish the clear responsibility, adaptation and community preparedness to help achieve this.
- **Rapidity:** This refers to the speed at which a disruption can be overcome, and safety, services and financial stability restored. This requires financial strength for providers. Financial tools can support resilient infrastructure and include project-specific tools, such as insurance arrangements, and system-wide tools, such as contingent liability planning by the central ministry of finance or treasury, and fiscal buffers or funds (e.g., the Earthquake Commission in New Zealand). Adequate contingency planning by the government ensures that, following shock events, funds can be made available to rebuild infrastructure quickly.

While resilience provides many benefits, there are also costs. If the costs are too high, then investments cease to be economically justified. Therefore, it is important to provide resilience efficiently, in the most cost-effective way. In relation to infrastructure, the cost-effectiveness of prevention will be enhanced where governments provide adequate infrastructure and

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[98] Courtenay Cabot Venton, Catherine Fitzgibbon, Tenna Shitarek, Lorraine Coulter and Olivia Dooley, "The Economics of Early Response and Disaster Resilience: Lessons from Kenya and Ethiopia" (2012).

[99] M. Bruneau, S. Chang, R. Eguchi, G. Lee, T. O'Rourke, A. Reinhorn, M. Shinozuka, K. Tierney, W. Wallace and D. von Winterfelt, "A Framework to Quantitatively Assess and Enhance the Seismic Resilience of Communities", *Earthquake Spectra* 19, no. 4 (2003): 733–52, cited in T.D. O'Rourke, "Critical Infrastructure, Interdependencies and Resilience", *The Bridge* 37, no. 1 (Spring 2007): 25, http://www.nae.edu/File.aspx?id=7405

services by not deferring high-return spending like maintenance and by applying higher margins of safety to critical infrastructure.[100]

[100] World Bank and United Nations, *Natural Hazards, UnNatural Disasters: The Economics of Effective Prevention* (World Bank, 2010).

What does a good structural policy look like?

Climate change resilience

The G20 climate and sustainability working group supported by the OECD has undertaken substantial work on resilience to climate change. Box 2.18 presents a summary of the work.

Box 2.18: Climate-resilient infrastructure

New and existing infrastructure needs to be (re-)designed, built and operated to take into consideration the impacts of climate change. Rising temperatures, increased flood risk and other climate impacts will affect infrastructure. These may result in decreased service reliability and increased maintenance costs, and may reduce the lifetime of infrastructure assets. Climate change may also influence the demand for infrastructure services, such as energy for heating and cooling buildings.

Given that infrastructure underpins economic development, increasing the resilience of infrastructure is an essential part of the challenge of adapting to a changing climate. Climate-resilient infrastructure can improve the reliability of service provision, increase asset life and protect asset returns. Best practices of governments that are taking action tend to focus on creating conducive framework conditions and mobilizing finance for climate-resilient infrastructure. Among these practices are:

Strengthening the enabling environment for the development of resilient infrastructure

- Invest in the provision of climate data and projections, combined with efforts to make that information easily accessible to end users
- Mainstream climate resilience into key policy areas, including in:
  - The design and implementation of spatial planning frameworks (to improve disaster risk management, reduce vulnerability and prevent the construction of new infrastructure in exposed areas)
  - Infrastructure project and policy appraisals, including strategic environmental assessments and environmental impact assessments
  - Regulatory, engineering and economic standards (including building codes)
- Encourage the disclosure of climate-related risks by infrastructure owners and operators.

Mobilizing public and private investment in climate-resilient infrastructure

- Examine the potential for nature-based, flexible or innovative approaches to climate-resilient infrastructure to prepare for the impacts of uncertain climate change.
- Develop infrastructure plans to provide a strategic view of how climate change will affect infrastructure needs in the coming decades, and design sequenced packages of investment (‘pathways’) that address interconnections and increase resilience in a way that cannot be achieved by looking at projects in isolation.
- Ensure that public procurement policies account for costs over the asset lifetime. For PPP contracts, it is important to clarify the allocation of responsibilities regarding climate-related risk planning, management and response.
- Undertake proportionate screening of public sector infrastructure investment to ensure that it is consistent with climate resilience.
- Use public finance to build capacity for project preparation to address capacity constraints relating to climate resilience. Blended finance may be used to improve the risk–return profile of investments where appropriate.

Source: Compiled by the OECD.

Institutional arrangements

Community preparedness and institutional capability are important in achieving resilient communities. Box 2.19 provides some examples.

Box 2.19: Resilience in Canada and New Zealand

Canada

Climate change is affecting the frequency and severity of extreme weather such as heatwaves and major precipitation events, as well as the occurrence of natural hazards such as floods, wildfires and droughts. These effects threaten safety and security, economic wellbeing, and access to essential services Canadians depend on.

In 2018, the government of Canada launched the CAD 2 billion Disaster Mitigation and Adaptation Fund under its 'Investing in Canada' plan.

- The Disaster Mitigation and Adaptation Fund will fund large-scale infrastructure projects over 10 years (2018–2028).
- The program will strengthen the resilience of Canadian communities to natural hazards and extreme weather through investments in large-scale infrastructure, including natural infrastructure.
- Investments will reduce the impacts of events such as floods, wildfires and seismic events, and slow-onset hazards such as the northern permafrost thaw and coastal sea-level rise; and protect Canadian communities from potentially devastating social and economic losses.

The Disaster Mitigation and Adaptation Fund is a key element of the government of Canada's commitments outlined in the Pan-Canadian Framework on Clean Growth and Climate Change. Specifically, these commitments include building climate resilience through infrastructure, and reducing climate-related hazards and disaster risks. Canadian provinces, territories, municipalities, public sector bodies, and indigenous communities are all eligible to apply to the program.

New Zealand

Transport infrastructure

The New Zealand government recognizes the transport system as critical infrastructure. The Ministry of Transport therefore identified transport system resilience as a priority and plays a key role in providing cross-sector leadership on resilience with the goals of:

- Planning, preparing and responding to events impacting on the transport system
- Building a longer-term resiliency strategy
- Encouraging engagement and collaboration across the transport sector
- Providing clear advice on government policy.

A government policy statement on land transport is issued by the Minister of Transport and guides the strategy on how land transport funds are invested over the next decade. The 2018 statement includes an explicit objective for investments to consider resilience, with a focus on the impacts of climate change.

Institutional preparedness

The creation of the New Zealand Lifelines Council in 1999 is an example of an approach toward building institutional capability with regard to resilience. The council aims to 'enhance the connectivity of lifeline utility organizations across agency and sector boundaries in order to improve infrastructure resilience'. The council is a community of critical infrastructure providers that share interdependencies, including telecommunications, electricity and gas, water and road providers, and government agencies.

The council undertakes several functions, including:

- Advising on best practices for resilience across a range of activities
- Providing a link between resilience work across government agencies
- Promoting and promulgating resilience-related research
- Organizing an annual National Lifelines Forum.

Source: (1) Innovation, Science and Economic Development Canada (ISED) (2) New Zealand Individual Economy Report.

Fiscal and financial resiliency

Financial resiliency of governments and entities exposed to infrastructure risks is important to ensuring the system can recover from damage. Governments can make reforms to fiscal and accounting policy to provide greater financial resiliency. The World Bank Group and the OECD developed a working paper titled 'Managing disaster risk related contingent liabilities in public finance frameworks' that discusses policies governments can adopt to manage fiscal risks and especially disaster-related contingent liabilities.[101] Key policies identified are:

- Clearly establishing institutional arrangements and responsibilities for disaster-related fiscal risk management, whether through a centralized model where the treasury has responsibility, or a decentralized model as in Australia where agencies produce their own annual reports, contributing to a fiscal risk statement published in the budget.
- Effective identification, quantifying and disclosure of contingent liabilities. For example:
  - The Philippines explicitly calculated a debt sustainability analysis under natural disasters in their 2013 Fiscal Risk Statement.[102]
  - In Australia, the annual Statement of Risks publication within the budget contains a specific category for 'significant but remote' contingent liabilities;[103] and New Zealand follows a similar approach with a chapter in its budget on specific fiscal risks.[104]
  - For Chile, the Fiscal Responsibility Law mandates that the government provide information on contingent liabilities (Box 2.20).
- Effective disaster risk management. For example:
  - Japan has the Disaster Relief Act (1947), which establishes central government support for disaster relief and welfare support, including the repair of private housing and cash transfers. The Disaster Countermeasures Act (1961) allocates the central and local governments' responsibilities for disaster risk management, and defines fiscal mechanisms for disaster response, including subsidies, taxes and debt measures. The Natural Disaster Victims Relief Law (1998) extended the scope of the government's financial responsibility and established the central government's responsibility for disaster relief at 80 per cent.
  - A series of laws in Japan also provide government support for insurance (earthquake, agricultural, fisheries, fishing boat and forest) and establish a contingent liability for the central government with respect to a portion of the payouts. For example, the Japanese government is responsible for a specific share of the losses covered by Japan Earthquake Reinsurance, which increases with the amount of overall losses and is revisited on a periodic basis based on the capacity of the insurance sector to

[101] Catherine Gamper, Benedikt Signer, Luis Alton and Murray Petrie, "Managing Disaster-related Contingent Liabilities in Public Finance Frameworks" (OECD Working Papers on Public Governance, no. 27, Paris: OECD Publishing, 2017), http://dx.doi.org/10.1787/a6e0265a-en.

[102] Bureau of the Treasury, Philippines, *Fiscal Risks Report 2013* (2013), http://www.treasury.gov.ph/wp-content/uploads/2018/01/FRS-2013.pdf. The statement is updated annually, with the series available at http://www.treasury.gov.ph/?page_id=7376.

[103] Department of Treasury, Australia, "Australia Budget 2018 –Statement 9: Statement of Risks" (2017), https://www.budget.gov.au/2017-18/content/bp1/download/bp1_bs9.pdf.

[104] New Zealand Treasury, "Budget Economic and Fiscal Update 2018", The Treasury, 17 May 2018, https://treasury.govt.nz/publications/efu/budget-economic-and-fiscal-update-2018-html#section-7.

cover earthquake losses. This provides financial resilience in an economy with concentrated seismic risk.

– Management of fiscal risks with *ex-ante* mitigation tools such as dedicated reserve funds, reinsurance, contingent credit facilities and catastrophe bonds. For example, in New Zealand, the Earthquake Commission covers a fixed amount of losses for dwellings and property contents in the event of a natural disaster. Losses beyond the cap are covered by private insurance. The commission is funded via a levy which is applied to private insurance premiums and accumulates in a fund that is used to pay claims.

Box 2.20: Measuring and valuing contingent liabilities in Chile

The Fiscal Responsibility Law mandates that the Chilean government provide information on contingent liabilities. The Budget Directorate in the Ministry of Finance must reveal the total amount and characteristics of government guarantees on an annual basis. These contingent liabilities, given the size, are taken into account when calculating the structural balance target.

Since 2007, the Budget Directorate has published a report on contingent liabilities yearly. This report presents sensitivity analysis on the minimum income guarantee for concessions; government guarantees on debts of government-owned enterprises; guarantees for higher education loans; government deposit guarantees; the Chilean Economic Development Agency's hedge fund risk and small business guarantee fund; and guarantees for the pension system.

In the particular case of PPPs, it should be noted that Chile started estimating the fiscal effect of revenue guarantees and revenue sharing for PPP in the late 1990s. This work led to the development of a spreadsheet model that could estimate the expected cost of revenue and exchange rate guarantees (and the expected revenue from revenue- and gain-sharing arrangements) for each year of each concession. The model also generated an estimate of the probability distribution of future spending and revenue each year, which allowed estimates of cash flow at risk and similar measures. The Ministry of Finance took over the model and developed it further, extending its scope to include airports as well as roads. The ministry now uses the model to estimate the cost of possible guarantees, to set guarantee fees and to report information on the costs and risks of guarantees.

Sources:

- Camila Vammalle and Ana Maria Ruiz Rivadeneira, "Budgeting in Chile", *OECD Journal on Budgeting* 16, no. 3 (2017), https://doi.org/10.1787/budget-16-5jfw22b3c0r3.
- Timothy Irwin and Tanya Mokdad, "Managing Contingent Liabilities in Public–Private Partnerships: Practice in Australia, Chile, and South Africa" (Washington, DC: World Bank, 2010), http://documents.worldbank.org/curated/en/998191467987871769/pdf/101491-WP-PUBLIC-Box394815B-WB-ManagingContingentLiabilitiesAustraliaChileSoAfrica.pdf.
- Compiled by the OECD.

2.5 POLICY CONCLUSIONS AND WAY FORWARD

Over the coming decades, demand for infrastructure in the APEC region will increase with its growing populations and rising incomes. As such, there is an urgent need to develop efficient long-term infrastructure planning processes. If such processes are not developed, economies risk stifling economic development, lowering competitiveness and worsening living standards for their people.

However, developing quality infrastructure that supports inclusive and sustainable growth requires a mix of structural policies and an integrated approach across many policy areas. Infrastructure not only needs to be productive and financially attractive (where private funds are sought), governments should also have regard for social development goals, sustainability, environmental impacts and the desired level of resiliency and the need to adapt to climate change.

Further, it is imperative that structural policies and reform be done in sync with the development priorities of individual economies. Economies are at different stages of development with different social challenges and will therefore prioritize structural reform differently. Well-crafted and forward-looking policies focusing on the needs of the member economy can ensure that the interventions have the most beneficial outcomes for that economy and utilize resources most efficiently.

Examples of reforms in APEC as well as best practices from existing literature highlighted in this report point to the following menu of structural policies that are important to achieving the nine outcomes set out at the start of Part 2, and thereby supporting quality infrastructure:

1. **Developing a credible pipeline of bankable projects will support prioritization of public expenditure and attract private investment**. A pipeline must have broad political backing to provide longer-term certainty to external investors and stakeholders. More specifically, to improve prioritization, APEC economies could consider:

    - Establishing/developing formal processes that ensure investment and risk assessments of infrastructure projects take place on a systematic basis. These processes should evaluate project costs and benefits through analytical methods such as cost–benefit analysis and further develop institutional structures to formalize this process. One example is the Chilean National Public Investment System.
    - Establishing processes to ensure that the assessments of infrastructure investment are unbiased and consistent – including through requiring that a different organization to the agency implementing a project conduct or review the evaluation (as in the case of Infrastructure Australia); and conducting investment assessments separately to determining the mode of procurement, such as with the budget rule of the New South Wales state government.
    - Seeking coordination and alignment of priorities across the different levels of governments to establish rigorous project prioritization. An example can be found in New Zealand where the Auckland Transport Alignment Project coordinates across both central and local governments.

2. **Creating long-term plans will ensure current investment decisions are consistent with longer-term drivers of infrastructure needs and fiscal constraints.** Long-term drivers of needs and objectives across sectors and a shared strategy to achieve the

objectives should be established. Future spending should be considered through sound fiscal planning and clear funding arrangements developed for the private sector to catalyze private infrastructure investments. This may need the development of accounting standards that require regular reporting on the state of public assets to ensure that the long-term condition of assets is considered in the planning process. One example is the 'Investing in Canada' plan which forecasts future infrastructure spending for the next 12 years and anticipates investing CAD 180 billion to modernize infrastructure in Canada.

3. **Standardization in infrastructure procurement and management approaches can improve the quality of infrastructure by enhancing capability and reducing opportunities for corruption and can lower the costs of infrastructure provision**. For example, the creation of transactional and contractual frameworks, templates for information, and finance structures can facilitate investment and can lower costs through improved transparency, security, administration and due diligence. Standardized approaches to project-level financial data can also assist in attracting private finance by providing confidence in the information provided. The OECD public procurement standards, the G20 principles for promoting integrity in public procurement and the WTO Agreement on Government Procurement are examples of procurement standards while ISO 55000 is an example of a management standard.

4. **Promoting private sector involvement in the provision of infrastructure, or the services from infrastructure, can improve efficiency, innovation and affordability.** Structural policies that support competition and the ease of entry into markets for the provision of infrastructure include:

    - Considering the ideas discussed at the APEC Conferences on Good Regulatory Practice, such as single online locations for regulatory information.
    - Reducing barriers to international entry for the provision or construction of infrastructure assets. An example can be seen in Viet Nam, where in 2001, the government opened the ISP business to the private sector; and its WTO accession led to it making commitments to offer market access to WTO members.
    - Reducing the complexity of establishing a business and ensuring regulations do not favor incumbent firms.
    - Allowing open tenders for projects and operating with transparency in procurement through stated, robust processes. For example, Korea has adopted an e-procurement system, KONEPS.
    - Increasing competition through unbundling the competitive parts of infrastructure services; and implementing policies that support competition in these markets such as facilitating consumers to switch between providers. Vertical unbundling may be necessary to ensure potential competitors have fair access to the specific links in infrastructure provision with natural monopoly characteristics. An example of such reforms is those carried out within Mexico's electricity market to unbundle the operation of electricity services.

5. **Modifying institutional arrangements to support private sector financing of infrastructure will help meet future infrastructure needs and lower fiscal burdens**. Infrastructure financing needs exceed the ability of governments to provide funding and hence private sector financing is critical to improving living standards through sound infrastructure investment. Governments must fulfil certain core functions to prepare

and develop infrastructure projects attractive to the private sector and must undertake certain *ex-post* monitoring roles. These include:

- Adequate project preparation to ensure technical, legal, economic, financial, social and environmental viability
- Independent project evaluation, which should include value for money assessments
- Provision of fiscal support (if necessary) for projects of high net social benefit but that may not be financially viable
- Ongoing monitoring and evaluation after the procurement process is finalized
- Oversight and management to ensure value for money is delivered
- Management of fiscal commitments to ensure fiscal sustainability
- Managing the risk–return characteristics of a project through the use of legislation and best practice procurement guidelines.

Additionally, deepening or broadening capital markets, reducing barriers to foreign investment, creating a stable policy environment and enabling a diversity of financing sources can also support private sector investment.

6. **Ensuring regulatory systems are adaptive and incentivize technology uptake and innovation.** Governments should regularly review, and consider the adaptability of, regulatory systems and legislation to accommodate new infrastructure technology and to adapt to the impacts of new technologies on market dynamics. Where there are positive net benefits (that exceed financial benefits), government investment in new technology may support economic growth and wellbeing. An example of such investment is New Zealand's Ultra-Fast Broadband program which subsidized the rollout of the fiber-to-the-home network.
7. **Aligning investment decisions with development strategies will help to ensure that infrastructure investment decisions also assist in meeting social objectives**. Quality infrastructure will ensure job creation, capacity building and the transfer of expertise and know-how to local communities. The location of infrastructure has implications for the distribution of returns from the infrastructure. Where there is a tension between commercial and social objectives, governments can consider the following structural policies to assist in meeting distribution or social objectives:
    - **Community service obligations:** These require business enterprises to achieve identified social purposes that they would not have chosen to provide on a commercial basis, or that they would only provide commercially at higher prices.
    - **Government financial support to private providers:** This may be justified where the social benefits of a project are greater than the financial benefits.
    - **Government subsidies to those on low incomes:** Subsidies to users make it possible to increase access to essential infrastructure.
8. **Social and environmental impacts must be taken into account through structural policy for infrastructure aimed at mitigating effects.** Infrastructure has impacts on the environment and can also negatively affect certain communities, including in remote areas. Implementation of responsible business conduct standards can help ensure that consideration of social and environmental impacts is well integrated across all stages of the infrastructure life-cycle processes. Additionally, these impacts can be mitigated by: (1) establishing environmental, safety, habitat protection and other relevant standards or safeguards; (2) mandating stakeholder engagement with

communities throughout the entire project life-cycle; (3) supporting compensation arrangements to guarantee that affected communities are at least as well off as they were prior to the project commencing; and (4) promoting the use of digital technologies to assist in the development of smart cities.

9. **Ensuring sufficient resiliency of infrastructure, fiscal balances and entities to potential disruptive events can minimize costs and disruption over time.** Structural policies that ensure increased resilience include:
    - Ensuring business cases consider the costs and benefits of enhanced resilience
    - Ensuring critical infrastructure is identified and can operate if there is a disaster
    - Ensuring infrastructure meets adequate robustness standards
    - Ensuring the financial resiliency of entities, and fiscal resiliency of governments, that are exposed to the costs that arise from disasters and other events. This includes building adequate fiscal buffers at the government level (including considering building reserves, reinsurance and catastrophe bonds) and ensuring the adequacy of accounting policy (e.g., the recognition of disaster-related contingent liabilities). For instance, Japan has implemented such policies through the Disaster Relief Act (1947) and Disaster Countermeasures Act (1961); the Philippines implemented them through debt sustainability analysis; and Chile has laws that mandate disclosure of contingent liabilities. Reforms to fiscal and accounting policy to provide greater financial resiliency can also be helpful.

10. **Adequate digital infrastructure is important for participation in the digital economy.** The ABAC report highlights the need for economies to have adequate fixed line broadband infrastructure and recommends that APEC economies that lack good broadband infrastructure should assign a high priority to fixed line broadband.

2.5.1 Moving forward

While APEC has undertaken several initiatives to advance the infrastructure development capacity of economies, there is still much room for improvement. Some areas that could further strengthen its capabilities are highlighted below.

Expansion or deepening of APEC's role

APEC economies in their IER submissions highlighted that APEC should deepen its role as a platform to share knowledge and best practices, accommodate the interests of the private sector and promote homogenization of standards. In general, APEC economies have identified that there are efficiencies to be gained through better coordination and collaboration.

ABAC is of the view that APEC has an opportunity to add its voice to encouraging its members to develop green digital economies, probably the most important challenge for the planet.

Strengthening capacity-building initiatives

There is a need for greater capacity-building initiatives to strengthen institutional capacity in the region, particularly in areas such as PPP process, project cycle, PPP modalities, and financial contract structuring and project funding strategies. The development of capacity-building initiatives will enhance the ability of member economies to identify and prepare good infrastructure projects that are attractive and bankable.

APEC may expand its support to individual economies, focusing on the least developed and developing member economies. One area for possible APEC assistance would be the development of a compendium of structural reforms in infrastructure among the economies, which could provide a platform for sharing/exchange of views, experiences and knowledge in addressing common infrastructure challenges.

Promoting greater cross-fora and international collaboration

While the different fora within APEC have different objectives and focus areas, there tends be a degree of overlap in some priorities, particularly in infrastructure-related areas. Given this overlap, the different initiatives carried out by individual groups may at times address the same problem, leading to both wastage of resources and reduced efficiencies. For example, the Peer Review and Capacity Building on APEC Infrastructure Development and Investment is an initiative under the Committee on Trade and Investment that is focused on supporting the development of quality infrastructure through facilitating PPPs. At the same time, under the APEC Finance Ministers' Process, a PPP experts advisory panel was established (now disbanded) and there is a pilot PPP center. Also, the Asia-Pacific Infrastructure Partnership was proposed in 2010 by ABAC.

Promoting greater cross-fora collaboration allows resources and expertise to be pooled together and infrastructure priorities to be better met in a collaborative manner. Related fora with similar interests should continue discussions on further advancing the collaboration.

APEC should also continue to expand and deepen collaboration with international organizations. For example, the OECD has a longstanding partnership with APEC on promoting the development and sustainable financing of infrastructure in the Asia-Pacific region, primarily under the 2015 Cebu Action Plan in the APEC Finance Ministers' Process. This includes the OECD's 2018 deliverables to APEC Finance Ministers: a capacity-building package providing illustrative examples of good practices in APEC economies related to effective approaches to financing infrastructure.

APPENDIX TO THE MAIN REPORT

Table 3.1: Relationship between growth and productivity with infrastructure (public capital)

$$\frac{\text{Log of GDP per Capita (2014)}}{\text{Log of GDP per Capita (1970)}} = a_1\text{Log of 1970 real GDP Per capita} + b_1\text{Log of Private Capital} + c_1\text{Log of Human Capital} + d_1\text{Log of Public Capital} + \text{Constant}$$

Dependent variable	
Log of real 1970 GDP	-0.35
	(0.044)
Log of Private Capital	0.26
	(0.1140148)
Output Elasticity	0.15
Log of Human Capital	0.90
	(0.1620557)
Output Elasticity	0.53
Log of Public Capital	0.18
	(0.0896682)
Output Elasticity	0.11
Constant	-1.80
	(0.481248)
Observations	124
Adjusted R-Squared	0.48

GDP = Gross domestic product.
Notes: Robust standard errors in parentheses
Source: Penn World Table 9.0 Data; IMF Investment and Capital Stock Dataset, 1960–2015; APEC Policy Support Unit staff estimates.

Table 3.2: Elasticity of poverty with respect to infrastructure investment

Poverty Headcount or Log of Extreme Poverty Headcount = a_1Log of Real GDP + b_1Log of Real GFCF + c_1Log of Population + d_1Gini Coefficient + Constant

	(1)	(2)
Dependent variable	**Log of poverty headcount**	**Log of extreme poverty headcount**
Log of real GDP	-0.875*	-1.912***
	(0.473)	(0.633)
Log of real GFCF	**-0.448****	**-0.0131**
	(0.207)	**(0.238)**
Log of population	3.186***	4.478***
	(1.069)	(1.395)
Gini index	0.0663***	0.0602**
	(0.0188)	(0.0234)
Constant	-9.568	-14.79
	(21.10)	(24.27)
Observations	702	1,579
R-squared	0.467	0.379
Number of economies	99	124

GDP = gross domestic product; GFCF = gross fixed capital formation; PPP=purchasing power parity; OLS=ordinary least squares

Notes:

- poverty headcount = number of people living on less than USD 2.00 PPP per person per day; extreme poverty headcount = number of people living on less than USD 1.25 PPP per person per day; real data for GDP and GFCF are in constant 2005 USD.
- Regressions used economy fixed effects panel OLS. Year dummy variables are suppressed for brevity. *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses.

Source: World Bank Data; APEC Policy Support Unit staff estimates.

Annex 1:

Case Studies

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AUSTRALIA: HEAVY VEHICLE ROAD REFORM CASE STUDY

Introduction

Australia's expansive road network is one of its most valuable assets, and a substantial contributor to the economy. At last count, in 2015, the road network was over 870,000km in length,[1] with an estimated value of around AUD 470 billion.[2] Construction continues apace too, with AUD 26.2 billion being spent in 2015–2016 on new roads and maintenance.

The estimated unit costs per lane kilometer of road type are illustrative of some of the costs of road construction in Australia. These costs are averaged but provide an insight into general costs of building new roads: AUD 15,000 for gravel roads to AUD 600,000 for metropolitan paved divided roadways, and from AUD 7 million for metropolitan freeways to AUD 120 million for metropolitan tunnels.[3]

Despite its size, demands on the road network are increasing. This increased demand can be attributed to three main factors:

- Population growth;
- Individuals' preference for private road travel over other options; and
- The preference of industry to transport freight using roads.

This last factor is critical – freight on road is increasing substantially in Australia. In 1994–1995, 101.4 billion ton kilometers (BTK) of freight was transported over Australian roads, while in 2015–2016, the figure was 212 BTK.

Under the Australian Constitution, the federal government has no responsibility for road construction or maintenance. Rather, ownership and control of the road network in Australia lies with state, territory (i.e., provincial governments) and local governments. States and territories tend to own and manage main highways and arterial roads, with local governments owning and managing smaller, local roads. A small proportion of the road network is privately held by toll road operators. Importantly, road expenditure in Australia is financed by federal, as well as state, territory, and local governments. The majority of road related revenue is collected by the federal government (through fuel excise) and distributed to states and territories through annual budget processes.

Governments in Australia – at all levels – are under significant pressure to deliver an appropriate level of service to road users and industries that are dependent on roads. To meet demand, total government road expenditure has been increasing at an average annual growth

[1] Bureau of Infrastructure, Transport and Regional Economics (BITRE), *Yearbook 2017: Australian Infrastructure Statistics* (2017), https://bitre.gov.au/publications/2017/yearbook_2017.aspx
[2] In 2015 dollars; S. Alchin, *Establishing a regulated asset base and applying a corporatised delivery model to the Australian road network – opportunities and challenges*, ITF Discussion Paper, 2018
[3] Ibid.

rate of 6 per cent per year, and expenditure requirements are expected to increase further given the forecast growth in population, freight movement and vehicle use.[4]

At the same time that road use and spending on roads is increasing, the revenue base for funding roads is being eroded. Across all vehicles (heavies and lights), fuel excise receipts decreased from AUD 13.67 billion in 1999–2000 to AUD 11.03 billion in 2014–2015 in real terms. Revenue from vehicle registration has only increased incrementally over this same period.

If revenue continues to decline, as expected, governments will struggle to fund new roads and maintain existing ones. This will put a significant brake on productivity and growth.

Pre-reform situation

Heavy vehicle operators currently pay charges (fuel excise and registration fees) designed to recover the cost of their road use. Known as "pay as you go" (PAYGO), this basic system has been in place since 1992. But flaws with this system are becoming apparent.

For heavy vehicles, the National Transport Commission (NTC) estimates average road user charges that aim to recover past road expenditure that is attributable to heavy vehicle use. Basing future charges on past expenditure does not guarantee that future costs, including maintenance, are fully funded. Further, the NTC only has the power to recommend a price. Recently governments have decided not to adopt the NTC's recommendations.

Additionally, under PAYGO there is no real way to link the service road users might want (e.g., a bridge strong enough to carry high productivity vehicles) with the road charges paid. In a broader sense, funding arrangements give road managers little long-term revenue certainty to plan for efficient investment in infrastructure. Instead, the current funding system tends to favor short-term thinking (e.g., potentially spending available funds on quick fixes rather than a rigorous schedule of maintenance that might optimize asset value).

Fuel use and annual registration charges are poor proxies for actual road use. The amount users pay for fuel and registration do not directly reflect the actual use of specific roads and the damage caused by heavy vehicles. Moving to a charging system where users pay more directly and fairly for their consumption of road services is an opportunity to move to a more sustainable basis for funding road infrastructure. This would better match how charges are applied in other infrastructure sectors. It would also allow road managers to better manage demand for roads and thereby deliver more sustainable transport outcomes.

Policy response

Heavy vehicle road reform (HVRR) is a long-term microeconomic reform that aims to improve the efficiency and sustainability of funding arrangements for road infrastructure. The reform aims to achieve this by better linking heavy vehicle road use with the charges paid by heavy vehicle operators, aligning charges with investment in the road network to support heavy

[4] Total government road related expenditure increased from AUD 15.2 billion in 2005–2006 to AUD 24.8 billion in 2013-2014 (adjusted CPI, constant 2013-14 prices). This represents an average annual growth rate of 6.4 per cent per year. Source: BITRE; NTC.

vehicle services. The principles underpinning HVRR have worked in similar infrastructure sectors such as telecommunications, water and energy.

HVRR has been underway since late 2015. There are four phases to the reform which allows governments to take a deliberative, incremental approach. HVRR is following a reform road map which has been agreed upon by federal, state and territory governments through the Transport and Infrastructure Council (a council made up of transport and infrastructure ministers at the federal, state and territory level). It provides a flexible, pragmatic, phased approach to longer-term reform, drawing on past experiences and challenges faced (see Figure 1, below).

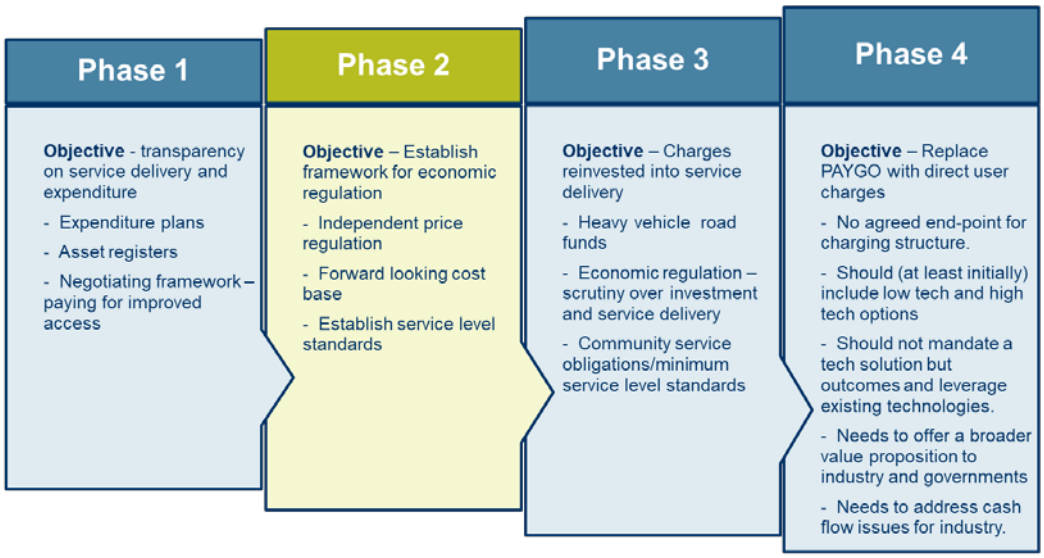


Figure 1: HVRR 4 Phases Roadmap: This is a summary of the HVRR roadmap endorsed by the Transport and Infrastructure Council in May 2015, noting that it contains a number of policy decisions that remain subject to the agreement of federal and provincial governments.

Phase 1 of HVRR is largely complete, but subject to ongoing improvement and refinement. The TIC website now includes detailed asset registers (showing heavy vehicle ratings for all key freight routes in Australia) and expenditure plans (showing state and territory planned investment on those same routes).[5]

In 2018–2019, governments are working toward the introduction of two Phase 2 governance measures – independent price regulation of heavy vehicle charges, and a forward-looking cost base. These two measures will provide the basis for a charging system which is more efficient, financially sustainable and fair. Independent price regulation of heavy vehicle charges will enable a regulator to determine charges at arm's length from governments. A forward-looking cost base would enable governments to charge heavy vehicle road users on the basis of a fair return on an expenditure base that includes the forecast cost of building, maintaining and upgrading road infrastructure to at least a minimum standard.

[5] Transport and Infrastructure Council, Australia. (2017). Heavy Vehicle Road Reform. Retrieved from http://transportinfrastructurecouncil.gov.au/publications/heavy_vehicle_road_reform.aspx

Consideration of other issues is beginning to take place – such as around community service obligations (CSOs) and how funding might be returned to road managers at the state and local levels. An early analysis of CSOs has commenced across government through work such as the recent Austroads report, 'Community Service Obligations Framework for the Roads Sector'.[6] Consideration is also being given to heavy vehicle road funds, as a mechanism to better link heavy vehicle charges to investments in heavy vehicle infrastructure.

Impact

The ultimate goal of HVRR is being guided by a number of principles:

- Accountability – Funding and investment decisions should be accountable to road users and end-users
- Transparency – Road users should be able to see how their charges are set and spent
- Fairness – Road users should pay in proportion to their use of road assets
- Efficiency – Funding should be directed to investments that deliver the greatest benefit in the most efficient way

These objectives, together, aim to develop a system which results in improved freight productivity outcomes for heavy vehicle operators. More cost-reflective charging will enable governments to improve access for high productivity vehicles and oversize loads across the road network by more directly linking heavy vehicle charges to the impact those vehicles have on the roads – and the funding to manage those roads. Getting goods more efficiently into and out of freight hubs, for example, will improve the profitability of the industries reliant on them and the economic welfare of surrounding areas.

Productivity benefits accrue through improved access because it can reduce decoupling and unloading by allowing the use of higher productivity vehicles across a wider range of roads, resulting in a more efficient mix of heavy vehicles being used. Currently, if road providers (particularly local governments) provide access to larger heavy vehicles, it is unlikely they will receive the funding flows or economic benefits to support this access.

Funding certainty and a forward-looking approach to asset and cost management would encourage road managers to prioritize optimized road maintenance. For road users, this would mean better quality roads on average over longer periods.

These productivity improvements should ultimately result in reduced costs for consumers as heavy vehicle operators will be able to take advantage of economies of scale through transporting larger loads, improvements to access, and reduced vehicle operating costs.

Challenges and lessons

HVRR is economy-wide reform being worked on together by the federal government and by states and territories. The federal government does not own or manage any of the road network and has limited powers over state and territory, and local government road management. This means that the reform process needs to be coordinated across a large number of government stakeholders, many with competing views and interests. Additionally, some of the reforms

[6] Available at: https://www.onlinepublications.austroads.com.au/items/AP-R545-17

being proposed, such as independent price regulation and a forward-looking cost base, involve significant complexity.

Designing a new system, which is predicated on support from a broad stakeholder group – including different industries and advocacy bodies – has involved being highly consultative and clear in approach. While industry is broadly supportive of the reforms, governments have had to manage industry expectations as to the pace at which reform can take place.

CANADA: ACCESS TO DIGITAL INFRASTRUCTURE IN CANADA

Introduction

Inclusive prosperity in the modern economy rests on the ability of every citizen to meaningfully participate. Canada is one of the largest economies in the world in terms of area at nearly 9 million square kilometers and has a population of approximately 35 million.

The government of Canada's overall telecommunications policy approach has been to establish marketplace frameworks to foster competition and investment, effectively manage the spectrum to encourage the availability of wireless services, and establish targeted funding programs for rural broadband expansion for areas that lack a private sector business case.

The private sector has long been the primary source of telecommunications investment in Canada. On average, the private sector invests in the order of CAD 10 billion per year. The majority of the population has access to competing fixed line broadband infrastructures based on regional telephone and cable companies that have upgraded their networks to provide broadband services. In rural and remote areas, a wireline broadband option can be much more challenging economically to build and maintain. Terrestrial wireless infrastructures are more common along with satellite-based broadband services.

In terms of market structure, regional cable carriers collectively have 49 per cent of the residential Internet access market and incumbent telephone carriers have 39 per cent of the market in total. The remaining 12 per cent is composed of a large number of other carriers. They include wholesale-based providers that largely operate in urban areas using wholesale access to incumbent infrastructures to provide their own retail services. They also include a range of rural-oriented providers that focus on providing service in rural areas and/or to specific local communities. They are more likely to include wireless technologies.

Pre-reform situation

Canada's rural and remote regions face particular challenges in accessing broadband networks. Low population density and challenging terrain mean that it can be difficult for the private sector to generate adequate returns and invest in new or upgraded broadband networks. Rural and remote areas lag behind urban areas in terms of broadband coverage, with the gap widening at faster speeds. In addition, certain northern remote communities are satellite dependent, and have the greatest needs. As such, successive Canadian governments have established targeted programming to ensure inclusive access.

Policy response

Early programs focused on ensuring a basic level of service in the order of 1.5 megabits per second (Mbps) to all Canadians. One of the first significant broadband programs was launched by the Government of Canada in 2002. The three year, CAD 105 million, Broadband for Rural and Northern Development Pilot Program (BRAND) provided funding for high-speed internet services in communities that would not otherwise have been connected by market forces alone. The two pillars of the BRAND program: providing financial support to develop sustainable

business plans; and capital funding to implement those plans, would serve as the model for future support programs aimed at providing internet access to communities that struggle to independently attract private investment. This ground-based infrastructure program was complemented by a National Satellite Initiative (NSI) to establish broadband capacity in high-cost remote and First Nations communities in the mid-to-far North. This initiative was executed collaboratively between three key government sponsors: Infrastructure Canada, Industry Canada (now Innovation, Science and Economic Development Canada), and the Canadian Space Agency.

Building on the success of BRAND and NSI, the Government of Canada launched the Broadband Canada Program (BCP) in July 2009 to further reduce the number of rural and northern communities that lacked high-speed broadband. The CAD 225 million BCP was mandated to finance projects that extended broadband coverage to unserved and underserved households. The program would achieve this objective by providing up to 50 per cent of project costs (up to 100 per cent for indigenous communities when combined with other federal support programs) while aiming to leverage funding from the private sector and other levels of government.

These programs complemented existing private sector investments and programs by provincial and territorial governments.

More recently, the focus has been on providing access to faster speeds in light of technological change and demand growth. Connecting Canadians, a CAD 305 million program launched in 2014, was aimed at extending and enhancing broadband networks at a target speed of at least 5 Mbps. The program included assessment criteria that considered scalability among other criteria and funded projects at faster speeds (e.g., 25 Mbps). In recognition of the unique geographic circumstances of far northern communities, it included a dedicated northern component to extend and augment capacity in northern communities in Nunavut and the Nunavik region of Quebec.

In December 2016, the Government of Canada launched the CAD 500 million Connect to Innovate program. Connect to Innovate is focused on expanding high-capacity backhaul to underserved rural and remote communities and also connecting anchor institutions such as schools, hospitals, and indigenous government buildings. More broadly, access to community backhaul will support fixed and mobile services to local homes and businesses at faster speeds. The goal is to provide a transformative level of service to rural and remote communities that can both support current needs and scale for long-term growth.

The Connect to Innovate program has been highly successful. The program received close to 900 applications, requesting over CAD 4.4 billion in funding. To date, the government of Canada has announced funding for 139 projects in seven provinces and territories across the economy. These projects will improve connectivity in 740 rural and remote communities – more than double the 300 initially targeted. The government of Canada expects to make additional funding announcement with project partners over the coming months.

In December 2016, the Canadian Radio-television and Telecommunications Commission (CRTC) completed a comprehensive review of its basic telecommunications framework (referred to as universal service frameworks in some economies), which stipulates which

telecommunications services Canadians should have access to in order to participate meaningfully in the digital economy, and the commission's role in ensuring access to them.

In this decision, the commission established broadband as a basic service, noting that broadband access had increased in importance to Canadians. The CRTC also set a speed target of 50 Mbps download and 10 Mbps upload across the economy, and access to the latest mobile wireless technologies where Canadians live and along major roads. In order to help meet these objectives, the CRTC created a new fund with up to CAD 750 million to invest over five years. The CRTC has been consulting on the implementation criteria with a decision expected in 2018.

Impact

Essentially universal coverage of at least low speeds was reached by 2012. The next highest tier of 5 Mbps is also reaching essentially universal access. Access to 25 Mbps reached 91 per cent of the population in 2016 using a mix of wired and wireless technologies. The 50 Mbps standard is expected to reach 90 per cent of the population by 2020 up from 84 per cent as of 2016.

There has been strong growth in faster speeds as well, with 100 Mbps available to 83 per cent of households in 2016, up from 35 per cent in 2012. Growth of speeds at 1 gigabit per second (Gbps) is following the same trajectory and is expected to reach 80 per cent of the population by 2020.

Lessons learned

In designing its rural broadband funding initiatives, the government of Canada has been guided by certain policy principles to help maximize the impact on Canadians and ensure that projects are focused on areas that would not otherwise be served by market forces due to lack of a business case. These principles include:

- Undertaking robust and extensive broadband data collection and mapping activities to inform policy and program development, and to help identify underserved areas, so that funding is focused on areas that lack access and that are of greatest need.
- Using open competitive application processes to maximize value for money and promote sound and competitive projects.
- Coordinating and collaborating with key stakeholders and project partners, including the private sector, provinces and territories, not-for-profit organizations, and indigenous communities, to share broadband coverage information, leverage local expertise, align objectives, and maximize leveraging opportunities. In recognition of the complexity of executing these projects, more time has been allocated upfront for consultation and planning.
- Promoting technological neutrality by ensuring that programs allow for a variety of potential technologies to be used (e.g., wireline, wireless and satellite), provided that they meet the established program criteria (e.g., speeds, quality of service, scalability, etc.)
- Covering only the uneconomic portion of infrastructure costs and establishing program contribution limits that encourage build-out in challenging areas, while

balancing interest in having applicants invest their own funds. In particular, past programs have recognized the unique circumstances of very remote, satellite-dependent, and indigenous communities and have had higher contribution limits in these areas. Contribution limits have evolved over time to better account for particular needs and local circumstances.

CANADA: INVESTING IN SOCIAL INFRASTRUCTURE

Introduction

In Canada, infrastructure is largely developed, owned and managed by provincial, territorial and municipal governments. This includes highways, roads, bridges and other transportation infrastructure; water and waste-water facilities; education and health infrastructure; and social infrastructure, including housing, early learning and child care, and community centers. A number of other active players contribute to infrastructure investment, operations and regulations in Canada, including the private sector, semi-private entities like Crown corporations as well as non-profit associations.

In recent years, all orders of government in Canada have increased their investments in infrastructure. Provinces, territories and municipalities, which own the vast majority of core public infrastructure, collectively doubled their investments between 2003 and 2013, from CAD 14.5 billion to CAD 29.5 billion. The federal government also increased its spending on core public infrastructure, from CAD 600 million annually in 2003–2004 to CAD 5.5 billion annually by 2014–2015.

Despite increased investments, infrastructure demand has outpaced investments for several decades. Examples of the gap include congestion in urban centers, too many Canadians struggling to meet their housing needs, insufficient and aging water and wastewater systems, lack of broadband Internet connectivity in many rural and remote areas, and a lack of basic infrastructure in many indigenous communities. While the size of Canada's infrastructure gap is a matter for debate, there is consensus that significant investments are needed to address it. The additional CAD 95 billion in federal support announced in Budgets 2016 and 2017, including more than CAD 8.6 billion for indigenous communities, along with significant investments in infrastructure by other orders of government, will help to close the gap while also supporting longer-term investments to address emerging challenges and opportunities.

Pre-reform situation

The government of Canada recognizes that infrastructure is essential to the delivery of the services required to build inclusive communities where all people can participate and contribute to society. The Minister of Infrastructure and Communities' 2015 mandate letter reflects the need to address Canada's broad-based infrastructure gap. Extensive research, public engagement and the advice of the Advisory Council on Economic Growth make it clear that Canada needs a long-term approach to investing in infrastructure to improve the quality, accessibility and sustainability of services that Canadians use every day.

The Investing in Canada Plan is built upon extensive research and public engagement that made it clear Canada faces a broad-based infrastructure gap which is limiting Canada's economic growth and Canadians' quality of life. With historic investments in social infrastructure, public transit, green infrastructure, trade and transportation infrastructure, and rural and northern communities (see Annex A), new federal investments will take advantage of historically low interest rates to renew Canada's infrastructure and improve the quality of life for all Canadians.

Understanding the Social Infrastructure Gap

Early Learning and Child Care

Over the last three decades, the need for child care has grown steadily, with the rise in employment rates among women and the corresponding increase in dual-income earner families. Beyond need, the demand for quality child care has also increased, due to the potential benefits on peer socialization, school readiness, and numeracy and language skills. Only one in four children in Canada have access to regulated early learning and child care. Affordability also remains a concern for many families. The lack of affordable, quality child care can limit the ability of parents to participate in the labor market.

The government of Canada supports child care through direct support and tax measures for families and through a notional allocation of the Canada Social Transfer (CST) to provinces and territories. These funds are transferred on an equal per capita basis. Provincial and territorial governments have the responsibility to design and deliver programs and are accountable to their citizens and legislatures for outcomes achieved and dollars spent.

Housing and homelessness

Across Canada, homelessness affects a diverse cross-section of the population and the communities in which they reside. In 2014, an average of 13,857 Canadians slept in an emergency shelter on any given night, accounting for over 90 per cent of Canada's 15,000 shelter beds. Indigenous peoples are particularly overrepresented in emergency shelters, representing approximately 30 per cent of all shelter use in 2014. Additionally, in 2016 over 1.7 million Canadian households (12.7 per cent) were in core housing need, meaning that their housing was either in poor condition, crowded or unaffordable, and the family was unable to access acceptable alternative housing in their community. Indigenous people are disproportionately affected by poor housing.

The government of Canada, through the Canada Mortgage and Housing Corporation, works with its provincial and territorial partners to reduce the number of Canadians in need by improving access to affordable housing. Since 2011, new federal funding for affordable housing has been provided through the Investment in Affordable Housing initiative, which is cost matched by provinces and territories.

Community, Culture and Recreational Infrastructure

Canada's culture and recreational infrastructure is in critical need of repair and refurbishment. The Canada Infrastructure Report Card determined that sport and recreation facilities in the public realm are in the poorest condition of all asset categories surveyed, with 19 per cent of sport and recreation infrastructure rated in poor or very poor condition, which negatively impacts the functioning of the facilities. The estimated replacement cost of facilities in poor and very poor condition is CAD 9 billion.

Policy Response

The Investing in Canada plan is the Government of Canada's comprehensive, long-term plan for building a prosperous and inclusive economy through historic infrastructure investments.

The plan will contribute to building communities where all Canadians have the opportunity to succeed in the economy and society. The plan is built upon extensive research and public engagement that made it clear Canada faces a broad-based infrastructure gap which is limiting economic growth and Canadians' quality of life. The Investing in Canada plan differs from previous infrastructure plans—it is longer term and guided by clear priorities, concrete objectives and, instead of outputs, by measurable outcomes. It offers long-term, sustained funding to enable planning and prioritization by all orders of government.

Over the 12 years of the plan, starting in 2016, the government will invest over CAD 180 billion in infrastructure—more than doubling existing federal funding—to achieve three objectives:

- Generate long-term economic growth
- Improve the resilience of communities and transition to a clean growth economy
- Improve social inclusion and socioeconomic outcomes for all Canadians

Provinces, territories, municipalities and indigenous communities are key partners in developing and implementing the plan. Through the plan, the federal government's increased investment in infrastructure will be further leveraged by all orders of government to more than double the reach of the plan's funding.

A two-phased approach

Through extensive consultations with provincial, territorial, municipal and indigenous partners, as well as various domestic and regional stakeholders, it was clear that some investments had to be made quickly, but that the government also needed to effectively plan for the long term. Before making massive investments in major, transformative projects, the government needed to restore, modernize and adapt Canada's current stock of aging infrastructure. To address both long-term and short-term needs, a two-phased approach was developed.

The first phase of the plan, outlined in Budget 2016, accelerated existing programs and launched short-term programs focused on rehabilitation, repair and modernization. The next phase, outlined in Budget 2017, consists of long-term investments to address broader and more ambitious goals, such as a more inclusive society.

- ***Phase 1***

As part of the government's Phase 1 commitments, Budget 2016 proposed initial social infrastructure investments totaling CAD 3.4 billion over five years. These investments are helping to expand affordable housing (including shelters for victims of violence), support early learning and child care, renew cultural and recreational infrastructure (such as community centers, museums, parks and arenas), and improve community healthcare facilities on reserve. Of this new funding, CAD 1.2 billion is being invested in First Nations, Inuit and northern communities, which is a key pillar of the government's strategy to create growth that benefits everyone.

- ***Phase 2***

The next phase of the plan sees Canada invest in big projects that will help build Canada's economy for the future and help achieve the overall vision the government has for Canadian

communities, including better access to affordable housing and more affordable child care spaces. By investing in the things that help make neighborhoods better places to live the government is building stronger neighborhoods and a better quality of life for the future. Budget 2017 provides new investments of CAD 21.9 billion over 11 years to support social infrastructure in Canadian communities.

Social infrastructure: A CAD 25.3 billion investment

- ***Early Learning and Child Care***

To help Canadian children get the best start in life and to better support families, Budget 2016 and 2017 announced investments totaling CAD 7.5 billion over 11 years, starting in 2017–2018, to support and create more high-quality, affordable child care across the economy, particularly for families more in need, including indigenous families and children living on and off reserve.

On 12 June 2017, the government of Canada announced a historic agreement with provincial and territorial governments on a Multilateral Early Learning and Child Care Framework. The framework will be seeking to increase the quality, accessibility, affordability, flexibility and inclusivity in early learning and child care, in particular for families that need child care the most. To implement the framework, the federal government has been working with each province and territory to enter into initial three-year bilateral agreements. These bilateral agreements, representing a total value of CAD 1.2 billion, are publicly available once concluded and accompanied by an action plan detailing how each province and territory will support and report on the unique early learning and child care needs of their jurisdiction. This investment will increase the number of affordable child care spaces for low- and modest-income families by supporting up to 40,000 new subsidized child care spaces over the first three years of funding. The government is also working in partnership with indigenous peoples to co-develop the Indigenous Early Learning and Child Care Framework to better support the distinct needs of indigenous children and families.

- ***National Housing Strategy***

Through the National Housing Strategy—of which CAD 16.1 billion in direct funding over 11 years is led by the Canada Mortgage and Housing Corporation[7]—the government is reengaging in affordable housing by investing in the growth of livable communities and the resilience of the community housing sector. The strategy was developed in collaboration with the provinces and territories, and in consultation with municipalities, indigenous peoples, industry experts, stakeholders and Canadians living with the challenge of finding adequate and affordable housing.

Key elements of the National Housing Strategy include:

[7] The portion of National Housing Strategy funding allocated under the Investing in Canada plan, total also includes internal funding sources from the Canada Mortgage and Housing Corporation and funding of CAD 2.1 billion for homelessness programming led by Employment and Social Development Canada as per Annex A.

- A renewed partnership between the government and provinces and territories (CAD 7.7 billion) to address distinct housing priorities, including affordability, repair and construction.
- A National Housing Co-Investment Fund (CAD 5.1 billion) to ensure existing rental housing is not lost to disrepair and to develop new, high-performing affordable housing integrated with supports and services.
- An expanded federal homelessness program (CAD 2.1 billion) to reduce homelessness.

- ***Community, culture and recreational infrastructure***

Canada's cultural industries reflect the Canadian experience and showcase Canadians' creativity and diversity. To help promote arts and culture in Canada, Budget 2016 invested CAD 1.9 billion over five years to support key domestic cultural institutions. Investments also supported recreational infrastructure and community accessibility across the economy.

Budget 2017 builds on this commitment, with a further investment of CAD 1.8 billion over 10 years starting in 2018–2019, focused on the following initiatives:

- The Community, Culture and Recreational stream of the Investing in Canada Infrastructure Program (CAD 1.3 billion over 10 years) is to provide funding for the construction, expansion or rehabilitation of new community, culture, sports and recreation facilities.
- The Canada Cultural Spaces Fund (CAD 300 million over 10 years) is to support the improvement of physical conditions for artistic creativity and innovation.

- Community Educational Infrastructure (CAD 80 million over 10 years) is to help build or modernize community educational infrastructure in official-language minority communities.
- The Enabling Accessibility Fund (CAD 77 million over 10 years) is to fund eligible capital projects that increase access for people with disabilities to community spaces and workplaces across Canada.

Delivering the plan

The government of Canada's Investing in Canada plan will be delivered by Infrastructure Canada, along with other federal departments and agencies such as the Canada Mortgage and Housing Corporation and Employment and Social Development Canada. The Minister of Infrastructure and Communities is responsible for coordinating the plan and ensuring that the outcomes of infrastructure investments are reported to Canadians.

Impact

Infrastructure investments are an optimal means for addressing inequalities. The focus on outcomes will be key. To allow Canadians to see exactly the difference infrastructure investments are making in their communities and lives, the Government will track and report regularly on the following outcomes:

1. Rate of economic growth is increased in an inclusive and sustainable way.
2. Environmental quality is improved, GHG emissions are reduced and resilience of communities is increased.
3. Improve urban mobility in Canadian communities.
4. Housing is affordable and in good condition and homelessness is reduced year over year.
5. Early learning and child care are of high quality, affordable, flexible and inclusive.
6. Canadian communities are more inclusive and accessible.
7. Infrastructure is managed in a more sustainable way.

The government measures progress on these indicators against existing data sources where available, and by developing new data sources. Example indicators have been developed for each outcome; these indicators will be refined as enhanced data becomes available. Results will be reported to the public through Canada.ca/results and the website of Infrastructure Canada.

Challenges and lessons

Key challenges of the Investing in Canada plan include the lack of precise data on the state and performance of existing assets, a lack of innovation in infrastructure development, and the need to find new ways to better use public funds and access private capital.

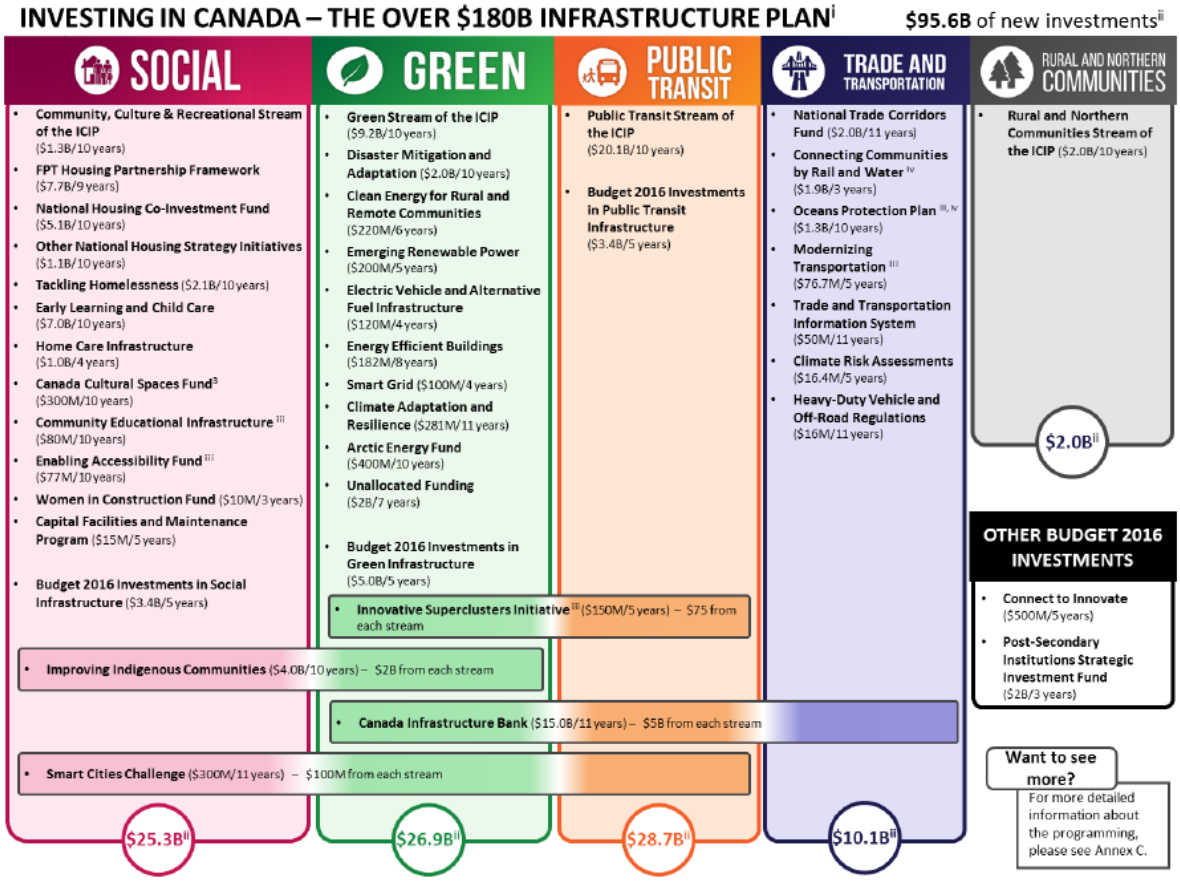
The Investing in Canada plan will introduce new ways to measure the impact of infrastructure investments – a process that begins with improving data collection. For example, the Canada Mortgage and Housing Corporation is improving data on housing through improved data

collection and analytics on housing and household conditions through new economy-wide surveys, leveraging existing surveys, and expanding the collection of program data. Employment and Social Development Canada is improving data, including by leveraging existing administrative data to support early learning child care data collection and analysis and to develop a new methodology to measure shelter use patterns and trends among the homeless population.

The Investing in Canada plan is an ambitious long-term blueprint for investing in and building the infrastructure that Canada needs for today and for generations to come. The plan is focused on addressing infrastructure challenges across Canada and reflects the priorities of Canadians. It is a plan that seeks to benefit all Canadians. As with all long-term plans and major investments, the results will unfold over time. To ensure that the Investing in Canada plan is a success, the government is working closely with other orders of government to deliver on its commitments.

Annex A

Overview of Investing in Canada Plan Commitments



For details on the Investing in Canada table, please refer to page 7 of the Investing in Canada Plan: 2018 Report at the link below.

For more information on the Investing in Canada plan, including the social infrastructure components, please see:

Infrastructure Canada. (2018). Investing in Canada. Retrieved from http://www.infrastructure.gc.ca/site/alt-format/pdf/plan/icp-pic/IC-InvestingInCanadaPlan-ENG.pdf

Employment and Social Development Canada. (2018). Early Learning and Child Care. Retrieved from https://www.canada.ca/en/employment-social-development/programs/early-learning-child-care.html

Place to Call Home. (n.d.). Canada's National Housing Strategy. Retrieved from https://www.placetocallhome.ca/pdfs/Canada-National-Housing-Strategy.pdf.

CHINA: REFORM OF INVESTMENT AND FINANCING SYSTEM FACILITATES TRANSPORT INFRASTRUCTURE CONSTRUCTION

Introduction

In the past five years, China has continued to witness profound changes in its economy and society, and has made positive progress in economy, innovation, poverty alleviation, environmental protection and other fields. On one hand, the economy has maintained a medium and high-speed growth rate, and the growth quality has been significantly improved. GDP has surged from RMB 54 trillion to 83 trillion, ranking second in the world, which has contributed over 30 per cent to global economic growth. The proportion of the service industry in GDP has surpassed 50 per cent for the first time, making it the main driver of economic growth. China has ascended to number two in the world by whole-society R&D investment scale, and has also taken lead in the world in aspects of high-speed rail network, e-commerce, mobile payments, the sharing economy, etc. On the other hand, social development has become more inclusive and sustainable. The annual growth rate of resident income has reached 7.4 per cent, exceeding the economic growth rate, and the world's most populous middle-income group has formed in China. Poverty reduction has made decisive progress, with the number of the poor decreasing by more than 68 million and the incidence of poverty declining from 10.2 per cent to 3.1 per cent. The energy and water consumption per unit of GDP has both dropped by 20 per cent, and the number of days with heavy pollution in key cities has reduced by half. As a whole, China, the world's largest developing economy, is expected to build a moderately prosperous society by 2020.

Infrastructure has played an important role in boosting the economic and social development of China. A study indicates that the contribution rate of transportation to the domestic economy has risen from 3.5 per cent in 2012 to 4.3 per cent in 2016, and transport infrastructure has already become a driver of the economic and social development. By the end of 2017, the total mileage of roads has reached 4.77 million kilometers in China, and the operating mileage of railways has achieved 127,000km. Notably, the mileage of highways has exceeded 130,000 kilometers and that of high-speed rails has surpassed 25,000km, both ranking number one in the world. The number of berths at the 10,000-ton level and above at ports has come to 2,366, while the total mileage of inland waterways has reached 127,000km, including 12,500km for high-grade waterways. The number of certified civil aviation airports has come to 229. The road network, rails, ports and airways have been basically interlinked horizontally and vertically, making China's comprehensive transportation system shift from 'five in the lengthwise and five in the transverse" to "ten in the lengthwise and ten in the transverse'. This advancement has not only allowed people to travel in a more convenient way, but also played a guiding and supporting role in serving the domestic strategy, connecting economic zones, facilitating the development along the routes, and strengthening interconnection and intercommunication.

Pre-reform situation

The investment and financing system is an important systematic factor of transport infrastructure construction and management. Before a new round of reform of the investment and financing system, China has already explored the investment and financing models of transport infrastructure. For instance, to address the fund shortage issue at the early stage of China's reform and opening up, China has expanded the sources of funds for road construction

through various channels, including work relief, raising the road toll standard, imposing surcharges on vehicle purchases, fund-raising or bank loans, developing government loan roads as well as operating toll roads, etc. In the railway construction field, China has gradually adopted the management contract responsibility system and explored a new model of 'ministerial-provincial cooperation' to advance the construction. In terms of ports, China has encouraged owner units to build dedicated wharfs on their own, and continuously stepped up the building of ports through measures such as imposing port construction fees. With regard to airports, China has strengthened the central support, arranged civil aviation development funds and investment within the central budget to accelerate the airport construction. Since 1992, China has viewed transport infrastructure construction as a key priority to facilitate domestic demand. Through preferential systems and policies, China's transport infrastructure construction has been actively invested by the central government, local governments and enterprises, vigorously attracted foreign investment and received support from other funds. From 1992 to 2008, the fixed asset investment in the transport sector has surged nearly 30 times, and a batch of world-class transport infrastructure projects have been successively built, including the Qinghai-Tibet Railway, the Beijing-Tianjin Intercity Railway and the Hangzhou Bay Bridge.

During the construction and development of transport infrastructure, some issues have also shown up, such as poor coordination between departments and complicated approval procedures. In addition, we both witness the excessive government interference in investment and financing activities and the enterprise fail to play a key role in facilitating investment. In some regions, the impulse for blind expansion of transport infrastructure, the unsound exit mechanism and poor return, and significant problems in transformation of regional transport investment and financing platforms have emerged. Targeting these issues, China urgently needs to further deepen the reform of the investment and financing system in its transport infrastructure sector, enhance the key role of enterprises in investment, clarify the investment boundary of the government, loosen and motivate social investment, and inspire private investment potential and innovation vitality. China provides vigorous support for the sustainable and healthy development of transport infrastructure by clarifying the investment financing relationship, improving the investment and financing efficiency.

Policy response

To effectively address the issues arising from transport infrastructure investment and financing, China has launched several reforms targeting the infrastructure investment and financing system and mechanism. China has issued 'Guidance on Deepening the Reform of Transport Infrastructure Investment and Financing' and 'Guidance on Deepening the Reform of the Investment and Financing System' in succession between 2015 and 2016. The overall direction of the two documents is to scientifically define and strictly control the scope of investment by the government, play a guidance and leading role of the government in investment, clarify the investment subject position of enterprises, treat various investment subjects equally, and loosen and motivate social investment. Under the guidelines of the above documents, key tasks as follows have been implemented nationwide:

First, the boundary between investment by the government and enterprises has been accurately defined. The documents made clear that non-operating projects and government loan roads generating certain benefits should be directly invested by the government, while operating projects should be fully invested by enterprises on their own in principle. If the government support is indeed required, the capital injection should be the main form, and subsidies and interest discounts should be auxiliary forms. For operating PPP projects, the government should not arrange investment funds in principle, but for projects that indeed need the

government's support, they should undergo a series of procedures, such as scientific argumentation, approval, budget management and information publicity.

Second, the content of investment management by the government has been clarified. Starting with key procedures such as budget management, appraisal and approval, information publicity and process and after-event supervision, the government has established a collaboration mechanism across the departments of transport, finance development and reform, and domestic land resources; studied the three-year rolling budget and the organic connection between appraisal and approval; and explored models such as the third-party assessment, which has improved its investment management capabilities.

Third, the PPP model has been vigorously advanced. The government has simplified and standardized the approval of PPP projects, and focused on studying the transformation of stock projects to the PPP model, and explored project bundling and 'road + tourism' resource bundling models to integrate relevant resources, so as to reasonably reward social capital.

Fourth, the transformation of transport financing platform companies was promoted. Financing platform companies must become the investment subject of infrastructure projects through the cooperation between the government and social funds according to the requirements of debt elimination, institutional reforms and business transformation, on the premise that they are not reliant on the credit of the government and able to operate independently.

Fifth, innovative transport investment and financing mechanisms were established. The government has raised capital through government investment funds, pushed forward the implementation of projects in a combination of the PPP model, and established and improved related mechanisms for duration matching, effective exit, risk sharing, etc.

Impact

The deepening of China's investment and financing reform in transport sector has fully mobilized enthusiasm from all walks of life, provided broad investment channels and vigorous financial support for transport infrastructure construction, and basically shaped the multi-channel and multi-form sources of construction funds featured by investment by the government, fund-raising by regions, social financing and introduction of foreign capital, which has broken the situation in which the economy is the unitary source of funds and the only investment subject for infrastructure construction. The allocation of transport infrastructure construction funds has been significantly optimized, infrastructure quality has been remarkably improved, and the trading market has been basically established. Besides, interconnection and intercommunication have been further strengthened, and transport infrastructure has further boosted the economic development and benefited people's well-being. For example, in 2014, Shanxi province, located in the central part of China, raised capital of RMB 88.365 billion by enhancing the debt risk control and optimizing the debt structure, and lowered the off-balance-sheet financing rate from the average level of 10.46 per cent and the maximum level of 12.99 per cent to less than 8 per cent, which has reduced interest payments by RMB 867 million. In 2015, the province cancelled, integrated and handed over nine highways-construction and management departments, so that there was no need to set up new institutions for three new government loan roads under construction. It also took initiative to open up the investment market, incorporated 30 highway and trunk highway projects into the provincial government's catalog of 46 projects invested by social funds, and invested in the construction of a few highways by means of build-operate-transfer (BOT) and build-transfer (BT) financing, equity receiving, etc. Zhejiang province – which is located in the east of China and has a more advanced economy – developed resources along roads, and changed the status quo of return on investment in highways via tolls. By building large transport investment and

financing platforms, the province collected hundreds of billions of road and railway assets, which has not only strengthened its anti-risk ability and significantly improved its credit rating and financing capacity, but also cut financing costs. New investment and financing models have been constantly emerging and have been widely applied. Take investment and financing in urban rail transits, for example. Comprehensive development models, such as 'rail + property management', 'rail + community' and 'rail + town', as well as diversified fund-raising models, such as the PPP model and bond issuance, have taken shape in some regions, and appropriate ways of development have been used to facilitate the rail transit construction.

Challenges and lessons

China has encountered a lot of challenges in implementing the reform of the transport infrastructure investment and financing system. For example, the fuel tax reform faced issues such as inadequate tax revenue, failure to achieve maintenance, construction and other targets, and incomplete capital management and allocation mechanisms. The PPP model was not implemented smoothly due to complicated approval procedures and imperfect mechanisms for return on investment, exit and sharing. The transformation of transport investment and financing platforms also met with some difficulties as the economy stepped up its efforts to rectify local debt and strictly control its scale. China should solve these problems as a whole by enhancing its top-level design in the future.

China's development process indicates that transport infrastructure has been playing a basic, leading, supportive and service-centered role in transport sector and even the entire economic and social system. China's efforts in advancing the reform of its investment and financing system for transport infrastructure construction offer two points of inspiration for other economies: First, the government must play a positive role in transport infrastructure construction and investment & financing activities. Transport infrastructure construction boasts a long cycle, capital intensity and economic efficiency of the network, and many projects even possess the attribute of being beneficial to the public. The government should dominate the investment of large public benefit transport infrastructure through the formulation of dedicated development plans. For operating projects that indeed need the government's support, the government should take measures such as interest discounts, and scientifically guide and reasonably arrange the transport infrastructure construction. Second, the government must redouble its efforts to enhance the reform of the transport infrastructure investment and financing system and carry out institutional innovation. Since its reform and opening-up, China has been constantly exploring new tools, models and practices of transport infrastructure investment and financing, such as establishing various transport construction funds, imposing transport infrastructure management and construction taxes and fees, utilizing bank loans at home and abroad, raising funds directly from the capital market, building large transport investment and financing platforms, and widely applying the PPP model. These explorations have not only reduced financing cost and improved the financing efficiency, but also mobilized the enthusiasm of social capital and created favorable conditions for the sustainable and healthy development of transport infrastructure.

INDONESIA: PPP GOVERNANCE STRUCTURAL REFORM AND FINANCING SUPPORT FOR INFRASTRUCTURE PROVISION

I. Introduction

Before 1990s, PPP had been recognized and applied as an infrastructure provision method in Indonesia. However, PPP governance was not sufficient, with low sector coverage and poor risk management. These had led to low accountability, depriving and limiting private interest or participation in infrastructure provision through PPP. To meet a surging need in infrastructure development, the government of Indonesia needs to seek alternative financing to complement existing financing needs for infrastructure provision. Indonesia's budget constraint is impeding infrastructure provision as it is projected that the infrastructure financing needs in RPJMN (National Medium Term Development Plan) period of 2015–2019 will reach IDR 4,796.2 trillion (Ministry of Finance, 2017). Infrastructure budget spending had been increased from IDR184.3 trillion in 2013 to IDR 410.4 trillion in 2018 or 28.22 per cent of the government's total expenditure in 2018 (Ministry of Finance, 2018). Although it experienced yearly incremental change in infrastructure budget spending, Indonesia's infrastructure spending is relatively low compared with other growing economies. In 2017, Indonesia's infrastructure spending accounted for only 2.85 per cent of Indonesia's GDP[8] (Statistics Indonesia, 2018; Ministry of Finance, 2017).

As an alternative method to tap and increase third-party financing for infrastructure development, the government has set up and advanced its PPP governance. The changing paradigm in Indonesia's PPP model is expected to yield investor trust and commitment in spurring fair growth by means of infrastructure development. Furthermore, the government of Indonesia has issued Presidential Regulation 38/2015 (PP 38/2015) regarding PPPs in infrastructure provision. The PP 38/2015 marked a new paradigm in Indonesia's PPP governance.

II. Pre-reform situation

Before 2008, PPP governance in infrastructure provision was inadequate and unable to oversee robust coordination among stakeholders. The PPP regime (Presidential Regulation 67/2005) did not cover the needed instruments in supporting PPP structure and limited certain stakeholder involvement (e.g., state-owned enterprises or SOEs) in financing PPP projects. The government's stakeholder transition period of adapting the new PPP governance was also characterized by capacity imbalance, diverse conceptions of PPP and measurement, and an inability to detach from traditional infrastructure provision sourced from the government budget. This has hindered PPP governance from progressing, as good PPP governance and implementation need solid interaction from stakeholders with complex arrangements (structure/scheme) to perform well.

[8] GDP at current prices

Aside from inadequate governance, there was also a lack of coordination among stakeholders of PPP projects, which is limiting support in managing complex and intensive PPP networks and phases (initiative, planning, preparation, project bidding, implementation and evaluation). In the preparation phase, credibility becomes an issue due to the low quality of PPP project preparation, limited funding allocations as well as the unavailability of a guarantee. Consequently, these issues have led to a marginal creditworthiness and has potentially triggered the 'market punishment' of an excessive price for a project.

Other issues, specifically related with financing policies response, are unreliable land acquisition, contingent liability and PPP project creditworthiness. Infrastructure projects are often constrained by a problem with land acquisition, thus delaying the delivery time for PPP projects. High political risk, entangled with poor risk management, has made PPP projects unattractive for the private sector and at the same time directly places a heavy contingent liability on the government budget. A government blanket guarantee unequipped with sufficient agreements but rated as sufficient guarantees and leverages creditworthiness, yet posed a great risk toward the government budget.

It is considered imperative to increase PPP governance and to provide financial support in order to make PPP projects attractive for investors to participate.

Policy response

Indonesia has been using the PPP method in infrastructure provision for limited sectors since the 1980s. However, in general, the policy response initiative can be represented, since 2005, by Presidential Regulation 67/2005 which enlarged infrastructure types that can be provided through PPP schemes, and which since then has been continuously enhanced and complemented with other supporting policies. For example, in 2008, there were policies and regulations issued to speed up PPP projects, such as the Fast Track Program and the establishment of certain showcase projects. However, by 2014, there had been only one PPP project agreement signed, which had not reached a financial close.

Furthermore, significant structural reform was implemented in order to increase PPP governance since 2014. This reform was marked as a paradigm shift in Indonesian PPP. The issuance of policies and regulations has enhanced PPP in Indonesia in terms of:

- Better PPP governance and planning
  - Stronger mandate, increasing capacities, and robust coordination between stakeholders.

    In 2014 the government, through Presidential Regulation 75/2014, has established the Priority Infrastructure Provision Acceleration Committee (KPPIP) revitalizing the National Committee for the Acceleration of Infrastructure Provision or KKPPI with a stronger mandate. The KPPIP's objective is to lead and coordinate infrastructure development acceleration particularly in debottlenecking problems in infrastructure development. The improvement measures are supported by the development of the capacity of the Ministry of Planning or Bappenas in providing project preparation facilities focusing on outline business case (OBC) development. The synergy between the KPPIP and Bappenas is expected to result robust PPP Pipeline and improve the planning process. To strengthen the procurement process,

the government issued the Head of National Public Procurement Agency (NPPA) Regulation number 19 of 2015 that guides the PPP procurement processes to be more effective, fair, competitive, transparent and accountable. In addition, a PPP unit was developed within the Ministry of Finance in 2015. The main roles of the unit are to manage the Project Development Facility (PDF) in structuring the final business case (FBC) and ensuring the transaction process done properly.

- Widen sector coverage and PPP scheme enhancement.
  With the latest PPP regulation (Presidential Regulation 38/2015), infrastructure sector development coverage is widened, from only revolving around three sectors before 2005, broadening to eight and becoming 19 in the current PPP regime. Presidential Regulation 38/2015 also stipulates a guarantee and payment scheme, allowing private sectors to mitigate their risks and at the same time increase the appeal of PPP projects.

- Fiscal support and facilities for PPP projects
  The government of Indonesia has provided a robust guarantee scheme and improved financing facilities for PPP projects.
  - Land acquisition financing support (Ministry of Finance Regulation No. PMK 21/PMK.06/2017) from the National Asset Management Agency
  - A Project Development Facility (PDF) (Ministry of Finance Regulation No. 265/ PMK.08/2015 and No. 129/PMK.08/2016): A facility used to support preparation phase and transaction support.
  - A Viability Gap Fund or VGF (Ministry of Finance Regulation No. 223/PMK.011/2012): A facility provided to support creditworthiness of a PPP project and to have an affordable service provision.
  - Availability Payment or AP (No 260/PMK.08/2016): AP is a payment scheme for service provision directly from the government of Indonesia that includes capital expenditure, operational expenditure and rate of investment, thus mitigating demand risks for the private sector. The scheme is suitable for social infrastructure projects such as hospitals, schools, etc.
  - Guaranteed support (Presidential Regulation 78/2010 and Ministry of Finance Regulation 8/PMK.08/2016) to increase PPP project creditworthiness, appeal to investors and a part of risk management in PPP projects.

The PPP Unit within the Ministry of Finance manages the fiscal government support and facilities for PPP projects, except for land acquisition financing support which is managed by the National Asset Management Agency.

Matrix 1. PPP Structural Reform Phases

	Phases		
Time Period	**I (1998–2005)**	**II (2005–2013)**	**III (2014–Present)**
General	• Private participation in infrastructure provision: o Sectoral frame	• Presidential Regulation 42/2005 about National	• Presidential Regulation 42/2005 revitalized with Presidential Regulation 75/2015about Committee for Acceleration of Priority Infrastructure Delivery (KPPIP) which gave stronger mandate than before (KKPPI)

	o Electrical infrastructure provision regulation o Independent Power Producer (IPP) is re-negotiated. o Infrastructure provision regulations issued	Committee for the Acceleration of Infrastructure Provision (KKPPI) • PPP Provision (President Regulation 67/2005)	• PPP provision enhanced (President Regulation 67/2015), emphasizing regulation on infrastructure provision through PPP (President Regulation 38/2015) with sectoral scope enlarged from previously 8 to 19 sectors. • Planning Ministry Regulation on infrastructure provision through PPP (Permen PPN/Bappenas No. 4/2015) • Head of National Public Procurement Agency Regulation on Infrastructure procurement through PPP (No. 19/2015) The establishment of PPP Unit Ministry of Finance in 2015 • PPP Book	
			III (2008–2010)	**IV (2010–present)**
Financing Support and Guarantee	• Blanket guarantee through support letter (direct exposure towards government budget).	• Blanket guarantee through support letter (direct exposure towards government budget).	• Government guarantee in PPP project (President Regulation 78/2010) • Specific risk guarantee with guarantee letter (direct exposure towards government budget). • Establishment of PT Indonesia Infrastructure Finance (IIF, co-ownership) and PT Sarana Multi Infrastruktur (SMI, State-Owned Enterprises) for financing support • Establishment of Indonesia Infrastructure Guarantee Fund or IIGF (SOE) for guarantee support for more prudent and professional guarantee provision • Guarantee support, specific risk guarantee through Guarantee Agreement	• New Fiscal government supports : o Viability Gap Fund (VGF), o Land acquisition financing support • New Fiscal Facility to prepare a PPP Project named Project Development Facility • New return on investment scheme is introduced named Availability Payment scheme

Impact

With these structural reforms of PPP governance for infrastructure provision, Indonesia has achieved the needed improvements in scaling its infrastructure development. Indonesia's infrastructure quality is recognized and improved. There are currently 14 PPP projects that have reached financial close (Table 2).

Table 2. PPP Contract and Financial Close

No.	Project Name	Project Cost (IDR) Trillion	Financial Facility and Guarantee
1.	Central Java Power Plant Project	40	Guarantee (MoF and IIGF)
2.	Umbulan Water Project	2.1	PDF, VGF and IIGF Guarantee
3.	Palapa Ring Project–West Package	1.28	PDF, IIGF Guarantee and AP
4.	Palapa Ring Project–Central Package	1.38	PDF, IIGF Guarantee and AP
5.	Palapa Ring Project–East Package	5.13	PDF, IIGF Guarantee and AP

6.	Batang–Semarang Toll Road Project	11	IIGF Guarantee
7.	Manado–Bitung Toll Road Project	5.1	IIGF Guarantee
8.	Balikpapan–Samarinda Toll Road Project	9.9	IIGF Guarantee
9.	Pandaan–Malang Toll Road Project	5.9	IIGF Guarantee
10.	Serpong–Balaraja Toll Road Project	6	IIGF Guarantee
11.	Jakarta–Cikampek Toll Road Project	16	Co-guarantee (IIGF and MoF)
12.	Krian–Legundi–Bunder–Manyar Toll Road Project	12.2	Co-guarantee (IIGF and MoF)
13.	Serang-Panimbang Toll Road	5.33	Co-guarantee (IIGF and MoF)
14.	Cileunyi Sumedang-Dawuan Toll Road	8.21	Co-guarantee (IIGF and MoF)

Source: Ministry of Finance, 2017

III. Challenges and lessons

While PPP governance reform has brought substantial results to Indonesia infrastructure development, the need for infrastructure development is still huge while there are also rooms for improvements. Several challenges for the current PPP governance that need to be improved are as follows:

- Increasing stakeholder capacities in PPP governance, especially local government capacities. In addition, sector coverage needs to be expanded to cover other infrastructure services with better infrastructure quality.
- Standardizing project preparation document to ensure the quality of the business cases offered to the private sector to attract broader investors and lenders, including international parties.
- Coordinated PPP financing support, especially for support coming from donors under the fiscal authority. The support could be formed as pooling funds for project preparation.

From PPP governance structural reform experience, it is imperative to have a continuous process and efforts in enhancing PPP governance. Challenges regarding stakeholder involvement and perspective need to be addressed with careful approaches and innovative instruments. Such approaches and instruments will better the accountability and risk management of PPP governance. Thus, it will later increase the attractiveness of PPP for the private sector as one alternative in filling the financing gap in infrastructure development.

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MEXICO: ENERGY INDUSTRY REFORM

Introduction

Mexico is the 12th largest economy and 13th largest export economy in the world. The profound transformation of the Mexican economy over the last years has increased its energy consumption. Thirty years ago, Mexico began the path of integration into the global market. With the growth and diversification of its foreign trade, manufactures left behind crude oil as the main export product. The manufacturing sector now contributes 90 per cent of Mexico's exports, while in 1990, crude oil represented 38 per cent. More than 70 per cent of Latin American high-tech exports originate in Mexico and the economy went from exporting auto parts to exporting complete automobiles. In the same period, energy consumption patterns changed. A majority of the population (80 per cent) now live in cities and each Mexican consumes on average 63 per cent more electricity than in 1997.

Today, 120 million Mexicans consume 54 per cent more energy, and more than twice the natural gas of 90 million in 1997. Hydrocarbons now account for 86 per cent of domestic energy consumption. As Mexico's population grows, the economy needs to provide a rising energy demand. Meanwhile, energy output has declined. Oil production has fallen steadily for 13 years. In 2017 Mexico produced 1.95 million barrels per day; 42 per cent below the peak of 3.4 million barrels per day reached in 2004. The total production of crude oil, natural gas and condensates today is similar to that of 20 years ago. The growing deficit in energy output has turned Mexico into a net importer of natural gas and oil products: 70 per cent of the gasoline and diesel used for transportation and 65 per cent of natural gas demand are covered with imports.

Moreover, in the past decades investment in energy infrastructure was insufficient. In 2012, Mexico's gas network was only 11,347km, while 11 states did not have any coverage infrastructure. That year, Mexico's demand surpassed capacity in its natural gas transport infrastructure. That led to interruptions in the natural gas supply, increasing the risk in operational safety and forcing Pemex – as operator of the transport network – to ask interconnected users to reduce their consumption for certain periods of time, which became known as critical alerts. Between 2012 and 2013, there were 35 critical alerts, with severe economic consequences on industrial consumers. In 2013, the Bank of Mexico estimated that critical alerts caused a drop of 0.3 points in the GDP. In the oil products sector, underinvestment also increases operational risk. Mexico had just three days of fuel inventories, not enough for the fourth largest gasoline market worldwide.

Pre-reform situation

In 2013, Mexico's hydrocarbon industry monopoly reached the limit of its capacity. Before the reform, the Constitution bound Pemex to carry out on its own all the activities of the oil industry, regardless of the financial, operational, or technological restrictions to which it was subject. Pemex was the only company that could extract the hydrocarbons from the subsoil. Despite historically high investments in exploration and production of hydrocarbons, oil output went from 3.4 million barrels per day in 2004, to 2.5 million barrels per day in 2013, a decrease

of 26 per cent in just 10 years. The natural gas production spun two years in a row of decline: In 2012, the natural gas production of 4.6 billions of cubic feet equivalent (Bcfd) was 8 per cent lower to the production in 2010 (5 Bcfd), the peak of historical production.

Despite the high investment of Pemex in E&P, it was not enough. According to estimates of the International Energy Agency, reaching a three-million-barrel oil output in Mexico would require approximately 640 billion dollars in the next 25 years, equivalent to 25.6 billion dollars per year (IEA, 2016). While Pemex estimations suggested investments of more than 60 billion dollars per year to develop to the maximum the resource potential of Mexico. In 2017, Pemex only had about 18 billion dollars in its annual plans for E&P activities. Even with a more attractive fiscal regime, this investment would be insufficient to develop Mexico's resources and to provide an adequate supply of energy for future demand.

Without additional investment, the forecast for Mexico's hydrocarbon production was not very encouraging, particularly since no major discoveries had been announced since 2008 to restore oil and gas reserves. This implied that Pemex would continue to produce less hydrocarbons in the following years.

The absence of competition in the sector caused a lack of investment in the oil value chain that was reflected in the sustained increase in imports of fuels and natural gas. Currently 65 per cent of the natural gas consumed in the economy is being imported. Furthermore, the imports represented 90 per cent of the demand if Pemex's own consumption is excluded. In the fuels market, a combination of limited refining capacities, underutilization and rising demand let to Mexico's turning into a net importer of oil products. In 2017, Mexico's oil products imports represented 68 per cent of domestic demand.

Furthermore, Mexico's infrastructure capacity for transport and distribution of natural gas and petroleum products did not grow at the same pace as its demand. Higher use of inefficient alternatives like trucks increased operational risks and costs, raising prices of these products and limiting industrial use. Regarding oil products infrastructure, Mexico is the economy with the lowest storage capacity after Colombia, which is an economy with a fuel consumption almost seven times lower than that of Mexico. Additionally, we can observe a significant delay in pipeline infrastructure in comparison to the United States and Canada, despite the fact that the latter has a fuel demand three times lower than Mexico.

In the power sector, without the same efficiency gains made in networks and other parts of the system, the costs of electricity supply are higher, meaning higher prices for industry and an expanded subsidy bill for households (a cumulative USD 135 billion to 2040) to avoid sharper rises in residential electricity tariffs. Without specific policies to increase the role of clean energy, lower deployment of renewables leaves Mexico well short of its clean energy targets; the repercussions extend beyond the energy sector and into the wider economy.

Ultimately, another problem identified that gave rise to the need of the new structural reform was that Mexico's pre-reform energy pathway was not a sustainable one: the cumulative gains in GDP from the Reform to 2040 are estimated at more than USD 1 trillion, compared with a case in which the reforms do not take place.

Policy response

Since the government enacted energy reform in 2013, the energy sector is in a period of profound change. New investment and technology are brought to the table, across the hydrocarbons value chain by ending the monopoly of PEMEX and by attracting new players into the power sector to ensure cost-efficient investment into both traditional and low-carbon sources of electricity. The reform package implemented new structures for the oil, gas, and power industries in Mexico, and recasts the structures that have governed the energy sector for over 80 years.

The Reform put an end to the government monopoly on oil and gas production and on electricity retail sales. These changes have drastically altered the hue of policy and policymaking in Mexico, and therefore the outlook for energy prospects.

Key aspects of the constitutional amendments that have been passed are the Electricity Law, the Hydrocarbons and Hydrocarbons Revenue Laws, the PEMEX Law, the CFE (Federal Electricity Commission) Law, and the establishment of the Mexican Petroleum Fund for Stabilization and Development.

- Electricity Law: since 1992, CFE has monopolized the generation market and transmission and distribution. The new Electricity Law helps develop a competitive electricity market by reorganizing the vertical structure of CFE and offers SENER (Mexican Ministry of Energy), the CRE (Energy Regulatory Commission) and to CENACE (National Center for Energy Control) regulatory and market-control capacities.
- Hydrocarbons Law and Hydrocarbons Revenue Law: this law allows the private sector to contribute in upstream activities, through four new contract types: license, production-sharing and profit-sharing contracts, as well as service agreements. New responsibilities are assigned for regulation to the CNH (National Hydrocarbons Commission), and an independent operator, CENEGAS (National Gas Control Center), is in charge of the natural gas pipeline network. Furthermore, SENER receives the authority to grant permits for petroleum treatment and refining, processing of natural gas, import and export of crude oil, natural gas and petroleum products, and activities that were previously exclusive to PEMEX.
- PEMEX Law: with this law, PEMEX becomes a ‘state productive enterprise’, which obliges it to pay dividends to the new ‘Petroleum Fund for Stabilization and Development’ (30 per cent of revenues in 2016, decreasing until 0 per cent in 2026 when the Ministry of Finance and Public Credit will determine the dividend). PEMEX will also be able to partner with private enterprises in the hydrocarbon value chain and to bid for exploration and extraction blocks in tenders held by the government.
- CFE Law: also becomes a ‘state productive enterprise’ with dividend obligations to the federal government, with a reorganization of the corporate governance structure.
- The establishment of the Mexican Petroleum Fund for Stabilization and Development, under the management of the Central Bank and a board comprising the ministers of finance and energy. The chairman of the central bank and four independent members are nominated by the president and ratified by the Senate. All royalties and resource rents from the oil and gas sector will be held in this fund. The right to withdraw from this fund to finance the government budget is capped at 4.3 per cent of GDP.

Energy governance has also been transformed with the reform. A number of responsibilities that were the domain of state-owned monopolies have been transferred to independent regulatory bodies. These include the CNH and the CRE. The reform is part of a broader vision by the government to pursue energy policies that reconcile energy security imperatives with sustainability and efficiency considerations, and a general recognition of the need to shift to a low-carbon growth model. This underpins the National Energy Strategy (2014–2027); the Energy Transition Law (passed in December 2015) and the far-reaching climate pledge submitted in advance of the Paris COP21.

Summing up, the reform opens the long-closed oil, gas and electricity sectors to competition. It turns the state-owned monopolies PEMEX and CFE into state productive enterprises, which are expected to follow a business-driven strategy and to strengthen incentives for investments from old and new players.

Regarding the regions and population benefitted by the reform, natural gas pipeline expansion is an excellent example. The expansion of the pipeline network will benefit 26 states, which represent 98 million inhabitants, equivalent to 82 per cent of the total population of Mexico. The recent published storage policy for natural gas will allow Mexico to have at least five days of consumption in 2026 to secure continuous supply. Furthermore, in oil products, the Public Policy on Minimum Stocks of Oil Products issued by SENER will allow to guarantee market supply for all regions: by 2025, up to 13 days of consumption will be the minimum storage obligation to be fulfilled by participants in the wholesale and retail markets.

Impact

In just three years since the approval of Mexico's energy reform, the oil sector is undergoing a deep transformation: 71 new companies, in addition to PEMEX, have signed 76 contracts for the exploration and production of hydrocarbons, which could represent investments of USD 161 billion in case of commercial success. Twenty seismic companies have invested USD 2 billion that have made the Mexican part of the Gulf of Mexico the area with the highest seismic coverage in the world. Eleven companies invested USD 12 billion in the largest expansion of natural gas pipelines in history. In logistics – storage, transportation and distribution of gas and oil products – 70 companies participate, with an estimated investment of USD 5 billion. In retail fuel, more than 40 new brands other than PEMEX compete to serve the economy's consumers. In total, the reform represents a potential investment of USD 180 billion in the entire hydrocarbons value chain, with more than 170 private firms competing with PEMEX.

SENER has published public policies with the objective of increasing Mexico's hydrocarbons storage capacity for both natural gas and oil products. These policies will allow Mexico, for the first time in its history, to build strategic reserves of natural gas, gasoline, diesel and jet fuel, to ensure continuous supply of fuels in emergency situations, as well as the construction of infrastructure for the storage, strengthening domestic energy security. Moreover, these policies include an obligation to report information on transactions, inventory levels and trades. This information will allow SENER to create an aggregate supply and demand balance by region, which will provide crucial information to all participants in these markets. For natural gas, the minimum inventory will be five days of sales in 2026, while for oil products, it will be up to 13 days in 2025.

The outlook for developing Mexico's oil and gas resources has been reshaped by the reform. The decline in total oil production bottoms out in 2018 at 2.3 mb/d, before climbing to 3.4 mb/d by 2040. Gas production follows a similar trajectory to oil, as much of the output is associated gas; but towards the end of the projection period, Mexico starts to see larger scale development of its considerable shale gas resources. Total gas production rises to 60bcm, but Mexico remains a sizeable importer of gas from the United States throughout the period to 2040, benefiting from the availability of competitively priced imports. As Mexico's natural gas use increases, so does the importance of good interconnections and market operation, and gas storage to meet fluctuations in demand.

Electricity wise, demand grows robustly by 85 per cent, being that the largest growth comes from the buildings sector, yet industry remains the largest consumer. The role of gas and low-carbon sources in lifting generation from 300 TWh to more than 500 TWh by 2040 heralds a sharp reduction in the greenhouse-gas emissions intensity of the power sector. Solar PV and wind account for around half of total investment in generation and half of generating capacity additions over the period, helping Mexico to achieve its long-term targets for electricity generation from clean power sources. CO2 emissions from power generation are around 20 per cent lower in 2040 than in 2014.

The new policy and market design provides a substantial boost to Mexico's clean energy efforts: more than half of the 120 GW of new power generation capacity installed to 2040 is renewable-based. This halves the emissions intensity of power generation; from more than 450g CO2/kWh in 2014 to 220g CO2/kWh in 2040. A distinctive feature of Mexico's reform in the power sector is that clean energy has been integrated into the reform package from the outset.

As a result, by 2040, oil production is some 1 mb/d lower than in the New Policies Scenario. In the power sector, without the efficiency gains made in networks and other parts of the system in the New Policies Scenario, the cost of electricity supply is higher. Without specific policies to increase the role of clean energy, lower deployment of renewables leaves Mexico well short of its clean energy targets.

Challenges and lessons

At the time the reform was approved, Mexico had almost eight decades operating with a monopoly in charge of almost every activity in the oil and gas sector. As implementation of the new energy model moves forward, it will be important for all the agencies to remain focused on the overarching goal to build open, efficient and competitive markets. Simplification of regulation should be part of the agenda, as the day to day operation of new players, from exploration and production to retail, identify areas of opportunity to streamline processes, reduce the cost of compliance and improve the processes to approve permits. One example of the importance of evaluation during implementation happened during the early licensing rounds of exploration and production contracts. The exchange between regulators and private companies participating in licensing bids facilitated understanding of results, leading to a faster adoption of international best practices, for example publication of minimum bidding variables, streamlining of pre-qualification criteria and simplification of bidding rules. This review improved Mexico's bidding system, which has led to 107 contracts signed in 9 licensing rounds, with competitive results and a 74 per cent government take.

In the mid- and downstream sector, private companies are responding to public policy and to the opportunity of doing businesses in the 12th largest economy in the world. Currently, there are more than 40 projects for oil products storage. In order to comply with the new strategic storage policy of up to 13 days of fuel consumption in 2025, 13 of the largest announced projects should be built, in addition to operating capacity for new players in the market. Managing to complete these projects will require continuity in policy implementation, to provide certainty to investors. Regulators should constantly evaluate their permitting process to simplify and improve, reducing the cost of compliance. Entry of new players in the wholesale market will speed up the emergence of competition, in favor of consumers.

Mexico's reform also introduced regulation on prior and informed consultation, and on payments to the owners of land surface rights for the first time in the oil and gas industry. Before this reform, PEMEX was the only company in charge of energy infrastructure projects, which allowed it to resort to eminent domain to move projects ahead. As this new regulation is implemented, it will be necessary to study the best agreements reached by communities, owners and companies to approve projects under the new legislation. This will allow faster adoption of best practice across all the participants in this industry, leading to a consultation and approval process that balances the rights of communities and owners, while reducing risks for construction and operation of new infrastructure.

The implementation of Mexico's energy reform has important lessons for future reforms. First, follow closely principles of transparency and regulatory certainty to foster competition. Second, actively counter the incentives of incumbents to use their market power. Third, define clear roles and responsibilities for the public and private entities involved to maintain and improve the ability to collect data and monitor the sector's performance. These lessons are embodied in how government and regulatory agencies, such as SENER, the Ministry of Finance, the CNH and the CRE, were restructured to increase their transparency and independence to facilitate competition. For example, their collective ability to adjust bidding terms in response to real outcomes in licensing rounds reflects the objective of holding truly competitive and transparent auctions. PEMEX was restructured as well as CFE, which was unbundled into 11 different subsidiaries opening the way for new players in the energy market.

Another example is the creation of CENAGAS and CENACE, as robust independent system operators of the natural gas and electricity transportation systems, which facilitated open access for new participants to their infrastructure. This has contributed to ensure continuity and security of supply, encouraging competition in these crucial markets.

MEXICO: TELECOMMUNICATION INDUSTRY REFORM

Introduction

According to the OECD Study on Telecommunications Policies and Regulation in Mexico (2012), one of the shortcomings was the lack of competition in the telecommunications market, which caused inefficiency that turned into significant costs on the Mexican economy and that had a negative impact on the population welfare. The sector was characterized by high prices, among the highest of the members of the OECD, and a great lack of competition, which resulted in a low rate of penetration of services and a poor development of the infrastructure needed to provide them.[9]

In addition, regulatory decisions were seldom applied, or their application was suspended by the judiciary's non-specialized courts, which meant less effective development of the regulation and one of the main barriers to competition. This system not only generated the interposition of legal recourse, but also produced economic benefits for the dominant operator and economic damages to the new entrants.

As a result of the 2012 study, the OECD issued a series of recommendations for Mexico which were: 1) guaranteeing low entry barriers and contestable telecommunication markets; 2) ensuring the transparency, non-discrimination and effective application of regulation and related processes and 3) reforming regulation to stimulate competition and eliminate rules unless there is clear evidence that they are the optimal means to serve the public interest.

Consequently, on 2 December 2012, the Pact for Mexico (*Pacto por México*) was signed, which was a political agreement whose main objective was to specify the actions and reforms required by the economy. The commitments of the pact, among which 'promoting the democratization of civic participation', 'addressing inequality and creating opportunities' and 'expanding the effective application of social rights', emerged from a consensus of the needs to carry out a series of structural reforms.

One of these reforms was the telecommunications and broadcasting reform in order to guarantee its social function, so the modernization of the government and the society could be achieved through the information and communication technologies (ICTs); as well as the strengthening of the faculties of the authorities on economic competition.

It is important to note that two of the agreements of the pact for the telecommunications sector were the benefits of an economy formed by competitive markets and the guarantee of equitable access to telecommunications. These agreements included the implementation, of measures such as the creation of specialized courts in economic competition and telecommunications and the establishment of the right to broadband and Internet access as a constitutional guarantee.

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[9] OECD. (2012). Estudio de la OCDE sobre políticas y regulación de telecomunicaciones en México. Retrieved from https://www.oecd.org/centrodemexico/49528111.pdf.

Pre-reform situation

As mentioned above, the 2012 OECD Study on Telecommunications Policies and Regulation in Mexico and the Pact for Mexico represent significant antecedents of the constitutional reform in telecommunications, as detailed in this section.

On 12 March 2013, the Federal Executive presented to the Chamber of Deputies the initiative that reforms and adds various provisions of the Political Constitution of the United Mexican States, in the field of telecommunications, which aimed to establish various provisions aimed at regulating, modernizing and strengthening the field of telecommunications. Among the proposals, the following stand out:

- To establish that the government will guarantee the universal right of access to ICTs, as well as broadcasting, communication and broadband services, promoting effective competition and quality in their provision.
- Specify that telecommunications and broadcasting are public services of general interest, and they have to be provided in conditions of competition, quality, plurality, universal coverage, interconnection, convergence, free access and continuity.
- Create the following institutions:
    - A Federal Telecommunications Institute (IFT by its acronym in Spanish), as an autonomous body, with legal personality, whose purpose is the efficient development of broadcasting and telecommunications. For this purpose, the institute is responsible for the regulation, promotion and oversight of the use, development and operation of the radio spectrum, networks and the provision of broadcasting and telecommunications services, as well as access to active and passive infrastructure and other essential inputs.
    - A Federal Commission of Economic Competition (COFECE by its acronym in Spanish), autonomous and with legal personality and own assets, and that will have the aim to guarantee the free competition and concurrence, as well as to prevent, investigate and fight the monopolies, the concentrations and other restrictions to the efficient operation of the markets.
- The COFECE and the IFT will be independent in their decisions and operation.
- The IFT will grant the concessions for broadcasting and telecommunications sectors instead of the Telecommunications Ministry (executive branch).
- To empower Congress to enact laws on the subject and adjust the corresponding regulatory frameworks and create the Consultative Council of the Federal Telecommunications Institute.
- Allow direct foreign investment up to 100 per cent in telecommunications and satellite communications sectors, and up to 49 per cent in broadcasting sectors.
- Is mandatory for public television concessionaires to offer their signals to other operators at no additional cost; in the same way, pay television operators are obliged to transmit said content without implying an extra charge to the final consumer. The concessionaires declared with substantial power or as preponderant economic agents in any of the markets will not benefit from the rule of free content.

- Establish the bidding process for two new public television channels, in which companies that accumulated concessions to provide broadcasting services of 12MHz or more in any geographic coverage area will not be able to participate.
- Specify that the Federal Judicial Council must establish collegiate circuit courts and district courts specialized in economic competition, broadcasting and telecommunications.
- To establish that the Federal Electricity Commission will fully assign to Telecomunicaciones de México (Telecomm, is in charge of controlling and operating telegraphic, satellite, radio-maritime services and offers basic financial services) its concession to install and operate a public telecommunications network and will transfer all necessary resources and equipment for the operation of said concession, with the exception of optical fiber, rights of roads, towers, poles, buildings and facilities.
- To compel the Federal Executive, through its competent agencies, to install a shared network (Red Compartida) that promotes effective access to broadband communication, and may contemplate public or private investment. To that end, the proposed was to reform articles 6, 7, 27, 28, 73, 78 and 94 of the Constitution.

Policy response

After the legislative process, on June 11, 2013, the Official Gazette of the Federation (DOF by its acronym in Spanish) published 'the Executive Order reforming and supplementing various provisions of Articles 6, 7, 27, 28, 73, 78, 94 and 105 of the Mexican Political Constitution On telecommunications matters', which adopted six guiding principles:

- Issuance of a new legal framework
- Specific rules for effective competition
- Strengthening of the institutions involved in the telecommunications and broadcasting sectors
- Specific objectives for universal coverage of services
- Deployment of infrastructure
- Expansion of the fundamental rights of freedom of expression, access to information and information and communication technologies

It is important to highlight that, from the aforementioned constitutional reform, the article 6 of the Constitution establishes that the government will guarantee the right of access to information and communication technologies, as well as to broadcasting and telecommunications services, including broadband and Internet, so, the government will establish conditions of effective competition in the provision of such services. In that sense, among the bases and principles that the government should follow, are:

- The government will guarantee the integration of the population to the information and knowledge society, through a universal digital inclusion policy with annual and sexennial goals.
- The telecommunications are public services of general interest, so the government will guarantee that they are provided in conditions of competition, quality, plurality,

universal coverage, interconnection, convergence, continuity, free access and without arbitrary interference.

- Broadcasting is a public service of general interest, so the government will ensure its provision in conditions of competition and quality and with the benefits of culture to the entire population, preserving the plurality and veracity of the information.

In addition, with the amendment to article 28 of the Constitution, IFT was created as an autonomous constitutional body, with its own legal personality and assets, whose purpose is the efficient development of broadcasting and telecommunications in accordance with the provisions of the Constitution, as well as in the terms established by the laws.

Derived from this reform, several constitutional goals were established, which are indicated below:

- Publication of the rules to bidding new broadcasting television frequencies concessions, grouping at least two new television channels with economy-wide coverage.
- Determination of preponderant economic agents in the telecommunications and broadcasting sectors, as well as regulation.
- Establishment of measures that allow the effective disaggregation of the local network of the preponderant economic agent in telecommunications.
- Review of the current concession titles, in order to verify compliance with their terms, conditions and modalities.
- Creation of the Concessions Public Registry
- Issuance of the IFT's Organic Statute.
- Issuance of guidelines of a general nature to provide additional services or to move to a single concession model for the preponderant economic agents.
- Implementation of digital switchover throughout the economy.
- Issue the guidelines and agreements for Telecomunicaciones de México to have the authority and resources to promote access to broadband services, plan, and design and execute the construction and growth of a robust telecommunications backbone infrastructure, as well as communication via satellite and the provision of telegraph service.
- Actions that correspond to the IFT, depending on its competence, in relation to the installation of the shared public network that guaranteed by the federal branch.
- Actions corresponding to the IFT, depending on its competence, to contribute to the objectives and goals set in the National Development Plan and other programmatic instruments, related to the telecommunications and broadcasting sectors.

On 24 March 2014, the President of Mexico sent the decree initiative for the issuance of the Federal Telecommunications and Broadcasting Law to the Congress. Later, the Federal Executive promulgated and published this initiative by in the *Official Gazette* on 4 July 2014.

This law sets out a number of diverse issues as convergent single concessions, the administration and allocation of the radio spectrum, the interconnection of networks, the substantial market power and preponderant economic agents, the sharing of the local network and the user's rights, among other concerns.

Impact

As a consequence of regulatory reform, the relevant markets in the telecommunication industry have developed positively; the penetration levels have increased in broadband markets, there are new players in the mobile market and quality of service has improved particularly the broadband speeds and data volumes. Actually, the investment in higher capacity mobile technologies and further availability of spectrum for mobile telecommunication services, including via the digital switchover, has led to an acceleration of gains. In the domestic economic context, between 2012 and 2016, prices for telecommunication services significantly decreased, leading to an important increase in subscriptions, especially in mobile markets. Over 50 million new mobile subscriptions to the mobile Internet and, from a small base, the number of people using the internet for online transactions has multiplied by a factor of four. In addition, foreign investment increased, and the telecommunication and broadcasting sectors grew faster than the overall Mexican economy. A third domestic free-to-air (FTA) television network has been introduced and plans have been announced for a fourth set of licenses to be made available and awarded on a regional basis.

From 2013 to 2014, telecommunications GDP did not show much growth and private investment in infrastructure fell. However, from 2014 to 2016, the telecommunications sector generated an investment of USD 10.35 billion. At the end of 2016, the investment grew by 73 per cent compared to 2014, while in the same period the telecommunications GDP grew by 20 per cent. The foregoing situates 2016 as a year in which the sector GDP had a remarkable development accompanied by a strong growth in investment, which represents a positive outlook for telecommunications in the short and medium term.

The level of income of the telecommunications operators as a whole in 2013 was close to USD 20 billion, for 2014, they reached USD 21.9 billion, and in 2016, they generated more than USD 22.5 billion, that is to say, a growth of close to 15 per cent between 2013 and 2016. In the second quarter of 2017, revenues amounted to USD 11.35 billion.

Before the reform, the Foreign Direct Investment (FDI) that the telecommunications sector generated was less than 1 per cent. For the year of the reform it was 5 per cent, and during 2015 it represented more than 8 per cent of the total FDI – as a result of the acquisitions made by AT&T of Iusacell and Nextel for USD 2.5 and 1.875 billion, respectively. In the second quarter of 2017 the investment balance remains positive.

As for fixed telephony service, América Móvil (Telmex) has lost 8 percentage points of its market share, going from 72 per cent to 64 per cent. In terms of mobile telephony service, although América Móvil (Telcel) has lost 4 percentage points in its participation, the entry of AT&T, as well as the birth of 13 mobile virtual operators (MVNOs), has generated greater competition in this market, which has had a significant impact on the decrease in prices.

On the other hand, mobile broadband services have registered the highest growth, going from 27.4 to 76.9 million Internet lines through mobile phones. At the same time, América Móvil

(Telcel) has lost 11 percentage points of its participation, going from 82 per cent to 71 per cent during the period analyzed.

Challenges and lessons

The Report on Relevant Actions of the Ministry of Communications and Transportation (SCT)[10], corresponding to the period from January 2013 to December 2017, indicates that the benefits of the Telecommunications Reform are: 1) increased of connectivity and internet users; 2) price reduction in telecommunications services; 3) opening of the sector and new investments; 4) economic dynamism in the telecommunications sector and e) higher quality of telecommunications services.

Likewise, the OECD Study on Telecommunications Regulation Policies in Mexico (2017)[11] states that, since the reform in the telecommunications sector, there are new entrants in the market, there is a substantial reduction of the prices and an increment of access, particularly in mobile broadband subscriptions and data usage. Also, the prices of mobile service baskets have decreased between 61 per cent and 75 per cent since the reform. As a reference, the same study generates a table that indicates the status of the implementation of the 2012 OECD recommendations (Annex I).

In addition, the quality of the service (QoS) has improved in terms of the speed of broadband services. In addition, foreign investment has increased, and the telecommunications and broadcasting sectors have grown faster than the Mexican economy in general. As for the broadcasting sector, Mexico has completed the transition to digital terrestrial television and has already authorized concessions for a third domestic of the open TV channels, which began broadcasting in 2016.

Finally, the OECD determined a series of recommendations aimed at accessing high quality telecommunication and broadcasting services. These recommendations are divided into the following areas (for more information please see Annex II):

Recommendations to promote competition

- The measures proposed by the IFT in its preponderance review of telecommunication services are found to be balanced and proportionate. Access seekers need to have elements such as local loops and leased lines available to them, together with the use of an effective electronic management system.
- If market developments and the new preponderant measures do not increase competition over time, research and consultation should be carried out on options such as functional and structural separation of the preponderant agent as a last resort.

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[10] Informe sobre Acciones relevantes de la Secretaría de Comunicaciones y Transportes (SCT), correspondiente al período de enero de 2013 a diciembre de 2017. Available at [http://www.sct.gob.mx/fileadmin/oficialia-mayor/acciones-relevantes-SCT.pdf]

[11] OECD. (2017). Estudio de la OCDE sobre telecomunicaciones y radiodifusión en México 2017. Retrieved fromhttp://www.ift.org.mx/sites/default/files/estudio_de_la_ocde_sobre_telecomuncaciones_y_radiodifusion_en_mexico_2017.pdf

- The IFT should assess the entry of Telmex into pay TV as soon as possible, following the successful implementation of its functional separation.
- Transitory Article 9 of the Federal Telecommunication and Broadcasting Law provides a fast track for non-preponderant agents to perform concentrations; this possibility should be eliminated.

Recommendations to improve market conditions

- Continue to lower investment barriers in the telecommunication and broadcasting sectors: 1) abolish the remaining legal restrictions on foreign direct investment in the area of broadcasting) revise the reserved capacity requirements for satellites.
- Eliminate the special tax on products and services levied on telecommunication services.
- The way spectrum fees are divided between the auction fee and annual fees should be reconsidered and more analysis should be done on the fee structure to help guarantee that the auction process establishes a fair value for the use of spectrum. As a consequence, there might be a need to lower the current annual spectrum fees in future auctions to take into account the effects of these recurring fees on meeting policy objectives.

  Barriers should be reduced for infrastructure deployment at the local and municipal levels. The Ministry of Communications and Transportation (Secretaría de Comunicaciones y Transportes, SCT) should accelerate the elaboration of guidelines and co-ordination agreements for all levels of government and work with the different levels of government to implement them as soon as possible.

Recommendations for domestic policies

- The National Digital Strategy should be updated and revised, and milestones for the different elements of the strategy should be established.
- Co-operation needs to be improved between governmental entities and across the different levels of government (central, state and municipal) for the México Conectado program. Furthermore, effective monitoring mechanisms should be put in place and satellite connections reduced once the Red Compartida is deployed.
- The development of digital skills should be furthered and skill training in firms should be promoted.

Recommendations on the legal and institutional framework

- From a long-term perspective, the Constitution should retain the key principles and goals pertaining to the telecommunication and broadcasting sectors, such as digital inclusion.
- Attributions among different governmental entities in formulating and implementing digital economy policy should be better aligned. Different options exist. Skilled personnel are crucial for designing effective digital economy policies; therefore, staff should be carefully recruited.
- The attributions of the COFECE and the IFT should be very clear.
- Audio-visual content regulation could benefit from strengthening the IFT’s role, especially to guarantee the rights of children and people with disabilities. The adoption

of an approach that encourages co-regulatory and consumer empowerment mechanisms would also improve current audio-visual content.

ANNEX I[12]

Table 1.1. **State of implementation of the 2012 OECD recommendations**

Telecommunication sector	State of implementation
Ensure low barriers to entry and "contestable" telecommunication markets	
Eliminate all foreign investment restrictions/caps on fixed-line telecommunication operators in Mexico.	✓
Reform the existing concession system to a simpler class-licensing regime (except for resource scarcity restraints, i.e. spectrum).	✓
Monitor and enforce existing obligations.	✓
Simplify and encourage entry of resellers to the market (including mobile virtual network operators).	✓
Ensure that regulations and regulatory processes are transparent, non-discriminatory and applied effectively	
Reform the current legal system to prohibit courts from suspending and overturning policy/regulatory decisions systematically, and provide protection for individuals acting on behalf of a public authority.	✓
Separate responsibilities for policy formulation (ministry) from regulatory/marketing functions (regulator) (e.g. granting concession process) in order to eliminate the "double window".	✓
The Federal Commission of Telecommunications (Comisión Federal de Telecomunicaciones, COFETEL) should have greater autonomy to carry out its mandate and should have the power to enforce/revoke concessions.	✓
COFETEL should have the authority to declare significant market power and subject that company to appropriate remedies.	✓
The jurisdictions of COFETEL and the Federal Competition Commission (Comisión Federal de Competencia, COFECO) and the various other regulatory bodies should be clearly defined and co-operation should be formalised.	✓1
The regulator should have greater budgetary independence and a clearly defined and sufficient source of funding.	✓
The regulator should have the power to impose fines high enough to ensure regulatory adherence.	✓
Quality of service indicators should be published regularly.	✓
Wholesale indicators from dominant firms should be available to new entrants (e.g. access to leased lines, etc.).	✓
Establish formal public consultations and transparency procedures for COFETEL to follow to ensure increased accountability and transparency.	✓
Reform regulations to stimulate competition and eliminate regulations, except where clear evidence demonstrates that they are the best way to serve the broad public interest	
COFETEL should be authorised to regulate interconnection tariffs *ex ante* to foster competition among operators.	✓
Telmex (fixed-line incumbent) should be required to consolidate local dialling areas as determined by COFETEL.	✓
COFETEL should be authorised to declare bottlenecks and essential facilities and to establish non-discriminatory conditions to access these facilities.	✓
COFETEL should be able to undertake market reviews, declare market powers, and apply remedies as appropriate, and impose regulations to protect consumers.	✓
COFETEL should have the authority to impose a functional and structural separation of an operator that abuses its dominate power.	✓
COFETEL should set the "X factor" and administer price caps to regulate Telmex's end-user prices, including the use of "sub-caps".	✓
Only operators with significant market power should have to register their wholesale prices.	✓
Sufficient spectrum should be released to meet the growing demand for mobile broadband data service, including releasing some of the Federal Electricity Commission's (Comisión Federal de Electricidad, CFE) dark fibre. Incentives also should be put in place to promote infrastructure sharing.	✓
Modify the legal framework to promote infrastructure sharing and to remove barriers to obtain rights of way, by making governmental facilities available for mobile operators to deploy their networks and accelerating procedures to grant permits for rights of way.	Partial/in progress
The government should clarify the policy of universal service and define plans on how to effectively implement it.	Partial/in progress
The Federal Consumer Protection Agency (Procudaría Federal del Consumidor, PROFECO) and COFETEL should clarify their roles and take action to facilitate consumers to switch service providers.	✓
Broadcasting sector	
Telmex should only be allowed to provide TV services when it's subject to asymmetric regulations and is in compliance with such regulations.	✓
The government should award a third and fourth free-to-air (FTA) national TV license on a fair, non-discriminatory and neutral process.	✓2
Must-carry obligations should apply to all pay TV providers, which should be obliged to carry all terrestrial broadcasting signals. Must-offer obligations should also apply to FTA broadcasters and the conditions (e.g. price, channel bundling) should be reassessed periodically.	✓3
Ensure the transition to digital terrestrial television progresses to meet completion date of 2016.	✓
Foreign ownership restrictions on Mexican TV broadcasters should be lifted.	Partial
Cable operators should be able to obtain one national license for the whole country, instead of multiple regional ones.	✓

1. A recent judicial decision to allow both regulatory bodies to work jointly on the same case may undermine the progress made to close the "double window" between the Federal Telecommunications Institute (Instituto Federal de Telecomunicaciones, IFT) and the Ministry of Communications and Transport (Secretaría de Comunicaciones y Transportes, SCT) by opening one between the IFT and COFECE.

2. A third national licence is operational and a 2017 auction process will grant the spectrum which was initially offered for the fourth national broadcasting network.

3. The IFT plans a forthcoming assessment of the guidelines and outcomes of the must-carry must-offer obligations.

[12] OECD. (2017). Estudio de la OCDE sobre telecomunicaciones y radiodifusión en México 2017. Retrieved from

ANNEX II[13]

Recommendations to promote competition
The measures proposed by the IFT in its preponderance review of telecommunication services are found to be balanced and proportionate. Access seekers need to have elements such as local loops and leased lines available to them, together with the use of an effective electronic management system.
If market developments and the new preponderant measures do not increase competition over time, research and consultation should be carried out on options such as functional and structural separation of the preponderant agent as a last resort.
The IFT should assess the entry of Telmex into pay TV as soon as possible, following the successful implementation of its functional separation.
Transitory Article 9 of the Federal Telecommunication and Broadcasting Law which provides a fast track for non-preponderant agents to concentrate, should be eliminated.
The sector definitions of the telecommunication and broadcasting sectors should be revised periodically, taking the convergence of different communication services into account.
The IFT should continue to reduce termination rates, based on a thorough assessment of competition levels in the Mexican market. This can be done gradually over time at the discretion of the IFT. With respect to Internet interconnection, the functioning of the existing Internet exchange point (IXP) should be improved. Access to the IXP should be enhanced and additional IXPs developed across Mexico.
Continue to foster the adoption of Internet Protocol version 6 (IPv6) standards throughout Mexico.
Competition and plurality in audiovisual content should be enhanced through an evidence-based assessment of the provision of audiovisual services and of the diversity of media ownership, and a clarification of must-carry must-offer rules by the IFT.
The IFT should strengthen its research into cross-ownership, production and programming agreements related to telecommunication services and broadcasting.
Substantial market power investigations could be improved by giving the Investigative Authority (Autoridad Investigadora, AI) of the IFT more time than currently allowed to conduct them and by adding to the list of factors to be considered, information on changes in market shares over time, profit margins, and the history of entry and exit in the market.
The IFT should publish the commitments merging parties make to win approval for merger and acquisition transactions.

http://www.ift.org.mx/sites/default/files/estudio_de_la_ocde_sobre_telecomuncaciones_y_radiodifusion_en_mexico_2017.pdf

[13] Internal document on the[13] OECD (2017), OECD Telecommunication and Broadcasting Review of Mexico 2017. International Affairs Bureau (IFT)

The IFT should analyze network neutrality and monitor potential breaches as well as the evolution of differential pricing (zero-rating) and specialized services.
Recommendations to improve market conditions
Continue to lower barriers to investment in the telecommunication and broadcasting sectors: 1) abolish the remaining legal restrictions on foreign direct investment in the area of broadcasting) revise the reserved capacity requirements for satellites.
Eliminate the special tax on products and services levied on telecommunication services.
The way spectrum fees are divided between the auction fee and annual fees should be reconsidered and more analysis should be done on the fee structure to help guarantee that the auction process establishes a fair value for the use of spectrum. As a consequence, there might be a need to lower the current annual spectrum fees in future auctions to take into account the effects of these recurring fees on meeting policy objectives.
Barriers should be reduced for infrastructure deployment at the local and municipal levels. The Ministry of Communications and Transport (Secretaría de Comunicaciones y Transportes, SCT) should accelerate the elaboration of guidelines and co-ordination agreements for all levels of government and work with the different levels of government to implement them as soon as possible.
Instead of providing airtime for official use, broadcasting concessionaires should pay an annual license and spectrum fees in cash.
The Federal Telecommunication and Broadcasting Law (Ley Federal de Telecomunicaciones y Radiodifusión, LFTR) should be amended to allow for a more flexible imposition of sanctions, taking into account the principle of proportionality, particularly regarding consumer protection regulations. The LFTR should also be reformed to allow the IFT to impose sanctions on any person or entity violating the provisions set out by the IFT in the exercise of its powers.
Federal Telecommunication and Broadcasting Law (Ley Federal de Telecomunicaciones y Radiodifusión, LFTR) rules requiring registration of adhesion contracts should be reoriented towards enabling the Federal Consumer Protection Agency (Procudaría Federal del Consumidor, PROFECO) to require operators and services to provide contractual information in a format useful for consumers, such as through use of standard and simplified contracts.

The elements that the Ministry of Communications and Transport (Secretaría de Comunicaciones y Transportes, SCT) should include in its technical opinion to the IFT for granting concessions should be clarified. Accordingly, the SCT should be able to request relevant information from other ministries and authorities to inform its technical opinions.
Recommendations for domestic policies
The National Digital Strategy should be updated and revised, and milestones for the different elements of the strategy should be established.
Promoting private sector involvement for the Red Troncal and México Conectado programs can help overcome budget constraints and resolve other current implementation challenges.
Co-operation needs to be improved between governmental entities and across the different levels of government (central, state and municipal) for the México Conectado program. Furthermore, effective monitoring mechanisms should be put in place and satellite connections reduced once the Red Compartida is deployed. For the @prende 2.0 program, local communities and local levels of government should become involved and the strategy should be revised with regards to devices in the coming years. A close assessment should be undertaken of the effects of the program as outlined in its monitoring and evaluation section.
The development of digital skills should be furthered through the Puntos México Conectado program and skill training in firms should be promoted.
The successful deployment of the Red Compartida needs to be a priority for Mexico. Mobile network operators and mobile virtual network operators must have an incentive to use the network via appealing access offers that give them maximum freedom to innovate and design their service offers to end users. Potential obstacles such as access to international mobile roaming agreements need to be addressed from the beginning. Effective oversight by the Organism for the Promotion of Investment in Telecommunications (Organismo Promotor de Inversiones en Telecomunicaciones, PROMTEL) is essential to ensure that milestones are met. The 2.5 GHz auction should be executed as soon as possible.
A new social coverage scheme should be adopted that uses market mechanisms for achieving coverage obligations. The successful bidder should be required to indicate how it will monitor service quality, and these data should be made public for open review once available.
The demand for the Bicentario and Morelos 3 satellites should be assessed and their use should be revised.

A more flexible framework for the funding of public broadcasters should be established to enable them to meet their mandate in a rapidly changing environment.
Mexico should continue to improve the collection and analysis of statistical information in the broadcasting sector and with respect to connectivity coverage maps and the use of applications.
Recommendations on the legal and institutional framework
From a long-term perspective, the Constitution should retain the key principles and goals pertaining to the telecommunication and broadcasting sectors, such as digital inclusion. The more detailed prescriptions, especially those included in transitory articles, should be removed and, as appropriate, otherwise addressed, once their initial purpose has been achieved, in order to provide more flexibility to the different institutions to effectively perform their mandate in light of technological change.
While it is crucial that the general rules, acts or omissions of the IFT and the Federal Economic Competition Commission (Comisión Federal de Competencia Económica, COFECE) may only be challenged by indirect amparo trials not subject to suspension, the exception rule for fine and divestiture decisions for COFECE should also apply to the IFT.
Attributions among different governmental entities in formulating and implementing digital economy policy should be better aligned. Different options exist. Skilled personnel are crucial for designing effective digital economy policies; therefore staff should be carefully recruited.
The attributions of the Federal Economic Competition Commission (Comisión Federal de Competencia Económica, COFECE) and the IFT should be very clear. Parallel procedures should be avoided as should reopening a double window.
There should be a clearer definition of roles between the Federal Consumer Protection Agency (Procuraduría Federal del Consumidor, PROFECO) and the IFT on the operators' compliance regarding the provision of advertising, which should be entrusted to PROFECO. PROFECO could benefit from having a head with a fixed-term appointment.
Audiovisual content regulation could benefit from strengthening the IFT's role, especially to guarantee the rights of children and people with disabilities. The adoption of an approach that encourages co-regulatory and consumer empowerment mechanisms would also improve current audiovisual content.
The specialized courts would benefit from a modicum of in-house technical support. The budget assigned to the courts should allow judges and their staff to receive specific training in their areas of competence. The terms of appointment for the specialized judges should be extended to at least five years, and their appointments should be made in a manner that ensures continuity of expertise.
The number of Board members of the IFT and the Federal Economic Competition Commission (Comisión Federal de Competencia Económica, COFECE) could be reduced, as should the number of members on the IFT's Advisory Council.

The responsibilities of the IFT Board could be reviewed and the board should be able to delegate some of its responsibilities to the IFT's internal departments. The obligation to electronically record meetings between regulated entities and IFT commissioners could be simplified so as to retain only the publication of the dates of the meeting and the regulated entities with whom the commissioners are meeting.

NEW ZEALAND: AUCKLAND TRANSPORT ALIGNMENT PROJECT

Introduction

New Zealand is a developed economy with a population of 4.7 million people. The main city is Auckland which has a population of 1.37 million (30 per cent of the population). Given that Auckland is the major urban area in New Zealand, Auckland's economic success is important to the domestic economy. A key element of Auckland's success is ensuring that Auckland has a suitable land transport system.

New Zealand has experienced high levels of population growth over recent years, with the majority of these migrants going into Auckland. This has placed pressure on Auckland's infrastructure, including its transport system. It is expected that the population of Auckland will continue to grow rapidly over coming years, creating more need for investment in the transport system.

Auckland's transport system is jointly funded by the central government and the Auckland Council. As joint transport investors, the government and council have a shared interest in ensuring value for money from Auckland transport investments. To this end, the government and Auckland Council have agreed on the need to develop an agreed strategic approach to transport investment over the long term. This challenge gave rise to the Auckland Transport Alignment Project ('ATAP'), established in late 2015.

Pre-reform situation

Prior to the ATAP, transport funding decisions in Auckland were guided by two plans, the 'Basic Transport Network' and the 'Auckland Plan Transport Network' (APTN), which were developed by the Auckland Council and consulted on in 2015. The APTN identified an NZD 300 million per year funding shortfall if the program set out in the plan were to be implemented.

Prior to agreeing to additional funding or funding tools for Auckland transport, the central government wanted to be confident that investment in Auckland's transport system would address the regions transport challenges and provide value for money.

The ATAP project was therefore established to improve alignment over the way Auckland's transport system should develop over the next 30 years, and to test whether better returns from transport investment could be achieved than from the APTN, particularly in relation to the following objectives:

- To support economic growth and increased productivity by ensuring that **access to employment/labor improves** relative to current levels as Auckland's population grows.
- To **improve congestion results**, relative to predicted levels, in particular travel times and reliability, in the peak period and to ensure congestion does not become widespread during working hours.
- To **improve public transport's mode share**, relative to predicted results, where it will address congestion.

- To ensure any increases in the financial costs of using the transport system **deliver net benefits to users** of the system.

The agencies involved were the Ministry of Transport, Auckland Council, Auckland Transport, the New Zealand Transport Agency, the Treasury and the State Services Commission. The terms of reference for ATAP provided for three deliverables. The first, the ATAP Foundation Report, was published in February 2016 and provided an overview of the context (including the impact of technology), assumptions, problem definition, desired outcomes and measures. The second, the Interim Report, was published in June 2016 and provided preliminary conclusions, including the testing and evaluation of broad intervention packages. It also set out an emerging strategic approach and sought feedback from the parties to inform the Final Report. The third and Final Report, Auckland Transport Alignment Project Recommended Strategic Approach, was completed and submitted to Ministers and the Mayor on 31 August 2016.

Policy response

The ATAP sets out a strategic approach, agreed between Central and local Government, for the development of Auckland's transport system over the next 30 years that aims to improve returns from transport investment over the medium and long-term. A conclusion of the work is that, while changing the mix of investment would deliver improvements in some areas, it could not deliver a step change in performance and by itself would not result in transport investment keeping pace with projected growth in demand. A broader range of tools was therefore needed and hence the ATAP Final Report therefore recommended an ongoing strategic approach containing three integrated elements:

- Making better use of existing networks
- Targeting investment to the most significant challenges
- Maximizing new opportunities to influence travel demand, including the introduction of smarter transport pricing

The key difference between the APTN program and the recommended ATAP strategic approach is the proposed introduction of measures to influence transport demand, in particular the introduction of smarter transport pricing. The ATAP assumes that demand pricing will be fully implemented by 2036, although in practice a phased implementation in advance of this would potentially be possible.

The ATAP Final Report included an indicative package of investments that illustrated the type and quantum of investment likely to be required to deliver this strategic approach. The indicative package included all operational and capital expenditure by the NZTA, Auckland Transport and KiwiRail in Auckland over the next 10 years. The package in the Final Report was a mixture of committed and uncommitted investments and totaled around NZD 24 billion over the 2018–2028 period and NZD 84 billion over 30 years (at 2016 prices).

A new government was elected in late 2017. Further, since the ATAP Final Report was published expenditure forecasts were updated in light of population growth. The new government and Auckland Council have consequently jointly updated the ATAP plan in order to align the priorities of the new government with the existing priorities of Auckland Council. The updated ATAP proposes to invest NZD 28 billion in Auckland transport across the next

10 years and establishes a list of future priorities that will be brought forward if additional funding becomes available. This is now guiding the development of 2018 statutory transport planning and funding documents.[14]

It is important to note that the ATAP package is not an investment program and individual projects will still need to go through the required planning and funding processes to proceed. The timing and sequencing of projects assumed in the indicative program will also change as projects and growth continues. For example, some projects may need to be brought forward to meet demand.

The next steps for Auckland Transport are to work with the relevant agencies to implement the recommendations, progress business cases for high priority interventions identified in the ATAP report, and work through how transport funding processes can best reflect the benefits of enabling growth. These changes are expected to be seen through the proposed investment program for inclusion in the 2018–2028 Regional Long-Term plan.

Impact

A key goal of the ATAP was to improve alignment between central and local government in terms of the outcomes sought from investment in Auckland's transport system. The process was a major step forward in terms of providing agreement on a recommended strategic approach and priorities for investment between all of the agencies.

Challenges and lessons

A key challenge going forward will be maintaining alignment between the agencies so that the recommendations made by ATAP can be implemented as quickly and effectively as possible. Increases in population growth above what was originally expected also mean that the initial projections for funding requirements needed to be revised up. The plan therefore needs to be flexible enough to adapt to changing priorities over time.

Links

Informs the Background section above: Ministry of Transport, New Zealand. (2016). Auckland Transport Alignment Project: Foundation Report. Retrieved from https://www.transport.govt.nz/assets/Uploads/Land/Documents/Auckland-Transport-Alignment-Project-Foundation-Report.pdf.

Informs the ATAP Objectives section above. Ministry of Transport, New Zealand. (2017). Auckland Transport Alignment Project: Update to reflect faster growth. Retrieved from https://www.transport.govt.nz/assets/Uploads/Land/Documents/Auckland-Transport-Alignment-Project-Update-to-reflect-faster-growth-August-2017.pdf.

Informs most of the information above: Auckland Transport. (2016). Retrieved from https://at.govt.nz/media/1971357/item-115-atapfinal.pdf.

[14] Including the including the Government Policy Statement, Auckland Plan, National Land Transport Programme, Regional Land Transport Plan (RLTP), and the Long-term Plan.

NEW ZEALAND: BROADBAND ROLL OUT

Introduction

The goal of successive governments in New Zealand has been to improve access to broadband services in both absolute and relative terms. This culminated in the roll-out of the Ultra-Fast Broadband (UFB) program, a government sponsored project to achieve over 86 per cent fiber-to-the-home (FTTH) coverage by the end of 2022. The UFB program is currently at 68 per cent completion.

The UFB program includes a government contribution of almost NZD 1.8 billion, most of which will be returned to government, in nominal terms, by the time the project is completed. It also includes an estimated NZD 5.7 billion of private sector investment.

Once the UFB program is complete, New Zealand should be in the top five economies in the OECD for the proportion of the population that can access FTTH.

Pre-reform situation

In the early 2000s, Telecom was a vertically integrated telecommunications provider with a monopoly, or near monopoly position in some services and regions. It was a publicly listed company and successor to the state-owned Post Office (which has included post, telephony and banking).

There were concerns that broadband service offerings to New Zealanders lagged behind those of economies New Zealand regarded as peers. There were also concerns about competition and the level of investment in the sector, particularly around the ability of third parties to access the monopoly copper network and the rate of investment in broadband infrastructure.

The Telecommunications Act 2001 signaled a move from generic competition legislation to sector specific regulation, however there was a prolonged debate about whether the move was having any effect.

In 2006, the government mandated local loop unbundling and the operational separation of Telecom into retail, wholesale and network arms, with third parties able to access Telecom's wholesale services on the same terms as Telecom's retail arm.

Despite this change, there was continued debate about whether broadband infrastructure was being upgraded at the appropriate rate, particularly around whether Telecom had sufficient incentives to invest.

Policy response

In 2009 the government launched the UFB program, committing an initial NZD 1.345 billion to subsidize the roll-out of a FTTH network to 75 per cent of the population.

Build-own-operate contracts were offered on a regional basis. A condition of participation in the UFB initiative was that any company partnering with the government to provide wholesale UFB was not allowed to also provide retail telecommunications services.

The government entered into contracts with four companies to deliver UFB: three regional electricity lines companies and Telecom. As a condition of participating in the program, Telecom agreed to split into two companies; Chorus, a wholesaler covering copper networks and local loops; and Spark, a fixed-line retailer and mobile network operator.

The initial target of the program was for 75 per cent of the population to have access to FTTH. Since then, the target has increased to over 86 per cent with an additional NZD 437 million of government funding, including funds 'recycled' from the first phase of the program.

Rural areas have been provided broadband access (via xDSL or wireless technology) through a separate initiative, the Rural Broadband Initiative, that grant-funds broadband infrastructure in rural areas where UFB is not commercially viable.

Impact

The impact of the UFB program is that over 86 per cent of the population will be able to access FTTH by the end of 2022. Currently, 41.3 per cent of households with FTTH access are connected to the fiber network.

According to the most recent AKAMAI State of the Internet Connectivity Report (Q1 2017), New Zealand has an average internet connection speed of 14.7 Mbps, placing it 27th in the world.

Challenges and lessons

- Challenge: increasing both competition and capital investment in a sector at the same time. Previous legislative and structural changes increased retail competition, however did not create incentives for infrastructure investment.
- Lesson: government co-investment was required to incentivize private sector investment in broadband infrastructure.
- Challenge: getting a monopoly incumbent to offer good commercial terms to a government-subsidized project.
- Lessons: Commercial offerings needed to be structured to allow participation by new entrants. In particular it was important to ensure contract terms allocated risk to the appropriate party. In the case of UFB, contracts were divided into regions so that local electricity distribution network companies could participate, and the contracts were structured so that government took on the uptake risk. Partnering companies took on the construction and ongoing operational risk. It was necessary to bring in appropriate commercial skills to work closely with the policy team to ensure alignment of policy objectives with commercial offerings.

PAPUA NEW GUINEA: KUMUL REFORM AGENDA AND STATE-OWNED ENTERPRISE POLICIES

This case study discusses the recent reform on the management of the government's investments in the state-owned enterprises (SOEs) sector known as the Kumul Reform Agenda. It discusses how it has contributed to improving infrastructures developments. It also briefly discusses other SOE reform policies that were developed that would have contributed equally to improving operations/management of SOEs if implemented.

The case study will draw on the challenges faced whilst implementing the reform policies and also highlight lessons learned during the process. These would form the basis of future policy discussion, to develop or improve on in infrastructure service delivery in the economy.

Kumul Reform Agenda

The PNG Government has undertaken a major structural reform of its SOE portfolio through the Kumul Consolidations Reform Agenda. The Kumul reform was implemented in 2015 to address inefficiencies in the management of the government's commercial investments with SOEs.

Nearly all the government's commercial investments were formerly managed under the Independent Public Business Corporation (IPBC) of Papua New Guinea, which was a government owned corporation set up in 2002 under its own legislation (IPBC Act 2002).

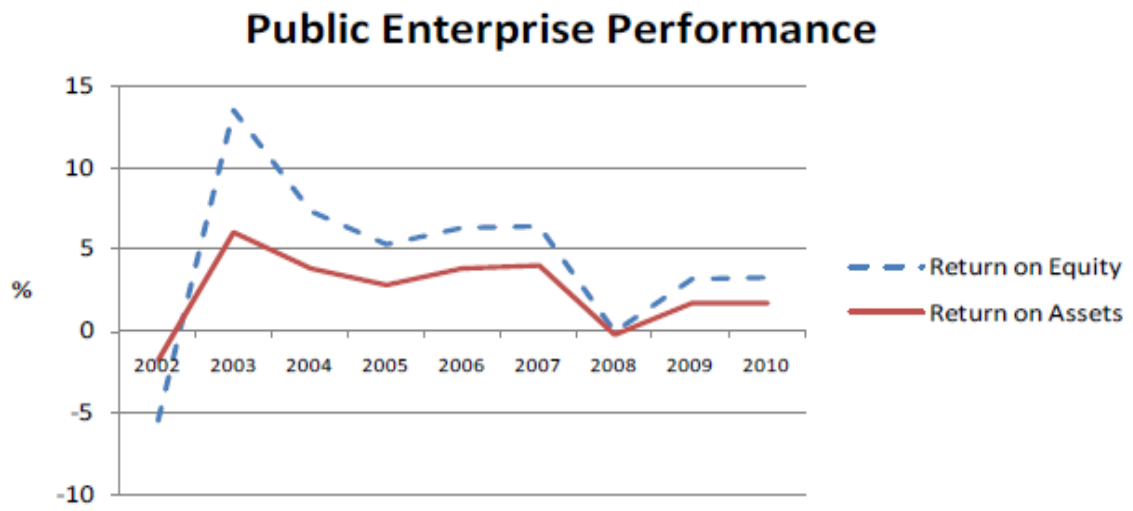
The IPBC managed all government's investments in the traditional SOEs together with the government's interests in the petroleum sector. These were all held and managed in a trust called the General Business Trust. The IPBC acted as the trustee of the GBT. The IPBC guided by its legislation, subject to Cabinet's approval, could also undertake certain investment activities, including the funding of high impact projects.

Prior to 2015, the efficient management of the government's commercial investments in SOEs have been an area of concern. The government requires effective and efficient management of its SOE's as they are directly involved in the provision of essential infrastructure services such as provision of telecommunication service, transport, electricity, water, finance and postal logistic services.

The government realized the importance of building capacity in the SOEs and therefore, has invested significantly in SOEs through direct capital funding. However, SOE's performance (productivity level) has remained relatively low despite capital contributions by the Government. Most SOEs are natural monopolies in their own sectors like power/electricity and water leading to no or little competition while some SOE services are regulated as well as with little competition that has created less incentive for SOEs to improve performances.[15]

[15] Note: Telecommunications - Communications monopoly effectively ended in 2007 with the offering of mobile phone/gateway licenses through ICCC & NICTA. The introduction of well financed and capable competitors changed the market from a publicly owned communications monopoly to a privately owned one.

Figure 2: SOE Performance 2002 - 2010



Source: ADB (Fig 29. Public Enterprise Performance) – PNG BUDGET Volume 1, 2014

The government, intending to improve the management of its SOEs, led to restructuring its SOE portfolio holding structure. Subsequent consultations and legislative changes were made to effect the new Kumul reform structure.

Building capacity

The government's assets underwent significant structural reorganization through the Kumul Reform Agenda. The Kumul reform has seen the government's commercial investment and assets placed in trust under three Kumul entities:

- **Kumul Consolidated Holdings (KCH)** is to oversee the government's infrastructure and service provision through its SOEs. KCH is the holding entity of the General Business Trust, which holds the government-owned assets formerly managed by the IPBC;
- **Kumul Minerals Holdings (KMH)** to hold all government's interests in mining projects including those previously held by Petromin (SOE); and
- **Kumul Petroleum Holdings (KPH)** to hold the government's interests in oil and gas projects including the PNG LNG project. It also holds those assets formerly held by an SOE – the National Petroleum Company of PNG (NPCP).

The Kumul structure was anticipated to enable a governance regime that applies corporate principles to the management of the government's investments. The Kumul reforms were intended to improve synergy, coordination and efficiency in the government's participation in commercial activities. This included the aggregation of government companies and interest under the KCH, KMH and KPH.

The Kumul entities are guided by their own governing legislations which outline their responsibilities and roles. They operate independently in managing government investments, delivering high impact projects and providing budget support to the government through dividend payments.

There are various capital infrastructure projects that the Kumuls are progressing throughout the economy currently. For instance, KCH is undertaking the implementation of the Port Moresby Sewerage Upgrade Project (POMSSUP) – upgrading of the coastal sewerage system to improve health and hygiene for the people, infrastructure development in the port sectors, hydro power project discussions – for sustainable power sources for the economy and many other impact projects that will contribute to the betterment of the people. The infrastructure development projects are done in line with the overall policy direction of the government.

Other SOE reform policies to support the Kumul Agenda

Other policy initiatives were developed by the government in its attempt to contribute to improving SOE performances include the Dividend Policy passed in 2015 and the State Guarantee Policy.

On-Lending Policy

The On-Lending policy promotes transparency and resource efficiency by on-lending to government agencies. Basically, through various commercial lending arrangements, the government receives a loan from a financial institution/s and is responsible for making repayments to the financial institution. The government then passes on the loan principal to a government agency or SOE which in turn repays the principle to the government.

The on-lending arrangement builds capacity in government agencies to be able to access financing on favorable terms from the government, to deliver high infrastructure projects in the county.

There are currently a number of on-lending agreements in place between the government and other government entities. These arrangements are on the financing of priority impact infrastructure projects in the economy. One of this high impact project is the Lae Tidal Basin Project undertaken by KCH and PNG Ports Corporation. The project has enhanced the port infrastructure capacity for the Lae Port. As the port sector in general is a vital link between the Papua New Guinean economy and the rest of the world, with more than 80 per cent of Papua New Guinea's exports shipped through this port. The Lae Tidal Basin project will contribute significantly to improving trade capacity and enhance development of the Papua New Guinean economy.

These policies were specific reforms on SOEs to encourage efficiency in the delivery of services and improve profitability of SOEs.

Challenges and lessons learned

The government's Kumul reforms have not addressed all the structural reform issues associated with the operations and management of SOEs. There needs to be more policy dialogue and better coordination of the existing SOE reform policies.

The government needs to implement other reform policies such as the Community Service Obligation (CSO) and Public Private Partnership Policy to complement its Kumul reform objectives and deliver infrastructure and services efficiently.

The CSO Policy, which was developed and endorsed in 2013 to enhance SOE financial performance needs to be implemented. This would allow SOEs to offer services which would be otherwise commercially unviable; the government subsidizes the cost of providing the CSO services.

The government could also embrace the PPP Policy to pursue most of the big infrastructure projects that KCH is currently undertaking. This policy would ease the government of fiscal pressure and transfer most of the cost and risks to the private sector.

Furthermore, reforms to introduce a National Procurement Policy would streamline procurement planning process and framework to enable efficiency and improve service delivery to the people.

Going forward

In general, SOEs performance can only be improved through better structural reforms on corporate governance and management. Better and improved planning and monitoring on the Government's investment performance and through increase capacity to be able to efficiently and effectively deliver services.

The government would achieve better outcomes in pursuit of infrastructural developments if more SOE reform policies such as CSO and PPP would be implemented alongside the new Kumul structure. The effective implementation of these policies continues to be a challenge. However, efforts are still being made to progress the SOE reforms.

THE RUSSIAN FEDERATION: PPP REFORM FOR INFRASTRUCTURE PROJECTS

Introduction

The Russian economy has exited recession and grew by 1.5 per cent in 2017. Both private consumption and investment rose by more than 3 per cent, while export growth exceeded 5 per cent. Import demand increased by 17 per cent, thus making a strong contribution to growth in Russia's main trading partners. Going forward, the key preconditions for stronger growth are stable, rule-based macroeconomic framework and reforms to boost potential GDP and inclusiveness. Concerning fiscal policy, gradual fiscal consolidation (federal budget deficit is projected to fall to 0.8 per cent of GDP by 2020 compared to 1.4 per cent of GDP in 2017) will ensure that public debt stays at low level and that there are no crowding-out effects for private investment. The fiscal rule, which ties public expenditures to revenues based on a conservative assumption for oil prices (USD 40/barrel), results in rebuilding of fiscal buffers. It also has an additional benefit of lowering exchange rate volatility, contributing to reducing uncertainty for exporters and importers. Concerning monetary policy, the Bank of Russia's inflation targeting regime succeeded in lowering inflation below 4 per cent in 2017 and in gradual reduction of inflation expectations. Given the absence of price pressures from fiscal policies, there is space for continued gradual monetary easing, which will have positive effects on investment. High resilience to possible external shocks is ensured by adequate reserves, positive net foreign assets position and floating exchange rate regime.

As for state of infrastructure, government spending on this sector amounted to RUB 1.6 trillion (about USD 25.3 billion) in 2017, which makes about 16 per cent of total budgetary expenditures. In 2018 it is expected to increase the pace of road construction (from 326km in 2017 to 982km in 2018), ports capacities (from 722 million tons in 2016 to 966 million tons in 2021), export of transport services (from USD 14.5 billion in 2016 to USD 19 billion in 2021). It is anticipated that these objectives will be reached by using mainly concessions and PPP agreements.

Pre-reform situation

Until recently the Federal Law No. 115-FZ 'On Concession Agreements' dated 21 July 2005 (the 'Concession Law') was the main legislative act in Russia governing the procedure for the implementation of public-private partnership (PPP) projects at the federal level. However, concession legislation limits the structuring of PPP projects to a model, where the right of ownership of a facility remains with the public authority.

Over the past 15 years most Russian regions adopted their own regional PPP laws to provide options for implementing PPP projects that were based on private ownership of the relevant infrastructure objects. The regional authorities filled in the legislative gap that existed at the federal level as the federal legislation at the time did not provide for infrastructure objects to be held in private ownership in the context of PPP projects. As a result, it was difficult to use many common international PPP models, such as build-own-operate (BOO) and build-own-operate-transfer (BOOT), without the adoption of a regional legislation that allows private

ownership of infrastructure objects. The most notable example of a regional PPP law was the St. Petersburg PPP law, which was adopted in 2006.

Policy response

On 1 January 2016 the Federal Law No. 224-FZ 'On Public – Private Partnership, Municipal – Private Partnership in the Russian Federation and Amending Certain Legislative Acts of the Russian Federation' (the 'PPP Law') entered into force. The PPP Law will coexist with the current concession legislation, creating the legal framework for the use of PPP forms (models) that also allow transferring the ownership of a facility to an investor (a project company). This will provide the possibility for market participants to choose the most beneficial form for the implementation of a PPP project and, consequently, increase the number of such projects implemented on the market.

Pursuant to the PPP Law a public – private partnership agreement is defined as a civil law agreement concluded between the public partner and the private partner for the period of no less than three years based on the principles of resource consolidation and risk allocation between the parties to the agreement (the 'PPP Agreement'). Under the law only a legal entity established under the laws of Russia may become a private partner. That said, the law, however, does not impose any restriction in relation to foreign shareholding of a private partner.

Under a PPP agreement the private partner must (re-)construct an infrastructure object, fully or partially finance such (re-)construction, as well as operate and/or maintain the object. The private partner may also be required to prepare the design documentation, and fully or partially finance the operation and/or maintenance of the object.

The law contains an exhaustive list of infrastructure objects that may form the subject of a PPP agreement. This list, among others, includes private roads, bridges, roadside utilities, public transportation (excluding metros), railways, pipelines, sea and river ports, airports, electricity generation plants, public health facilities and social infrastructure. Any infrastructure that cannot be held in private ownership under the Russian law is excluded from the scope of the new Law. Such infrastructure objects may only be subject to a concession agreement.

Impact

The adoption of the new law has become a significant milestone in the development of the legal regulation of the Russian PPP sector. The law is aimed at attracting private investment in Russian infrastructure (which is already existing under the Law on Concession Agreements) and provides investors and financial lenders with PPP models and security instruments that are commonly used in international best practices.

In 2016, when the law entered into force, the number of PPP projects in Russia surged from 873 (2015) to 2,183. Private investments in PPP projects also increased from RUB 408 billion in 2015 (about USD 6.5 million) to RUB 1.3 trillion (about USD 20.6 billion) in 2016.

Challenges and lessons

The main challenge was that the adoption of the new law has created certain legal difficulties for investors with respect to the regional PPP laws and the PPP projects that were implemented on the basis of such regional laws. For example, large projects in Saint Petersburg, such as

Pulkovo Airport and Western High-Speed Diameter, are currently implemented with the participation of public banks, which the new law does not consider as a PPP project.

In order to manage this challenge, the existing regional PPP laws will have to be brought in line with the provisions of the federal law by 1 January 2025. Otherwise, such regional laws will only be effective if they do not contradict the new federal law. Also, the law states that PPP agreements signed under the regional PPP laws before 2016 remain in force as signed until their expiration. All of these clarifications and exemptions are in place in order to ensure that the projects which were signed under regional laws will be implemented without any legislative obstacles.

Going forward

As it is seen from the results of two first years of the new PPP Law's implementation, the number of the PPP projects increased 2.5 times and the prospects of further growth look rather optimistic. At the moment there are 2,980 projects registered in the common PPP projects database. The majority of projects are implemented in electric and public utilities (81.51 per cent) that are followed by social infrastructure (12.35 per cent) and transportation (2.92 per cent). Other spheres comprise 3.22 per cent. Moreover, the government continues to establish special institutes to promote and support PPP in infrastructure, such as the federal platform to support the PPP projects in Russia. The platform provides investors with the up-to-date information on the recent developments of PPP in Russia and supports the application and implementation of the PPP infrastructure projects. The platform is being maintained by the National PPP Center with support of the Ministry of Economic development of the Russian Federation. Moreover, in March 2018 Russia has endorsed one of the biggest planning strategies of the infrastructural development structural reforms, that involves 16 aspects and instrument of infrastructure development, including better PPP implementation, called 'The Roadmap on the PPP instruments development', which should create more favorable environment for private sector investment into infrastructure in Russia.

VIET NAM: REFORM IN TELECOMMUNICATION SECTOR[16][17]

Introduction

The services sector has retained its importance in Viet Nam's economy, despite different pattern of growth in 2000–2006 and 2007–2017. During 2000–2006, the services sector's growth has been robust, averaging at 7.18 per cent per annum. Due to relatively slower growth compared to overall GDP, the share of the services sector in GDP fell from 38.73 per cent in 2000 to 38.06 per cent in 2006. Meanwhile, the share of the services sector in total employment went up to 25.6 per cent in 2006 from 21.8 per cent in 2000. Labor productivity in services sector increased on average by 8.2 per cent per annum during 2000–2006.

After the WTO accession in 2007, Viet Nam's economy exhibited relatively slower growth due to global downturn and domestic restructuring attempts. Still, the decrease of the services sector's share of GDP growth was significantly smaller compared to other sectors. On average, the growth of the services sector share of GDP reached 5.61 per cent per annum during 2007–2017. The share of services in total employment rose from 28.2 per cent in 2007 to 33.4 per cent in 2014.

Continuous growth of the services sector since 2000 was driven by series of reforms in Viet Nam. First, the legal framework was gradually improved towards facilitating private business activities in general and private provision of services in particular. Specifically, the Common Investment Law and Unified Enterprise Law were issued in 2005 to establish a framework for more equal regulatory treatment over business and investment activities, irrespective of the ownership form. In 2014, both of these laws were amended again, aiming to realize 'full freedom of doing business' for the business entities, unless there are prohibitions or conditions imposed by the Government.

Second, Viet Nam equitized a number of state-owned enterprises since early 2000. It should be noted that many of the equitized enterprises were dominant firms or monopoly in key services areas such as distribution, telecommunication, banking, etc.

Third, competition policy was improved and enforced more effectively. In various sectors, such as telecommunication, post, financial services, etc., the competition between state-owned services providers and private ones were gradually nurtured and protected.

Finally, Viet Nam actively participated in a number of free trade agreements (FTAs), which both opened up the opportunities for services and incorporated liberalization of the services sector. The first important arrangement was Viet Nam–US bilateral trade agreement – signed in 2000, in effect since 2001. Upon WTO accession, Viet Nam has committed to open market to 11 services sectors, or 110 subsectors out of 155 subsectors according to the WTO's services classification.

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[16] Lee, R.C. (2011), Telecommunications in Viet Nam. Report prepared for APEC SOM2 and Related Meetings in 2011.

[17] National Assembly of Viet Nam (2009), Law on Telecommunication.

Pre-reform situation

Prior to the reform, Viet Nam's telecommunication was underdeveloped. Until 1990, the sector was originally provided solely by state-owned enterprises. The diversity of services was limited. Access to modern telecommunication services and equipment was slow due to limited resource of the government, limited innovation capacity and poor competition. By 1995, Viet Nam attained an average of only 3.8 telephones per 100 people, which was much smaller than other Southeast Asian economies. This was then translated into higher communication costs for firms, which was of importance as Viet Nam was in early stage of development.

Policy response

Reforms of the telecommunication sector include: (1) horizontal measures which affect all sectors in Viet Nam's economy; and (2) specific measures on the telecommunication sector in Viet Nam. Specific structural reform measures in the telecommunication sector since 2000 include: (1) relaxation of entry for private providers, including foreign ones, in the telecommunication market; (2) equitization of government-owned telecommunication providers; and (3) enhancement of competition in the telecommunication market via regulatory changes and enforcement of competition law.

Reforming Viet Nam's telecommunication sector was a long process. In 1995, Saigon Postel – a joint stock company – was established, marking the end of government monopoly in the sector. The Military Electronic and Telecommunication Company (Viettel) was then established in 2004 and became another major competitor.

Government Decree 55/2001/ND-CP issued in 2001 excludes Internet services from the government dominating policy. Specifically, ISP business were open to the private sector and foreign investors, though the provision of Internet exchange was reserved to government owned operators or operators where the government holds majority shares.

Meanwhile, foreign investment in Viet Nam's telecommunications sector was first introduced in the form of a Business Cooperation Contract (BCC) scheme. However, the foreign partner does not have an equity claim in the assets and does not have any managerial control on the project. The first BCC scheme was established in 1988. Until 2009, there remained a number of BCCs in operation. Relaxation in foreign participation took a significant step forward when Viet Nam ratified the Viet Nam–USA BTA. The Viet Nam–USA BTA includes not only Viet Nam's commitments and obligations in the telecommunications sector but also a roadmap and blueprints for future reform. The BTA requires Viet Nam, among other things, to adopt the regulatory principles set out in the WTO Reference Paper on Basic Telecommunications so as to establish a transparent and pro-competitive regulatory regime, with the regime maintaining an arm's length with operators.

A second reform milestone was Viet Nam's WTO accession in 2007. As part of its accession commitments, Viet Nam in essence offered to all WTO members, on a most-favored nation basis, more favorable market access conditions than those offered to US companies in the BTA. This allowed joint ventures with foreign partners to provide telecommunications services related to network infrastructure such as telephone services, packet-switched data transmission services, circuit-switched data transmission services, telex services, telegraph services, facsimile services and private leased circuit services.

In terms of domestic regulations, the Law on Telecommunication in 2009 and the Competition Law in 2004 have delivered the key reforms of competition in the telecommunications sector. The Law on Telecommunications in essence establishes a framework for telecommunications regulations, with many specific regulatory items to be developed by implementation rules and regulations in the future. Relaxation of entry to the telecommunications sector, as per Viet Nam's commitment upon joining WTO, was also incorporated in the law. The law also provides for a regulatory authority to be established and in charge of regulating competition issues in the telecommunications sector and will act as a dispute settlement body for interconnection and infrastructure sharing disputes. Meanwhile, the Competition Law and its Implementation Decree No. 116/2005/ND-CP classify various telecommunications providers in Viet Nam as those with significant market power. Therefore, such providers must submit any proposal to change the retail tariff to the Ministry of Information and Telecommunications (MIC) before issuing the tariff. Moreover, 'basic' and 'important' interconnection charges that would greatly affect the telecommunications market are decided by the MIC.

The Law on Legal Normative Documents, which incorporated substances of good regulatory practices (such as regulatory impact assessment, public consultation), was only issued in 2008 and then amended in 2015. As such, one could hardly expect to collect regulatory impact assessment for related regulations of telecommunication sector. Nor were there any attempts to consult stakeholders other than the government agencies and key government owned providers in the sector. Since 2009, however, the regulations that ignited reforms in telecommunications were widely consulted and incorporate regulatory impact assessment. Nonetheless, the impact assessment was rather simple and largely qualitative in manner.

Impact

The reforms led to significant growth of telecommunication. Gross revenues of telecommunication sector rose by almost 6.2 times over the period 2007–2016, or on average by 22.4 per cent per annum. The GDP share of the information and communication sector grew on average by 8.8 per cent per annum in 2007–2017, albeit slower than in 2005 (16.3 per cent) and 2006 (9.68 per cent). In addition, Viet Nam has since moved from an underdeveloped economy to join many of its developed peers in the region in fixed-line availability. Mobile services in Viet Nam again shows a jump-start style of network expansion, surpassing both Indonesia and the Philippines during 2007–2008. The number of mobile subscribers increased by roughly 19.9 per cent per annum during 2007–2016. In the same period, the number of ADSL subscribers rose by 31.6 per cent on annual average.

The reforms contributed to improve the efficiency of various enterprises in Viet Nam. With improved quality and availability of telecommunication services, the enterprises in Viet Nam could contact and/or coordinate with their customers and network of suppliers at enjoyably smaller costs. This enhances the competitiveness of Vietnamese enterprises and ensure that they could join the global value chains in a timely manner.

Challenges and lessons

Reforms of the telecommunication sector in Viet Nam encountered several challenges, particularly before 2007 (the milestone of major reforms). First, increasing competition and private participation in the sector encountered difficulties, due to: (1) previous dominance of

the government-owned providers; (2) inadequate institutional and technical capacity of competition authority to address competition cases in the sector; and (3) ambiguity in the classification of telecommunication as public services, given that rural access to such services was also a priority. Second, improving regulatory institutions and processes were seen as critical, but entailed ample technical challenges. Third, restructuring and reforming the dominant carriers are no easy task, as was observed in the generally slow process of reforming state-owned enterprises in Viet Nam until 2016.

Some key lessons could be drawn from the reforms of telecommunication sector as follows:

- The sizeable benefits from reforming telecommunication sector shows that such reforms were simply irreversible. As such, economy-wide perspective should be adopted in structurally reforming the sector.
- Enhancing competition and/or contestability of telecommunication helps maximize the value for consumers;
- Devising a consistent and feasible roadmap for reforming telecommunication sector plays an essential role;
- Leveraging the external pressures can be beneficial in sustaining the momentum for reforming telecommunication sector.

Annex 2:

Individual Economy Reports

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AEPR 2018: Structural Reform and Infrastructure
Individual Economy Report Questionnaire

This year's AEPR is on the topic of structural reform and infrastructure, with a focus on how structural policies for infrastructure can improve the efficiency of infrastructure provision and management, support inclusive growth and promote economic and environmental resilience. Challenges in the provision and management of digital infrastructure and supporting connectivity between economies will be cross-cutting themes throughout the report, given the importance of digital technology and connectivity to economic growth going forward. Economies are encouraged to include learnings on these themes.

As an important aspect of the AEPR, the Individual Economy Reports (IERs) provide an opportunity for economies to identify ways forward for structural reform to improve infrastructure provision and management, support inclusive growth and improve resilience. The IERs will be incorporated into the report, and will contribute to developing a broader picture of the lessons, gaps, challenges, and opportunities in implementing structural reform for infrastructure. The IERs will also contribute to identifying avenues for regional cooperation and capacity building.

For the purposes of this questionnaire, we define structural reforms for infrastructure as including reforms relating to: public sector governance and management, competition policy, ease of doing business, standards and international norms relating to infrastructure[1], the regulation of or legal framework for infrastructure, or for markets that support infrastructure (such as funding markets/related service markets), among others. Policies are included if their ultimate aim is to: improve the efficiency of infrastructure provision and management; improve the operation of markets relating to infrastructure; support broad access to infrastructure across the population in order to ensure the benefits of infrastructure investment are widely shared; or support the resilience of infrastructure and related markets.

For the purpose of this report infrastructure systems that are resilient are systems that can withstand disruption, absorb disturbances and recognise changing conditions over time, and in particular are robust to emergent and shock events from new technology, temperature extremes and weather events. Furthermore, we define inclusive growth as a pattern of economic growth that provides greater opportunities for economic participation and employment among underprivileged segments of society, or segments of society that are underserved in terms of infrastructure, such as remote regions, the poor, indigenous peoples, minorities, women or youth and people living with disabilities.

Where an economy has provided a case study that it wishes to use in this IER, the economy may cross refer to that case study. Economies should provide the following information to the extent available for their economy:

[1] Examples of standards and international norms include G7 Ise-Shima Principles for Promoting Quality Infrastructure Investment and the WTO's Agreement on Government Procurement.

Questionnaire

Please limit responses to a maximum of four pages in total.
Capabilities: what significant policy or institutional structures (e.g. top 2) support your economy in meeting the following objectives. Economies could discuss whole of Government policies or policies that apply at a sector specific level: o **Cost effectiveness: Providing for the efficient provision and management of infrastructure and the efficient operation of infrastructure markets, including providing for cost-based access;** o **Resilience: Enhancing adaptability and ensuring the infrastructure system is robust to disruptions and shocks;** o **Inclusion: Ensuring broad access (e.g. across regions, genders, underserved or minority groups and indigenous people) to infrastructure, including digital infrastructure, to support inclusive growth?** **Gaps: What are the highest priority structural or institutional reforms you have identified to meet these objectives?** **Barriers and challenges: What are the key barriers and challenges to implementing structural reforms for infrastructure in your economy and has your economy identified any solutions to overcome those barriers or challenges?**
Needs and financing requirements: What are your economy's main (e.g. top 2-3) identified physical and digital infrastructure needs over the medium-long term? Please describe the required financing and expected impact of these infrastructures. **Future needs: What are the main factors (e.g. population increase, technology, climate change or variability, ageing capital stock) that will influence your economy's future physical and digital infrastructure needs?**
Leading practices: Among your economy's structural reforms relating to infrastructure in the past 5 years (2013-2018), which two do you think have been implemented most effectively? Please identify the main reasons for the effectiveness of this structural reform that could be relevant for other economies.
Regional cooperation: What role can regional cooperation and regional bodies such as APEC play? You may like to consider the role of cooperation in addressing the challenges and policy gaps previously identified, in enhancing the investment environment, in making more possible cross-border/regional connectivity projects and in promoting co-ordination of development funding. **How can we ensure that Asia Pacific has top-quality physical and digital infrastructure to ensure maximum connectivity? What would be the benefits to your economy from improved connectivity?**

AUSTRALIA

Capabilities: what significant policy or institutional structures (e.g. top 2) support your economy in meeting the following objectives. Economies could discuss whole of Government policies or policies that apply at a sector specific level:

- **Cost effectiveness: Providing for the efficient provision and management of infrastructure and the efficient operation of infrastructure markets, including providing for cost-based access;**
- **Resilience: Enhancing adaptability and ensuring the infrastructure system is robust to disruptions and shocks;**
- **Inclusion: Ensuring broad access (e.g. across regions, genders, underserved or minority groups and indigenous people) to infrastructure, including digital infrastructure, to support inclusive growth?**

Gaps: What are the highest priority structural or institutional reforms you have identified to meet these objectives?

Barriers and challenges: What are the key barriers and challenges to implementing structural reforms for infrastructure in your economy and has your economy identified any solutions to overcome those barriers or challenges?

In Australia, responsibility for the provision of most economic and social infrastructure lies with the state, territory and local governments. In some States, core utilities (electricity and telecommunications) are provided by both private and public entities. However, in others, major utilities service providers are owned by the State. The other tiers of government are primarily responsible for planning and providing public services (such as schools, hospitals, roads, water and sewerage).

The states, territories and local governments raise revenues from taxes and charges to fund the delivery of these and other services they provide. To supplement this, the central government provides additional funding support to the other tiers of government through general-purpose financial assistance grants and grants for individual transport infrastructure projects. Each government is responsible for planning, delivery and operation of their services, which is done through departments and with ministers accountable for this to their communities. In many States, this is supported by independent infrastructure planning and advisory bodies, who provide written advice to the government on specific infrastructure matters. This includes assessment of government or private sector proposals, government infrastructure plans and intergovernmental submissions.

In 2008, the Australian Government established Infrastructure Australia (IA) to advise on Federal financial support for transport and other infrastructure. IA provides independent research and advice to all levels of government as well as investors and owners of infrastructure on projects and reforms Australia needs in order to fill the infrastructure gap. Australia released its first Infrastructure Plan, which sets out the infrastructure challenges, and opportunities Australia faces over the next 15 years.

In March 2018, IA released an update to the Infrastructure Priority List. The **Priority List** is a critical reference point for the most important investments needed to address critical infrastructure gaps. The Priority List is updated regularly to reflect emerging infrastructure priorities across Australia and provides independent, evidence-based advice to governments and industry on the projects that will most benefit our growing communities. The latest Priority List identifies over $A55 billion worth of economy-shaping projects. Of the five highest priority projects, four relates to addressing urban road congestion and one relates to economy-wide connectivity and boosting Australia's aviation capacity.

These arrangements at the economy-wide and state/territory/local level are intended to provide the institutional structures to support sound decisions on economic and social infrastructure. They are also intended to facilitate good outcomes but decisions are ultimately made by governments taking advice into account which are accountable to the community.

Australia has a long history of structural reform in infrastructure. Over the 1980s and 1990s, the Australian Government partially deregulated and restructured airlines, coastal shipping, telecommunications and wharves/ports. In addition, across-the-board commercialisation, corporatization and privatization initiatives for government business enterprises were progressively implemented around the same time.

The Australian Government is committed to continued improvement of its infrastructure delivery in the water, telecommunications, transport and energy infrastructure markets. Key barriers and challenges to implementing structural reform for infrastructure are emerging technologies (including rapid speed of change) and barriers to entry for mobile network providers in regional Australia.

The Australian Government recognises that new, flexible approaches to regulation will enable technological benefits to be realised, reducing barriers to competition in infrastructure services and delivering efficiency gains to consumers and businesses. The Government considers, and seeks to reduce the regulatory burden on businesses, individuals and community organisations, through its Regulatory Reform Agenda, under which it made decisions to reduce red tape by a net $4.8 billion between September 2013 and December 2015. In November 2015, the Government announced it would strengthen the Regulatory Reform Agenda to focus on changes enhancing innovation, competition and productivity.

The construction and completion of the National Broadband Network (NBN) will improve telecommunications in Australia, including in regional areas. The Government expects NBN Co Limited to make the NBN fixed wireless towers open to co-location from mobile network operators. As a result, mobile network operators have begun co-locating equipment on a number of NBN fixed wireless towers. NBN Co Limited has developed a Cell Site Access Product, which will enable it to leverage the Government's investment to deliver additional telecommunication service improvements in regional areas. In addition, the Government's Mobile Black Spot Program (rounds 1 and 2) encourages the sharing of mobile base stations and associated infrastructure by mobile network operators.

Needs and financing requirements: What are your economy's main (e.g. top 2-3) identified physical and digital infrastructure needs over the medium-long term? Please describe the required financing and expected impact of these infrastructures.

Future needs: What are the main factors (e.g. population increase, technology, climate change or variability, ageing capital stock) that will influence your economy's future physical and digital infrastructure needs?

Australia's three main identified physical infrastructure medium-long term needs are:

- **Sydney Metro:** Increasing the City and Southwest rail network capacity (see pg 20 of **priority list**)
  - Funded jointly by the Australian Government, the State Government and the Private Sector
  - The project's major benefits will be for public transport users through travel time savings and reliability improvements. The proponents stated benefit-cost ratio for conventional benefits is 1.3.
- **Western Sydney Airport:** Boosting domestic connectivity (see pg 21 of **priority list**)
  - Funded jointly by the Australian Government and the Private Sector
  - Addressing the identified capacity constraint would improve productivity and facilitate broader economic impacts such as increased trade, tourism and foreign direct investment, and wider economic benefits such as agglomeration benefits derived from improved connectivity between businesses (including the clustering of airport businesses). The proponents stated benefit-cost ratio is 1.9 (7% real discount rate), not including wider economic benefits.
- **Southern Sydney to CBD public transport enhancement:** connection between inner south urban area and Sydney CBD (see pg 41 of **priority list**)
  - Funding, options development and benefits to be determined.

The major digital infrastructure requirement is ensuring access to reliable broadband internet. The Australian Government is delivering an economy-wide broadband optical fibre network which is being undertaken by a government owned company and funded by equity and debt provided by the Australian Government. The NBN Co charges wholesale rates to internet service providers that provide end users with services at retail rates. The NBN is underpinned by a purpose to connect Australia and bridge the digital divide. NBN's key objective is to ensure all Australians have access to fast broadband as soon as possible (2020), at affordable prices, and at least cost.

Australia's historically has high current levels of population growth and expected aging are significant challenges in the medium to long term. The arrangements noted above (in the previous question) are intended to deal with this challenge by providing the planning and delivery structures to support appropriate infrastructure decisions.

Leading practices: Among your economy's structural reforms relating to infrastructure in the past 5 years (2013-2018), which two do you think have been implemented most effectively? Please identify the main reasons for the effectiveness of this structural reform that could be relevant for other economies.

The establishment of independent infrastructure planning arrangements by the national and lower tiers of government provides a strong platform for sound funding decisions to be made.

A continued focus towards adopting market-based arrangements for infrastructure delivery has provided a good platform for increased efficiency and effectiveness of infrastructure services. This improves the quality of resource allocation decisions and increases productivity throughout the economy. Much of the structural reform initiative were undertaken prior to this period but it remains a core policy achievement and an ongoing priority.

Regional cooperation: What role can regional cooperation and regional bodies such as APEC play? You may like to consider the role of cooperation in addressing the challenges and policy gaps previously identified, in enhancing the investment environment, in making more possible cross-border/regional connectivity projects and in promoting co-ordination of development funding.

How can we ensure that Asia Pacific has top-quality physical and digital infrastructure to ensure maximum connectivity? What would be the benefits to your economy from improved connectivity?

APEC is the premier forum for facilitating economic growth, cooperation, trade and investment in the Asia-Pacific region. APEC operates on the basis of non-binding commitments, open dialogue and equal respect for the views of all participants. Unlike the WTO or other multilateral trade bodies, APEC has no treaty obligations required of its participants. Decisions made within APEC are reached by consensus and commitments are undertaken on a voluntary basis. APEC's non-binding, consensus approach creates an environment to incubate ideas.

APEC has an established a strong work plan on procuring infrastructure. This includes enhancing the government's ability to plan infrastructure projects considering lifecycle cost, environment, safety, quality. The APEC Guidebook on Quality of Infrastructure and Development and Investment is an example of shared best practices for government officials and other stakeholders to detail common recognitions for infrastructure development and investment. In addition, APEC has played a role towards bridging the infrastructure-funding gap in the region.

Australia stands to gain from improved regional infrastructure services through trade and the experience and skills it can offer regional economies.

BRUNEI DARUSSALAM

Capabilities: what significant policy or institutional structures (e.g. top 2) support your economy in meeting the following objectives. Economies could discuss whole of Government policies or policies that apply at a sector specific level:

- **Cost effectiveness: Providing for the efficient provision and management of infrastructure and the efficient operation of infrastructure markets, including providing for cost-based access;**
- **Resilience: Enhancing adaptability and ensuring the infrastructure system is robust to disruptions and shocks;**
- **Inclusion: Ensuring broad access (e.g. across regions, genders, underserved or minority groups and indigenous people) to infrastructure, including digital infrastructure, to support inclusive growth?**

Gaps: What are the highest priority structural or institutional reforms you have identified to meet these objectives?

Barriers and challenges: What are the key barriers and challenges to implementing structural reforms for infrastructure in your economy and has your economy identified any solutions to overcome those barriers or challenges?

In Brunei Darussalam, to determine if an infrastructure procurement is cost effective, the Ministry and its Department estimates the cost of the project based on the market value of its goods, materials and services. They will also need to make sure that the estimation is not over the budget allocated for the project.

For the purpose of this report, Brunei Darussalam will be looking into its Infrastructure Development Strategy. The Infrastructure Development Strategy under the stewardship of the Ministry of Development, working with various government agencies including the Ministry of Communications, Ministry of Health, and the Ministry of Education. The domestic objective is to promote economic prosperity, growth and contribute towards a high quality of life by providing adequate social and economic development such as public housing, communication, health care and education.

One of the pillars for the Infrastructure Development Strategy is to ensure continued government investment by leveraging on public-private sector partnership in developing and maintaining infrastructure. Under this strategy, the Government focuses on the following policies in the Infrastructure Development Strategy:

1. Cost effectiveness

The Ministry of Development continues to improve the quality of infrastructure as well as the sustainability of infrastructure funding through the following key initiatives: -

a. Reviewing the Government's infrastructure procedures such as reviewing contracts that are awarded and managed in order to ensure that any infrastructure projects are implemented on time and cost-effectively;
b. Leveraging on Public-Private-Partnerships (PPP) for economically viable projects by adopting appropriate legal and regulatory frameworks to promote

investment in social and industrial infrastructure, including privatization and public-private partnerships (PPP) in line with international best practice; and

c. Alternative financing and procurement in the form of involving private developers or investors in Design-Build-Operate-Transfer procurement.

2. Resilience

The Ministry of Development's priority is to ensure well-planned and optimized future investments for integrated and resilient assets. On disaster mitigation infrastructure, the Ministry has successfully built infrastructure, particularly on water, sanitation and drainage to alleviate some of the regular incidences of flash floods in Brunei Darussalam. Our economy does not experience any occurrences of major disruptions and shocks.

3. Inclusion

The Ministry of Development has always been committed towards providing the highest level of its provisions and services to the people regardless of their social status. The Ministry's main priority is enabling affordable infrastructure and services as a means for inclusive development and economy building. For example:

- Road Connectivity

  Roads are the main mode of connectivity in Brunei Darussalam for the movement of people as well as goods and services.
  - To date, Brunei Darussalam's road-related assets includes approximately 3,100 kilometers of roads, 279 bridges, 20 flyovers, 19 pedestrian bridges, 30 major roundabouts and 1 underpass.
  - Currently, road connectivity is at 97%.
- Rural-Urban Development

  Disparity in rural-urban development is being monitored closely by the Ministry of Development to strike a balanced rural-urban development and promote inclusivity. To this end, all major development projects are planned. Our physical planners are guided by the National Land Use Master Plan 2006-2025 (NLUMP 2006-25), which has 26 key Planning Policy Areas.

Gaps and priority reforms:

- Focusing and ensuring the completion of high impact projects can be achieved by consistent monitoring and reviewing of the development plan.
- Alternative financing methods have been identified to encourage public private partnerships (PPP) to raise additional financing. The Ministry is currently reviewing the legal and regulatory framework conditions as well as other institutional arrangements to allow financing flexibility. This may lead to more effective and efficient financing and/or delivery of infrastructure;
- Emphasis on land optimization strategy to provide continued and improved benefits to society, and to cater to the current and future needs of Brunei Darussalam.

Barriers and Challenges

- Aging infrastructure assets are costly to upgrade and/or maintain. In Brunei Darussalam, this maintenance cost is incurred by the Government.

  Possible Solutions:
  - Public Private Partnerships
  - To create effective mechanisms for cost recovery for the maintenance of the infrastructure built
  - Value engineering to evaluate cost effectiveness of projects.

- The need to bring in new methodology (i.e. best practices or technology) in construction to reduce cost on any infrastructure sector over the long run.

  Possible Solutions:
  - Capacity building for technical professionals in the area of innovative construction methodologies as well as in the area of project management and implementation
  - Adoption of new construction technologies that can assist in efficient and effective construction practices.
- Shortage of data hinders the process of prioritizing projects.

  Possible Solution: To integrate the data from all relevant sectors into one platform through cross-sectoral mechanism.

<u>Needs and financing requirements</u>: What are your economy's main (e.g. top 2-3) identified physical and digital infrastructure needs over the medium-long term? Please describe the required financing and expected impact of these infrastructures.

<u>Future needs</u>: What are the main factors (e.g. population increase, technology, climate change or variability, ageing capital stock) that will influence your economy's future physical and digital infrastructure needs?

<u>Needs and financing requirements</u>

- The immediate priority for physical infrastructure is the provision of adequate quality housing to cater towards the increasingly high demand for public housing and to expedite construction and delivery time, sustainability, as well as enhance affordability of home ownership.

<u>Future needs</u>

The main factors that will influence Brunei Darussalam's future infrastructure needs are the economy's ageing capital stock and economic diversification. Brunei Darussalam's ageing capital stock continues to make it a priority for significant investments, in order to modernise the economy. This will ensure optimal performance thereby reducing long-term costs.

Infrastructure improvements are also needed to support Government's economic diversification goals. It can contribute towards economic diversification through various avenues such as reducing transaction costs, cultivating increased foreign direct investment, and enhancing productivity.

Growing demand for housing and other social infrastructure will inevitably exert pressure on the available land and natural resources and hence the Ministry of Development will have to manage the competing needs for social and economic growth on limited developable land uses.

Balanced development and sustainability of the environment is another critical priority for infrastructure development so as not to compromise the environment for our future generations.

<u>Leading practices</u>: Among your economy's structural reforms relating to infrastructure in the past 5 years (2013-2018), which <u>two</u> do you think have been

implemented most effectively? Please identify the main reasons for the effectiveness of this structural reform that could be relevant for other economies.

Leading Practices

1. As part of the improvement for Registering Properties, one area that will have a positive impact on Brunei Darussalam's real estate sector is the recent implementation of the new Land Code (Amendments) 2016. This will allow foreigners and permanent residents to acquire land ownership under the Strata Title for an extended lease term of between 60 to 99 years. With this change in place, the growth of strata property market in the future looks very promising and this will definitely boost the attractiveness of FDI in the real estate sector for Brunei Darussalam.
2. Another structural reform undertaken by the Ministry of Development is the review and streamlining of construction approval processes that now only takes 7 days for developers and companies to obtain 'Planning Permission' from the Ministry of Development. The Construction Permit processes - obtaining planning permission, granting development approval and occupational permit - have been consolidated, which has resulted in the reduction in number of steps to only six steps.
3. The introduction and use of online portals have also accelerated the application processes. For example, OneBiz of Negara Brunei Darussalam is a one stop online portal to ease the starting up of businesses in Brunei Darussalam and its use has improved the submission processes across all agencies involved. Another online portal, the Planning Permission Electronic System, also known as e-KP, accelerates the planning permission application process.

Regional cooperation: What role can regional cooperation and regional bodies such as APEC play? You may like to consider the role of cooperation in addressing the challenges and policy gaps previously identified, in enhancing the investment environment, in making more possible cross-border/regional connectivity projects and in promoting co-ordination of development funding.

Regional Cooperation

- Through the sharing of knowledge, experience and best practices as well as success stories among Asia Pacific economies, particularly on planning and execution of policy implementation, it can serve as a guide for Brunei Darussalam to design policies specific to the economy's needs.
- Sharing data and key resources, such as the exchange of professionals among Asia-Pacific economies, through capacity building, training and workshops.
- Match-making key industry players, through conducting public-private sector dialogues and academic experts, to assist in narrowing some of the key common gaps identified by Asia-Pacific economies in the region.

How can we ensure that Asia Pacific has top-quality physical and digital infrastructure to ensure maximum connectivity? What would be the benefits to your economy from improved connectivity?

- Closer collaboration and to conduct high impact physical infrastructure projects regionally with APEC economies through joint-funding mechanisms.

CANADA

Capabilities: what significant policy or institutional structures (e.g. top 2) support your economy in meeting the following objectives. Economies could discuss whole of Government policies or policies that apply at a sector specific level:

- **Cost effectiveness: Providing for the efficient provision and management of infrastructure and the efficient operation of infrastructure markets, including providing for cost-based access;**
- **Resilience: Enhancing adaptability and ensuring the infrastructure system is robust to disruptions and shocks;**
- **Inclusion: Ensuring broad access (e.g. across regions, genders, underserved or minority groups and indigenous people) to infrastructure, including digital infrastructure, to support inclusive growth?**

The 'Investing in Canada' plan is the Government of Canada's comprehensive, long-term plan towards building a prosperous and inclusive economy through historic infrastructure investments. Over the 12 years of the plan, starting in 2016, the Government will invest over $180 billion in infrastructure—more than doubling existing federal funding—to achieve long-term economic growth, improve the resilience of communities and social inclusion and socioeconomic outcomes for all Canadians.

Cost Effectiveness: Canada will make significant investments over the long-term in five priority investment streams: public transit ($28.7 billion), green infrastructure ($26.9 billion), social infrastructure ($25.3 billion), infrastructure for rural and northern communities ($2 billion) and trade and transportation infrastructure ($10.1 billion). In addition, the Plan includes permanent funding such as the Gas Tax Fund and funding committed prior to 2016 such as the New Building Canada Fund. These targeted investments will ensure that federal dollars are used to address key infrastructure priorities across the economy. As part of the long-term infrastructure plan, $33 billion will be delivered over 10 years through integrated bilateral agreements (IBAs) between the federal government and each of the provinces and territories. We have worked with other levels of government to ensure that this spending will be effective and, provide flexibility within an outcomes-based framework. This is significant change from the way infrastructure funding in Canada was allocated in the past.

Resilience: To ensure that Canada's communities are healthy and are productive places to live, now and in the future, Canada is investing in sustainable solutions. Green infrastructure investments have the potential to help achieve GHG reductions across various sectors and can drive innovation and growth by increasing technology development and adoption. Disasters related to climate change are increasing in scale and severity. Investments in infrastructure specifically designed for climate impacts, including innovative nature-based solutions, enhance the resilience of Canadian communities while continuing to safely provide essential services. By accounting for the effects of climate change in infrastructure development, communities will be better prepared to respond and recover from severe weather events.

Inclusion: Canada's investments in infrastructure will seek to leverage infrastructure investments to address socio-economic inequality, by understanding that certain populations and groups face disadvantages and have unique needs. Under the 'Investing in Canada' plan, funding

will be targeted towards communities in which investments are needed the most. For example, the Government uses the Gender-Based Analysis + (GBA+), an analytical tool that measures the impact of legislation, policies and programs on diverse groups of Canadian women and men, as part of its policy development and project review processes.

The Government has also integrated a Community Employment Benefits (CEB) initiative in its long-term infrastructure plan. The CEB will focus on providing employment and/or procurement opportunities for apprentices, Indigenous peoples, women, persons with disabilities, veterans, youth, newcomers to Canada, small and medium-sized enterprises and social enterprises.

Gaps: What are the highest priority structural or institutional reforms you have identified to meet these objectives?

Cost Effectiveness: The 'Investing in Canada' plan is an evolution on how the federal government delivers infrastructure funding. It moves towards an approach that promotes partnerships with other orders of government to align priorities and programs. This is an important shift in approach, as these partnerships allow the federal government to leverage and thus significantly increase the reach of funding from the Plan. Bilateral agreements with provinces and territories in particular represent a key delivery mechanism for the Plan.

The Government also understands the need to innovate and try new approaches to fund infrastructure in Canada. The Canada Infrastructure Bank (CIB) is an additional tool available to provinces, territories, municipalities and Indigenous communities to leverage public funds to attract private sector and institutional investment for new, revenue-generating infrastructure projects in the public interest. The CIB will invest $35 billion over 11 years, using loans, equity investments and other innovative financial tools.

In addition, the Government launched the Smart Cities Challenge, a Canada-wide competition open to communities of all sizes, including municipalities, regional governments and Indigenous communities. The Challenge encourages communities to improve the lives of their residents by using data and connected technology in innovative ways. The Challenge will deliver $300 million in prizes over 10 years through a total of three competitions

Resilience: One of the main objectives of the 'Investing in Canada' plan is to improve the resilience of communities and transition towards a clean growth economy. The Plan will address persistent challenges to air, water and soil quality and make Canadian communities more resilient to climate change, natural disasters and extreme weather events. Infrastructure that reduces greenhouse gas emissions through cleaner electricity grids, energy efficient buildings and transportation systems sets us on a path towards a low-carbon future. Other investments in green infrastructure are building Canada's resilience to the risks we face from the impacts of climate change.

Inclusion: The Plan will contribute towards building communities where all Canadians have the opportunity to succeed. It will do this by improving access to quality affordable housing, shelters, early learning and child care, cultural, sport and recreation infrastructure and reliable public transit. The Plan also addresses pressing needs within Indigenous communities. Investments will also improve physical accessibility and safety for persons with disabilities.

<u>Barriers and challenges:</u> What are the key barriers and challenges to implementing structural reforms for infrastructure in your economy and has your economy identified any solutions to overcome those barriers or challenges?

A key challenge to implementing structural reforms for infrastructure in Canada is the **need for better infrastructure data**. Canada lacks information and data on infrastructure investments, but also on existing capital assets across the economy. The lack of information on existing infrastructure assets can be a serious barrier towards implementing meaningful structural reforms and investments in infrastructure in Canada. It is important to note that provinces, territories and municipalities own close to 98% of the net stock of core public infrastructure in Canada (Statistics Canada: 2016). Municipalities that do not possess asset management strategies can be limited in their ability to develop and implement medium to long-term investment strategies in infrastructure.

The Government of Canada launched Canada's Core Public Infrastructure (CCPI) survey in July 2017 to improve the knowledge and understanding of Canada's core public infrastructure assets across the economy. In Fall 2018, a summary of the 2017 key findings will be available online. Key elements of the CCPI survey will be repeated every two years, and over time it will give decision makers from all orders of government a clear view of trends on the state and performance of core public assets. The government is also providing financial support to Canadian municipalities to develop sound asset management practices.

<u>Needs and financing requirements</u>: What are your economy's main (e.g. top 2-3) identified physical and digital infrastructure needs over the medium-long term? Please describe the required financing and expected impact of these infrastructures.

Over the next 10 years, the Government of Canada, through the 'Investing in Canada' plan, will invest over $180 billion in infrastructure in the areas of public transit, green, social and rural and northern infrastructure. In addition to federal investments, provinces, territories and municipalities will make significant investments over the same period of time, in areas such as health, education, transportation, digital connectivity, culture and municipal infrastructure.

Subnational jurisdictions in Canada face different infrastructure challenges based on their respective demographics, socioeconomic context, climate and geographic location. However, certain needs and challenges appear to be shared across jurisdictions, such as easing road congestion in large urban centres, lack of telecommunications infrastructure in rural and northern communities, and enhancement of trade corridors to ensure that Canadian goods and resources are moved to domestic and international markets as efficiently as possible.

According to the Advisory Council on Economic Growth, which was established by the Government of Canada in 2016, estimates of the infrastructure gap in Canada ranges from $150 billion to $1 trillion. Although the federal, provincial and territorial governments are making significant long-term investments in infrastructure, there is a need for other sources of financing to bridge the infrastructure gap in Canada. The Advisory Council on Economic Growth suggests that the participation of financial institutions such as banks, pension funds, sovereign wealth funds and other long-term investors can help further leverage and amplify public dollars spent on infrastructure.

That is also why the Government of Canada established the CIB in 2017. The CIB will make investments in revenue-generating infrastructure projects that are in the public interest, and seek

to attract investment from private sector and institutional investors for those projects. This is an innovative partnership model between all orders of government, across all regions of Canada, leveraging the expertise of the private sector.

Infrastructure investments can lead to economic growth and productivity. According to the Advisory Council on Economic Growth, infrastructure drives economic productivity year after year to the tune of 20 to 50 cents on every dollar invested over the longer term. In addition to strong economic growth, infrastructure investments can improve the resilience of communities as well as social inclusion and socioeconomic outcomes for citizens.

Future needs: What are the main factors (e.g. population increase, technology, climate change or variability, ageing capital stock) that will influence your economy's future physical and digital infrastructure needs?

Physical and digital infrastructures contributes directly towards Canada's economic growth. Both of these sub infrastructure sectors are influenced by various social, structural, environmental and technical factors. Canada has identified four main factors affecting its economy future physical and digital infrastructure needs namely ageing population, ageing capital stock, climate change, and disruptive technology.

Aging population: Canada's population is in the midst of a fundamental shift. In 2016, approximately 16.9 per cent of Canadians were 65 years old and over; by 2030, that number will jump to nearly 25 per cent. This demographic change presents new challenges as well as new opportunities for Canadian society. Immigration policies are used by the Canadian government to increase the number of labour force participants. The concept of Universal Design is being gradually integrated into Canadian infrastructure projects and local urban plans which increases accessibility and supports longer civic participation of seniors.

Ageing capital stock: The 2016 Canadian Infrastructure Report Card reported that one-third of Canadian municipal infrastructure, which accounts for just under 60% of total infrastructure in Canada, was in fair, poor or very poor condition. Survey results demonstrated that roads, municipal buildings, sport and recreation facilities and public transit are the asset classes most in need of attention. Increasing reinvestment rates has been identified as a way to stop the deterioration of infrastructure.

The federal government is partnering with the Federation of Canadian Municipalities to implement and deliver the Municipal Asset Management Program which helps Canadian cities and communities make informed decisions about infrastructure investments in a context of constrained financial resources. The program will help harmonize asset management standards at an economy-wide level.

Climate Change: Canada's climate is changing. Temperatures in Canada have been increasing at roughly double the global average; in Canada's North, they are rising at roughly three times the global average. Increased temperatures have brought with them longer heat waves; more intense, frequent and extreme storms; permafrost degradation; diminishing sea ice and snow cover; and rising sea levels.

Climate change and extreme weather events threaten infrastructure across the economy, impacting its effectiveness, lifespan, cost, maintenance, rehabilitation and renewal. For example,

some older water systems cannot process an increase in precipitation, which increases the risk of flooding.

The 'Investing in Canada' plan makes it clear that federal infrastructure investments should reduce or minimize GHG emissions and also enhance resilience to the impacts of climate change. Infrastructure Canada has developed a climate lens ensuring that project proponents consider and evaluate GHG emissions reduction and climate resiliency when they seek funding through the 'Investing in Canada' Infrastructure Program

The climate lens will provide insight into the climate impacts associated with individual projects, and encourage project planners to make choices consistent with shared federal, provincial and territorial objectives articulated in the Pan-Canadian Framework for Clean Growth and Climate Change—including a commitment to reduce Canada's GHG emissions by 30% below 2005 levels by 2030.

Disruptive technologies: We know the world is changing. Every day it becomes more digital; international trade grows; and the ways we work, move and communicate are evolving. International experience shows that investments in technologies to make better use of infrastructure can significantly increase productivity.

Canada launched the Smart Cities Challenge to encourage communities to improve the lives of their residents by using data and connected technology in innovative ways. The Challenge is a pan-Canadian competition open to communities of all sizes, including municipalities, regional governments and Indigenous communities. The Challenge will empower partners to take risks and think outside the box. It will fund projects that are ambitious yet achievable, as well as innovative, transferable, replicable and scalable.

Leading practices: Among your economy's structural reforms relating to infrastructure in the past 5 years (2013-2018), which two do you think have been implemented most effectively? Please identify the main reasons for the effectiveness of this structural reform that could be relevant for other economies.

Public-Private Partnerships: The Canadian model of Public-Private Partnerships (often called P3s) is considered as one of the most successful models in the world. There have been major political commitments towards P3s across Canada, and among governments at the federal, provincial and municipal level. Over 200 infrastructure projects have been delivered in the last 20 years, representing over C$70 billion of capital investment.

The Canadian case suggests that, while political will is of paramount importance in a P3 programme's success, local and regional actors can themselves drive the emergence of viable markets.

Key determinants of P3 success in Canada have been: a steady pipeline of well-structured economic and social infrastructure projects; standardized procurement processes, including consistent project agreements and payment mechanisms, evaluation methodologies, and financing requirements; a collegial approach both among and within the provinces, including the sharing of lessons learned and new approaches; and a framework of mutual trust between the public and private sectors that has helped to elicit and sustain the development of a diverse and competitive supply market.

Lessons learned: At the individual project level too, trust and working partnerships are fundamental towards securing the risk-sharing and good, balanced, contractual relations that are at the heart of good project delivery. To generate this, it is essential that the contracting parties have access to clear, transparent and objective information about the level of performance under the contract.

Regional cooperation: What role can regional cooperation and regional bodies such as APEC play? You may like to consider the role of cooperation in addressing the challenges and policy gaps previously identified, in enhancing the investment environment, in making more possible cross-border/regional connectivity projects and in promoting co-ordination of development funding.

Regional cooperation fosters sharing best practices to address common challenges and policy gaps, identifying barriers in the investment environment, promoting cross-border/regional connectivity projects, and coordinating development funding.

How can we ensure that Asia Pacific has top-quality physical and digital infrastructure to ensure maximum connectivity? What would be the benefits to your economy from improved connectivity?

To ensure Asia Pacific has top-quality physical and digital infrastructure, Canada supports domestic policies, action plans and strategies that provide stable and predictable funding over time (medium and long term). In addition, Canada fosters innovative governance and financing options for infrastructure projects.

Canada could benefit from improved connectivity in Asia Pacific through increased business/ trade opportunities that would improve the mobility of goods and people. Outcomes of trade agreements like the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) could be leveraged by improved physical and digital infrastructure.

CHINA

Capabilities: what significant policy or institutional structures (e.g. top 2) support your economy in meeting the following objectives. Economies could discuss whole of Government policies or policies that apply at a sector specific level:

- **Cost effectiveness: Providing for the efficient provision and management of infrastructure and the efficient operation of infrastructure markets, including providing for cost-based access;**
- **Resilience: Enhancing adaptability and ensuring the infrastructure system is robust to disruptions and shocks;**
- **Inclusion: Ensuring broad access (e.g. across regions, genders, underserved or minority groups and indigenous people) to infrastructure, including digital infrastructure, to support inclusive growth?**

- Cost effectiveness: providing for the efficient provision and management of infrastructure and the efficient operation of infrastructure markets, including providing for efficient access;
- Resilience: enhancing adaptability and ensuring the infrastructure system is robust to disruptions and shocks;
- Inclusion: ensuring broad access (e.g. across regions, genders, underserved or minority groups and indigenous people) to infrastructure, including digital infrastructure, to support inclusive growth?

Over the last 40 years, since initial reform and opening up for 40 years, China has made outstanding progress within infrastructure development, which has vigorously boosted economic and social development. On one hand, the transport infrastructure construction has been rapidly advanced, with road, railway, port, airport and urban rail transit networks having taken shape gradually. A comprehensive transport channel featuring “ten in the lengthwise and ten in the transverse” has been basically established, which has not only allowed people to travel in a convenient way, but also played a guiding and supporting role in serving the domestic strategy, connecting economic zones, facilitating the development along the routes, and strengthening interconnection and intercommunication. A study indicates that the contribution rate of transportation to the domestic economy rose from 3.5% in 2012 to 4.3% in 2016. On the other hand, the information infrastructure construction and upgrading have continuously accelerated with China’s Internet penetration rate having increased as a result of broadband access at home, speed lift and fees reduction. Notably, the Internet penetration rate has exceeded 30% in rural areas. By the end of 2016, 89.9% of the villages had achieved access to the Internet, and 25.1% are equipped with e-commerce delivery sites.

The above achievements are closely intertwined with measures such as the reform of the investment and financing system in transport infrastructure sector and the advancement of Internet popularity in information infrastructure sector. To address the fund shortage issue at the early stage of reform and opening up in the transport infrastructure sector, China has expanded the sources of funds for road construction through various channels, including work relief, raising the road toll standard, imposing surcharges on vehicle purchases, fund-

raising or bank loans, developing government loan roads as well as operating toll roads (e,g, in railway construction field, China has actively explored a new model of "ministerial-provincial cooperation" to advance the construction). In terms of ports, China has gradually delegated powers to regions, encouraged owner units to build dedicated wharfs on their own, and continuously stepped up the building of ports through measures such as imposing port construction fees. With regard to airports, China has strengthened the central support, arranged civil aviation development funds and investment within the central budget to accelerate the airport construction, and actively attracted private investment. In the information infrastructure sector, China has redoubled its efforts to lift network speeds and cut fees, and vigorously implemented the project of "boosting network coverage in every village" in rural areas, which has improved infrastructure inclusiveness. For example, China's three telecom operators, namely China Telecom, China Mobile and China Unicom, have launched a few rounds of speed lift and fees cut measures since 2015, which have led to a reduction of fixed broadband charges by 86% and mobile broadband charges by 65% within two years. Other examples are that some regions have effectively integrated various types of agriculture-related information resources to build the modern rural comprehensive information service network featuring "multiple channels, multiple terminals, diversification and different levels"; developed a new model boasting "guidance by the government, co-building and sharing, and operation by enterprises"; and explored a new path on sustainable growth of rural information construction.

Gaps: What are the highest priority structural or institutional reforms you have identified to meet these objectives?

To achieve the above objectives, the reform of the infrastructure investment and financing system has always been one of the most important and urgent reforms. Currently, China remains the world's largest developing economy, and is still facing many deficiencies in the field of infrastructure construction. For instance, infrastructure is still scarce in some remote areas; there are big gaps in infrastructure levels between different regions, the contradiction between the demand for infrastructure construction and the financial capacity of local governments becomes very conspicuous. Key measures to solve the insufficiency and imbalance issues of infrastructure construction are to push forward the reform of the infrastructure construction investment and financing system, continuously introduce diversified investment and financing subjects, optimize development models, and improve the investment and financing efficiency.

Barriers and challenges: What are the key barriers and challenges to implementing structural reforms for infrastructure in your economy and has your economy identified any solutions to overcome those barriers or challenges?

During the reform of the transport infrastructure investment and financing system, some issues have arisen, such as complicated approval procedures, failure to further identify the investment subject position of enterprises, the impulse for blind expansion of transport infrastructure in some regions, imperfect return on investment and exit mechanisms and outstanding problems during the transformation of regional transport investment and financing platforms. Targeting these issues, China urgently needs to further deepen the reform of its investment and financing system within the transport infrastructure sector,

identify the investment subject position of enterprises, clarify the investment boundary of the government, loosen and motivate social investment, and inspire private investment potential and innovation vitality. China will provide vigorous support for the sustainable and healthy development of transport infrastructures by clarifying the investment and financing relationship as well as improving the investment and financing efficiency.

Connectivity needs and financing requirements: what are the main (e.g. top 3) identified physical and digital infrastructure needs for your economy over the next 30 years?

Please describe the required financing and expected impact of these infrastructures.

Looking into the future, China urgently needs to build digital infrastructures and raise the intelligence levels of its infrastructures. Digital infrastructures not only include infrastructures related to information and communication technologies, but also involve digital transformation and upgrading of infrastructures. For example, the accelerated construction of vehicle-road collaborative technology systems and relevant infrastructures will create conditions for the building of intelligent transport and smart cities. The construction of smart ports will boost the shift from information, digital and intelligent ports to smart ports; and the construction of infrastructures related to smart rail transits will further bring more convenience for urban mobility and improve urban congestion.

To speed up the construction and upgrading of digital infrastructures, China needs to establish effective investment & financing, return on investment and exit mechanisms by introducing diversified investment subjects, adopting comprehensive, three-dimensional development pattern and taking innovative business models. Improving the smart levels of infrastructures will effectively increase the convenience within transportation, lower transportation costs, and further expand the role of infrastructures in the domestic economy.

Future needs: What are the main factors (e.g. population increase, technology, climate change or variability, ageing capital stock) that will influence your economy's future physical and digital infrastructure needs?

China's process of urbanization and development of the digital economy have a significant influence on infrastructure construction. On one hand, there is still a wide gap between the urbanization level in China and those of developed economies as well as with the different regions in China which remain unbalanced. With the increase in urbanization levels and the implementation of the rural revitalization strategy, China still has a strong demand for the construction of infrastructures such as comprehensive underground pipe galleries, smart urban transport and intercity rail transit systems. On the other hand, the digital economy has maintained a robust double-digit growth rate in recent years, and the in-depth application of digital technology in industry, agriculture and other fields will raise requirements for connectivity and transmission, leading to new rounds of transformation and upgrading within the information infrastructure sector.

Leading practices: Among your economy's structural reforms relating to infrastructure in the past 5 years (2013-2018), which two do you think have been

implemented most effectively? Please identify the main reasons for the effectiveness of this structural reform that could be relevant for other economies.

Over the past five years, China has continuously advanced the reform of the transport infrastructure investment and financing system. Practices in two aspects have been constantly promoted and active achievements have been made, as a result of the close cooperation between central and regional governments and a broad consensus on playing the decisive role of the market in resource allocation.

The first practice is the central-regional government cooperation, which has stepped up the infrastructure construction by means of diversified fund-raising modes. For example, the co-financing model between the central and regional governments has been adopted during the railway construction. The main sources of funds for railway construction include investment within the central budget, railway construction funds, railway construction bonds and dedicated construction funds, as well as financing from banks, investment of local governments and part of social funds. Diversified fund-raising modes has allowed China to make remarkable achievements in the construction of railways, particularly high-speed railways, in the past few years.

The second practice is the introduction of social funds to the infrastructure construction sector to achieve the diversification of investment and financing subjects. For example, related social funds have been introduced to participate in the construction and development of some urban rail transits, which has not only lowered the financing cost and played the leverage role of government funds, but also brought in excellent governance structures and advanced operation experience. Comprehensive development models, such as "rail + property management," "rail + community" and "rail + town," as well as diversified fund-raising models, such as the PPP model and bond issuance, have taken shape in some regions, and appropriate ways of development have been used to facilitate the rail transit construction. Another example is that economic organizations at home and abroad are allowed to set up operating toll road companies by investing in road construction or accepting the transfer of the toll right of government loan roads. The establishment of the toll road system has not only brought roads to the market, but also realized the diversification of investment subjects, making bank loans and equity investment new extra sources of funds for road construction.

<u>Regional cooperation</u>: What role can regional cooperation and regional bodies such as APEC play? You may like to consider the role of cooperation in addressing the challenges and policy gaps previously identified, in enhancing the investment environment, in making more possible cross-border/regional connectivity projects and in promoting co-ordination of development funding.

How can we ensure that Asia Pacific has top-quality physical and digital infrastructure to ensure maximum connectivity? What would be the benefits to your economy from improved connectivity?

APEC can play a bigger role in promoting the transportation convenience in the Asia-Pacific region. It is suggested more attention should be paid to solve issues such as the difference of specific standards in the planning, layout and construction of inter-state transport

infrastructures, and coordinate with related economies so as to further improve the transportation convenience level.

China firmly supports globalization and trade liberalization, as higher interconnection and intercommunication levels in Asia Pacific will benefit the economic and trade cooperation between China and other economies in the region. China also has the willingness, ability and experience to make bigger contributions to the infrastructure construction in Asia Pacific and to the promotion of interconnection and intercommunication in the region.

HONG KONG, CHINA

Capabilities: what significant policy or institutional structures (e.g. top 2) support your economy in meeting the following objectives. Economies could discuss whole of Government policies or policies that apply at a sector specific level:

- **Cost effectiveness: Providing for the efficient provision and management of infrastructure and the efficient operation of infrastructure markets, including providing for cost-based access;**
- **Resilience: Enhancing adaptability and ensuring the infrastructure system is robust to disruptions and shocks;**
- **Inclusion: Ensuring broad access (e.g. across regions, genders, underserved or minority groups and indigenous people) to infrastructure, including digital infrastructure, to support inclusive growth?**

Gaps: What are the highest priority structural or institutional reforms you have identified to meet these objectives?

Barriers and challenges: What are the key barriers and challenges to implementing structural reforms for infrastructure in your economy and has your economy identified any solutions to overcome those barriers or challenges?

Capabilities

There is a need for the Hong Kong, China (HKC) Government to strengthen cost management for public works projects. The Development Bureau (DEVB) established the Project Cost Management Office (PCMO) in June 2016 to take forward various cost management initiatives for public works projects and promote cost management in the private construction sector. In assuming the overall cost management role, the PCMO also oversees the implementation of the Capital Works Programme which comprises the whole of the public works projects covering both basic and social infrastructures including transportation, environment, health, education, water supply and drainage systems for the economic development of Hong Kong, China and enhancement of the quality of living of our community.

Gaps

Hong Kong, China has been beset by the challenge of high construction costs in recent years. An international report has ranked Hong Kong, China as the 3rd highest construction cost city in 2018. Despite tender prices having stabilised since 2016, noting the predicted keen demand on construction services, HKC needs to adopt proactive and structured approaches to tackle the issues of high construction cost. If the challenges of high construction cost are not properly tackled, it will adversely affect the implementation of capital works projects and may eventually undermine Hong Kong, China's competitiveness.

Barriers and challenges

The construction industry in Hong Kong, China has been facing challenges of high construction cost, shortage in skilled labour and declining productivity. DEVB established the PCMO in June 2016 with the objective of strengthening cost management of construction projects. This cost management policy drive will also bring forward reform in the construction industry by instilling the culture of treating cost as a major driver of construction projects. The establishment of PCMO to promote cost management is one of the most important Government policy initiatives for the construction industry undertaken in recent years.

HKC is striving to adopt innovation and advanced technology in public works projects to reduce manpower requirements and enhance productivity for achieving better cost-effectiveness. HKC promotes and leads the adoption of Modular Integrated Construction (MiC) in the construction industry. By adopting the concept of "factory assembly followed by on-site installation" and the mode of manufacturing, labour intensive processes can be accomplished in off-site prefabrication yard with a view to enhancing productivity and cost-effectiveness. Furthermore, HKC is actively seeking to promote the use of the Building Information Modelling (BIM) technology in Hong Kong, China. The construction industry as a whole will benefit from the adoption of BIM by enhancing visibility and reducing project risks, multiple handling, abortive work, etc. To lead by example, the HKC Government requires consultants and contractors to adopt BIM when undertaking major Government capital works projects starting from 2018.

HKC has been promoting buildability in capital works projects in recent years. Buildable designs can lower construction cost through comprehensive appraisal of the construction methods and ensuring their practicality and effectiveness well in advance in the design stage. HKC aims to pilot the use of buildability evaluation system in Government building projects in 2018.

With Government support, the Construction Innovation and Technology Application Centre of the Construction Industry Council was in operation in 2017 to provide the latest information on the local and overseas construction technologies with a view to supporting small and medium enterprises for adoption. The centre aims at establishing a global research network to promote interdisciplinary research and application on enhancement of productivity and safety performance in the long run.

In 2018 Budget, the Financial Secretary committed to set up a $1 billion Construction Innovation and Technology Fund to boost the capacities of enterprises and practitioners in the construction industry to adopt new technology, and support the industry to harness innovative technology. Eligible contractors, registered sub-contractors and consultants can apply for financial support from the Fund to acquire the software and hardware as well as to nurture the expertise required for using local and overseas innovative construction technologies, such as BIM, steel reinforcing bar products produced in local prefabrication yards and MiC when carrying out construction projects. The Fund will also support students and practitioners of the construction industry to receive training on innovative construction technologies.

<u>Needs and financing requirements</u>: What are your economy's main (e.g. top 2-3) identified physical and digital infrastructure needs over the medium-long term? Please describe the required financing and expected impact of these infrastructures.

<u>Future needs</u>: What are the main factors (e.g. population increase, technology, climate change or variability, ageing capital stock) that will influence your economy's future physical and digital infrastructure needs?

<u>Needs and financing requirements</u>

Looking ahead, HKC will need to sustain capital works investment to meet the needs in various fronts, such as land and housing supply in the medium to longer time horizon; the 10-year Hospital Development Plan to look after the ageing population; various initiatives to improve people's livelihood and district environment; enhancement of transportation networks to boost connectivity etc. Based on the planned infrastructure programme, the HKC Government anticipates that the annual capital works expenditure in the coming years will exceed $100 billion. Some main identified physical infrastructure will include:

1. Three-Runway System (3RS) project at the Hong Kong International Airport (HKIA): the Airport Authority Hong Kong (AAHK) commenced construction of the 3RS on 1 August 2016. The construction works will take eight years to complete. The commissioning of the new runway is scheduled for 2022, after which the existing north runway will be closed for reconfiguration, and the full commissioning of the 3RS is targeted in 2024. The 3RS will be crucial for maintaining Hong Kong, China's competitiveness as an international and regional aviation hub

   Expected Impact: With the 3RS, the capacity of HKIA will be substantially enhanced. HKIA will be able to handle air traffic demand at least up to 2030, by which time the annual passenger and cargo volumes are expected to increase to around 100 million and 9 million tonnes respectively. Expanding the HKIA into a 3RS will not only strengthen Hong Kong, China's status as an international and regional aviation hub, but also benefit a wide range of industries, in particular the aviation industry. According to AAHK, the whole 3RS project is estimated to generate additional economic benefits of HK $455 billion (in 2012 dollars) over a 50-year period and create more jobs opportunities in Hong Kong, China. AAHK anticipated that the 3RS would create direct employment of around 123,000 jobs as well as indirect and induced employment of 165,000 jobs, much higher than that of the two-runway system comparable of 89,000 and 119,000 jobs.

2. Hong Kong – Zhuhai – Macao Bridge (HZMB): The Hong Kong - Zhuhai - Macao Bridge, a direct land transport infrastructure, will link Hong Kong, China directly with Zhuhai and Macao. The project is jointly taken forward by the Guangdong; Hong Kong, China; and Macao Governments. The Main Bridge will become the longest bridge-cum-tunnel sea crossing in the world, totalling 29.6 km in length (including 6.7 km of underwater tunnel). As a major strategic cross-boundary project, the HZMB is unprecedented in terms of scope, scale and complexity.

   Expected Impact: The HZMB is strategically important. It will facilitate the further economic development of Hong Kong, China; Macao; and Western Pearl River Delta, and will significantly reduce transportation costs and time for travellers and goods on roads of Hong Kong, China. Its commissioning will benefit various sectors

in Hong Kong, China such as tourism, finance and commerce. Upon completion of the HZMB, the journey time between the Kwai Chung Container Terminal and Zhuhai will be reduced from currently 3.5 hours or so to about 75 minutes, whilst the journey time between the Hong Kong International Airport and Zhuhai will be reduced from currently 4 hours or so to about 45 minutes.

Future needs

The Government has all along been adopting long-term and visionary planning for infrastructure projects and will continue to invest in worthwhile infrastructure projects in a timely manner to meet social needs and maintain Hong Kong, China's competitiveness. It is imperative for Hong Kong, China to expand land resources on an on-going basis. This includes the provision of land and space for economic activities to accommodate commercial facilities and industrial developments with a view to maintaining economic development and creating job opportunities. HKC will continue to invest in world-class infrastructure to support sustainable economic growth and sharpen our competitive edge.

Leading practices: Among your economy's structural reforms relating to infrastructure in the past 5 years (2013-2018), which two do you think have been implemented most effectively? Please identify the main reasons for the effectiveness of this structural reform that could be relevant for other economies.

1. Establishment of PCMO

DEVB established the PCMO in 2016 with the objective of strengthening cost management of construction projects. This cost management policy drive will also bring forward reform in the construction industry by instilling the culture of treating cost as a major driver of construction projects. The establishment of PCMO to promote cost management is one of the most important Government policy initiatives for the construction industry undertaken in recent years.

Under the guiding principles of not compromising functionality, quality and safety of works, the PCMO has adopted a three-prong approach to take forward the relevant initiatives for capital works projects, namely: (a) reviewing requirements and devising works policies; (b) project-by-project scrutiny; and (c) enhancing project management. Since 2016, the PCMO has reviewed some 130 projects at a total estimated cost of over $250 billion. HKC Government managed to achieve cost saving of some 10% of the total project cost.

2. Hong Kong Construction 2.0

Construction is a pillar industry supporting the development of Hong Kong, China. Facing the multifaceted challenges nowadays including high construction cost, shortage of skilled labour and declining productivity, HKC Government's leadership is instrumental to championing the upgrading of the industry for meeting the rising aspiration of the community and maintaining the sustainability of the industry. In 2018, DEVB launched a new initiative namely, "Hong Kong Construction 2.0" to transform the construction industry to a new generation. Innovation, Professionalisation and Revitalisation are the three pillars under the "Hong Kong Construction 2.0". This new initiative will instigate an institutional reform and drive the cultural change of Hong Kong, China's construction industry for strengthening our delivery capability to tackle the challenges ahead.

<u>Regional cooperation</u>: What role can regional cooperation and regional bodies such as APEC play? You may like to consider the role of cooperation in addressing the challenges and policy gaps previously identified, in enhancing the investment environment, in making more possible cross-border/regional connectivity projects and in promoting co-ordination of development funding. **How can we ensure that Asia Pacific has top-quality physical and digital infrastructure to ensure maximum connectivity? What would be the benefits to your economy from improved connectivity?**
Regional cooperation and initiatives by international organisations such as APEC can share the knowledge and best practice regarding infrastructure, and help economies learn from the experiences of each other and devise measures to overcome the challenges in their respective contexts. These efforts also provide valuable fora for economies to discuss and pursue cross-border and regional connectivity projects. HKC, as an international logistics and trade centre, would benefit from the connectivity enabled by an advanced IT and communications infrastructure and a global network of shipping and aviation services. Further improvement in connectivity of the region would enhance the role of HKC as a transport hub and expand the capacities for economic development.

INDONESIA

Capabilities: what significant policy or institutional structures (e.g. top 2) support your economy in meeting the following objectives. Economies could discuss whole of Government policies or policies that apply at a sector specific level:

- **Cost effectiveness: Providing for the efficient provision and management of infrastructure and the efficient operation of infrastructure markets, including providing for cost-based access;**
- **Resilience: Enhancing adaptability and ensuring the infrastructure system is robust to disruptions and shocks;**
- **Inclusion: Ensuring broad access (e.g. across regions, genders, underserved or minority groups and indigenous people) to infrastructure, including digital infrastructure, to support inclusive growth?**

Regarding fiscal management, in the last ten years, Indonesia has greatly enhanced its policies on infrastructure provision and management in terms of quantity and quality to support fair and strong growth. In 2018, Indonesia has more than doubled its infrastructure budget allocation since 2014 (IDR 177.9 trillion to IDR 410 trillion), mainly for connectivity and energy infrastructure development. Since 2008, significant efforts and results has been made in infrastructure provision through the public private partnership (PPP) scheme.

Cost effectiveness, resilience and inclusion:
The Government of Indonesia (GoI) has issued several laws and regulations as part of its structural reform to increase capabilities in infrastructure, including promoting the PPP scheme to enhance the cost effectiveness, resilience and inclusion.

- Presidential Regulation Number 38/ 2015: to activate the PPP scheme, certain studies are required, such as Value for Money Analysis and Environmental Study.
- Ministry of Communication and Informatics Regulation Number 25/2015: this regulation was issued to ensure the quality of infrastructure services by the private party are maintained properly based on PPP contracts and that service coverage for marginal groups and remote area are provided for.
- The GoI also provides supporting facilities to accelerate infrastructure market development, such as through Viability Gap Fund (VGF), Government Guarantees, and Infrastructure Financing Fund, of which are parts of structural reform.

Gaps: What are the highest priority structural or institutional reforms you have identified to meet these objectives?

Indonesia's highest priority is to reform its infrastructure provision policy to acquire the investment needed to develop strategic and important infrastructure. Thus, Indonesia has established the National Strategic Projects (President Regulation No 58/2017), supported by a number of regulations to improve financing and investment for infrastructure provision in supporting fair growth and welfare, especially financing through PPP.

Barriers and challenges: What are the key barriers and challenges to implementing structural reforms for infrastructure in your economy and has your economy identified any solutions to overcome those barriers or challenges?

Apart from the shortage of funds, there are other issues that challenge the acceleration of infrastructure development in Indonesia.

- Issue of land acquisition

  Regarding this matter, GoI has published Law Number 2/2012 on land acquisition and has established the Public Services Agency (State Assets Management Institutions or Lembaga Manajemen Aset Negara (LMAN)) to fund the land acquisition in order to have well-coordinated, fast and efficient processes.
- Project planning and preparation to ensure a good quality of infrastructure and to attract investor (especially on infrastructure provision through PPPs)
  On this matter, the government have established regulations on project planning and preparation (see Box 1 in the attachment). For example, in terms of project preparation, the GoI through the Ministry of Finance provides facilities (Project Development Fund) to help Government Contracting Agencies (GCA) in project preparation and transaction to ensure preparation runs well and the transaction process is fair, transparent and competitive.

In case of funding through the government budget, other efforts undertaken include increasing government revenues through taxes (structural reform efforts in tax system itself, part of it is Tax Amnesty Program and other program) and encouraging management improvement in infrastructure provision under the universal/public services obligation to finance infrastructure development.

<u>Needs and financing requirements</u>: What are your economy's main (e.g. top 2-3) identified physical and digital infrastructure needs over the medium-long term? Please describe the required financing and expected impact of these infrastructures.

Though Indonesian Government infrastructure spending has increased significantly in the last five years (Table 1), approximately 87% financing gap still exists within infrastructure development. Indonesia's needs within infrastructure financing for the National Strategic Project is estimated at IDR 4,796 trillion and are planned to be sourced from the government budget (41%), state owned enterprises (SOEs) (22%) and the private sector (37%). GoI has a limited financing capacity for connectivity and telecommunication infrastructure (Table 2 in attachment).

<u>Future needs</u>: What are the main factors (e.g. population increase, technology, climate change or variability, ageing capital stock) that will influence your economy's future physical and digital infrastructure needs?

As outlined within our development goals, through creative industries, Indonesia's demographic bonus holds the potential to advance Indonesia's development and growth to a higher level. Indonesia's pivotal role in the trans-regional value chain and connectivity combined with its productive population as well as efficient and productive labor force has become increasingly essential to support growth. Furthermore, as an economy with a huge market potential with high penetration and ramification from information and technology development (e.g digital transaction, education, and other), e-commerce has become one of Indonesia's priority areas to develop.

Based on the issues highlighted above, refocusing fiscal policy or structural reforms in budget allocation and spending quality are essential. Strengthening fiscal capacity,

efficiency, effectivity and productivity, particularly in infrastructure provision (physical and digital), has become Indonesia's top development priority.

<u>Leading practices</u>: Among your economy's structural reforms relating to infrastructure in the past 5 years (2013-2018), which <u>two</u> do you think have been implemented most effectively? Please identify the main reasons for the effectiveness of this structural reform that could be relevant for other economies.

Within the fiscal management framework, structural reforms in infrastructure provision has been effectively implemented. Leading practices can be seen in the National Strategic Project development (consist of 245 projects and 2 programs) increasing the proportion of infrastructure budget allocated and the development of the PPP scheme as a source of financing and other supporting policies. Especially for PPPs, Indonesia has set out regulations in order to support their use, especially for financing and accelerating infrastructure development (see Box 1). The Ministry of Finance (MOF) has assisted in a number of PPP projects agreement. Indonesia has 17 PPP (project) contracts signed, where 13 projects are in the construction stage (Table 3 below).

Structural reforms to support growth are also a continuous effort within the telecommunication infrastructure sector. Policies have been made regarding infrastructure provision involving Public Services Agency that serve Universal Services Obligation (public service on telecommunication, including infrastructure provision). Policies made also highlight on inclusivity, where the Ministry of Communication and Informatics Regulation Number 25/2015 stipulates that the service provision coverage includes remote area and marginal groups.

<u>Regional cooperation</u>: What role can regional cooperation and regional bodies such as APEC play? You may like to consider the role of cooperation in addressing the challenges and policy gaps previously identified, in enhancing the investment environment, in making more possible cross-border/regional connectivity projects and in promoting co-ordination of development funding.

As a trans-regional forum, APEC can support trans-regional cooperation in developing a set of standards needed for quality infrastructure services in Asia Pacific based on development and needs of economies. In addition, APEC can conduct a review to economies' best practices in infrastructure provision that is best suited for its economies, have a significant impact in lowering business and other cost, and can be replicated for other economies. Knowledge sharing can be another way or method in disseminating experience knowledge (from economies to economies) to address issues within infrastructure provision, such as financing and investment.

Overall, APEC has the potential to improve the quality of physical and digital infrastructure to ensure maximum connectivity through trans-regional cooperation by having business hub or space that accommodates the interests of private sector in infrastructure development. Those interests, thus, act as modalities to identify the array of infrastructure development policies.

How can we ensure that Asia Pacific has top-quality physical and digital infrastructure to ensure maximum connectivity? What would be the benefits to your economy from improved connectivity?
By engaging close cooperation in implementing Infrastructure Development Framework as instructed by Leaders in 2013. The inter-connected and well-developed infrastructure in the region is the backbone for the freer flow of trade and investment in the Asia Pacific. It will eliminate barriers to trade, accelerate regional economic integration, improve and sustain growth, reduce inequality and contribute towards Asia Pacific's economic resilience (APEC 2013 Annex B Leaders Declaration). The benefit of enhanced connectivity in the Asia Pacific will not only benefit Indonesia but all economies in the region.

ATTACHMENT

Table 1. Infrastructure Budget Allocation

		Year					
		2013	**2014**	**2015**	**2016**	**2017**	**2018**
1	Infrastructure Budget (in IDR trillion)	155.9	177.9	290.3	313.5	346.6	410.4
2	Percentage of GDP (current price)	2.30	1.68	2.51	2.52	2.55	-

Table 2. Budget Allocation for Connectivity and Telecommunication Infrastructure

Infrastructure		**Year (in IDR trillion)**					
		2013	**2014**	**2015**	**2016**	**2017**	**2018**
1	Bridges and Roads	32.59	33.41	48.66	34.22	35.97	33.02
2	Transportation Terminals	5.68	5.11	7.69	5.75	5.16	4.87
3	Telecommunication*	-	-	-	-	-	0.8

*There is budget allocation for telecommunication infrastructure as much as IDR 4 trillion through PPP scheme in 2018.

Table 3. List of PPP Projects Awarded the Private Proponent and Signed The PPP Agreement

No.	Project Name	Project Cost (IDR Trillion)	Financial Facility From MOF	Status
1.	Central Java Power Plant Project	40 T	Guarantee (MOF and IIGF)	Construction process (targeted COD 2019)
2.	Umbulan Water Project	2.1 T	PDF, VGF and IIGF Guarantee	Construction process (targeted COD 2019)
3.	Palapa Ring Project – West Package	1.28 T	PDF, IIGF Guarantee and AP	Construction process (targeted COD 2018)
4.	Palapa Ring Project – Central Package	1.38 T	PDF, IIGF Guarantee and AP	Construction process (targeted COD 2018)
5.	Palapa Ring Project – East Package	5.13 T	PDF, IIGF Guarantee and AP	Construction process (targeted COD 2018)
6.	Batang – Semarang Toll Road Project	11 T	IIGF Guarantee	Construction process (targeted COD 2019)
7.	Manado – Bitung Toll Road Project	5.1 T	IIGF Guarantee	Construction process (targeted COD 2019)
8.	Balikpapan – Samarinda Toll Road Project	9.9 T	IIGF Guarantee	Construction process (targeted COD 2019)
9.	Pandaan – Malang Toll Road Project	5.9 T	IIGF Guarantee	Construction process (targeted COD 2019)
10.	Serpong—Balaraja Toll Road Project	6T	IIGF Guarantee	Construction process (targeted COD 2019)
11.	Jakarta-Cikampek Toll Road Project	16 T	Co guarantee (IIGF and MoF)	Construction process
12.	Krian-Legundi-Bunder-Manyar Toll Road Project	12.2 T	Co guarantee (IIGF and MoF)	Construction process
13.	Serang-Panimbang Toll Road	5.33 T	Co guarantee (IIGF and MoF)	Construction process
14.	Cileunyi Sumedang-Dawuan Toll Road	8.21 T	Co guarantee (IIGF and MoF)	Land Acquisition
15	Probolinggo-Banyuwangi Toll Road	21 T	Co guarantee (IIGF and MoF)	PPP Agreement Signed
16	Jakarta-Cikampek II South Toll Road	13,38 T	Co guarantee (IIGF and MoF)	PPP Agreement Signed
17	Bandar Lampung Water Project	1,1 T	PDF, VGF and IIGF Guarantee	PPP Agreement Signed

Box 1. List of regulations regarding Acceleration of Infrastructure Development

- **Presidential Regulation No. 75/2014** regarding Acceleration of Providing Priority Infrastructure
- **Presidential Regulation No. 38/2015** concerning Partnership of Government and Business Entity in Infrastructure Provision.

  (This regulation replaces Presidential Regulation Number 67/2005 that has been modified several times)
- **Presidential Regulation No. 3/2016** regarding Acceleration of Implementation in National Strategic Projects
- **Minister of National Development Planning Regulation No. 4/2015** concerning Implementation Guideline in Cooperation Projects between the Government and Business Entity in Providing Infrastructure
- **Coordinating Minister for The Economy Regulation No.12/2015** concerning Acceleration of Preparation for Priority Infrastructure
- **Chair of National Public Procurement Agency Regulation No. 19/2015** regarding Implementation Guideline in Providing Business Entity for Cooperation Projects between the Government and Business Entity in Providing Infrastructure
- Minister of Finance Regulation No. 260/2010 regarding Implementation Guideline on Infrastructure Guarantee in Cooperation Project Between the Government and Business Entity.
- Minister of Finance Regulation Number 223/2012 concerning Construction Cost Contribution for PPP Project.
- Minister of Finance Regulation Number 265/2015 concerning Facility for Preparation and Transaction of Cooperation Between Government and Business Entities in Infrastructure Provision
- Minister of Finance Regulation No. 8/2016 concerning Adendum on MoF Regulation No. 260/2010 regarding Implementation Guideline on Infrastructure Guarantee in Cooperation Project Between the Government and Business Entity.
- Minister of Finance Regulation No. 260/2016 concerning Availability Payment.

JAPAN

Capabilities: what significant policy or institutional structures (e.g. top 2) support your economy in meeting the following objectives. Economies could discuss whole of Government policies or policies that apply at a sector specific level:

- **Cost effectiveness: Providing for the efficient provision and management of infrastructure and the efficient operation of infrastructure markets, including providing for cost-based access;**
- **Resilience: Enhancing adaptability and ensuring the infrastructure system is robust to disruptions and shocks;**
- **Inclusion: Ensuring broad access (e.g. across regions, genders, underserved or minority groups and indigenous people) to infrastructure, including digital infrastructure, to support inclusive growth?**

Gaps: What are the highest priority structural or institutional reforms you have identified to meet these objectives?

Barriers and challenges: What are the key barriers and challenges to implementing structural reforms for infrastructure in your economy and has your economy identified any solutions to overcome those barriers or challenges?

Japan considers that (1) building a safe and comfortable society contributes to both resilience and inclusion, and (2) utilizing ICT and promoting technology research and development supports cost effectiveness and resilience.

The key challenges to realize those objectives are:

i. Realizing Accessibility through a Universal Design Concept

The "Act on Promotion of Smooth Transportation, etc. of Elderly Persons, Disabled Persons, etc." embodies the universal design concept of "freedom and convenience for anywhere and anyone", making it mandatory to comply with "Accessibility Standards" for newly establishing various facilities (passenger facilities, various vehicles, roads, off-street parking facilities, city parks, buildings, etc.), as well as mandatory best effort for existing facilities and defining a development target for the end of FY2020 under the "Basic Policy on Accessibility" to promote accessibility.

ii. Shifting to a Society with Higher Disaster Prevention Awareness

In light of the lessons from the many disasters that occurred in 2016, we are undertaking a general mobilization of structural measures with major impacts and non-structural measures from the perspective of residents. It is a shift towards society to raise disaster prevention awareness and ensure all actors, including government, residents, and companies, are sharing knowledge and perspectives on disaster risks as well as preparing for all kinds of disasters, including−flooding, earthquakes, and sediment-related disasters.

iii. Shaping domestic land that is safe and resilient to disasters as well as enhancing and strengthening the Framework of Preparedness for Crisis Management

In order to mitigate and reduce damage caused by flood disasters which occurs frequently and seriously, structural measures such as preventative flood control measures and measures to prevent re-occurrence. Non-structural measures such as strengthening of the flood defense system and provision of river information are being promoted in a comprehensive manner taking into account the influence of climate change.

In order to prevent and mitigate the damages by sediment-related disasters, a combination of non-structural and structural measures, such as the construction of sediment-related disaster prevention facilities and improvement and enhancement of early warning and evacuation systems are being promoted.

In preparation for the volcanic mudflow caused by volcanic eruptions and the debris flow caused by rainfall, sediment control dams, training dikes among others are being constructed to prevent or reduce damages.

To protect human lives and assets from storm surges and high waves caused by frequently occurring storm surges, a combination of structural and non-structural measures are being promoted. Examples include the development of coastal levees and the issuing of flood prevention warnings.

Since a variety of factors contribute to coastal erosion across the economy, the administrators of rivers, coasts, shipping ports, and fishing ports have coordinated to implement measures such as sand bypasses and sand recycling.

For the tsunami measures for coasts, structural measures are taken to develop coastal levees and so on necessary for resisting tsunamis with relatively high frequency of occurrence, take earthquake and liquefaction measures, enable automatic/remote operation of floodgates, and develop coastal levees and seawalls with a tenacious structure that includes various structures, such as green coastal levees. These are in addition to non-structural measures taken to assist creation of tsunami and storm surges hazard maps and manage and operate floodgates and others effectively.

The key challenges towards encouraging the utilization of ICT and promoting technology research and development are:

i. Sophisticated Water Management and Water Disaster Prevention Utilizing ICT

In light of the new developments in information technology of recent years, new technology is being applied in the field to further improve the sophistication of water management and water disaster prevention.

ii. Improving Costing Technology for Public Works

For the purpose of ensuring transparency of public works, various price data standards are being made public. In FY2015, i-Construction, a method of improving productivity by incorporating ICT into studies, surveys, design functions, construction work, inspections, maintenance functions, and updating processes, was promoted and new estimation standards for ICT construction were enacted.

iii. CIM and BIM Initiatives

Construction Information Modeling/Management (CIM) endeavors to seamlessly connect processes at all stages by linking and developing three-dimensional models from the survey, planning, and design stages to the construction and maintenance management stages and promoting the sharing of information among concerned parties involved in the entire project.

Since FY2010, the adoption of Building Information Modeling (BIM) to help visualize design content and integrate and consolidate building information has been subject to trial operations to verify the effect of the adoption of BIM and any issues that might consequently arise.

<u>Needs and financing requirements</u>: What are your economy's main (e.g. top 2-3) identified physical and digital infrastructure needs over the medium-long term? Please describe the required financing and expected impact of these infrastructures.

<u>Future needs</u>: What are the main factors (e.g. population increase, technology, climate change or variability, ageing capital stock) that will influence your economy's future physical and digital infrastructure needs?

Infrastructure needs over the medium-long term and for the future in Japan are addressing: (1) rapid aging of infrastructure, (2) vulnerability of land (pressing issues for massive earthquakes and severe weather disasters), and (3) intensified international economic competition.

First, realizing advancement of the functions while promoting rationalization of the scale, through the construction of maintenance cycles and steady execution will ensure safety and security, along with reduction and equalization of total costs by construction of maintenance cycles. Promoting the recruitment and training of engineers involved in maintenance as well as the development and introduction of new technology will improve maintenance technology, and enhance competitiveness of the maintenance industry.

Second, focused preparation for Nankai Trough earthquake and an inland earthquake directly under Tokyo Metropolitan area, etc. will reduce risks of imminent massive earthquakes, tsunami, and large-scale eruptions. Enhancing measures against frequent and intense flood as well as sediment disaster will reduce risks for intense meteorological disasters. Promoting enrichment and enhancement of TEC-FORCE, and the introduction of a time line(*) will enhance risk management measures to reduce risks when a disaster occurs.

Finally, forming global level urban environments and enhancing functions of international airports and ports will enhance global competitiveness in metropolitan areas. Priority development of infrastructures, such as enhancement of traffic networks which contribute to the inducement of private investment including regional relocation of corporations, will promote urban and regional development inducing industry and tourism investment in regional areas. Promotion of overseas expansion of infrastructure systems related to transportation and urban development by partnership between the government and private sector will support Overseas expansion of quality infrastructure systems of Japan.

<u>Leading practices</u>: Among your economy's structural reforms relating to infrastructure in the past 5 years (2013-2018), which <u>two</u> do you think have been implemented most effectively? Please identify the main reasons for the effectiveness of this structural reform that could be relevant for other economies.
<u>Regional cooperation</u>: What role can regional cooperation and regional bodies such as APEC play? You may like to consider the role of cooperation in addressing the challenges and policy gaps previously identified, in enhancing the investment environment, in making more possible cross-border/regional connectivity projects and in promoting co-ordination of development funding. **How can we ensure that Asia Pacific has top-quality physical and digital infrastructure to ensure maximum connectivity? What would be the benefits to your economy from improved connectivity?**
One of the most important roles of APEC is providing its economies with the opportunity to exchange information such as the "High Level Meeting on Quality Infrastructure" that was held in Tokyo, Japan in October 2017. In the Meeting, participants shared good practices on Quality Infrastructure Investment (QII), and discussed challenges and elements that are conducive to QII. It was also agreed to issue the "Report on the Outcomes" which suggests necessity of "continuing efforts" in order to promote the QII in the Asia-Pacific region.

REPUBLIC OF KOREA

Capabilities: what significant policy or institutional structures (e.g. top 2) support your economy in meeting the following objectives. Economies could discuss whole of Government policies or policies that apply at a sector specific level:

- **Cost effectiveness: Providing for the efficient provision and management of infrastructure and the efficient operation of infrastructure markets, including providing for cost-based access;**
- **Resilience: Enhancing adaptability and ensuring the infrastructure system is robust to disruptions and shocks;**
- **Inclusion: Ensuring broad access (e.g. across regions, genders, underserved or minority groups and indigenous people) to infrastructure, including digital infrastructure, to support inclusive growth?**

Gaps: What are the highest priority structural or institutional reforms you have identified to meet these objectives?

Barriers and challenges: What are the key barriers and challenges to implementing structural reforms for infrastructure in your economy and has your economy identified any solutions to overcome those barriers or challenges?

Capabilities:

The Korean government is making continued efforts to enhance Internet access and improve the quality of Internet services in order to reduce the digital divide, achieve balanced digital development across the economy and encourage digital-based innovation. As the rapid advancement of ICT has a significant impact on human life, disparities in the access to and usage of those technologies have become a major barrier towards inclusive growth. In response to this challenge, Korea has expanded the coverage of the gigabit Internet service (i.e. digital infrastructure offering 1Gbps Internet connection) and developed new innovative application services such as ones based-on 5G networks. Specifically, the Korean government adopted the Giga Internet Plan, a road map for equipment development and verification, and carried out two follow-up projects to implement the plan: pilot programs on virtual reality and smart homes in 2015 and designating test districts for the new gigabit Internet service in 2016. At the end of 2016, Korea's gigabit Internet service coverage reached 91.82% in urban areas, and the number of subscribers reached 4.4 million.

Korea is also focusing on improving its social infrastructure, especially for the employment of women, with a view to further developing human resources and achieve inclusive long-term growth. To prepare for the demographical cliff influenced by the decreasing fertility rate in Korea, there is an urgent need to put in place well-designed infrastructure to increase the female workforce. The heavy burden of childbirth and childcare on Korean women has led to serious career interruptions as seen by Korea's female employment rate of 56.2% in 2016, which is significantly lower than the OECD average of 59.4%. To tackle this problem, the Korean government established the Women's Re-

employment Centre, a one-stop institution for career counselling, vocational training, and job referrals, in 2009.

Gaps:

Timely policy responses to facilitate continued investment in digital infrastructure, such as the next generation 10Gbps Internet service, intelligent IT and the Internet of Things, are highly required. The demands for network connection and mobile traffic are expected to increase exponentially, five times higher in 2021 compared with 2016. Catching up with the fast changing technologies, exploding demands and acquiring the capability to process the accompanying data flows effectively are prerequisites for building an innovative business environment and improving the quality of life. These are closely linked to achieving efficient, resilient and quality growth of the economy.

Strengthening support for women in their 30s is also high up on the priority list as they are the most vulnerable group representing 51% of women experiencing career discontinuity. The prevalent career interruption among this age group undermines the long-term base for labour supply and decreases overall productivity, which in turn, has a negative impact on business activities and the economy.

Barriers and challenges:

A large amount of initial fixed-cost investment is necessary to provide and manage network infrastructure, given the significance of economies of scale in this field. Also, rising competition among telecommunication companies may lead to duplicate investments. Taking account of these factors, the Korean government plans to implement various measures that will serve as incentives for the private sector to make cost-efficient engagements. The measures include finalizing 5G frequency allocation by 2019, improving regulations on advanced communication networks, and promoting joint constructions of infrastructure and facility sharing in rural areas.

There are structural vulnerabilities in terms of wage, job stability, and skill level that hinder women's active economic participation. The wage gap between genders remains large, and women are more likely to work for part-time positions with less legal protection against unfair treatment. Due to career interruptions, building an advanced skillset is often harder for females. One solution for this is to provide a customized platform based on diversified re-education programs and partnerships with local businesses.

Needs and financing requirements: What are your economy's main (e.g. top 2-3) identified physical and digital infrastructure needs over the medium-long term? Please describe the required financing and expected impact of these infrastructures.

Future needs: What are the main factors (e.g. population increase, technology, climate change or variability, ageing capital stock) that will influence your economy's future physical and digital infrastructure needs?

Needs and financing requirements:

Korea needs to build a digital ecosystem that is able to utilize newly created technologies with minimum costs and expand the Internet service coverage to vulnerable groups such as those in rural areas, low-income families and the old. Digital infrastructure could also contribute towards creating decent jobs, which plays a pivotal role in achieving sustainable growth. To achieve this, it is essential that the government and businesses join hands. In particular, the government needs to provide comprehensive policy support to the private sector in order to diversify the funding sources for digital infrastructure and achieve efficient operation of the infrastructure market and risk management.

Investment in intangible infrastructure, such as changing the gender-biased employment culture and promoting work-life balance, is also required as this will increase the efficiency and competitiveness of the labour input in a wide range of industries. As government initiatives are important in motivating employers to modify their corporate culture in accordance with the changing social demand, the Korean government is carrying out pilot programs at 15 local offices of the Women's Re-employment Centre and is seeking to expand the number gradually.

Future needs:

The advancements in technology and their unforeseen impacts are the most influential factors in shaping Korea's future digital infrastructure needs. In the era of the fourth industrial revolution, digital technology has the biggest potential to profoundly transform economic and social structures. Commercialized intelligent IT, convergence among different telecommunications and broadcasting services, and the spread of the Internet of Things networks are examples of future changes in technology.

Rapid demographical change is another concern. Korea has seen its lowest birth rate of 1.17 in 2016 and is moving towards becoming an aged society at a fast pace. As a result, it is forecasted that Korea's working population will shrink after 2018. Therefore, more emphasis should be placed on investing in infrastructure that maximizes the utilization of existing human resources.

Leading practices: Among your economy's structural reforms relating to infrastructure in the past 5 years (2013-2018), which two do you think have been implemented most effectively? Please identify the main reasons for the effectiveness of this structural reform that could be relevant for other economies.

Leading practices:

The Korean government is focusing on narrowing or eliminating the digital divide between urban and rural areas. To this end, it has joined hands with private telecommunication companies to build the Broadband convergence Network (BcN) in rural areas since 2010. The Korean government's strategy for building rural BcN is based on the following three

objectives: constructing physical subscription networks; developing services using the constructed networks; and stimulating the utilization of the networks and services with support plans. To ensure access to communication services in rural areas, the Korean government carried out the Subscription Networks for Rural BcN project and built the BcN in rural villages with fewer than 50 households. The Korean government, municipal governments, and private communication operators provided 25%, 25% and 50% of the funding needed to carry out this project, respectively. The project was completed in 2017. The most notable outcomes of this project are that the average annual household income in rural areas increased by 980 thousand won and that lower service fees and information gathering via web was brought about by cost-reduction effects. It also contributed towards improving the well-being of those living within rural areas.

To provide more support for women who want to restart their careers after a career interruption and increase their access to such support, the Korean government more than doubled the number of the regional offices of the Women's Re-employment Centre between 2009 and 2015. Since 2015, the Korean government has categorized the Centre's regional offices into "general," "career-developing" and "rural" branches to meet the needs of various targets, including highly educated women in their 30s and women in rural areas. In addition, to encourage women to restart their careers after a career interruption, the Centre provides job training programs in value-added sectors, such as 3D printing, big data and drones.

<u>Regional cooperation</u>: What role can regional cooperation and regional bodies such as APEC play? You may like to consider the role of cooperation in addressing the challenges and policy gaps previously identified, in enhancing the investment environment, in making more possible cross-border/regional connectivity projects and in promoting co-ordination of development funding.

How can we ensure that Asia Pacific has top-quality physical and digital infrastructure to ensure maximum connectivity? What would be the benefits to your economy from improved connectivity?

<u>Regional cooperation</u>:

APEC can serve as a venue for member economies and relevant external institutions to share their experiences, knowledge, and best practices within the APEC context. For example, Korea could provide practical advice to interested economies in areas where Korea has a comparative advantage such as developing ICT-based digital infrastructure or constructing highway, high-speed train, and subway systems.

Also, economies can consider strengthening the conformity of technologies and adopting a standard technology in the field of ICT to improve connectivity and interoperability in the region. Mutually compatible technologies can promote digital trade and e-commerce, which contributes towards increasing the mobility of products and people and achieving future growth.

MALAYSIA

Capabilities: what significant policy or institutional structures (e.g. top 2) support your economy in meeting the following objectives. Economies could discuss whole of Government policies or policies that apply at a sector specific level:

- **Cost effectiveness: Providing for the efficient provision and management of infrastructure and the efficient operation of infrastructure markets, including providing for cost-based access;**
- **Resilience: Enhancing adaptability and ensuring the infrastructure system is robust to disruptions and shocks;**
- **Inclusion: Ensuring broad access (e.g. across regions, genders, underserved or minority groups and indigenous people) to infrastructure, including digital infrastructure, to support inclusive growth?**

Gaps: What are the highest priority structural or institutional reforms you have identified to meet these objectives?

Barriers and challenges: What are the key barriers and challenges to implementing structural reforms for infrastructure in your economy and has your economy identified any solutions to overcome those barriers or challenges?

For this survey, Malaysia would like to highlight its achievement in Structural Reforms and Infrastructure in the areas of:

A. Improving coverage, quality and affordability of digital infrastructure; *and*
B. Building an integrated need-based transport system.

A. Improving Coverage, Quality and Affordability of Digital Infrastructure

- Digital infrastructure plays a critical role in connecting businesses and individuals to the global marketplace, and due to rapid technological advances, it allows people to communicate in ways unthinkable before. Malaysia aspires to ensure that its citizens gain benefits from digital economy by expanding the roll-out of digital technologies such as the High-Speed Broadband (HSBB) and Digital Terrestrial Television (DTT).
- This, coupled with efforts to increase the affordability of such services, and enhanced consumer protection standards, will pave the way for the ubiquity of fiber connectivity, ensuring that Malaysians have access to affordable, high-quality digital infrastructure on par with developed economies. These aspirations will be achieved through **four (4) strategies:**

1. Expanding and upgrading broadband infrastructure

Improving Connectivity from International to Last-Mile Connections

- Measures will be undertaken to improve the international to last-mile bandwidth capacity to meet the expected demand of 41 terabytes per second (Tbps) during the 11th Malaysia Plan. Efforts will also be undertaken to enhance connectivity through

deployment of the High-Speed Broadband 2 (HSBB 2) and Suburban Broadband (SUBB) for a more holistic coverage in all state capitals and selected high-impact growth areas.

Integrating Digital Infrastructure Planning

- Collaboration amongst the Ministry of Communications and Multimedia, Malaysian Communications and Multimedia Commission (MCMC), state governments and local authorities will be strengthened on the planning and deployment of digital infrastructure. The collaboration will ensure that broadband supply meets both federal and state requirements.

2. **Increasing affordability and protection for consumers through an improved Access Pricing Framework (APF)**

Improving the Access Pricing Framework for providers

- The APF will be improved to facilitate competition and infrastructure sharing among service providers which is expected to reduce the fixed broadband cost from 2.42% of Gross National Income (GNI) per capita in 2013 to 1% in 2020, in line with the domestic target. This will increase affordability and improve broadband outreach to the underserved.

3. Migrating to Digital Terrestrial Television (DTT) and introducing value-added services

Migrating to Digital Terrestrial Television (DTT)

- DTT is a technological advancement in television that allows the broadcast of high quality video over digitized land-based signals. DTT has lower operating costs than satellite television, but offers a higher quality of broadcast than analogue. For broadcasters and consumers, this would mean better affordability and improved quality of viewing on regular television, without the need for satellite antennas.

Implementing second phase of DTT

- The second phase of the DTT service will be implemented in 2016-2017, covering 46 areas economy-wide including 24 areas in Sabah and Sarawak. The second phase roll-out will give more households the option to choose between DTT and satellite televisions, increasing consumer choice.

4. Strengthening infrastructure for smart cities through better connectivity

- Smart Cities is a next generation approach to urban management with solutions that address these issues and improve the quality of life of urban dwellers. During the 11th Malaysia Plan, a framework will be developed to prioritize areas of focus in the development of smart cities. A fundamental initiative to realize the migration to smart cities will be the development of smart communities.

B. <u>Building and Integrated need-based transport system</u>

- The Government of Malaysia is committed towards developing an effective and sustainable transport system that can cope with the rising demand of personal mobility and the pressing need to bring down the cost of doing business. In the 10th Malaysia Plan,

network expansion of essential infrastructure such as roads, rail was undertaken to reach more households and improve standards of living.

- Improvements in transport infrastructure and measures to facilitate online trading contributed to increased trade activities, improving Malaysia's ranking in the World Bank Logistic Performance Index from 29 out of 160 economies in 2013 to 25 in 2014. **Four (4) strategies** towards achieving an integrated need-based transport systems:

1. **Enhancing connectivity across transport modes and regions**
   - Comprehensive and efficient public transport connectivity is an enabler for sustained economic prosperity. To increase public transport utilization, public transport facilities will be made available, reliable and convenient for users.
   - To achieve a balanced and inclusive growth, highway development will be focused towards rural and remote areas. A comprehensive needs analysis will be undertaken in road planning to ensure effective decision making on whether to upgrade existing road or construct new ones.

2. **Expanding port capacity, access and operations**
   - As Malaysia integrates into the ASEAN Economic Community and the global economy, economic growth through trade and exports will necessitate greater capacity and efficiency of its infrastructure.

3. **Strengthening regulatory and institutional framework for the transport industry**
   - Greater attention will be given towards strengthening the institutional and regulatory framework for public transport, port and civil aviation. This will ensure that development in these sectors is planned, structured and systematic in order to remain competitive and sustainable.

4. **Improving safety, efficiency and service levels of transport operations**
   - Strategies to expand Malaysia's transport network and enhance intermodal integration must be complemented by efforts to improve the systems' safety. Road and rail safety will be improved through initiatives such as Blackspot Mitigation Programme and Road Safety Audit to reduce accidents and fatalities. In addition to that, utilization of advanced materials and innovative technology in road construction and maintenance will be intensified to ensure durability of road infrastructure.

Highlights of the achievements (2011-2015):

- Road length rose 68% from 137,200 km in 2010 to an estimated 230,000 km in 2015. This resulted in a rise in the National Road Development Index from 1.42 in 2010 to 2.29 in 2015. During this period, road development focused on improving economy-wide linkages for better connectivity. Road maintenance programmes were continuously undertaken with greater focus on corrective maintenance.
- Two Malaysian ports were featured in the International Association of Ports and Harbours World's Top 20 Container Ports report in 2013. Port Klang, Selangor was ranked at at 13th place with 10.4 million twenty-footer equivalent unit (TEU) and Port of Tanjung Pelepas was at 19th spot with 7.6 million TEUs. Between 2010 and 2014, total cargo volume grew 20.2% reaching 540 million freight weight tonnes. Major projects were

undertaken to expand port capacity with the addition of new container wharfs at Northport and Westport of Port Klang, Penang Port and Kuantan Port.

- Airports recorded an average annual growth rate of 8.5% for passengers handled. There was an increase of 39% in total volume between 2010 and 2014 (85 million passengers in 2014). In May 2014, Kuala Lumpur International Airport 2 (KLIA 2) was launched as a new low-cost carrier terminal and a third runway was operationalized at KLIA, to facilitate greater number of aircraft movement.
- The bottlenecks at key ports and airports are being addressed to capture existing and future demand. This is vital to ensure that the ports and airports remain competitive at the regional and global level.

<u>Needs and financing requirements</u>: What are your economy's main (e.g. top 2-3) identified physical and digital infrastructure needs over the medium-long term? Please describe the required financing and expected impact of these infrastructures.

<u>Future needs</u>: What are the main factors (e.g. population increase, technology, climate change or variability, ageing capital stock) that will influence your economy's future physical and digital infrastructure needs?

A. Among future Digital Infrastructure plans under the 11th Malaysia Plan are:

1. Fixed line broadband expansion
   - High Speed Broadband Phase 2 infrastructure expansion with speeds of 100 Mbps in state capital
   - Sub-urban broadband infrastructure with speeds up to 20 Mbps
   - The widening of broadband infrastructure with speeds up to 20 Mbps in rural areas

2. Mobile broadband coverage expansion
   - Construction of 800 towers that will improve 3G/4G mobile broadband services
   - 1500 existing towers upgraded to 4G mobile broadband

3. Submarine cable systems
   - A new submarine cable system is part of the government's initiatives to increase the capacity of high-speed broadband and data traffic between Peninsular Malaysia and Sabah and Sarawak.
   - The new submarine cable system which spans over 3,800 km lands at six landings in Kuantan, Mersing, Kuching, Bintulu, Miri and Kota Kinabalu. It will adopt state-of-the –art 100 Gbps technology, with a capacity of 4 Terabit per second (Tbps), enabling access to higher quality services to all Malaysians.

Malaysia's broadband penetration rate has reached 84.5% in 2017.

B. Key Physical Infrastructure plans under the 11th Malaysia Plan:

Pan Borneo Highway, Sabah and Sarawak

Pan Borneo Highway which spans over 2,325 km across the states of Sabah and Sarawak will play a major role in opening up economic corridors and opportunities to the areas connected by and along the highway. The completion of the Pan Borneo Highway Sabah and

Sarawak by the year of 2022 will certainly contribute towards the overall increase in productivity and revenue of the states.

<u>Leading practices</u>: Among your economy's structural reform relating to infrastructure in the past 5 years (2013-2018), which <u>two</u> do you think have been implemented most effectively? Please identify the main reasons for the effectiveness of this structural reform that could be relevant for other economies.

<u>Improving coverage, quality and affordability of digital infrastructure.</u>

Among the key reasons were:

1. Domestic agenda to transform Malaysia to a modern state and adoption of knowledge based economy;
2. To keep pace with the development of digital economy;
3. Digital infrastructure development was implemented in stages since 1996, with the formalization of Multimedia Super Corridor (MSC); *and*
4. Excellent cooperation and coordination between government, private sector and public at large.

<u>Regional cooperation</u>: What role can regional cooperation and regional bodies such as APEC play? You may like to consider the role of cooperation in addressing the challenges and policy gaps previously identified, in enhancing the investment environment, in making more possible cross-border/regional connectivity projects and in promoting co-ordination of development funding.

How can we ensure that Asia Pacific has top-quality physical and digital infrastructure to ensure maximum connectivity? What would be the benefits to your economy from improved connectivity?

It is proposed that APEC continues to play a role in driving Regional Economic Cooperation by:

1. establishing platforms for knowledge sharing and technology exchange on Physical/Digital Infrastructure management and maintenance;
2. organising workshops to discuss future developments and challenges of Sustainable Physical/Digital Infrastructure; *and*
3. Capacity building programmes for SMEs to learn from Successful Physical/Digital Infrastructure Industry Players.

MEXICO

Capabilities: what significant policy or institutional structures (e.g. top 2) support your economy in meeting the following objectives. Economies could discuss whole of Government policies or policies that apply at a sector specific level:

- **Cost effectiveness: Providing for the efficient provision and management of infrastructure and the efficient operation of infrastructure markets, including providing for cost-based access;**
- **Resilience: Enhancing adaptability and ensuring the infrastructure system is robust to disruptions and shocks;**
- **Inclusion: Ensuring broad access (e.g. across regions, genders, underserved or minority groups and indigenous people) to infrastructure, including digital infrastructure, to support inclusive growth?**

Gaps: What are the highest priority structural or institutional reforms you have identified to meet these objectives?

Barriers and challenges: What are the key barriers and challenges to implementing structural reforms for infrastructure in your economy and has your economy identified any solutions to overcome those barriers or challenges?

Capabilities:

- Access to high-quality telecommunication and broadcasting services.
- **Cost effectiveness**: (2012)- Mexico promoted Structural Reforms to boost economic growth and development: These Reforms trigger investments, promote productivity, and generate a more flexible economic structure to face internal and external challenges. (2017)- the Ministry of Finance announced the strategy to promote Investment Programs and Projects under the Public Private Partnerships (PPP). Mexico's private sector helps to reduce the need of public resources for infrastructure development.
- **Resilience**: An important part of the infrastructure development in Mexico is related to insurance schemes to protect the resources invested, ensuring its reconstruction in case of natural disasters. The PPP and concession schemes contemplate, in many cases, the construction risk transfer to the private enterprise in charge. The Mexican Government is reviewing the technical criteria of infrastructure projects to enhance resilience capacity.
- **Inclusion**: Telecommunications reform seeks to develop inclusion within Mexican society and to ensure that Mexico can provide broad access and democratize digital services to the citizens. In two projects: i) Shared Network ("Red Compartida"): a carrier that provides prime economy-wide telecommunications infrastructure equally available to all participants in the market; ii) Backbone Network ("Red Troncal"): to build a robust backbone network for access to a fixed broadband and facilitate telecommunication services through Federal Electricity Commission (CFE) infrastructure.

Gaps:

- With the telecommunications reform, the access to information and communication technologies, as well as the telecommunications and broadcasting services, including the broadband and Internet are considered to be human rights and the Mexican State shall guarantee that these services are provided in conditions of competition, quality, plurality, universal coverage, interconnection, convergence, continuity, free access and without arbitrary interference.
- One of the highest priorities of the telecommunications reform was to strengthen the legal and regulatory framework to improve the economic competition of this sector. **For this reason,** the reform introduced asymmetric regulation for the preponderant economic agents and allowed the Foreign Direct Investments (FDI) in all telecommunication and satellite communication services up to one hundred percent.
- Strengthen the legal and regulatory framework with a clear division between public policy and regulation, the creation of two autonomous bodies with ample powers: the IFT and the Federal Economic Competition Commission (COFECE). The IFT as a self-governing regulator has a transparent procedure for nominating and appointing the IFT's commissioners that involves the participation of different public powers and the IFT decisions cannot be suspended during judicial review. Also the reform created special courts to the telecommunication and broadcasting sectors for indirect appeal ("amparo"), convergent licenses to provide all services, an authority to grant and revoke licenses and exclusive powers to the IFT regarding antitrust for media and telecom.
- Mexico has set a legal framework to increase private sector participation:
  - Energy reform: boost productivity and investment.
  - Tax reform: changes to the tax system to increase tax collection.
  - Telecommunications reform: strengthens competition and investment.
  - Financial reform: promotes competition and access to better financing conditions.
  - Anti-trust reform: bolsters competition and investment.

  These reforms, as a key component of a new set of institutional arrangements, will facilitate and accelerate private investment in strategic infrastructure sectors.

Barriers and challenges:

The lack of project preparation implies incomplete and non-bankable projects, unaligned regulation, and unattractive risks; therefore, the government shall take actions aimed at:

- Strengthening public capacity to create greater impacts on institutional coordination, data collection for planning and project management.
- Reviewing and improving local regulation, especially for greater transparency and accountability for project development and financing.
- Understanding risk management to reduce inefficiencies, cost, and delivery time.

Needs and financing requirements: What are your economy's main (e.g. top 2-3) identified physical and digital infrastructure needs over the medium-long term? Please describe the required financing and expected impact of these infrastructures.

Future needs: What are the main factors (e.g. population increase, technology, climate change or variability, ageing capital stock) that will influence your economy's future physical and digital infrastructure needs?

Needs and financing requirements:

The Mexican Government recently created an infrastructure promotion area allocated in BANOBRAS, a Mexican development bank. Its main objective is to contribute towards

increasing the supply of well-structured PPP projects and to link these projects with local and international investors. Within this area, the online platform called "Proyectos Mexico" or "Mexican Project Hub" is a bilingual website with more than 450 opportunities in different infrastructure and energy sectors that require private funding (equity or financing).

Future needs:

- According to the OECD Telecommunication and Broadcasting Review of Mexico 2017, the main objective of the reform was to increase access to high-quality telecommunication and broadcasting services for Mexico to create a vibrant digital economy. To maintain the momentum and move further towards promoting competition, improve market conditions, such as encouraging further investment, improving spectrum management, eliminating the tax on telecommunication services and ensuring that market expansion benefits all stakeholders while reducing barriers. To most, effectively meet the targets of the reform updating the National Digital Strategy in ways that harness the benefits brought by the development of the digital economy and society.
- In the short term, Mexico will face technological change, climate change, structural change (ageing), demographic increase, as well as a more urbanized society. In general, the future Mexican society will demand more and better public and private services. In this sense, Mexico urges the expansion of coverage for public and private services by modernizing its infrastructure.

Leading practices: Among your economy's structural reforms relating to infrastructure in the past 5 years (2013-2018), which two do you think have been implemented most effectively? Please identify the main reasons for the effectiveness of this structural reform that could be relevant for other economies.

Leading practices:

- As a consequence of regulatory reform, the relevant markets in the telecommunication industry have developed positively: increased penetration levels can be observed in broadband markets, new players have entered the mobile market and the quality of service (QoS) has improved (the latter, particularly with respect to broadband speeds and data volumes, where investment in higher capacity mobile technologies and further availability of spectrum for mobile telecommunication services, including via the digital switchover, has led to an acceleration of gains). In the domestic economic context, between 2012 and 2016, prices for telecommunication services significantly decreased, leading to an important increase in subscriptions, especially in mobile markets: over 50 million new mobile subscriptions to the mobile Internet and, from a small base, the number of people using the Internet for online transactions has multiplied by a factor of four. In addition, foreign investment increased and the telecommunication and broadcasting sectors grew faster than the overall Mexican economy. A third domestic Free-to-air television network has been introduced and plans have been announced for a fourth set of licenses to be made available and awarded on a regional basis.

Energy reform:

- The modernization and consolidation of "Petróleos Mexicanos" (PEMEX) and "Comisión Federal de Electricidad" (CFE) as state owned productive companies.
- Attract investment to increase the availability of oil and natural gas.

- Improve the quality of public electricity, with broader coverage and more competitive prices.

Telecommunications reform:

- Attract investment towards satellite and broadcasting communications, thus stimulating telecommunications development throughout the economy.
- Opening DFI: up to 100% in telecommunications and up to 49% in broadcasting.
- Increase options for end consumers at affordable prices for cable television, fixed-line, and mobile telephony, and high speed internet.

Regional cooperation: What role can regional cooperation and regional bodies such as APEC play? You may like to consider the role of cooperation in addressing the challenges and policy gaps previously identified, in enhancing the investment environment, in making more possible cross-border/regional connectivity projects and in promoting co-ordination of development funding.

How can we ensure that Asia Pacific has top-quality physical and digital infrastructure to ensure maximum connectivity? What would be the benefits to your economy from improved connectivity?

Regional cooperation:

- The role of these regional bodies should be to continue the focus on promoting investment, accelerating regional economic integration, encouraging economic and technical cooperation, enhancing human security, facilitating a favorable and sustainable business environment in order to reach a sustainable and inclusive economic growth.
- The implementation of the Connectivity Plan (2018-2025), the exchange of knowledge and the creation of capacities, will allow APEC economies to have physical and high quality digital infrastructure to ensure maximum connectivity. Mexico is better prepared to face and adverse external environment:
  - Has achieved a sustained growth in the last 32 quarters, and in the last ten years recorded an average annual growth of 2.2%.
  - Implemented in the last several years 13 structural reforms with outstanding results:
    - → 3.35 million jobs created in the period 2012 – 2017.
    - → Committed investments by the private sector without precedent in the energy sector of over USD 200 billion.
  - Has proven prudent management of public finances that enabled a primary balance surplus of 1.4% of GDP in 2017.
  - Reversed the upward trend of public debt.
  - Has a solid legal framework that fosters the development of infrastructure through public-private partnerships.
  - Is committed to address climate change as demonstrated by the actions undertaken over the last few years.

NEW ZEALAND

Capabilities: what significant policy or institutional structures (e.g. top 2) support your economy in meeting the following objectives. Economies could discuss whole of Government policies or policies that apply at a sector specific level:

- **Cost effectiveness: Providing for the efficient provision and management of infrastructure and the efficient operation of infrastructure markets, including providing for cost-based access;**
- **Resilience: Enhancing adaptability and ensuring the infrastructure system is robust to disruptions and shocks;**
- **Inclusion: Ensuring broad access (e.g. across regions, genders, underserved or minority groups and indigenous people) to infrastructure, including digital infrastructure, to support inclusive growth?**

Cost-effectiveness: the Investment Management System

The investment management system encompasses the processes, rules, capabilities, information and behaviours that together shape the way investments are managed throughout their lifecycles. The system as a whole enables the New Zealand government to invest more effectively to maximize public value and improve the wellbeing of New Zealanders. The main goals of the system are:

- To enable investments to achieve their intended investment objectives,
- To optimise the value generated from existing assets and new investments,
- To increase the efficiency and effectiveness of the system over time.

Achieving these goals takes a concerted effort, because the system is complex and made up of many different agents (such as Ministers, boards, and agencies) with a range of roles and responsibilities. This organisational diversity exists in part because New Zealand, as a small economy of 4.7 million people, performs many government functions at a economy-wide level which are performed at regional or local levels in other jurisdictions.

The system is led and coordinated by the Treasury's Investment Management and Asset Performance (IMAP) team, in cooperation with other senior government officials at the centre of the New Zealand government. Together these "stewards" of the investment management system set rules and standards, run processes, and build capabilities to ensure investment across government is well developed and managed[2]. For example, when agencies develop new government investments of significance, the IMAP team (on behalf of the system) sets standards and expectations for business cases (outlined in the Better Business Case framework), provides business case clinics (if needed) to assist agencies developing investments, collects data periodically on the investment to track development, and (if needed) monitors progress from investment development through to delivery. Additional processes and supporting functions are also performed by the system stewards to assist agencies as investments are developed and delivered.

[2] The scope of the investment management system and the rules, processes and expectations which guide and support government investments, are articulated primarily in Cabinet Circular CO 15 (05).

A Principles-Based Approach

The complexity of the system requires a flexible, principles based approach to investment management. The system is underpinned by an Investment Strategy[3], which contains the following 11 principles to guide investment management:

Table 1: Principles of the Government Investment Strategy

Principle	**Description**
Considered and active stewardship	Take considered and active stewardship of taxpayer and Crown resources over a long-term investment horizon.
Continuous assessment	Continually assess whether existing investments and assets align with the Government's objectives and exit from assets, commitments or projects in development if it no longer makes sense to continue.
Balanced investment	Balance investment across the Government's interests and accountabilities when considering the make-up of the Government investment portfolio.
Informed decisions	Inform decision-making processes with information and evidence as well as analyses of the impacts of investing, not investing or divesting in public services.
Consideration of relative value	Consider the relative value of investment proposals against other proposals, existing investments, other options and forecast future proposals, in order to make decisions that make the best use of the precious resources in our care.
Alignment to Government priorities	Give preference to initiatives aligned with the priorities of the Government. Collective and all-of government approaches will be looked on favourably but must be able to demonstrate long-term value and show they have strong stakeholder support and commitment.
Optimal resource allocation	Move resources (including funding, assets and capability) to where they have the greatest overall effect, within the constraints of delegations and existing levers.
Appropriate risk management	Accept a level of risk in order to obtain the benefits from investments, but the risks need to be clearly identified and managed. Each decision carries risk, as does doing nothing. The Government is comfortable with a level of managed risk in its portfolio.
Good financial management	Expect agencies, in the first instance, to provide for current and future needs from within their existing baselines, and to understand: the costs of delivering their services; their medium to long-term planning; the impact of moving resources; and the performance of investments under their responsibility.
Alignment to fiscal strategy and balance	Inform and constrain (e.g., timing and maximums) its investment decision-making and management, at an all-of-government level, through the Government's fiscal strategy and balance sheet targets.

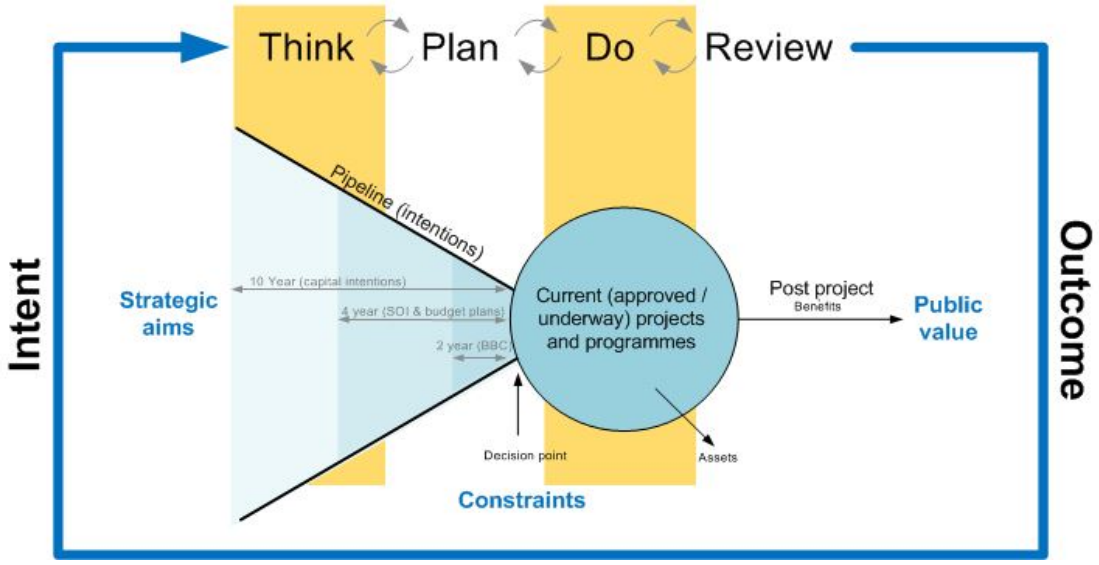
[3] Given the recent change of government, the investment strategy represented here is currently being reconsidered and revised by the new government, however it will likely be similar in intent and wording.

sheet targets	
Regular reporting	Review, and periodically report on, the performance of the Government's investment portfolio against the outcomes it wants to achieve, to ensure transparency.

Investment Lifecycle Phases

Conceptually the investment management system is organised into four investment lifecycle phases: think, plan, do and review. Throughout these phases, agencies manage their own investments, but with additional support and monitoring from the centre of Government to ensure success. Each phase has different implications for agencies and decision-makers. Figure 1 describes these investment lifecycle phases.

Figure 1: Phases of the Investment Lifecycle



Resilience

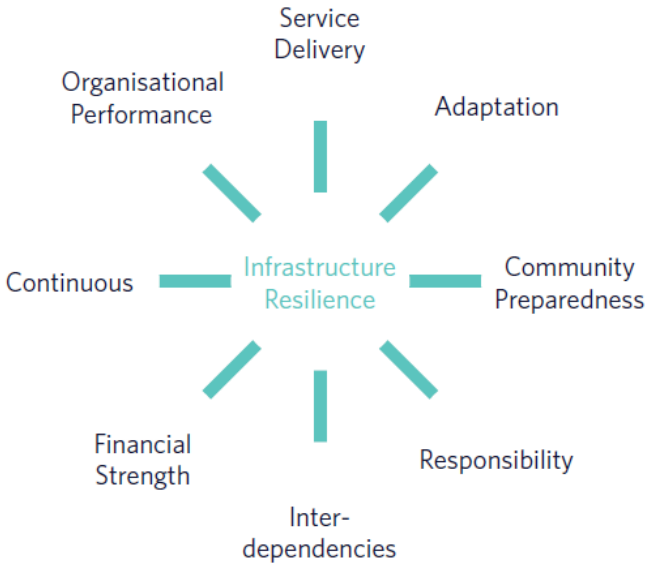
Given New Zealand's exposure to natural hazards, and the range of other factors that may disrupt the flow of services derived from infrastructures assets, ensuring that critical infrastructure systems can effectively respond to shocks is important. Under best practice resilience considerations would be incorporated into decision-making as 'business as usual', for example it should be a routine consideration alongside other considerations when developing business cases for new or existing infrastructure assets that get considered through the domestic budget, local government investments or Government-owned company board decisions.

Resilience should also be considered broadly (see figure 2), not just with a narrow focus on shock events such as earthquakes, or infrastructure failure. For example, consideration should be given to all potential hazards to a system including those that occur over a long period of time such as the impacts of climate change, thinking about interdependencies within and between systems and the impact of events on the level of service. Increasing

resilience is not just about building things stronger; the role of operational changes and community preparedness in mitigating the costs of hazards also needs to be considered.

Incorporating resilience considerations into strategic thinking, planning and funding therefore requires a level of capability across central and local government in understanding resilience. Below we discuss two initiatives that have been undertaken in New Zealand, the Lifelines Council and incorporation of consideration of resilience into planning for transport infrastructure.

Figure 2: Resilience attributes



Lifelines Council

In order to build cross agency capability in regards to resilience, the New Zealand Lifelines Council (NZLC)[4] was established in 1999 with the objective of "Enhancing the connectivity of lifeline utility organisations across agency and sector boundaries in order to improve infrastructure resilience". Members of the council include providers of critical infrastructure (e.g. providers of telecommunications, electricity and gas, water and road) and Government agencies with a relevant interest. The NZLC seeks to promote arrangements to improve infrastructure resilience, and has adopted three themes to frame work in this respect. These are the need for:

- Robust assets, or satisfactory alternative service continuity arrangements;
- Effective coordination, pre and post-event, at an economy-wide and local level;
- Realistic end-user expectations, so that users are risk-aware and better able to consider options.

The principal functions of the NZLC are:

[4] Ministry of Civil Defence and Emergency Management. (n.d.). New Zealand Lifelines Council. Retrieved from https://www.civildefence.govt.nz/cdem-sector/lifeline-utilities/new-zealand-lifelines-council/

- Advising community-based Lifelines Groups on best practices across a range of activities, including encouraging new projects and supporting them by offering information on methodology and other learnings from projects in other regions;
- Providing a link between Lifelines activities and government – relevant government programmes include Lifelines work within the Ministry for Civil Defence and Emergency Management and economy-wide infrastructure planning within Treasury;
- Promoting and promulgating resilience-related research;
- Organising the annual National Lifelines Forum. The Forum updates representatives from Lifeline Groups and domestic utilities on latest developments, and provides an opportunity to develop positions on common resilience-related issues.

Transport

The ability of our transport system to function effectively during a range of adverse conditions, and then to recover quickly to acceptable levels of service, is fundamental to the longer-term well-being of communities, and New Zealand's economic productivity. Aside from facilitating normal activity (including economic activity), the transport system is also a vital lifeline during an emergency response, and is critical for evacuations and supplying essential goods and services. Given transport's crucial role, improving transport *system* resilience has been identified as a key priority for the transport sector. In this regard the Ministry of Transport plays a key role in providing cross sector leadership in improving the resilience of the system as a whole and to:

- Plan, prepare, and respond to hazardous events impacting on the transport system;
- Build a longer-term strategy to improve transport system resilience, including a clear vision and outcomes framework and a cross-modal action plan;
- Encourage engagement and collaboration across the transport sector on transport system resilience;
- Provide clear advice on the appropriate role government should play to achieve a resilient transport system.

One key lever that central Government has to influence the resilience of the transport sector is through its funding choices. Funding choices for land transport are guided by the Government Policy Statement on land transport (GPS). This is issued by the Minister of Transport and outlines the Government's strategy to guide land transport investment over the next 10 years. The GPS guides decisions on how money from the National Land Transport Fund (NLTF) is to be invested over the next decade (currently approximately $4 billion each year) and guides the decisions of other entities that makes decisions on the funding of land transport (such as local government). One of the national land transport system objectives in the 2018 GPS is for a land transport system that is resilient, including a focus on resilience to climate change impacts, ensuring that this consideration is a factor in funding decisions.

Inclusion

One key element of inclusion in New Zealand is ensuring the economic prosperity of regional New Zealand. The New Zealand Government has recently undertaken an initiative to lift the productivity potential of regions that are seen to have fallen behind on a number of key economic indicators, such as employment and household income. The Tuawhenua Provincial Growth Fund (PGF), launched in February 2018, aims to lift productivity in the regions. It priorities are to enhance regional economic development opportunities, create sustainable jobs, enable Maori to reach their full potential, boost social inclusion and

participation, build resilient communities, and help meet New Zealand's climate change targets. This reflects a commitment to ensure that regional New Zealand can thrive through productive, sustainable and inclusive economic growth, and also reduce social and infrastructural deficits that are said to have emerged.

The PGF fund will allocate NZD$3 billion over 3 years towards regionally-based projects. One arm of the PGF is focused on investing in regional infrastructure projects that will lift productivity and grow jobs. The PGF will allow additional funding for regional infrastructure projects, such as land transport, that support the goals of the fund.

<u>Gaps, barriers, challenges and future needs</u>: What are the highest priority structural or institutional reforms you have identified to meet these objectives? What are the key barriers and challenges to implementing structural reforms for infrastructure in your economy and has your economy identified any solutions to overcome those barriers or challenges?

Our economy faces significant challenges over the next 30 years. This includes the need to balance fiscal resilience (by returning government debt to a 20 percent ratio of core Crown debt to GDP) against the need to invest to support the resilience of physical assets. Additionally, fiscal pressures resulting from the need to replace ageing assets (many of which were constructed post-war), as well as population and demand shifts will need to be addressed. Also, to keep our economy growing, our infrastructure needs to support increased productivity. At the same time, technology is transforming the way infrastructure providers deliver services. Finally, our climate is changing, and our natural resources are under pressure, which will create new challenges for infrastructure planning.

To respond to these challenges, we need a more sophisticated approach to planning, developing and managing our infrastructure. This includes having an overriding focus on the outcomes we want to achieve, rather than the assets used to deliver them. This can be achieved by infrastructure providers in central government, local government and the private sector:

- Increasing understanding of levels of service and future drivers of demand over the long term;
- Strengthening asset management practices and using data more effectively; and
- Optimising decision making, which includes having the right governance and management structures and regulatory regimes in place.

Specific examples of particular areas for improvement are below:

Three waters (drinking, storm- and wastewater)

A series of recent events have indicated the need for improvement in the management of three waters (drinking, storm and wastewater). This is illustrated by the following:

- The Auditor-General and the Productivity Commission have raised concerns about investment and regulation of three waters infrastructure;
- There was a widespread outbreak of gastroenteritis in Havelock North in August 2016, with more than 5000 people falling ill from contamination of the drinking water supply;
- It could take up to 120 days to restore water services to Wellington in the event of a major earthquake;

- There have been some examples of cost overruns/quality problems in water systems delivered by local Government, namely:
  - In Kaipara District Council, a wastewater scheme intended to cost the community $18.5 million actually cost $63.3 million, and required the Crown to appoint Commissioners to replace the elected council.
  - In Whanganui District Council, a wastewater scheme costing $27 million failed to meet intended performance levels and a new scheme costing approximately $41.2 million is proposed.

Resource management planning

The existing resource and land use regime could be reformed to better enable central and local government to more easily respond to demand for infrastructure. Challenges include a lack of alignment across legislative roles and responsibilities, particularly with regard to urban issues such as housing and infrastructure. Improvement to the planning system may mean more certainty that the right levels of infrastructure are planned, funded and delivered over the long term.

<u>Leading practices</u>: Among your economy's structural reforms relating to infrastructure in the past 5 years (2013-2018), which <u>two</u> do you think have been implemented most effectively? Please identify the main reasons for the effectiveness of this structural reform that could be relevant for other economies.

See case studies.

<u>Regional cooperation</u>: What role can regional cooperation and regional bodies such as APEC play? You may like to consider the role of cooperation in addressing the challenges and policy gaps previously identified, in enhancing the investment environment, in making more possible cross-border/regional connectivity projects and in promoting co-ordination of development funding.

How can we ensure that Asia Pacific has top-quality physical and digital infrastructure to ensure maximum connectivity? What would be the benefits to your economy from improved connectivity?

- Cooperation through regional bodies such as APEC provides the opportunity to share experiences on the lessons learned in improving structural policies for infrastructure provision and management. Economies can learn from others' reforms and outcomes. They can share the range of their experiences and challenges through policy dialogues, workshops and capacity building exercises, allowing other economies in similar positions to learn from their situations.
- This sharing allows economies to identify opportunities for joint projects and areas for coordination or parallel development. The more coordinated regional infrastructure development is, the more valuable this development to the Asia Pacific region as a whole.
- A regional discussion of infrastructure challenges and plans could also pave the way for constructive discussions with the market. For example, a regional articulation of future government infrastructure needs could attract suppliers to the region, or encourage them to increase capacity or capability to meet the regions' public sector infrastructure forecast needs.

- New Zealand is highly reliant on robust, good quality physical and digital infrastructure for its development and long term prosperity.
- The digital economy is becoming an increasingly important driver of economic growth and well-being. Encouraging development and alignment of digital infrastructure, in particular, is likely to generate significant benefits. The goal should be to achieve high standards of digital infrastructure and support connectivity between APEC economies, where businesses, people and government are all using digital technology to drive innovation, improve productivity and enhance the quality of life.

PAPUA NEW GUINEA

Capabilities: what significant policy or institutional structures (e.g. top 2) support your economy in meeting the following objectives. Economies could discuss whole of Government policies or policies that apply at a sector specific level:

- **Cost effectiveness: Providing for the efficient provision and management of infrastructure and the efficient operation of infrastructure markets, including providing for cost-based access;**
- **Resilience: Enhancing adaptability and ensuring the infrastructure system is robust to disruptions and shocks;**
- **Inclusion: Ensuring broad access (e.g. across regions, genders, underserved or minority groups and indigenous people) to infrastructure, including digital infrastructure, to support inclusive growth?**

There are various policy reforms being implemented by the Government to encourage cost-efficiency, sustainability and inclusive growth in the economy.

The Government has recently undertaken the Kumul Reform Agenda to improve governance in the management of SOEs and enhance efficiency in service delivery.

This is complemented by other various policies such as the Community Service Obligation (CSO) Policy and the On-Lending Policy. This policies are being implemented to address challenges that the SOEs face, to improve their investment performance and allow for efficient infrastructure service delivery.

SOEs contribute significantly to the economy not only in terms of providing basic essential infrastructure services such as power and water but SOE dividends contribute to the PNG domestic budget. Hence, the Government requires that SOEs maintain a good performance.

However, SOEs are frequently faced with the challenge of generating a comparable level of profit to private sector companies while providing goods or services to the community at a cost that renders those activities unprofitable. The CSO policy promotes both competition and transparency in the provision of goods and services by SOEs.

The CSO policy requires that all CSOs are fully costed and defined in a contract. This will ensure CSOs are delivered in a manner that is transparent, brings greater accountability and improves SOE performance. This will further enable the government to better monitor the performance of the SOEs and their delivery of CSOs.

Removing the need for SOEs to cross subsidize CSO activities from the profitable arms of their operation also enables the Government to understand the true cost of delivering CSOs, thus placing the Government in a better position to assess the scope for private sector involvement.

The CSO policy is currently being piloted with an SOE. Lessons from the pilot program will enable the broader roll-out of this policy onwards.

Gaps: What are the highest priority structural or institutional reforms you have identified to meet these objectives?

PPP - Infrastructure initiative.

The government remains committed to promoting reforms to encourage efficiency and enhance infrastructure service delivery. One such reform initiative is the Public Private Partnership (PPP). The Government passed the PPP Policy and legislation in 2014.

The recent gazettal of the PPP Act beginning 2018, will now enforce the implementation of the PPP legislation. The PPP law creates three PPP institutions namely; PPP Centre, PPP Forum and PPP Steering Committee.

The PPP modal will be used in the delivery of infrastructure service, assist in prioritising projects and ensure they are of the best outcomes and value for money. Supporting the government in identifying a streamline of bankable projects going forward. The government is in support of the PPP framework as it recognises that private sector participation in infrastructure and service delivery will lead to greater efficiencies.

The Government will utilize private sector capital, management, innovation and technology to realise these efficiencies. The greater use of PPP arrangements can also help to improve SOE efficiency and profitability as well.

There are existing PPP arrangements operating/implemented effectively outside of any formal PPP framework. The PPP legislation will bring all potential PPP arrangement project under one framework.

<u>Barriers and challenges:</u> What are the key barriers and challenges to implementing structural reforms for infrastructure in your economy and has your economy identified any solutions to overcome those barriers or challenges?

CHALLENGES

CONNECTIVITY

- **REMOTE GEOGRAPHICAL TERRAIN.**
- **DIFFICULTY IN ACCESS TO MARKETS**
- **SCATTERED POPULATION**

PNG (New Guinea) is one the largest island economies in the Pacific with a population of 8 million people, and an average growth rate of 2%. It has a population density of 18 people per square kilometer, which is relatively low in comparison to other pacific island economies. It is considered to be one of the most diverse and geographically complex places, given the wild terrain and large mountainous rainforests that is vastly un-inhabited.

People live widely scattered areas along the mountains and valley terrains, some in remote isolation accessible by walking. This makes it difficult in terms of accessing services and markets.

Many Papua New Guineans still live in very remote and isolated areas especially in the inland Highlands rural areas. Only an estimated 4% dwell in the urban towns. Hence service delivery and infrastructure is vital to connect them with the rest of the economy.

The Government sees Connectivity as critical to achieve a more productive and integrated robust economy. Better connectivity translates to lower trade costs, access to markets, create business opportunities among others.

- Connectivity could be Physical in term of road infrastructure, interconnection within the economy. Creating access for connecting people to services.

- Connectivity could be Institutional in terms interagency, Central Government to the Provincial government to the Local Level Government. Building capacity within the institutions to provide efficient and effective infrastructure services.

The Government has public systems and (decentralize) mechanisms in place to assist in identifying and allocating resources to the different communities in the economy.

Government is promoting policies that would better enhance service delivery and provide basic infrastructure to the people. The CSO and PPP Policy frameworks.

COMPETITIVE ENVIRONMENT - COST OF DOING BUSINESS

Affordable Utility Services – Providing quality and affordable electricity, water, telecommunication services to the people in the economy is a priority.

PNG's growing urban population demands for quality and affordable utility services. The Government is looking at alternative options that could improve the provision of all Utility Services.

Electricity

Currently only 13% of the population have access to electricity, the Government through its Medium Term Development Plan would like to see improvement such that more than 55% of households having access to electricity by 2025 and the overall economy access to 70% by 2050.

To achieve this goal, PNG needs sustainable domestic power solutions that could deliver quality and affordable electricity to the People and the economy as a whole. Hydro Power Projects coming on-line such as the Ramu 2 and Naoro Brown would contribute to enhancing infrastructure development in the medium term.

Telecommunication

Competition in the Telecommunications Sector has brought significant benefits to the PNG economy.

Reportedly, the telecommunications mobile phone sector reform and growth have made a strong contribution to PNG's GDP. Following the entry of Digicel in 2007, the contribution of the transport, storage and communication sector to total and non-mining GDP almost doubled – from 2.7% and 3% respectively in 2006 to 5.1% and 5.7% respectively in 2008. The sector contributed just over 20% of total GDP growth for 2008. With total GDP growth estimated at 7.16%, this means that the sector contributed approximately 1.4 percentage points to GDP growth in 2008.

Further reforms are being discussed in this Sector going forward to enhance efficiency and effective service delivery.

Water

There is currently two SOEs engaged in this sector in PNG namely Eda Ranu and Water PNG. There are discussion to merge the two entities to improve the efficiency of delivery of water and sanitation services to the people.

SOCIAL – LAND ISSUES: LAND TENURE

In PNG almost 80% of the land is Customary owned. The Government is always tasked to provide an economically beneficial solution to both PNG customary landowners and investors in terms of dealing with investments.

Also finding the right Policy framework that would give equal and fair treatment to all stakeholders when dealing with Customary Land issues is important.

NATURAL DISASTERS – MANY PACIFIC ISLAND ECONOMIES EXPERIENCING CLIMATE CHANGE.

Natural Disasters such as landslides, weather effects on the road conditions do affect productivity output and service delivery in PNG. Also PNG is an island economy that is experiencing issues in respect to climate change.

PNG , the reported changes in respect to Climate Change are ; (PNG Weather Service report on Climate Change, 2011 - 2012)

- Rising Sea Level. Many Communities in the coastal areas are experiencing issues with the sea coming in and washing away the villages and the taking the land. (eg. Wewak).

- Increased Temperature – with very hot days occurring more in the future (Hot Days - recording really high temperatures unlike before).

- This is also creating an issue for 85% of PNG's population who live a subsistence lifestyle and are dependent on the weather to harvest food and cash crops.

- Ocean Pollution and acidification. This is creating issues for PNG's diverse bio marine environment and the Government is looking for appropriate solutions for this.

The Government has to effectively manage these different priorities and needs as well as maintain a consistency in service delivery to the people.

The main objective for the Government is in identifying the right measures to deal with the challenges identified. Formulating strategic plans and appropriate reforms to addressing this issues/challenges going forward is very important.

GOING FORWARD

Getting Value for Money on Public Expenditure is Important

The Public Expenditure through government intervention programmes stimulate economic activity and contribute to developments in the economy. The government public expenditure to key areas such as health, education and infrastructure have been maintained continuously through the annual budgets, as it is part of the Medium Term Development Plan (MTDP) enablers towards improving PNG's social indicators for development.

However; translating the resources being given to tangible development outcomes in the economy is still to be realised.

Continue Public Investment

Sustainable Public Expenditure/Investment - Inclusive Green growth objectives (StaRS)

The PNG government is focusing its efforts on Inclusive Green growth investments, this means intervention programmes being implemented by the government are based on a having sustainable approach to development.

The Government direction is on the renewable sectors, such as re-invigorating growth through Small Medium Enterprises (SMEs) and the tourism and agriculture sectors that will underpin broad based and inclusive economic growth structures. This also means providing financing to enable development in these sectors.

In 2018 the PNG government allocated K100 million to the Agriculture Commercialisation Fund (ACEF) to boost economic activities in this sector. As well as allocating a K100 million aimed at SME development to commercial banks for concessional lending.

The PNG government is also undertaking other broader reforms such as the Public Expenditure and Financial Accountability (PEFA) assessment which is targeted towards improving the Public financial management system to enable greater transparency and accountability in the government system. Effective monitoring and disbursement of funds to the priority areas will contribute effectively to promote infrastructure and service delivery to the people.

PERU

Capabilities: what significant policy or institutional structures (e.g. top 2) support your economy in meeting the following objectives. Economies could discuss whole of Government policies or policies that apply at a sector specific level:

- **Cost effectiveness: Providing for the efficient provision and management of infrastructure and the efficient operation of infrastructure markets, including providing for cost-based access;**
- **Resilience: Enhancing adaptability and ensuring the infrastructure system is robust to disruptions and shocks;**
- **Inclusion: Ensuring broad access (e.g. across regions, genders, underserved or minority groups and indigenous people) to infrastructure, including digital infrastructure, to support inclusive growth?**

The Legislative Decree 1224 is the legal framework for Public Private Partnerships (PPP) in Peru, a modality that has been actively used during the last decade (the first PPP law was enacted in 2008):

- Institutional framework: Clearer roles were set, better defining responsibilities with the Central Government, as well as Sub-National authorities. The Domestic System for the Promotion of Private Investment has been created, with the Ministry of Economy and Finance's PPP control unit being the guiding entity of the System. Moreover, the domestic PPP unit called "Proinversión", which is a cross-sector agency focused on promoting private investment, especially PPPs, has been empowered.
- Policy: The Business Case methodology has also been strengthened: this part of reform was introduced to tackle one of Peru's main problems with PPPs, which is project readiness and preparation, focusing on the suitability of PPP procurement as well as the investment decision per se. There is an on-going effort to heighten risk analysis and mitigation throughout project preparation. The recent changes to the PPP law have also improved the payment mechanisms: trying to reduce tax money away from an overly guaranteed PPP model, aiming to strengthen the concepts of functionality and availability.

On the other hand, the Legislative Decree 1252 is the legal framework for the new National System for Public Investment, called National System for the Multiannual Programming and Management of Investments (Invierte.pe), which replaced the previous platform called SNIP:

- Institutional framework: All public bodies (as ministries, regional governments, municipalities or state-owned enterprises wishing) must apply to the Invierte.pe for funding in order to undertake an investment project. Depending on the type of project, an evaluation consists of either a cost-benefit analysis or a cost-effectiveness analysis.
- Policy: The new system provides a coherent framework for selecting, identifying, coordinating, evaluating and implementing public investments. Also, it improves resource allocation through an appropriate multi-year programme as a way to link project appraisal with economy's development priorities and to narrow "infrastructure investment gap". Moreover, the appraisal methodology that each project must undergo depend on its technical complexity, size and cost: for smaller projects or repeated investments (such as schools, police stations and rural roads), a positive evaluation (template) is sufficient for start-up.

<u>Gaps</u>: What are the highest priority structural or institutional reforms you have identified to meet these objectives?

Among the pending reforms to be implemented are:

- Publication of a guideline for the elaboration of a PPP standard contract, which would help reduce transaction costs for the development of a PPP project.
- Publication of a National Infrastructure Plan, where the Peruvian government will emphasize concepts like sustainability, resilience to climate change and natural disasters as well as cost effectiveness (better value for money).
- Ongoing capacity building efforts, especially at the regional and local government levels.

<u>Barriers and challenges:</u> What are the key barriers and challenges to implementing structural reforms for infrastructure in your economy and has your economy identified any solutions to overcome those barriers or challenges?

On the PPP side, one of the main challenges is getting the land. Informality and lack of an updated baseline for property owners throughout the economy are in dire need of reform. Solutions have been identified through the creation of a delivery unit for PPP, called APIP, within Proinversión. APIP, which stands for 'Access to Property for Prioritized Investment Projects', will be in charge of establishing ad hoc procedures to obtain the land, remove utilities and transfer property among public entities for a list of prioritized investment projects, including PPPs.

On the public investment side:

- Lack of effective implementation of investments and limited resources: It requires moving away from a strict project-based approach to a more strategic portfolio of projects approach, based on "closing infrastructure gaps" and government priorities. The new public investment system, Invierte.pe, seeks to prioritise projects according to this criteria in order to allocate resources.
- Assessment of functioning of investments: Public assets tend to be forgotten after projects have been completed and attention shifts to seek funding for new projects. To tackle this barrier, the new public investment system, Invierte.pe, keeps records of the existing assets and their current value, in order to allocate resources for the operation and maintenance of these assets.

<u>Needs and financing requirements</u>: What are your economy's main (e.g. top 2-3) identified physical and digital infrastructure needs over the medium-long term? Please describe the required financing and expected impact of these infrastructures.

On an economy-wide level, although there are no official estimates for the infrastructure gap, several studies commissioned or prepared by public and private entities have estimated the infrastructure gap in different sectors. For example, the Association for the Promotion of National Infrastructure (*Asociación para el Fomento de la Infraestructura Nacional - AFIN*) estimated the domestic infrastructure gap to be about US$ 159 billion for the period 2016–25. However, the study seems to underestimate needs in social sectors such as education, health, water and sanitation, and energy. Another study estimates an infrastructure gap of US$ 200 billion until 2062. However, methodologies are not consistent across studies, so these estimations should not be taken at face value. An official baseline study is needed.

Future needs: What are the main factors (e.g. population increase, technology, climate change or variability, ageing capital stock) that will influence your economy's future physical and digital infrastructure needs?

- A combination of increasing population and demand for better services (due to a growing middle class), especially in education and health.
- Climate change and pollution are becoming more important, regarding that Peru is highly vulnerable to these impacts. In line with Paris Agreement, Peru has committed to reduce its greenhouse gas emission in 30% by 2030, as well as reinforce its climate-change adaptation policies. Therefore, notions such as resilience, preparedness and sustainable development need to be integrated into infrastructure planning and assessment.

Leading practices: Among your economy's structural reforms relating to infrastructure in the past 5 years (2013-2018), which two do you think have been implemented most effectively? Please identify the main reasons for the effectiveness of this structural reform that could be relevant for other economies.

The enactment of Legislative Decree 1224, our existing PPP law, allowed the following improvements:

- Establishing five clear phases for the development of PPP: Planning and Programming, Formulation, Structuring, Transaction and Contract Execution.
- Creation of the National System for the Promotion of Private Investment, with the Ministry of Economy and Finance's PPP control unit being the guiding entity of the System. Before the creation of the System, each public entity involved in PPP (regulator, granting entities, National Audit Office, among others) had a different interpretation of the law.
- Creation of the Committees for the Promotion of Private Investment within the Ministries and subnational governments. Acting as project owners.
- Preparation of Evaluation Reports as business case documents, which include a qualitative value for money assessment. Allows a more thorough evaluation of the project, including economic, financial, technical, social and environmental aspects. Setting a target and roadmap for land acquisition is a must.

Preparation of the Multiannual PPP Investment Report by the Ministries and subnational governments, which is the main document of the Planning and Programming phase. Projects need to be aligned with strategic planning.

On the public investment side, the new National System for the Multiannual Programming and Management of Investments (Invierte.pe), allowed the following improvements:

- The new system covers the phases of the investment cycle in a more complete manner than the predecessor system (called SNIP) and the system of any other economy in the region. The new phase added is called "Multiannual Programming of Investments", whose main result is a portfolio of projects based on "closing infrastructure gaps" and aligned with strategic objectives.
- Appraisal methodologies may be differentiated according to the size of project or its complexity. This would mean less rigorous assessments for smaller projects and more rigorous ones for larger or riskier projects.
- Clearer roles were set, better defining responsibilities of the bodies part of the System.

Regional cooperation: What role can regional cooperation and regional bodies such as APEC play? You may like to consider the role of cooperation in addressing the challenges and policy gaps previously identified, in enhancing the investment

environment, in making more possible cross-border/regional connectivity projects and in promoting co-ordination of development funding.

How can we ensure that Asia Pacific has top-quality physical and digital infrastructure to ensure maximum connectivity? What would be the benefits to your economy from improved connectivity?

Initiatives such as the Global Infrastructure Hub (https://www.gihub.org/) and SOURCE (https://public.sif-source.org/) provide valuable databases and information on infrastructure projects that promote best practices among public officers as well as the private sector.

In order to ensure maximum connectivity among APEC economies, especially considering the sharp geographic differences (i.e. some member economies are located in Asia while others are located in America), a baseline study would have to be elaborated first to identify the common infrastructure needs and possibilities. Second, some proper planning would be required to develop cross-border investments. Finally, aspects such as financing and funding are key to determine which economy or group of economies will have to pay for the needed infrastructure.

With regard to the benefits of top-quality physical and digital infrastructure, a significant amount of research shows the positive relationship between an economy's stock of infrastructure and its economic and social performance. Infrastructure has a positive effect not only on economic growth, but also on development in terms of poverty alleviation and income distribution. According to APEC itself, well-designed, sustainable, and resilient infrastructure enhances economic growth, boosts productivity, and promotes job creation. Regional infrastructure also facilitates the smooth flow of goods, services, and people across borders, improves regional connectivity, and promotes sustainable development.

PHILIPPINES

Capabilities: what significant policy or institutional structures (e.g. top 2) support your economy in meeting the following objectives. Economies could discuss whole of Government policies or policies that apply at a sector specific level:

- **Cost effectiveness: Providing for the efficient provision and management of infrastructure and the efficient operation of infrastructure markets, including providing for cost-based access;**
- **Resilience: Enhancing adaptability and ensuring the infrastructure system is robust to disruptions and shocks;**
- **Inclusion: Ensuring broad access (e.g. across regions, genders, underserved or minority groups and indigenous people) to infrastructure, including digital infrastructure, to support inclusive growth?**

Gaps: What are the highest priority structural or institutional reforms you have identified to meet these objectives?

Barriers and challenges: What are the key barriers and challenges to implementing structural reforms for infrastructure in your economy and has your economy identified any solutions to overcome those barriers or challenges?

Capabilities

Recognizing the information and communications technology (ICT) sector's indispensable role in catalyzing economic growth and development in the economy, the Philippine Government formulated the National Broadband Plan (NBP) which will set the policy direction for the sector and blueprint to accelerate the development of broadband access in the economy.

The NBP is envisioned to provide a "resilient, comfortable and vibrant life for all, enabled by open, pervasive, inclusive, affordable and trusted broadband internet access" with the following four key outcome areas: (a) accelerated investment; (b) mobilized and engaged public and private sectors; (c) more places connected; and (d) increased usage/take-up rate.

To realize its vision and attain the four key outcome areas, the NBP will focus on three broad strategies as follows:

- Institute policy and regulatory reforms;
- Provide government investment in broadband infrastructure through the establishment of the Philippine Integrated Infostructure (PhII) and harmonization of existing government assets to reduce the deployment costs; and
- Support the stimulation of broadband demand through local content creation, among others.

The Philippine Government is currently in the conceptualization/development phase of various infrastructure projects to support the NBP implementation such as the following:

- Component 1: National Fiber Backbone;
- Component 2: International Cable Landing Stations;
- Component 3: Accelerated Tower Build (Access);
- Component 4: Accelerated Fiber Build (Access); and

- Component 5: Satellite Overlay (Access).

The full implementation of projects that will support the NBP may have implementation delays due to, among others, lack of forward planning which will affect the absorptive capacities of key implementing agencies (IAs), right-of-way (ROW) and resettlement issues, inadequate project preparation, poor quality-at-entry and poor project executive. These aspects may significantly reduce the project's value and hamper the attainment of the overall objectives of the NBP.

Thus, the Philippine Government has initiated/facilitated the following to ensure quality-at-entry of infrastructure projects and improve capacities of the concerned government agencies:

- Project Development and Other Related Studies (PDRS) Fund amounting to PhP1.5 95 billion to be administered by NEDA for 2018;
- Infrastructure Preparation and Innovation Facility (IPIF) amounting to PhP7.92 billion to be financed through Official Development Assistance (ODA) to be facilitated by the Department of Finance (DOF) from 2018 to 2021;
- Institutionalization of the Infrastructure Cluster (IC)[5] which is aimed at improving the quality and reliability of public infrastructure, public investment efficiency and enhancing the delivery of public infrastructure
- Facilitation of the Project Development and Monitoring Facility (PDMF), a revolving fund intended for the preparation of pre-investment studies of public-private partnership (PPP) projects, among others.

Moreover, the Philippine Government recognized the need to improve the management of existing and proposed infrastructure assets to ensure the sustainability of operations and resilience and maximize the functionality and project life.

In August 2017, Republic Act (RA) 10929 or the Free Internet Access in Public Places Act has been signed by the President to make broadband services more accessible to the public. This Act aims to provide internet access in 13,024 public places.[6]

Gaps, barriers and challenges

To further improve the ICT sector in the economy, the Philippine government has identified amendments to the Public Telecommunications Policy to consider changes in the market landscape and advancements in telecommunications and technology as well as to enhance competition in the playing field through the DICT and National Telecommunications Commission (NTC).[7] Other policies and regulatory issuances that restrict developments in ICT are the Public Service Act, Radio Control Law, Article XII of the 1987 Constitution,

[5] Executive Order (EO) No. 24, s. 2017: Reorganizing the Cabinet Clusters System by Integrating Good Governance and Anti-Corruption in the Policy Frameworks of All the Clusters and Creating the Infrastructure Cluster and Participatory Governance Source: http://www.officialgazette.gov.ph/downloads/2017/05may/20170516-E0-24-RRapdf

[6] Renewed APEC Agenda for Structural Reform Individual Action Plan Mid-Term Review

[7] Chapter 19, Philippine Development Plan 2017-2022

and the Guidelines on the Procurement of Orbital Slots and Frequency Registration of Philippine Satellites.[8]

Aside from amending the existing policies and regulatory issuances, the NBP also includes policies that the government may pursue to improve the industry. This includes, among others, the Open Access ad Peering Policy and Dig Once Policy. Furthermore, there is a need to streamline and standardize permits and processes across local government units to fast track the deployment of Info structure.

Other challenges associated with broadband rollout is the high construction costs. To minimize costs, the government will enable Info structure sharing and make government-owned facilities available to telecommunication entities.[5]

Needs and financing requirements: What are your economy's main (e.g. top 2-3) identified physical and digital infrastructure needs over the medium-long term? Please describe the required financing and expected impact of these infrastructures.

Future needs: What are the main factors (e.g. population increase, technology, climate change or variability, ageing capital stock) that will influence your economy's future physical and digital infrastructure needs?

Noting the recent institutionalization of the DICT through RA 10844 in May 2016, the Philippine Government is currently undertaking assessment and preparatory activities and studies which may be implemented to accelerate the development in the sector.

Based on the Public Investment Program (PIP) 2017-2022, the Department of Information and Communications Technology (DICT) shall implement the NBP from 2019 to 2022 with an estimated total cost of PhP39,501.03 million.[9]

Leading practices: Among your economy's structural reforms relating to infrastructure in the past 5 years (2013-2018), which two do you think have been implemented most effectively? Please identify the main reasons for the effectiveness of this structural reform that could be relevant for other economies.

With regards to digital connectivity, no structural reforms have been made yet. The NBP has only been launched last year and is still for implementation. The Philippine Government is currently in the conceptualization/development phase of various infrastructure projects to support the NBP implementation.

Regional cooperation: What role can regional cooperation and regional bodies such as APEC play? You may like to consider the role of cooperation in addressing the challenges and policy gaps previously identified, in enhancing the investment environment, in making more possible cross-border/regional connectivity projects and in promoting co-ordination of development funding.

[8] Department of Information and Communications Technology. 2017. National Broadband Plan.

[9] Chapter 19, Socioeconomic Report 2017. Retrieved from http://www.neda.gov.ph/wp-content/uploads/2018/03/SER-Chap-19_as-of-March-28-1.pdf

How can we ensure that Asia Pacific has top-quality physical and digital infrastructure to ensure maximum connectivity? What would be the benefits to your economy from improved connectivity?

The implementation of regional connectivity projects may be hampered by numerous issues such as the following, among others:

a. Unattractive investment climate for regional connectivity projects;
b. Unsound and incomplete institutional set-up at the regional and economy-wide levels; and
c. Implementation barriers such as technical and/or financial capability of the member economies to implement connectivity initiatives is affected by uneven levels of development.

Thus, it is imperative for regional bodies to ensure that the proposed regional connectivity development projects will cut across the different sectors of development and may support and expand different economic activities. Moreover, there is a need to ensure coherence of regional initiatives into the domestic development agenda of the respective member economies in order to ensure ownership of the projects and optimize resources.

In addition, the regional bodies, such as APEC, may further strengthen cooperation and competencies of member economies through capacity building initiatives and sharing of best practices concerning project preparation and execution of regional connectivity projects of member economies with advanced digital infrastructure and connectivity setup.

THE RUSSIAN FEDERATION

Capabilities: what significant policy or institutional structures (e.g. top 2) support your economy in meeting the following objectives. Economies could discuss whole of Government policies or policies that apply at a sector specific level:

- **Cost effectiveness: Providing for the efficient provision and management of infrastructure and the efficient operation of infrastructure markets, including providing for cost-based access;**
- **Resilience: Enhancing adaptability and ensuring the infrastructure system is robust to disruptions and shocks;**
- **Inclusion: Ensuring broad access (e.g. across regions, genders, underserved or minority groups and indigenous people) to infrastructure, including digital infrastructure, to support inclusive growth?**

Gaps: What are the highest priority structural or institutional reforms you have identified to meet these objectives?

Barriers and challenges: What are the key barriers and challenges to implementing structural reforms for infrastructure in your economy and has your economy identified any solutions to overcome those barriers or challenges?

Efficient operation of infrastructure markets. Roadmaps on public-private partnership (infrastructure mortgage) was adopted on 12th March, 2018. It contains measures aimed at developing PPP financing mechanisms, including: establishment of an open unified register of projects for the construction and reconstruction of infrastructure in key sectors, compilation of a list of PPP pilot projects and concessions whose socioeconomic efficiency has been confirmed, creation of ready forms, models and algorithms for investor and public party actions, and risk matrices and standard projects for different sectors.

Cost effectiveness. Russia ensures that public audit is conducted for most projects with government participation. In 2017, an audit was conducted for of all the projects with total value of 3 billion rubles or higher, in 2018 cutoff is expected to amount to 1.5 billion rubles. This measure is aimed at enhancing the efficiency of public investment, including the investment of the natural monopolies, through obligatory public technical and price audit of all large-scale projects even partially financed by the government.

Inclusion: Ensuring broad access to digital infrastructure. The program aimed at eliminating digital inequality involves the construction of the needed telecommunications network, the creation of access points to it and connecting small settlements to it with fiber optic lines. It started in 2014 and will last until 2024. During the project implementation, data services with a minimum speed of 10 Mbit/s will be provided to over 13 thousand settlements of between 250 and 500 people. As per March 2018, access points were established in 5 656 communities. Total investment are expected to amount to 67 bln Rubles (about 1.2 bln. USD).

Needs and financing requirements: What are your economy's main (e.g. top 2-3) identified physical and digital infrastructure needs over the medium-long term? Please describe the required financing and expected impact of these infrastructures.

Future needs: What are the main factors (e.g. population increase, technology, climate change or variability, ageing capital stock) that will influence your economy's future physical and digital infrastructure needs?

Physical infrastructure. "Expansion and modernization of the Trans-Siberian and Baikal-Amur railways" is an example of large project aimed at developing physical infrastructure in Russia. The main objective of the project is improvement of capacity and eliminating bottlenecks on the Trans-Siberian and Baikal-Amur mainlines. Total project costs amount to 562 bln. rubles (9.8 bln. USD). By the end of 2017 173 bln. rubles (3 bln USD) have already been invested. The project will increase additional cargo volume of up to 66 mln tons a year (current volume is about 126 mln tons per year), which will contribute to the development of industrial enterprises in the region, create new jobs, and the necessary economic conditions for effective and sustainable development of Siberia and the Far East. Moreover, it is expected that the Russian budget will receive 8.2 bln. USD from the added infrastructure during 30 years. The project is also expected to create about additional 40 thousand jobs.

Digital infrastructure. Main measures in the field of digital infrastructure are covered by the Program "Digital Economy of Russia", in particular, by the action plan "Information infrastructure". Action plan on "Information infrastructure" was adopted in December 2017 and contains measures aimed at establishing data centers in Russia, expansion of broadband internet access, development of roadmap of 5G network creation.

Implementation of the Action plan requires total investment of 436.5 bln Rubles (7.6 bln USD). According to the plan, the share of households with broadband access is expected to reach 50% by 2020 and 97% by 2025. Also it is expected to get 5G coverage in cities with a population of 1 million people or more and achieve average speed of 100 Mbit/s throughout the economy.

Leading practices: Among your economy's structural reforms relating to infrastructure in the past 5 years (2013-2018), which two do you think have been implemented most effectively? Please identify the main reasons for the effectiveness of this structural reform that could be relevant for other economies.

PPP law. The law on public-private partnerships (PPPs) and municipal-private partnerships (MPPs) in the Russian Federation and the introduction of amendments to certain legislative acts of the Russian Federation were adopted in July 2015 and entered into force on 1 January 2016. The Law, among other things, has introduced the concept of a PPP agreement, a new private initiative procedure and additional guarantees for private investors. In 2016, when the Law entered into force, the number of PPP projects in Russia surged from 873 (2015) to 2183. Private investments in PPP projects also increased from 408 bln. Rubles in 2015 to 1.3 trln. Rubles in 2016.

Regional cooperation: What role can regional cooperation and regional bodies such as APEC play? You may like to consider the role of cooperation in addressing the challenges and policy gaps previously identified, in enhancing the investment environment, in making more possible cross-border/regional connectivity projects and in promoting co-ordination of development funding.

How can we ensure that Asia Pacific has top-quality physical and digital infrastructure to ensure maximum connectivity? What would be the benefits to your economy from improved connectivity?
APEC may play an important role in sharing best practices and good examples of realizing domestic policies within infrastructure development.

CHINESE TAIPEI

Capabilities: what significant policy or institutional structures (e.g. top 2) support your economy in meeting the following objectives. Economies could discuss whole of Government policies or policies that apply at a sector specific level:

- **Cost effectiveness: Providing for the efficient provision and management of infrastructure and the efficient operation of infrastructure markets, including providing for cost-based access;**
- **Resilience: Enhancing adaptability and ensuring the infrastructure system is robust to disruptions and shocks;**
- **Inclusion: Ensuring broad access (e.g. across regions, genders, underserved or minority groups and indigenous people) to infrastructure, including digital infrastructure, to support inclusive growth?**

Gaps: What are the highest priority structural or institutional reforms you have identified to meet these objectives?

Barriers and challenges: What are the key barriers and challenges to implementing structural reforms for infrastructure in your economy and has your economy identified any solutions to overcome those barriers or challenges?

Chinese Taipei has adopted the practices of Life-Cycle Assessment of Public Construction so as to achieve the goals of cost effectiveness, resilience and inclusion of infrastructures. The budget reasonability, technical feasibility and cost effectiveness will be taken into consideration in the evaluation process of public construction projects. At the planning and design stage, the design shall include the purposes of saving energy, emission reduction of greenhouse gases, environmental protection, resource conservation, economic viability, and also take into account the aspects of the landscape, local ecology, and life aesthetics, as well as a friendly environment for users of different genders, ages, social groups and the disabled.

With the restriction of natural environment and vulnerability to natural disaster, the infrastructure is designed to prevent and mitigate the potential impacts. For example:

1. Water supply has been a challenge for Chinese Taipei due to the uneven temporal and spatial distribution of rainfall, global climate change and growing water demand of economic development. Chinese Taipei has set the strategies for providing stable water supply, which include developing multiple water resources based on the local characteristics and potential, saving water by enhancing the reduction of tap water leakage and the reuse of recycled water, better water allocation by giving priority to the usage of local water, and preparing the backup system in response to the abnormal rainfall distribution of the climate change effects.
2. In terms of traffic infrastructure, Chinese Taipei has initiated various action plans to adapt to climate change according to the goals stipulated within the National Climate Change Adjustment Policy Program and referred to in the risk concepts suggested by the Intergovernmental Panel on Climate Change (IPCC) of the United Nations. It has implemented the disaster-preventive plans for railroads and driveways as well as improvement measures such as the real-time monitoring of high-risk roads impacted by

disasters, enhancing the shock-proof capability of bridges and tunnels, reinforcement projects and the alert mechanism for disaster prevention. The disaster resistance and resilience of railroads and driveways are expected to be improved. Meanwhile, reducing the barriers for physically and mentally challenged citizens as well as satisfying the basic civil transportation demands for remote areas have also been incorporated into infrastructure projects. As for the cost-efficiency of traffic infrastructures, the interim, end-of-term and operating evaluations are also required so as to fully grasp the status of execution and goal-achievement in major projects, and thus the efficacy of the investment in traffic infrastructure projects can be ensured.

Needs and financing requirements: What are your economy's main (e.g. top 2-3) identified physical and digital infrastructure needs over the medium-long term? Please describe the required financing and expected impact of these infrastructures.

Future needs: What are the main factors (e.g. population increase, technology, climate change or variability, ageing capital stock) that will influence your economy's future physical and digital infrastructure needs?

Chinese Taipei is promoting the Forward-looking Infrastructure Development Program to build a new generation of infrastructure for the future. This program includes funding for eight categories:

1.railway projects to provide safe and fast transportation;

2.water environments to build resilience against climate change;

3.green energy infrastructure to ensure environmental sustainability;

4.digital infrastructure to create a smart and connected economy;

5.urban and rural projects to balance regional development;

6.child care facilities to reverse the declining birth rate trend;

7.infrastructure to ensure food safety;

8.human resources infrastructure to nurture talent and boost employment.

The Forward-looking Infrastructure Development Program is funded by a special budget which is completely financed through debt. However, we will adhere to our strict fiscal discipline. In accordance with the Public Debt Act and Special Act for Forward-Looking Infrastructure, the government's total amount of debt issued under the general and special budgets for the period of 2017-2020 is not to exceed 15 % of total budget and must comply with the debt level limit provided in the paragraph 1, Article 5 of Public Debt Act (40.6% of the average nominal GDP for the previous 3 years) so as to achieve financial stability and economic development. If any major public infrastructure projects in the future are approved, the financial resources will be raised to meet the overall planning policy.

Leading practices: Among your economy's structural reforms relating to infrastructure in the past 5 years (2013-2018), which two do you think have been implemented most effectively? Please identify the main reasons for the effectiveness of this structural reform that could be relevant for other economies.

1.Promotion of utilizing recycled aggregates in public works

For the purpose of facilitating industrial development, reducing natural resource consumptions, and implementing the circular economy policy, we set out an inter-agency task force, consisting of representatives from related industries, to promote utilization of recycled aggregates, such as steel slag and incinerated bottom ash in public works. Strategically, the competent authorities monitor the quality control and flow management of recycled aggregates. Meanwhile, government agencies take the lead in utilizing recycled aggregates in public works, for the purpose of developing a more environmental-friendly and prosperous economy.

2. Financial Improvement of Taiwan High Speed Rail (THSR)

(1) THSR Project is a leading BOT (Build-Operate-Transfer) project by Chinese Taipei. Ministry of Transportation and Communications (MOTC) of Chinese Taipei granted the concession to Taiwan High Speed Rail Corporation (THSRC) in 1998. The Company has outstanding operational performance and excellent services since 2007. However, bad financial structure and under-expectation of revenue income resulted in its financial crisis.

(2)The MOTC negotiated and cooperated with THSRC to draw up solutions which include reversing stock split, extending concession period, capital injection and terminating station development concessionaire. After discussing with related government agencies, via law amendment, communicating with the Legislature and the public, the solution program finally was executed in 2015 and resolved THSRC's dilemma. Hopefully, the THSRC would operate sustainably and reach a win-win-win situation for the people, the government and the THSRC.

(3)MOTC helps THSRC to carry on the financial improvement program successfully. The most effective reasons are:

i. Clarifying the issues and formulating solutions to propose the best program under the consideration of maintaining the maximum public interest and minimizing the overall cost of processing.
ii. Well inter-ministerial coordination to confirm that the program was acceptable and feasible by all contractual stakeholders.
iii. Collecting external questions and concerns, opening and explaining information to general public, also actively communicating with the Legislature, and seeking supports from all fields.

In addition to the above two practices, Chinese Taipei has launched a wide range of structural reforms such as the mitigation of the accumulated sediments in reservoirs to extend the

lifespan of the reservoirs, sewage systems, and expanding the capacity of the harbors through land reclamation and new berths to build advanced facilities for the future development.

<u>Regional cooperation</u>: What role can regional cooperation and regional bodies such as APEC play? You may like to consider the role of cooperation in addressing the challenges and policy gaps previously identified, in enhancing the investment environment, in making more possible cross-border/regional connectivity projects and in promoting co-ordination of development funding.

How can we ensure that Asia Pacific has top-quality physical and digital infrastructure to ensure maximum connectivity? What would be the benefits to your economy from improved connectivity?

To address domestic challenges and promote regional cooperation and connectivity, APEC member economies could share best practices and experiences through capacity-building activities, as well as launching regulatory harmonization and standardized measures. Also, APEC Business Advisory Council (ABAC) and APEC's policy partnerships and industry dialogues can contribute significantly by providing private sector feedback or insight on market needs, trends and expectations for APEC member economies' consideration. Chinese Taipei looks forward to cooperating with APEC member economies to improve the quality of infrastructure through initiatives under the "APEC Connectivity Blueprint for 2015-2025" and tackling possible challenges occurred during the execution of structural or institutional readjustment with the aim to make further contribution to the enhancement of APEC connectivity.

THAILAND

Capabilities: what significant policy or institutional structures (e.g. top 2) support your economy in meeting the following objectives. Economies could discuss whole of Government policies or policies that apply at a sector specific level:

- **Cost effectiveness: Providing for the efficient provision and management of infrastructure and the efficient operation of infrastructure markets, including providing for cost-based access;**
- **Resilience: Enhancing adaptability and ensuring the infrastructure system is robust to disruptions and shocks;**
- **Inclusion: Ensuring broad access (e.g. across regions, genders, underserved or minority groups and indigenous people) to infrastructure, including digital infrastructure, to support inclusive growth?**

According to the 7th Strategy (Infrastructure and Logistics Development) in the 12th National Economic and Social Development Plan (NESDP), Thailand puts particular emphasis on increasing its competitiveness, improving service quality to accommodate the expansion of cities and the main economic areas, and ensuring inclusive access to the public services and infrastructure in order to raise the quality of life among all social groups

In transport sector, Public Private Partnership (PPP) has been encouraged to engage private sector in transport infrastructure development, operation and maintenance, and service quality improvement. The employment of PPPs will ease a number of constraints such as limited government budget in transport infrastructure investment, expertise in transport infrastructure development, project management and advanced technology and knowledge. The Private Investment in State Undertaking Act B.E. 2556 (2013) (PISU Act), has recently been enacted in Thailand to promote private participation and attract private investment by ensuring transparent, traceable, streamlined accountable procedures regarding PPPs to be taken into consideration in any risk-benefit analyses. State Enterprise Policy Office (SEPO), Ministry of Finance, has also requested all infrastructure projects invested by State-Owned Enterprises (SOE) to apply Risk Management Plan. The Plan helps them identify and manage potential risks of doing such projects. Moreover, the impact of climate change is also required to be embedded in infrastructure planning processes.

To ensure broad access to infrastructure, the Ministry of Transport (MOT) is conducting a study on the universal design for vehicles and transport facilities to accommodate all groups of people including children, the elderly, and the disabled.

As for the digital infrastructure, Thailand aims to expand the economy-wide high speed internet network through encouraging new digital entrepreneurs and developing international standard cyber security. Digital Economy and Society Development Plan has been implemented to promote sustainable development through digital technology. The plan highlights digital infrastructure development; economic-driven digital technology; creating inclusive quality society by using digital technology; digital government transformation; workforce preparation for digital era; and confidential building on using digital technology.

Gaps: What are the highest priority structural or institutional reforms you have identified to meet these objectives?

- Structural reform has been undertaken in transport sector management through establishing a clear separation of function between policy maker, regulatory unit and the operators. For example, in air transport sector, the Civil Aviation Authority of Thailand (CAAT) has been established to regulate, promote, and ensure that the development of civil aviation is legal and high standard. The CAAT's role is also to oversee the airport operator, Department of Airports (DoA), and to ensure that the quality of air transport services, especially safety regulations meet the international standards as well as cost efficient. As for the rail transport, State Railway of Thailand (SRT) is a service operator, while the Department of Rail Transport is a regulator.

- Digital Development for Economy and Society Act B.E. 2560 (2017) has been enacted to shift institutional structure to promote digital economy and society. Under the Act, the National Digital Economy and Society Committee, chaired by the Prime Minister, is established to set out guidelines and policy under the digital economy framework, aiming mainly at maximizing the benefits of digital technologies, developing infrastructure for digital technology, raising the economy's competitiveness with digital innovation, creating equal opportunities with information and digital services, developing human capital for the digital era, creating public confidence in the use of digital technology and implementing digital technology to enhance Thailand's economy and society.

Barriers and challenges: What are the key barriers and challenges to implementing structural reforms for infrastructure in your economy and has your economy identified any solutions to overcome those barriers or challenges?

One key challenge to implementing structural reforms for infrastructure in Thailand is the fragmented management of public sector. The lack of interagency coordination among several public institutions responsible for infrastructure development leads to conflicting goals and priorities. Moreover, structural reforms tend to create winners and losers, and since the priorities of various agencies are different, the reforms may fail to engage relevant parties and hence are not successfully implemented. Thus, consultation and coordination with relevant stakeholders is important to the effective implementation of structural reforms. Infrastructure oversight body which oversees the economy-wide infrastructure projects as well as at the local level could also be established to ensure that all ministries understand and realise the same infrastructure priorities. Moreover, this oversight body could help setting the economy's strategic plan and framework as well as identifying policy sequencing to implement structural reforms for infrastructure. A holistic infrastructure development strategy should be developed as well, to determine a complete picture of transport and economic corridor. A group of projects shall be identified to include specific highways, railway corridors, and power generation and transmission lines that are needed to develop or expand in the short and long run.

Another challenge is the lack of expertise in the public sector to understand the technical intricacies associated with the implementation of structural reforms. For example, the lack of experts in digital technology, as well as inadequate rules and regulations regarding digital technology could be seen as an obstacle to implementing structural reforms for digital infrastructure in Thailand. Therefore, it is important to have international cooperation like APEC as a platform to share experiences and learn from best practices when designing practical solutions adapted to domestic challenges.

<u>Needs and financing requirements</u>: What are your economy's main (e.g. top 2-3) identified physical and digital infrastructure needs over the medium-long term? Please describe the required financing and expected impact of these infrastructures.

<u>Future needs</u>: What are the main factors (e.g. population increase, technology, climate change or variability, ageing capital stock) that will influence your economy's future physical and digital infrastructure needs?

According to ADB's report, Meeting Asia's Infrastructure Needs, infrastructure investment in Thailand (including climate-adjusted estimate) is expected to account for 3.2 percent of GDP, or approximately $ 268 billion during 2016-2030.

The Ministry of Transport has launched Thailand's Transport Infrastructure Development Strategy 2015-2022 as a framework for transport infrastructure development in Thailand. This strategy aligns with the 7th Strategy (Infrastructure and Logistics Development) in the 12th NESDP, as it aims to increase the proportion of freight transportation that uses the railways and waterways; to raise the proportion of passengers using public transportation systems in urban areas; and to expand the capacity of the Bangkok airports and of regional airports to meet increasing demand from passengers. The investment in rail network including passenger and freight transport, as well as mass rapid transit in Bangkok and major regional cities, accounts for approximately 76 percent of the overall transport infrastructure investment. The development in these infrastructure projects is expected to enhance time- and cost-effectiveness, as well as alleviate pollution problems from transport sector. However, transport infrastructure requires high capital investment and substantial time for development. The sources of funding for transport infrastructure are largely from loans (52%), government budget (28%), PPPs (16%) as well as state owned enterprises and other sources of funding (4%).

Another top priority of the government is to transform Thailand into a "Digital Economy" in order to enhance the economic and social prosperity. Since 2016, the Ministry of Digital Economy and Society (MDES) has been established to plan, promote, develop and implement activities related to a digital society and economy. Developing a hard digital infrastructure across the economy is one of the key strategies of the Digital Development Plan. The government is also accelerating the launch of a public broadband project. The TOT Public Company Limited, Thai state-owned telecommunications company, is assigned by the government to lay down the broadband internet for 24,700 villages, while the office of the National Broadcasting and Telecommunications Commission will handle the installation for the remaining 15,732 villages. The objective is to provide local people with greater access to digital technology.

Financing sources for physical and digital infrastructure in Thailand are largely from government budget. Debt consolidation or borrowing is primarily used for the development of infrastructure with a commercial return. Private sector is also encouraged to participate in PPP especially in operation and maintenance. Infrastructure Fund has become increasingly important as it is considered as a new source of funding for infrastructure development in Thailand.

<u>Future needs</u>: What are the main factors (e.g. population increase, technology, climate change or variability, ageing capital stock) that will influence your economy's future physical and digital infrastructure needs?

- Aging population will influence specific requirement for transport demand with accessibility and universal design that can accommodate people of various groups and needs especially the elderly.

- Urbanization will require expansion of mass rapid transit network and public transport services. The efficient public transport system will help the economy to reduce time, energy consumption, and pollution.

- Climate resilient infrastructure will need to be taken into account to promote sustainable infrastructure development. In the future, infrastructure must be constructed in such a way that can withstand disruption, absorb disturbance and recognize changing conditions/climate over time.

- Disruptive Technology, for example, more environment- friendly, autonomous vehicles or AI will be used in transport system and this could lead to increased transport efficiency. Congestion will be relieved, as energy demand and emissions could be greatly reduced. Moreover, hyper digital connectivity, as well as expansion of internet access in remote areas, artificial intelligence, and the Internet of Things could all shape the future needs for digital infrastructure development.

<u>Leading practices</u>: Among your economy's structural reforms relating to infrastructure in the past 5 years (2013-2018), which <u>two</u> do you think have been implemented most effectively? Please identify the main reasons for the effectiveness of this structural reform that could be relevant for other economies.

1. Ever since the enactment of the Private Investment in State Undertaking Act 2013 (PISU Act), the involvement of private sector in transport infrastructure development in the form of Public Private Partnership has become more prominent. Furthermore, the implementation of the PPP Fast Track programme under the PISU Act, the red tape and bottlenecks regarding the approval and development of infrastructure projects have been reduced. The project preparation is reduced to 3.5 months. Project proposal takes 4 months while private selection requires six weeks and after 9 months the project is ready for bidding. This has helped to shorten the time required for approvals and development of the projects from 25 to 9 months.

2. In early 2015, the International Civil Aviation Organisation's (ICAO) gave Thailand a red flag status as a number of significant safety concerns were raised regarding the economy's oversight of carriers, particularly its processes around awarding new air operator certificates. Thus, to solve this problem, the Civil Aviation Authority of Thailand (CAAT) has been established by the Ministry of Transport as a regulator, to ensure that aviation safety standard is uplifted to meet internationally acceptable level. This reform has led to a full commitment and collaboration between several public sector agencies, airlines and foreign experts which ultimately resulted in the removal of Thailand's "red-flag" status from ICAO in October 2017.

<u>Regional cooperation</u>: What role can regional cooperation and regional bodies such as APEC play? You may like to consider the role of cooperation in addressing the challenges and policy gaps previously identified, in enhancing the investment environment, in making more possible cross-border/regional connectivity projects and in promoting co-ordination of development funding.

How can we ensure that Asia Pacific has top-quality physical and digital infrastructure to ensure maximum connectivity? What would be the benefits to your economy from improved connectivity?

Regional cooperation and regional bodies play an important role in strengthening regional connectivity and facilitating infrastructure investment environment. Take ASEAN for example, in spite of the rapid economic growth, ASEAN still has a huge infrastructure gap. Therefore, to support continued infrastructure investment in ASEAN, ASEAN Infrastructure Fund (AIF) has been recently established and co-financed by the Asian Development Bank (ADB), as a source of fund for the region's infrastructure projects.

The Asia-Pacific region is facing a growing demand for infrastructure investment as well. Thus, it is imperative to find an appropriate way to invest in infrastructure with an aim to facilitating sustainable and quality development and growth and to achieve shared benefits among economies within the APEC region. APEC economies have discussed these issues for years, and this has resulted in two important documents. The first one is the "APEC Multi Year Plan on Infrastructure Development and Investment", which was adopted in 2013 at the leader level of APEC economies. The second one is "APEC Connectivity Blueprint for 2015-2025", adopted during the APEC Leaders' Meeting in 2014. The Blueprint aims to improve the connectivity within the APEC region as well as the institutional arrangement and facilitation of people to people exchange in terms of the three pillar, namely, "Physical Connectivity", "Institutional Connectivity" and "People-to-people Connectivity". It is clear that on the one hand good physical infrastructure is necessary, but one the other hand rules and regulations of cross-border and regional transport facilitation are also needed.

APEC has played a huge role in addressing challenges in reform in infrastructure development through providing assistance that could help developing economies to enhance its investment capacity as well as accelerate innovation for infrastructure. Its engagement with international organizations, for example, Organization for Economic Cooperation and Development (OECD), and World Bank could help providing technical support to developing economies to attract foreign direct investment for infrastructure development. Through capacity building and training programs organized by various working groups and committees under APEC, member economies could learn from each other's experiences which in turn give them the opportunity to apply best practices to their reform process in order to achieve the most concrete and effective infrastructure development. Ultimately, seamless and better infrastructure will help our region unleash the region's economic potential and alleviate poverty.

UNITED STATES OF AMERICA

Capabilities: what significant policy or institutional structures (e.g. top 2) support your economy in meeting the following objectives. Economies could discuss whole of Government policies or policies that apply at a sector specific level:

- **Cost effectiveness: Providing for the efficient provision and management of infrastructure and the efficient operation of infrastructure markets, including providing for cost-based access;**
- **Resilience: Enhancing adaptability and ensuring the infrastructure system is robust to disruptions and shocks;**
- **Inclusion: Ensuring broad access (e.g. across regions, genders, underserved or minority groups and indigenous people) to infrastructure, including digital infrastructure, to support inclusive growth?**

The Transportation Infrastructure Finance and Innovation Act (TIFIA) helps finance surface transportation projects through direct loans, loan guarantees, and lines of credit. One dollar of TIFIA subsidy leverages roughly $40 in project value. The program's fundamental goal is to leverage Federal funds by attracting substantial private and other non-Federal co-investment in critical improvements to the U.S. surface transportation system. TIFIA credit assistance is often available on more advantageous terms than in the financial market, making it possible to obtain financing for needed projects when it might not otherwise be possible.

The Private Activity Bonds (PABs) program allows the Department of Transportation to allocate authority to issue tax-exempt bonds on behalf of private entities constructing highway and freight transfer facilities. PABs have been used to finance many Public Private Partnerships (PPPs) projects.

The Federal Communications Commission (FCC) is pursuing a number of policies to improve U.S. broadband communications infrastructure, which is critical to bettering the lives of the American people and to boosting our economy's efficiency, competitiveness, and innovativeness**.** For example, to promote digital inclusion, the FCC's primary tool is the universal service programs, which provide direct support to spur the construction of wired and wireless networks in areas of the United States where the incentive for private investment does not exist. These public-private partnerships have been reinvigorated, with a focus on ensuring fiscal responsibility and guaranteeing that they leverage, rather than displace, private capital. To achieve these goals, the FCC will hold two multi-billion dollar reverse auctions to help connect rural America efficiently.

Gaps: What are the highest priority structural or institutional reforms you have identified to meet these objectives?

The United States is considering reforms on how infrastructure projects are regulated, funded, delivered, and maintained. The 2019 Budget provides $200 billion over 10 years for the Infrastructure Initiative. The main goal of this program is to encourage state and local

entities to raise new revenues or set aside additional funding dedicated for infrastructure investments and future operations and maintenance. The Infrastructure Initiative includes:

- **Infrastructure Incentives**—$100 billion is provided to encourage increased State, local, and private infrastructure investment by awarding incentives to project sponsors for demonstrating innovative approaches that would generate new revenue streams, prioritize maintenance, modernize procurement practices, and generate a social and economic return on investment. Incentives would be provided in the form of competitive grants.

- **Rural Formula Funds**—$50 billion is provided to address the significant need for investment in rural infrastructure, including broadband internet service.

- **Transformative Projects**—$20 billion is provided to support bold, innovative, and transformative infrastructure projects that can significantly improve existing infrastructure conditions and services.

- **Infrastructure Credit Programs**—$14 billion is provided in additional subsidies for key Federal credit programs providing financing to infrastructure projects via the Department of Transportation's Transportation Infrastructure Finance and Innovation Act (TIFIA) and Railroad Rehabilitation and Improvement Financing programs, the Environmental Protection Agency's Water Infrastructure Finance and Innovation Act program, and the Department of Agriculture's Rural Utilities Service program.

- **Private Activity Bonds (PABs)**—The initiative would expand flexibility and broaden eligibility for private activity bonds, which play an important part in delivering many large, regionally- and U.S.-wide-significant projects. The Budget includes $6 billion in costs related to this expansion.

- **Federal Capital Revolving Fund** — $10 billion is provided to establish a mandatory revolving fund to finance purchases, construction, or renovation of Federally-owned civilian real property

- **Environmental review and Permitting Process Enhancements** - In addition, implementing a more efficient and streamlined regulatory and environmental review process can speed up the benefits of that improved infrastructure in terms of time savings, health benefits, and business activity. The Infrastructure Initiative includes several proposals to streamline permitting decisions to accelerate project delivery while maintaining environmental safeguards, including:
    - **Improving Environmental performance** by considering pilot programs to better protect and enhance the environment.
    - **One Federal Decision** - The Federal Government can designate a single entity with responsibility for shepherding each project through the review and permitting process.
    - **Unnecessary Approvals** - The United States supports putting infrastructure permitting into the hands of responsible State and local officials where appropriate.

Barriers and challenges: What are the key barriers and challenges to implementing structural reforms for infrastructure in your economy and has your economy identified any solutions to overcome those barriers or challenges?

The flexibility to use Federal dollars to pay for essentially local infrastructure projects has created a dynamic in which State and local governments delay projects in the hope of receiving Federal funds. Overreliance on Federal grants and other Federal funding can create a strong disincentive for non-Federal revenue generation and investment.

The FCC has taken steps to review regulatory barriers to wireless network infrastructure deployment and examine how it could act to remove or reduce these barriers. In the next few years, wireless providers will need to deploy large numbers of cell sites to densify their networks, roll out 5G technology, and meet the United States' wireless broadband service needs. The FCC recently adopted new rules to streamline and expedite the environmental and historic-preservation procedures for reviewing proposed wireless infrastructure deployments. These steps are intended to reduce regulatory impediments to wireless network infrastructure investment and deployment and should promote more rapid introduction of 5G technologies, in turn expanding connectivity.

The FCC has also reduced regulatory barriers and promoted both wired and wireless infrastructure investment and innovation through its *Restoring Internet Freedom* order. By eliminating heavy-handed utility-style regulation of broadband Internet access service and returning to a light-touch regulatory framework, the FCC restored a favorable climate for network investment, key to closing the digital divide.

Needs and financing requirements: What are your economy's main (e.g. top 2-3) identified physical and digital infrastructure needs over the medium-long term? Please describe the required financing and expected impact of these infrastructures.

According to the American Society of Civil Engineers, the largest needs in physical infrastructure over the near and medium term are in surface transportation and electric generation, transmission and distribution.

Future needs: What are the main factors (e.g. population increase, technology, climate change or variability, ageing capital stock) that will influence your economy's future physical and digital infrastructure needs?

The main factors that will influence our economy's future physical and digital infrastructure needs is the sustained growth in the demand for infrastructure services and, with respect to physical infrastructure, the age of critical assets.

Leading practices: Among your economy's structural reforms relating to infrastructure in the past 5 years (2013-2018), which two do you think have been implemented most effectively? Please identify the main reasons for the effectiveness of this structural reform that could be relevant for other economies.

Transportation Performance Management - The Moving Ahead for Progress in the 21st Century Act of 2012 (MAP-21) transformed the Federal-aid highway program by establishing new requirements for performance management to ensure the most efficient

investment of Federal transportation funds. Performance management increases the accountability and transparency of the Federal-aid highway program and provides a framework to support improved investment decision-making through a focus on performance outcomes for key federal transportation goals. As part of performance management, recipients of Federal-aid highway funds will make transportation investments to achieve performance targets in the areas of safety, infrastructure condition, congestion reduction, system reliability, freight movement and economic vitality, environmental sustainability and reduced project delivery delays. Prior to MAP-21, there were no explicit requirements for State DOTs to demonstrate how their transportation program supported federal performance outcomes.

Multi-modal freight networks - The Fixing America's Surface Transportation Act of 2015 includes numerous provisions to improve the efficiency of the United States' multi-modal freight networks. The Act required the development of a National Freight Strategic Plan to address the conditions and performance of the multimodal freight system, identify strategies and best practices to improve intermodal connectivity and performance of the U.S. freight system, and mitigate the impacts of freight movement on communities. The Act also created a new freight-focused $4.5 billion grant program to improve safety, eliminate freight bottlenecks, and improve critical freight movements, and invests an additional $6.3 billion in freight projects on the National Highway Freight Network. The Act includes provisions to reduce the time it takes to break ground on new freight transportation projects, including by promoting best contracting practices and innovating financing and funding opportunities and by reducing uncertainty and delays with respect to environmental reviews and permitting.

Regional cooperation: What role can regional cooperation and regional bodies such as APEC play? You may like to consider the role of cooperation in addressing the challenges and policy gaps previously identified, in enhancing the investment environment, in making more possible cross-border/regional connectivity projects and in promoting co-ordination of development funding.

How can we ensure that Asia Pacific has top-quality physical and digital infrastructure to ensure maximum connectivity? What would be the benefits to your economy from improved connectivity?

Infrastructure projects should provide mutual economic and social benefits and job creation while allowing APEC economies maximum freedom to choose among alternatives to meet their infrastructure investment needs. APEC can help to achieve that by promulgating rules, norms, and standards that support high-quality, sustainable, and transparent infrastructure that meets stakeholder needs. Core project selection criteria should include life cycle costs; financial, environmental, regulatory, and market risks; and community impact. Insofar as energy infrastructure projects are concerned, APEC should insist on projects that contribute to more open, efficient, and liquid markets, such as for natural gas. Doing so will enhance regional energy security and bolster economic growth.

The benefits to United States are twofold: improved regional energy security, meaning access to reliable, diversified, and affordable energy resources, all of which increase regional stability; and economic opportunity, as fellow APEC economies can benefit from U.S. energy resources, technologies, and services.

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