APEC Economic Policy Report 2018 - Structural Reform and Infrastructure

Purpose: Information
Submitted by: New Zealand
APEC Economic Policy Report 2018:
Structural Reform and Infrastructure

Part 1: Introduction
Extended Outline
Drafted by the APEC Policy Support Unit (PSU)
1. Provide a stocktake of existing APEC (and G20) work on infrastructure:\footnote{This stocktake will include the “APEC Guidebook on Quality of Infrastructure Development and Investment (2014)” (and updated version), “APEC Guideline for Quality Electric Power Infrastructure” (2016) and “Peer Review and Capacity Building on APEC Infrastructure Development and Investment: The Philippines” (2017).}

- **Peer Review and Capacity Building on APEC Infrastructure Development 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 with principles of PPP best practices, LCC, VfM, etc. In addition, the process benchmarks evaluated economies against certain peer groups. Thus far, the infrastructure markets within the Philippines (Road Sector) and Viet Nam (Road and Water & Wastewater Sector) have been investigated.

- **2013: MYPIDI (Multi-Year Plan on Infrastructure Development and Investment)**
  - The plan was implemented 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. Under the plan, 4 work streams have been proposed as below:
    - **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.

  - The blueprint aims to strengthen physical, institutional and people-to-people connectivity within the region. It contains current initiatives, encourages reviving these 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 public-private partnerships (PPP), adopting assessment criteria’s to evaluate the quality of infrastructure proposals and enhancing the application of good practices and people centred investment for planning and implementing projects. In addition, the blueprint investigates transport and logistics facilitation through addressing trade facilitation, structural and regulatory reform.

- **2015: APEC Strategy for Strengthening Quality Growth for 2015-2030**
  - The strategy aims to strengthen APECs initiatives towards achieving the five (5) growth attributes identified in 2010 specifically: Balanced, Inclusive, Sustainable, Innovative and Secure Growth. Key Accountability Areas (KAAs) specified in the 2010 growth strategy namely institutional building, social cohesion and environmental impact.
The infrastructure theme was found to appear under the KAA of environmental impact specifically for the investment on disaster resilient infrastructure.

- **2015: Cebu Action Plan**
  - The Cebu Action Plan (CAP) was launched in 2015 and provides a roadmap for the creation of a more financially integrated, transparent, resilient and connected region. It does this through 4 main pillars specifically: (i) Promoting Financial Integration, (ii) Advancing Fiscal Reform and Transparency, (iii) Enhancing Financial Resiliency; and (iv) Accelerating Infrastructure Development and Financing
  - Among the 4 pillars identified, Pillar 4 is of relevance to the AEPR. Under this pillar, APEC has announced the creation of a Collaboration Action Plan between APEC economies and the Global Infrastructure Hub. Areas of collaboration include: (i) identifying opportunities for feedback on the Hub’s tools and resources by APEC member economies as they are developed; (ii) identifying opportunities for adoption of the Hub’s tools and resources by APEC member economies; (iii) providing open access to APEC member economies to the Hub’s knowledge platform; (iv) other related activities that may be agreed upon

- **2017: Action Agenda on Advancing Economic, Financial and Social Inclusion in the APEC region**
  - The action agenda was created to further advance APECs efforts towards achieving inclusive growth. The key pillars under this initiative includes: (i) Economic Inclusion; (ii) Financial Inclusion; (iii) Social Inclusion
  - The theme on infrastructure appears primarily under economic inclusion. For the case of economic inclusion, it includes accelerating both the quality and quantity of infrastructure investment; enhancing physical, institutional and people-to-people connectivity including areas under-developed, remote and rural.

- **2011: APEC Good Regulatory Practices**
  - APEC leaders have agreed to undertake actions to strengthen regulatory practices in the region through means such as
    - Develop, use, or strengthen process, 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 involve 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 of the 2005 APEC OECD Integrated Checklist on Regulatory Reform section on regulatory policy and the 2004 Leaders’ Statement to Implement the APEC Transparency Standards
  - Furthermore in 2017, APEC released its 2016 Final Report on Good Regulatory Practices in APEC economies. The review focuses on 3 main categories of regulatory practices that were identified in 2011 specifically: (i) Internal government coordination of rulemaking activity; (ii) Regulatory Impact assessment (RIA); (iii) Public consultation mechanism. It aims to
advance the work carried out by APEC economies as well as assess the progress of the Good Regulatory Practices in the region since its baseline report in 2011

- 2016: G20 Enhanced Structural Reform Agenda
  - The G20 Enhanced Structural Reform Agenda develops a set of priorities and guiding principles as a reference for reform efforts and creates an indicator system to improve assessing and monitoring structural reform efforts
  - Nine areas have been identified as structural reform priorities specifically: Promoting trade and investment openness; Advancing labour market reform, educational attainment and skills; Encouraging innovation; Improving infrastructure; Promoting fiscal reform; Promoting competition and an enabling environment; Improving and strengthening the financial system; Enhancing environmental sustainability; and Promoting inclusive growth
2. Discuss the impact of investment in physical and digital infrastructure on growth, productivity and connectivity for economies of different levels of development;
   a. Introduction
      i. Investments in Infrastructure has certain unique characteristics: its long term and capital intensive; with high sunk costs and long-lived assets that require proper maintenance. They pose the time inconsistency as well as risk management issues. Issues of market failure are also common in infrastructure investment and provision.
      ii. McKinsey Global Institute (2013): Globally, investment in infrastructure reaches $2.5 trillion a year on transportation, power, water, and telecommunications systems; there is still a gap of $1 trillion a year as a global investment of $3.3 trillion annually is required to support the current growth level.
      iii. Two options to bridge the growing infrastructure gap:
         1. Expanding the role of government as the principal financiers of infrastructure projects
         2. Get more involvements from the private investors

   b. Macro level
      o Lack of infrastructure investment may create bottlenecks. Adequate infrastructure investment may removes bottlenecks and expand access to social and business services, improving productivity, employment, connectivity, trade and better environment protection. Additionally, in the short-run, infrastructure investment and development create employment in construction and in the production of materials.
• IMF (2015): the economic and social impact of public investment critically depends on its efficiency. Average inefficiencies in public investment processes of around 30 percent; there is substantial scope for improving public investment efficiency in most countries.

**Box 1. Definition of Public Investment Efficiency, Productivity, and Performance**

![Diagram showing Public Investment Efficiency, Productivity, and Performance](image)

c. Micro/sectoral level
   i. Some literatures have noted that financial, social, and environmental performance of infrastructure investments is strikingly poor.
   
   ii. ADBI (2015):
       1. improvement in all transport infrastructure sectors results in an increase in trade flows.
       2. the role of ICT infrastructure plays a vital role in trade enhancement, and applies both exporters and importers.
       3. the need to examine the impact of soft infrastructure on trade flows.

   iii. Flyvbjerg (2002): cost estimates used to decide whether infrastructure projects should be built were highly and systematically misleading.
3. Discuss the potential impact of investment in physical and digital infrastructure on social inclusion (inclusive growth):

a. Improvements of fixed-line telecommunications networks have a positive causal link on economic growth but typically only when a near universal service is provided.

b. Goodridge (2017): mobile broadband introduction and penetration causes GDP growth rather than vice versa. The results suggest that a 10 percent increase in mobile broadband penetration causes a 0.6–2.8 percent increase in GDP, depending on the specification of the model.

c. Bertschek (2016): Broadband adoption is accompanied by a pronounced skill bias regarding workers’ labor market outcomes that strongly favors highly skilled workers. 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.

d. Crandall et al. (2007): broadband leads to a 0.2 to 0.3 percent increase in employment in a state for a 10 percent increase in broadband lines.

e. Wei Zou (2008): Reducing bottleneck of transport improves the mobility of production factors such as labor, capital and information which will support stronger economic growth and poverty alleviation in poor areas.

f. ADB (2012): Framework to Analyse Infrastructure for Inclusive Growth and Poverty Reduction
4. Based on the IERs or existing information: (Global Infrastructure Hub from G20 provides data on investment gaps and needs at country level)

- discuss infrastructure needs in APEC economies and the drivers of future infrastructure needs.
- discuss areas where economies have identified a need for structural reform or have capability/strength.
- discuss the challenges for ensuring the quality of infrastructure.²
- discuss the challenges in providing for broad access to infrastructure, including digital infrastructure.
- discuss the role regional co-operation or regional bodies can play, for example in: enhancing the investment environment and making more possible cross-border/regional connectivity projects, in promoting co-ordination of development funding or in facilitating the development of international standards.

² This discussion will draw on the work in footnote 1.
Part 2: The Role of Structural Policies in Enabling the Efficient Provision and Management of Infrastructure

Extended Outline to APEC

May
2018
## Table of Contents

1. Introduction

2. The role of structural policies in delivering value for money and quality infrastructure
   1. Credible project pipelines ensure investments with the highest return to society are prioritised
   2. Long term infrastructure planning and assessing value for money over the full project lifecycle ensures cost effective delivery and quality over the asset’s lifespan
   3. Quality standards can be used to drive quality infrastructure
   4. Funding models should be targeted to achieve value for money

3. Structural policies to improve the efficiency of the operation of infrastructure and related markets
   1. Scope for private sector involvement in the provision of infrastructure or the services from infrastructure
   2. Encouraging technology uptake and innovation in non-competitive markets
   3. Access to financing for infrastructure, including private sector financing

4. Promoting infrastructure development that supports inclusive growth
   1. Greater connectivity through open and fair access to the benefits of infrastructure
   2. Job creation and poverty reduction
   3. Mitigating the negative impacts of infrastructure development on communities

5. Promoting resilience

6. Lessons learned and policy recommendations in relation to structural reform and infrastructure
1 Introduction

- Quality infrastructure is vital to supporting inclusive growth. Roads and railways allow commuters to travel to work and goods to be transported to where they are most needed. Electricity transmission provides light and heat to homes, and water and sanitation networks provide hygienic environments and clean water.

- The need for quality infrastructure is growing; reports estimate that around USD 95 trillion of investments are needed from 2016 to 2030 in infrastructure (energy, transport, water and telecommunications).\(^3\)

- Building quality infrastructure that achieves value-for-money, supports inclusive growth and meets cost expectations requires sound structural policy settings, which – amongst other things – can ensure high service standards, efficiency through competition, and private sector innovation and investment.

Providing quality infrastructure requires effective structural policy settings, which must consider the unique characteristics of infrastructure

- Public infrastructure tends to have significant capital costs in relation to the size of the market. This can create market power with monopoly-like characteristics, requiring sound regulation to ensure infrastructure services are delivered effectively and to a high standard.

- High capital costs can also necessitate significant upfront investment from governments and the private sector, requiring policies that facilitate sound investment environments and allow for the allocation of costs over time through sound financing mechanisms.

- Once built, infrastructure assets are valuable and intended to be long-lived: policies must therefore promote effective maintenance practices and whole-of-life investment assessments.

Multiple policy options exist and must be tailored to circumstance

- Structural policy settings are broad and include wide-ranging instruments, from fiscal policy settings to competition policy, for example. The relevance of each policy in promoting quality infrastructure that supports inclusive growth depends on the sector and Member Economy in question.

- This Report focuses on four main objectives in respect of the role of structural policies:
  - delivering value for money quality infrastructure;
  - improving the efficiency of infrastructure, and related, markets;
  - promoting inclusive growth;
  - promoting infrastructure resilience.

- The Report finds policies that promote the following outcomes important to delivering these objectives:

---

Policies to promote asset and service quality (including international standardisation): Delivering quality infrastructure requires policy that focuses on the final service provided. Asset-level and service-level standards can achieve this. In non-competitive infrastructure markets, establishing minimum service level standards can drive good service outcomes. Shared standards – including international standards – can be used to encourage benchmarking between infrastructure providers to drive continuous improvement.

Sound infrastructure governance and project prioritisation processes: how projects are assessed and prioritised and decisions are taken about how to deliver infrastructure; who generates evidence on infrastructure needs and assesses value for money and asset performance; how costs are allocated and how the system guards against corruption and fraud; and which stakeholder are consulted and when, all have a significant role in ensuring that society invests its resources in the highest quality infrastructure projects.

Promoting competition, where possible: Competition drives efficiency by promoting innovation, productivity, and growth and also ensuring pricing reflects cost recovery. Structural policy can be used to promote competition; however many infrastructure sectors are naturally non-competitive. In this case competition policy can improve efficiency, for example through ensuring cost recovery based pricing and supporting service quality.

Policies to promote private sector investment and involvement: Infrastructure requires significant capital expenditures. Private investment can play a significant role in bridging the financing gap facing countries across the globe. But infrastructure financing should not be the sole driver of public-private partnerships; the private sector also brings innovation and efficiencies to infrastructure delivery in competitive markets. Governments also need to ensure adoption of good practice for reporting the fiscal risks of private participation.

Ensuring a fair allocation of benefits and costs: Ensuring open and fair access to infrastructure and the provision of infrastructure to remote or disadvantaged communities will help support inclusive growth.

Ensuring negative externalities – like environmental degradation – are fully considered and mitigated: Infrastructure can give rise to negative impacts such as pollution or large scale-resettlement. Regulation, consultation and other policies can be used to mitigate the impacts of negative externalities like pollution.

Promoting resilience: Multiple policies are needed to ensure the resilience of the infrastructure system.

Ensuring financing is available for projects that provide net social benefits: while there exists significant potential financing sources, the funding is not always available where it should be. This is related to various factors including the policy environment and project related issues where the bankability and sustainability of the projects are essential to attract investors;
the financing should also be diversified, with proper risk mitigation and allocation.⁴

- A major element for an adequate policy approach is to consider all these elements in a strategic, interconnected and coordinated approach.⁵ This calls for national strategies for infrastructure and structural reforms going well beyond silos approach.

2 The role of structural policies in delivering value for money and quality infrastructure

- Projects should only be considered for implementation if they generate sufficient value for money. Value for money assessment allows projects to be prioritised by determining their total social return.
- Value for money is the optimal combination of quantity, quality, features, and price over the lifespan of an infrastructure project.
- The optimal combination must be assessed, often by the government in charge of the project, ideally through a standardised process that is transparent and credible⁶

An economic evaluation can demonstrate that the total social benefits that result from the project outweigh the social costs

- There are a range of economic appraisal techniques used to appraise the economic viability of a project. Economic evaluation is concerned about all economic benefits and costs for the society, whereas a financial evaluation focusses on cash receipts and expenditures. A project is economically viable if it increases the net wealth of society. A project is financially viable when the parties undertaking the transaction can do so profitably.
- The socio-economic cost-benefit analysis (CBA) 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, and this also includes intangible factors and externalities such as social and environmental costs and benefits while also taking account of resilience (discussed in more detail later in this report). It is not concerned with the distribution of costs and benefits and these must be judged separately.
- The purpose of the economic analysis is to determine whether there is an economic case for the project investment decision. A financial case must also be made.
- Not all costs and benefits associated with a project can be easily or accurately estimated. The value of a comprehensive economic evaluation, such as a social CBA, is that it brings together benefits and costs that may be traded and readily identified alongside other impacts such as small widely dispersed impacts, untraded impacts and externalities, that are not typically captured in financial

---

⁴ See G20/OECD Guidance Note on Diversification of Financial Instruments for Infrastructure and SMEs
evaluations. Many of these impacts can be difficult to value – even though it is intuitively clear that they exist. Box 2.1 highlights an example.

### Box 2.1: Valuing un-traded attributes

Costs and benefits that are not traded in a market (and therefore do not have a readily available price to reference) can be harder to quantify. Non-market valuation techniques are used in these situations. The most common methods are:

- **Hedonic pricing:** The attribute may be traded in a related market and willingness to pay can be inferred via behaviour in that market
- **Travel cost methods:** Willingness to pay is inferred through the willingness to pay to travel (to an amenity for example)
- **Contingent valuation:** Willingness to pay is inferred through survey techniques

Benefit transfer is also a common practice where a non-market value established in a similar situation is used a proxy for the cost or benefit under consideration.

- Not all costs and benefits can be captured through a value for money analysis (for example, benefits from increased cultural integration). This will require the final decision maker to exercise some judgement regarding the importance of the unquantifiable costs and benefits and should be noted alongside a social cost benefit analysis. The purpose of the analysis in the decision-making process is to provide government with the maximum amount of information with which to make their decision.

- Estimates and assumptions for a project’s value-for-money do not always materialise. Government can promote effective monitoring and evaluation processes – including collecting baseline indicators – to inform future projects, including understanding whether project benefits (and costs) were obtained as anticipated, and if not, why this is.

- A complement to formal economic analysis tools include institutionalised stakeholders’ engagement. Such procedures may also help transmit the specific needs and possible inappropriate investment design to decision makers. Involving stakeholders in the design of infrastructure regulations also increases public trust in those projects and reduces the risk of disputes and legal challenges.

### 2.1 Credible project pipelines ensure investments with the highest return to society are prioritised

- A systematic approach to the economic appraisal of competing projects allows them to be ranked in order of value for money, and a ‘pipeline’ of projects to be developed.

- A project pipeline can prioritise projects in order of their highest social return: the highest social benefits for the lowest social costs. Equally, however, governments can find it useful to prioritise projects that generate the highest social return for the lowest cost to government itself. This allows for the deployment of those projects with the highest total value-for-money, within a government’s limited resources. In other words, a capital budgeting approach is...
followed under which government selects the combination of projects which maximizes total social benefit, within the confines of the government’s budget.

- The second approach should lead to better outcomes overall but typically results in the selection of more projects with a lower amount of government subsidy going into each. The first approach may lead to lower total value-for-money but reduces the total number of projects that a government prioritizes. This leads to a trade-off between increased operational complexity (which leads to higher operational risks) and increased social benefits. Depending on the level of each variable, and the government’s willingness and ability to take risk, either option may be chosen.

Why is this important? What is the positive outcome that it enables?

- Efficient use of finite resources. Standardized and transparent economic analysis is essential to determine if an infrastructure project is the best way to allocate a finite set of resources to achieve positive economic and welfare outcomes. As with any project, the government will forgo the opportunity to maintain the status quo, solve the problem in a different way or to do something entirely different with the resources.

- Efficient use of fiscal expenditure. The analysis will make sure that government subsidies are no more than the net public benefit that will be gained from the project. Where a project requires explicit fiscal support (such as through viability gap funding, subsidies and grants), the economic analysis needs to be scrutinized to justify fiscal expenditure. The OECD Budget Transparency Toolkit\(^8\) can be a useful resource in making this judgement.

- A credible and transparent public procurement process reduces the risks from a private investor’s perspective. This is because the private investor is more able to predict future government behaviour (in terms of projects that receive focus) and manage these risks. For this reason, countries with credible project pipelines typically attract more private investment at lower cost. This does not negate the fact that, to be able to attract private investment, a project that achieves a high social return still needs to be financially viable. In other words, some of the social benefits need to be monetised.

How could structural policy support it?

- Infrastructure governance models can:
  - Establish formal processes that ensure investment and risk assessments of infrastructure projects take place on a systematic basis.
  - Ensure investment assessments are conducted by a different organisation to the agency implementing a project.\(^9\)
  - Ensure investment assessments are conducted before the mode of procurement is determined. This ensures a project’s economic value is established prior to an assessment of the most effective delivery mechanism. The Australian New South Wales Government have integrated this approach in the state’s ‘budget rule’, which will be discussed here.

---


\(^9\) OECD (2017) *Getting Infrastructure Right*
Establish a credible project pipeline, with transparency over how value for money was determined. A particular issue that needs to be managed is that many politicians prefer to build new projects with high visibility, rather than spending on maintaining and upgrading existing assets.\(^\text{10}\)

- For a pipeline to be successful, the government agency overseeing the prioritization and identification of projects must be aligned with those executing and funding them. For example, in large federalist countries with multiple layers of government, investment decisions are taken at the state, local or municipal level, or at least require their active approval. In such cases, the pipeline is typically best developed at a state or regional level, with the national role focused on coordinating inter-state projects, clearing roadblocks and promoting best practices.

What does a good structural policy look like?

- Systematic assessments of infrastructure projects: There are several good examples to draw from. New Zealand have adopted the Better Business Case (BBC) model for significant infrastructure investments, which includes a strategic, economic, financial, commercial, and management assessment of the project. This can be described in further detail.

- Ensuring investment assessments are conducted by a different organisation to the implementing agency: Several countries split these functions between the implementing agency and the Treasury or Ministry of Finance. A specialised infrastructure procurement unit can coordinate across sectors and provide consistency to the prioritisation process.

- Conducting investment assessments prior to procurement assessments: The Australian New South Wales Government have integrated this approach in the state’s ‘budget rule’, which will be discussed here.

- Establish a credible project pipeline: Central coordinating agencies can perform this function. There are several examples to draw from in member countries throughout APEC.

2.2 Long term infrastructure planning and assessing value for money over the full project lifecycle ensures cost effective delivery and quality over the asset’s lifespan

- Long term infrastructure planning ensures a coherent and strategic approach across multiple sectors, institutions, policy areas, levels of government, and community stakeholders\(^\text{11}\). Planning should include determining and prioritising the needs from and trade-offs associated with infrastructure as well as a strategy to address these issues. The planning process must be transparent and based on clear assumptions as well as take the views of all stakeholders into account.

Why is this important? What is the positive outcome that it enables?

- Long term costs and benefits can be overlooked in favour of up-front costs when infrastructure planning does not look sufficiently far into the future. The

\(^{10}\) Ibid.
\(^{11}\) OECD (2015) Towards a Framework for the Governance of Infrastructure, Public Governance and Territorial Development Directorate, OECD, Paris
infrastructure planning horizon should reflect the long lifespan of infrastructure assets and the need for ongoing maintenance of assets

- Quality infrastructure assets will continue to deliver a high level of service throughout their lifetime. Infrastructure planning must focus on the performance of assets through their lifespan.
- Long term planning will help align the strategy of the multiple players involved in infrastructure development. Infrastructure development often has multiple objectives, which may mean trade-offs must be made between them.

How could structural policy support it?

- Infrastructure governance can support long term planning by requiring a long-term plan that states and prioritises the most important outcomes and trade-offs for infrastructure. This plan would require concrete actions to provide infrastructure services and outlines a set of key decisions across all players involved in provision of infrastructure.
- Infrastructure planning should be linked to long term fiscal projections and planning. Infrastructure investment requires allocation of a budget towards projects, together with planned revenue from user charges. Insufficient allocation of budget towards infrastructure investment will lead to low project implementation. Sound fiscal planning and clear funding provisions will also help catalyse private investment in infrastructure.
- Accounting standards can help ensure the long-term condition of assets is taken into account in the planning process. Accounting standards should require the state of public assets be reported and there should be a requirement to account for contingent liabilities. Such information also facilitates the role of regulators in setting revenue requirements for infrastructure managers.

What does a good structural policy look like?

- We use New Zealand as a case study to illustrate a successful example of how to transition from an inadequate policy structure to a more robust one. Box 2.2 outlines Auckland’s transition from one capital allocation system to another.

---

Box 2.2: Case Study - Auckland Transport Alignment Project

New Zealand has experienced high levels of population growth over recent years, with most of these migrants going into Auckland. This has placed pressure on Auckland’s infrastructure, including its transport system.

Prior to the Auckland Transport Alignment Project (ATAP), transport funding decisions in Auckland were guided by two plans, the ‘Basic Transport Network’ and the ‘Auckland Plan Transport Network’ (APTN). The APTN identified a $300 million per year funding shortfall if the programme set out in the plan were to be implemented. The ATAP project was established to ensure that investment in Auckland’s transport system would address the regions transport challenges and provide value for money, particularly in relation to the following objectives:

- To support economic growth and increased productivity by ensuring that access to employment/labour improves
- To improve congestion results, travel times and reliability, in the peak period and to ensure congestion is minimized at other times
- To improve public transport’s mode share 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 ATAP set out a strategic approach 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. The key difference between the APTN programme 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 included an indicative package of investments that illustrates the type and quantum of investment likely to be required to deliver this strategic approach. The package was a mixture of committed and uncommitted investments and totalled around $24 billion over the 2018-2028 period and $84 billion over 30 years.

Source: [Insert source if citing a third party. If source is Castalia delete the line]

2.3 Quality standards can be used to drive quality infrastructure

- Standards can be used to drive quality infrastructure service delivery. They include environmental standards, data standards, and policy and governance standards.

- International standards can increase the scope of standardisation, and drive benchmarking between countries, shared best-practice, and drive increased competition and service quality between public and private providers operating across boundaries. It can especially useful to compare services provided by regional monopolies.

Why is this important? What is the positive outcome that it enables?

- Environmental standards can set minimal environmental performance requirements and minimise environmental impacts. This is important where infrastructure providers are not otherwise incentivised to minimise negative externalities (like environmental pollution).
Meaningfully integrating environmental and social issues across all steps of the infrastructure project life-cycle is as much of an economic incentive as a broad sustainability goal for both governments and businesses involved in the financing and delivery of infrastructure. Implementation of responsible business conduct principles and standards can help improve the quality of assets and ensure a risk-based approach and due diligence on environmental and social issues.

Data standards are standardised ways of collecting important data on infrastructure assets. This includes built asset level data, and financial information.

Built asset level data is foundational to understanding pressures on networks, the likely timing and cost of future investment, and expected future service needs. Data can be collected in a consistent and comparable way so that infrastructure condition and performance can be meaningfully compared and benchmarked, and infrastructure providers can understand network interdependencies. Shared data standards across organisations responsible for similar types of assets like roads or water infrastructure is important to help facilitate this.

Standardisation in infrastructure finance and procurement can improve quality by improving capability - for example through the creation of transactional and contractual frameworks, templates for information, cost reduction, and finance structures that can facilitate investment through improved transparency, security, administration and due diligence.

Project-level financial data is vital to attract private finance because it can support investors to:
- Allocate capital towards sustainable and quality infrastructure investments
- Understand the effects of infrastructure investment on institutional investors’ overall portfolio efficiency
- Manage long-term risks
- Better understand the effects of technology and innovation on the financial performance of infrastructure assets

The OECD’s Infrastructure Data Initiative and the World Bank’s Prioritization Tool are examples of tools that can assist economies collect the right data to prioritise projects and attract private investors.

Infrastructure projects are complex, with long supply chains and multiple stakeholders, and are highly vulnerable to corruption and other social and environmental risks. Policy and governance standards, like standardised procurement guidelines, can drive improvements in investment analysis and procurement. Standardised procurement processes help guard against corruption while also promoting more strategic approaches in procurement such as green procurement.

The standardisation of infrastructure finance and procurement can support quality investment, through common contractual arrangements, financial instruments, documentation, and data standards that support investment. Box 2.3 includes a summary of economies in the World Bank’s Benchmarking Public
Procurement report, which looks at public procurement laws and regulations across 180 countries

**Box 2.3: Major Issues with Public Procurement Policies**

- **Payment delays**: Delays in payment hinder participation by private firms in the public procurement process—especially small and medium enterprises (SMEs) that struggle with limited cash flow. Benchmarking Public Procurement data shows that the higher the income level, the fewer the number of days suppliers must wait to get paid. Delays average 30 to 60 days in 9 of the 32 high-income economies, while the remaining 23 ensure timely payments to suppliers. 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 or so low as to allow frivolous offers. Most economies have bid security and performance guarantee requirements, but they do not always regulate them. In 32 economies where bid security is required by the legal and regulatory framework, there is no provision limiting the discretion of the procuring entity regarding the amount, which may cause financial uncertainty and can be a burden for suppliers interested in bidding for a public tender.

- **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). 26 of the 180 economies measured do not have an electronic portal specifically dedicated to public procurement. The lack of such a portal means that suppliers may not have access to procurement opportunities and associated information.

- **Complaint mechanisms**: The existence of a fair and transparent complaints mechanism bestows confidence in the procurement process because it increases the likelihood that the procurement will be carried out in a more impartial and transparent manner. While disgruntled bidders should have the right to file a complaint at any stage of the procurement process, this possibility is not always built into the procurement process. In 10 economies, the legal framework does not even contemplate the possibility of filing a complaint before a contract is awarded. Bidders must wait until the tendering process is concluded to protest any irregularity. This may limit the effectiveness of corrective measures that the review body can take.

- **Time needed to resolve complaints**: Timely resolution of complaints, as well as the presence of legal time limits, increases the private sector’s trust in the system and encourages its participation in public tendering. Not only must suppliers be confident that their complaints will be resolved without delay, but they should also be assured that their protest will be given an appropriate amount of time to be reviewed. The time needed for review bodies to issue decisions differs greatly, ranging from 2 to 450 days. Moreover, the time needed for review decisions to be issued is not correlated with the income level of the economies. Even in OECD high-income economies, delays occur. Timeliness and efficient reviews are standard in only 36 economies.


---

Sharing international standards allows countries to benchmark, share best-practice, and (in the case of procurement standardisation) drive competition and therefore value-for-money.

Meeting these standards might also encourage private investment as it reduces complexity from an investor’s perspective and potentially allows a wider group of investors to consider a project. Private investors look particularly favourably on government initiatives to improve the ease of doing business in a country as it signals the Government is business-friendly. This reduces their perceived risk of unfavourable future behaviour from the government (a significant business risk in many developing countries), which may increase their willingness to participate in certain projects.

How could structural policy support it?

Governments may choose to promote or even mandate standardisation in certain areas. The APEC forum also provides a good opportunity for countries to consider cross-border standardisation in key areas like environmental standards, procurement standards, and data standards.

What does a good structural policy look like?

- G7 Ise-Shima Principles for Promoting Quality Infrastructure Investment and the World Trade Organisation’s Agreement on Government Procurement can be used as guidelines to achieve quality infrastructure.

- Under the G7 Ise-Shima Principles for Promoting Quality Infrastructure Investment, delivering quality infrastructure means ensuring:
  - effective governance, reliable operation and economic efficiency in view of life-cycle cost as well as safety and resilience against natural disaster, terrorism and cyber-attack risks;
  - job creation, capacity building and transfer of expertise and know-how for local communities;
  - social and environmental impacts are addressed;
  - alignment with economic and development strategies including aspect of climate change and environment at the national and regional levels; and
  - effective resource mobilization including through PPP.

- OECD Public Procurement standards\(^\text{14}\) and the G20 principles for promoting integrity in public procurement are other examples of good structural policy guidelines\(^\text{15}\).

2.4 Funding models should be targeted to achieve value for money

Infrastructure funding models should be designed to ensure efficient delivery and use of assets. The cost of infrastructure should be funded by the beneficiaries, cost exacerbators, risk exacerbators or a combination.

---


Governments can also overlay policy on top of a system beneficiary funded infrastructure to achieve social objectives, e.g. providing a cross-subsidy to low income areas to ensure infrastructure access.

**Why is this important? What is the positive outcome that it enables?**

- Funding models for infrastructure should be designed to ensure the agency responsible for delivery has the correct incentives to deliver value for money while considering equity of the cost burden.
- The choice between taxpayer funded infrastructure and user-pays infrastructure should consider the trade-offs between delivering the efficient level of infrastructure, providing access to all user groups, and ensuring equity of the cost burden across consumer groups and over time (inter-generational equity).
- The funding model needs to be at the appropriate spatial scale (e.g. local vs national level management) to ensure equity in the cost burden and to ensure the asset is managed by the appropriate body.

**How could structural policy support it?**

- Regulation can deliver value-for-money by ensuring the beneficiaries of infrastructure provision are also the funders. This includes regulation that ensures, where possible, that charges paid by users are cost reflective.
- Infrastructure network regulators are often responsible for ensuring customers receive an affordable price while an efficient level of service is maintained. Tariffs must be priced to strike a balance between the need for affordability and the need for cost-recovery and innovation.
- Where prices are set below operating costs, there is a disincentive for expanding services and it can encourage ‘overconsumption’ – consumption of a limited resource at inefficiently high levels. Pricing which includes full lifecycle costs, including building, operations and decommissioning are required to incentivise new provision and ensure consumption at levels which optimise limited resources.
- Governments can overlay cost-reflective tariff-setting with refinements to ensure affordability to a broad element of society. Policies to promote affordability include cross-subsidisation and taxpayer support.
- Regulators often face satisfying these competing goals in the electricity sector, as described in Box 2.4.
Box 2.4: Regulation Challenges in the Electricity Transmission Networks

- The cost of infrastructure should be funded by the beneficiaries, cost exacerbators, risk exacerbators or a combination:
  - Transmission pricing methodologies have been charged variously on the basis of; regional peak injection and offtake (a cost exacerbator model), or, connection (a beneficiary pays model), or combinations. 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 (resilience) will require higher prices to be paid. It is important for a regulator to decide what the correct balance for society is (determine the optimal price quality trade-off for society). 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

- Reflecting the marginal cost of connection:
  
  Marginal cost pricing maximises the efficiency incentive on to 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: [Insert source if citing a third party. If source is Castalia delete the line]

- Infrastructure governance models need to be designed at the correct scale to ensure efficient service, quality provision across geographic regions, and equity of payments. The most effective public-sector governance models range from very local provision funded directly from the householders, which has the advantage of immediate accountability, to a single national utility funded by taxpayers, to a state-owned enterprise run commercially which might provide better fiscal outcomes for government.

What does a good structural policy look like?

- In many countries electricity markets are regulated to ensure cost reflective pricing, though governments can also provide subsidies to achieve social goals or provide Community Service Obligations (CSOs) to commercially-driven state-owned enterprises. We discuss an example of this in Box 2.5.

Box 2.5: Examples of Community Service Obligation

TBC: “Examples of Community Services Obligations exist in NZ in Postal networks (the deed of understanding required delivery to everywhere and limited pricing options) and in Telecommunications networks ‘kiwi share’ – linked maximum monthly prices for network access to consumer inflation rates.”

Source: [Insert source if citing a third party. If source is Castalia delete the line]

- Large infrastructure like electricity transmission and distribution, roads, and water services should be aggregated at a scale which incentivises efficient provision and fair distribution of the cost burden.
3 Structural policies to improve the efficiency of the operation of infrastructure and related markets

- Efficient operation of markets refers to how markets perform relative to the marginal cost pricing of perfect competition.

- Competitive markets, where there are not significant externalities, will generally result in the efficient pricing and provision of the services derived from infrastructure. However, for many forms of infrastructure private competition for the provision of infrastructure is not possible and Government plays a significant role in the infrastructure market either as funder or regulator. Consequently, infrastructure is often provided in APEC economies through large established enterprises or directly overseen by Government.

- Typically, there are two economic characteristics that lead to infrastructure provision being better suited to public sector provision/financing or require regulation, such as price regulation, to improve the efficiency of the operation of the markets in respect of that infrastructure:

  - **Provisioning a Public good**: A public good has two key characteristics:
    
    - *A public good is non-rivalrous* – A good is considered non-rivalrous if, for any level of production, the cost of providing it to an additional individual is zero. The provision of national defence – and its associated infrastructure – is non-rivalrous as one person’s defence does not reduce the amount of defence provided to another person.
    
    - *A public good is non-excludable* - A good or service is non-excludable if non-paying consumers cannot be prevented from accessing it. The inability to exclude an individual from the benefits of a public good, regardless of whether he or she contributes to it, gives rise to a ‘free rider’ problem. Common examples of public goods include: defence, the prison system, lighthouses and clean air.

  - The only way to efficiently fund public goods is through taxation. The private sector will have insufficient incentive to produce an optimal amount of a public good or service and will generally provide little or none. However, even for public goods, there can be good logic for private involvement in the provision of certain services related to the asset, if the scope of service has been defined properly. An example of this is the use of PPPs to deliver hospitality services in the defence sector in New Zealand. This is effective because it isolates the element of the service that can be competitively delivered allowing for efficient pricing for this service.

  - **The market dynamics are conducive to the formation of a natural monopoly** - A natural monopoly is where barriers to entry give the largest supplier in an industry market power and overwhelming advantage over potential competitors. In addition, there are no significant diseconomies of scale in a natural monopoly. A natural monopoly typically has a high fixed cost and low marginal costs. A good example is infrastructure networks such as large-scale electricity transmission or a fixed line copper telecommunications network, or a postal network.

  - In these markets, it is necessary to introduce regulation to ensure that the incumbent does not abuse its market power and charge monopoly rents.
Many types of infrastructure, such as water and sanitation networks, energy transmission and distribution, telecommunications networks, and some transport networks have high fixed costs and strong network effects.

- This means there is risk of providers in these sectors acting as monopolists, with large amount of economic rent accruing to the owners or operators of infrastructure. This behaviour leads to high prices and low access. The traditional remedies for this are price regulation and direct public provision.

- 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 which created the market power, such as mobile telephone networks compared to traditional fixed copper line telecommunications provision. There are examples of electricity market disruption also, including the use of mini grids as alternatives to transmission and solar PV as an alternative to transmission and distribution. Section 3.2 of this Report considers how regulators can remain dynamic and flexible to new technology uptake, and the implications this has for competition policy.

- These two characteristics of infrastructure provision mean that there are a number of structural policies that can improve the efficiency of the operation of infrastructure markets either by isolating the competitive element of the market or by mimicking outcomes that would be achieved if the market were more competitive. This report focuses on four areas:
  - The scope for private sector involvement in the provision of infrastructure or services from infrastructure;
  - Encouraging technology update and innovation in non-competitive markets;
  - Regulating natural monopolies;
  - Operation of markets for the financing of infrastructure.

3.1 Scope for private sector involvement in the provision of infrastructure or the services from infrastructure

- Some infrastructure types, including in supporting markets or services from infrastructure which do not have strong public good or monopoly characteristics are conducive to private sector participation. Private sector involvement can be either in the provision of assets or the services from the asset.

- Structural policy can support the development of markets in such areas. Governments should identify areas where competition is possible and structural policy can de-lineate different services to support this.

Why is this important? What is the positive outcome that it enables?

- Private sector provision of infrastructure can lead to efficient delivery of infrastructure and lower the fiscal burden of infrastructure provision.

- Private sector provision and operation of infrastructure can (appropriately) shift risk from the state to risk taking private companies.
Private sector financing of infrastructure can enable more efficient and timely delivery of infrastructure services.

Competition can lead to efficient prices and substitute for the need to regulate. This will support affordability objectives by avoiding the extraction of monopoly rents by providers, more efficient provision, better access to infrastructure and attain a better allocation of resources.\(^{16}\)

Competition can be enhanced through regional economic integration (an APEC goal). Open and fair access to international firms in infrastructure construction and also operators and other relevant investors, can improve competition and regional economic integration thus supporting growth over the region.

**How could structural policy support it?**

- Appropriate delineation of private and public-sector goals can enable competitive provision of private goods and limit public provision to public goods.
- Structural policy needs to ensure it does not prevent or limit private sector involvement when that would otherwise occur.
- Structural policies which can support ease of entry into markets for the provision of infrastructure, or the services from infrastructure include:
  - Reducing barriers to international entry for the provision or construction of infrastructure assets.
  - Making procedures to start and operate business simple and cheap, avoid complex procedures to start and operate a business and regulatory barriers that favour incumbent firms.\(^{17}\)
  - This can include a ‘tiered’ approach, with lightest regulations for small new firms with only essential safety, environmental or public health concerns\(^{21}\).
  - Consider ideas discussed at the APEC Conferences on Good Regulatory Practice, such as ‘Single Online Locations for Regulatory Information’\(^{18}\).
  - We note that an extensive amount of work has been done by the OECD on competition policy, including on liberalisation and competition intervention in regulated sectors\(^{19}\).
  - The market for the construction of infrastructure can be competitive, even if the resulting asset is a monopoly asset. Allowing open tenders for projects and operating with transparency in procurement through stated, robust processes such as those provided by multilateral development banks\(^{20}\). This gives new firms the confidence to invest in crafting proposals by reducing the perception a pre-ordained result and makes it easier for non-incumbents to understand the process.

---


17 Ease of Doing Business

18 8th Conference on Good Regulatory Practice, 2016, APEC Sub-Committee on Standards and Conformance

– Competition policy, especially regulations to aid switching between providers by consumers

– Unbundling competitive parts of the service and providing policies that support competition in these markets such as allowing retail competitors to use physical infrastructure owned by large incumbent firms at a fair regulated price. Vertical unbundling may be necessary to ensure potential competitors have fair access to specific links in infrastructure provision have a feature of natural monopoly.21

– Establishing common technical standards both within countries and between them. This increases competition, and also has potential side benefits such as safety.

– PPPs (see Box)

What does a good structural policy look like?

▪ Good structural policy typically does two things:

  – **Increase private sector participation** – This can reduce the fiscal burden of infrastructure provision, shift risk from the state to private companies, and enable more efficient and timely delivery of infrastructure services.

  – **Increase competition** - especially regulations to aid switching between providers by consumers

▪ For example – bandwidth auctions. Telecoms competition management – allowing smaller competitors to use competitors infrastructure at a fair price to expand coverage. Regulations on switching providers. Network infrastructure standards.

▪ Vietnam, for example, implemented comprehensive regulatory reforms in its telecommunications sector. The growth in Vietnam’s telecommunications sector due to these reforms has been truly exceptional. Box 3.1 outlines Vietnam’s experience.

---

21 Improving access to infrastructure services by the poor: institutional and policy responses, 2001, Penelope Brook and Warrick Smith for the World Bank
Until 1990, the telecommunications sector in Vietnam was provided solely by State-owned enterprises. The diversity of services was limited. Access to modern telecommunication services and equipment was restricted due to limited resource of the government, limited innovation capacity, and poor competition. By 1995, Vietnam attained an average of only 3.8 telephones per 100 people, which was much lower than other Southeast Asian countries. This translated into higher communication costs for firms, which was of importance as Vietnam was in the early stage of development.

Reforms of the telecommunication sector can broadly fall into 3 categories:

- **Relaxation of entry for private providers, both domestic and foreign, in the telecommunication market** - In 2001, the Government excluded Internet services from the state-dominating policy. Specifically, ISP business were open to the private sector and foreign investors. A second reform milestone was Vietnam’s WTO accession in 2007. As part of its accession commitments, Vietnam offered access to its markets to all WTO members, on a most-favoured nation basis.

- **Equitization of State-owned telecommunication providers** - In 1995, Saigon Postel – a joint stock company – was established, marking the end of State monopoly in the sector.

- **Enhancement of competition in the telecommunication market via regulatory changes and enforcement of competition law** - The Law on Telecommunications (2009) established a framework for telecommunications regulation in Vietnam. Relaxation of entry to the telecommunication, as per Vietnam’s commitment upon joining WTO, was incorporated in the Law. The Law further provided for a regulatory authority to be established to investigate competition issues and perform dispute resolution. Meanwhile, the Competition Law (2004) classified various telecommunication providers in Vietnam as those with significant market power. These providers have limited ability to change their tariffs without the permission of the Ministry of Information and Telecommunication (MIC). Moreover, ‘basic’ and ‘important’ interconnection charges that would greatly affect the telecommunications market are decided by the MIC.

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. GDP of information and communication sector grew on average by 8.8 per cent per annum in 2007-2017. Mobile services in Vietnam showed a jump-start style of network expansion, surpassing both Indonesia and the Philippines during 2007–08. 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 effects of the change in regulation were far-reaching. The reforms contributed to improve the efficiency of various enterprises in Vietnam. With improved quality and availability of telecommunication services, the enterprises in Vietnam could coordinate with their customers and network of suppliers at substantially lower costs. This enhanced the competitiveness of Vietnamese enterprises, and ensured that they could join the global value chains in a timely manner.

Box 3.1: Vietnam’s Reform of its Telecommunications Sector

- Increasing competition can be achieved through many ways. It is not analogous to deregulating State-owned monopolies. It can be as simple as limiting the
The scope of a natural monopoly or bringing in limited private sector involvement in an industry where a natural monopoly dominates.

- An example of this can be found in the market design of energy markets. Specifically, disallowing vertical integration between transmission/distribution and generation/retail.
- Public private partnerships (PPPs), if implemented correctly, can be another way to initiate private sector involvement in an industry.

**Box 3.2: Opportunity for using PPPs (this box may include a summary of FMP work on PPPs)**

- 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: risks should be allocated to the party 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, whilst any political risks are better allocated to the government.

- Opportunities for PPP contract arise when the following conditions are met:
  - **Output can be clearly specified, measured, and enforced.** The service needs to be defined on a stand-alone basis. If there is a lack of clarity around what constitutes the output of the contract, or significant measurement issues, or there is insufficient ability by the private party to adequately influence the outcome, PPP is not the optimal solution.
  - **Private sector incentives over lifecycle of activity creates value for money.** PPP is the preferred solution when it is preferable to procure a service from the private sector, rather than procuring equipment. Involving the private sector may result in improved performance, for the following reasons:
    - **Expertise:** on-going provision of expertise through the delivery of services
    - **Innovation:** procurement of PPPs can allow the private sector to offer innovative solutions and delivery options (this form of innovation should not be confused with technological innovation: the public sector can always purchase the latest technology directly). However, private parties will need to be incentivised for these benefits to materialize
    - **Efficiency:** The private sector, if incentivised appropriately, is generally more efficient than its public counterparts. Involving the private sector will likely 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.

Source:
3.2 Encouraging technology uptake and innovation in non-competitive markets

- Optimizing the allocation of resources to produce what people currently want is an important objective of structural policies. Equally important is supporting dynamic efficiency over time that fosters a continual adjustment to the changing nature of production.

- In non-competitive markets, 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 being put in place by potential competitors.

- Structural policies can support the uptake of technology and innovation in noncompetitive infrastructure markets.

Why is this important? What is the positive outcome that it enables?

- Optimizing the allocation of resources to produce what people currently want is an important objective of structural policies. Equally important is supporting dynamic efficiency over time that fosters a continual adjustment to the changing nature of production.

- Technology is a key driver of the dynamic changes to production possibilities which lead to growth over the long term. Adequate technology uptake, especially in noncompetitive markets, including adequate research and development is necessary to realize optimal dynamic efficiency.

- In regulated ‘competitive’ markets, where some incentives exist for innovation to provide a competitive edge, governments may still intervene to roll out new technologies. For instance, in New Zealand, The Government considered that the up-front cost of building a fibre-optic telecommunications network would be too high for the telecommunications industry alone to fund and set up a government-owned company to invest in the network alongside the private sector.

- But new technology uptake presents new challenges to regulators, who must remain dynamic and flexible to responding to change. Box 3.3 considers the impact of new technologies in the telecommunications sector, and how the regulator in New Zealand responded to implications for competition policy.
Box 3.3: Technology Uptake in Telecommunications is Creating New Regulatory Challenges

- Technology is altering how competitive an infrastructure sector is, and structural policy must keep abreast of this and change accordingly.
- The telecommunications sector provides a compelling example. Traditionally, the copper network has been regulated as a natural monopoly – high fixed cost of provision has historically limited competition in this sector. The advent of new technology, however, is making the copper network obsolete. New technologies (like: UFB, wireless) are entering this market and introducing a competition to a market that has traditionally been viewed as a natural monopoly.
- Competition policy must keep pace with changing realities: structural policy must reflect how new technologies alter the competitive structure of the market.

Telecommunications regulation in New Zealand is responding dynamically to technological change

- The Telecommunications Act was designed in 2001 for an era that is no longer relevant – a time of vertical integration, with Telecom (the State-owned monopoly) owning the fixed line network and competing in retail markets, and before the rollout of the UFB network. It was introduced with a focus on competition problems in the sector at that time, such as interconnection of competing networks with Telecom, discrimination in favour of Telecom’s retail services, and low levels of competition and investment.
- In response to this, New Zealand required structural separation between the network business and the retail service providers. The networks business would provide access to its services to the retail service providers who would compete amongst themselves in the retail market. Discrimination between service providers was prohibited.
- New Zealand faces a different set of issues today. Improvements in wireless technologies have led to competition to traditional broadband through mobile networks. Additionally, Ultra-Fast Broadband (UFB) rollout is providing additional competition to the copper networks. This has significant regulatory implications.
- In a copper world, New Zealand’s regulatory regime was designed to promote the ‘ladder of investment’ concept – allowing Telecom’s competitors to progressively ‘climb the ladder’ from retailing to making investments deeper into the network. In a UFB world, the market power of the copper network diminishes substantially.
- New Zealand has proposed an amended regulatory framework in 2017 that established regulation for fibre services and removed copper service regulation for areas that had already been connected to fibre. The Bill, however, provides protections for end-users of copper services in deregulated areas.
- Since copper is much slower than fibre, its market price should be capped by the regulated price charged by fibre – end users will not be willing to pay more for copper if Fibre is available to them. The purpose of removing unnecessary price regulation on copper allows the owners of the service to charge low prices and attempt to segment the market based on price. This provides a compelling alternative to the end users.

How could structural policy support it?

- Structural policies that support competition such as those in Section 3.1 are important contributors to technological uptake as technology is a key aspect on which firms compete. Effective uptake of new technology is hard to predict – competition is the best determinant of which technology is valuable and appropriately allocates the risks.
Governments can invest for technology directly. There are risks with this strategy, requiring assumptions about the best technology. The benefits can include step changes in development.

Ensure the returns from technological development can be captured including effective intellectual property protections for things such as Patents, Trademarks, Designs and copyright that follow World Intellectual Property Organization standards and are consistent with other nations.\(^{22}\)

Directly stimulate innovation by establishing government research institutes which can compensate for a lack of interest by established firms.

Where there are limited inputs (Electromagnetic Bandwidth, road space, air space, water) regulate these to prevent monopolists from denying access to new innovative firms or preserve pieces as public domain.

Having a strategic vision when developing project pipelines which recognises demand and technological change – not just projections with current technology.\(^{23}\)

Regularly review regulatory systems and legislation to accommodate new infrastructure technology, paying attention to the interface between infrastructure and service providers to avoid disproportionate costs with little benefits (e.g. smart meters).

When new technologies become more feasible change regulatory system - Electric and autonomous, NZ regulatory review link.

What does a good structural policy look like?

Policies should encourage spending in research and development (R&D), where possible. R&D does not necessarily have to cover ground-breaking research – it is easier to incentivize the adoption of proven technology in new situations. This exposes companies to lower levels of risk. Investment in scientific infrastructure can also lead to large benefits in the long run.

Policies must be revisited regularly to verify their relevance to changing circumstances. An example of this can be found in the emergence of autonomous cars. New Zealand is currently undertaking a regulatory review. Many US states have changed laws to allow experiments to take place.

Legislation should also ensure that it is not too limiting. Innovation in the use of drones, for example, could be stifled by limited inputs—airspace, where access is in favour of existing technology. Legislation in some countries has recognised this.

### 3.3 Access to financing for infrastructure, including private sector financing

Infrastructure funding is often a constraint and a focus of structural policy; however, financing is equally important to facilitate the provision of infrastructure. Financing can be a constraint and costs can be high in some situations.

---

\(^{22}\) Promoting Innovation for Start-ups, APEC Small and Medium Enterprises Working Group November 2017

\(^{23}\) Infrastructure Investment Policy Blueprint. 2014 World Economic Forum
- Infrastructure projects with positive net present value in an economic analysis should be able to attract finance. However, in many cases this does not happen, despite investors claiming they are not meeting target allocations for infrastructure.[23]

- In many developing countries, infrastructure has not developed as a viable asset class for financial institutions. Access to long term financing is a critical issue in implementation of infrastructure projects. There are many inter-related reasons for this that include:
  - A shortage of long-term domestic currency finance
  - Local banking market capacity and appetite
  - A lack of adequately developed capital and inter-bank markets
  - Unavailability of government support mechanisms (such as guarantee facilities and viability gap mechanisms)
  - Unsuitable regulatory framework to protect the interest of institutional investors, and
  - A lack of viable project pipeline.

- Our work in this solution area looks to establish mechanisms and frameworks that can improve the flow of both domestic and foreign capital into infrastructure in a sustainable manner.

**Why is this important? What is the positive outcome that it enables?**

- The gap in infrastructure provision between what is needed and what is provided amounts to trillions of dollars each year.

- Financing constraints contribute to this, even when funding is provided. For example:
  - Governments may be debt constrained
  - Countries may face significant country risk premiums
  - Private sector involvement may not be facilitated

- A barrier frequently cited by the private sector in taking part is that projects are not bankable. Although the social benefits may be higher than the social costs, the financial returns from the project are not adequate to cover the private costs at a given risk level.

**How could structural policy support it?**

- First, governments must fulfil certain core functions to prepare and develop infrastructure projects attractive to the private sector. These include:
  - Adequate project preparation
  - Independent project evaluation
  - Provision of fiscal support if necessary
  - Transaction management
  - Ongoing monitoring and evaluation after the procurement process is finalized

---

[23]
• Oversight and management to ensure value for money is delivered
• Management of fiscal commitments to ensure fiscal sustainability

• But well-prepared projects must still be bankable. The bankability of a project (or lack thereof) depends on its risk-return characteristics. This is because the required return by the private sector is linked with the risks borne by it. The private sector will require a commensurate return for all risks that it bears.

• In most situations, the total return that the private investor can receive from delivering an infrastructure service is relatively inflexible. Political and social considerations mean governments limit the ability of the private sector to charge higher than a certain rate for delivering certain services.

• Another option, therefore, is to reduce the risks faced by the private investor. This allows the investor to accept a lower return for the project. Legislation and best-practice procurement guidelines can be used to reduce financial risks such as contract renegotiation risks and political risks.

• It is very important that the private investor bears some risk, however. Without the correct risk allocation, the private investor will not be incentivised to deliver the project efficiently or to an acceptable standard.

• The optimal solution is to induce the private party to take the risks that it can mitigate or bear, but not the risks that are out of its control. Requiring the private party to accept the right risks incentivizes it to perform. Allowing it to avoid risks that are outside of its control allows for a cheaper deal.

• Well-developed, bankable projects must be able to access finance. This can be aided with policies that deepen/broaden capital markets and reduce barriers to foreign investment, as this can expand the available sources of long-term finance for infrastructure projects

What does a good structural policy look like?

• Examples forthcoming, including a focus on governments fulfilling the necessary functions to develop attractive projects, policies designed to lower project risks, and policies to deepen capital markets and reduce barriers to foreign investment.

• Chile provides an example of a legislative fix for reducing financial risk, with laws that protect firms from legal changes after contracts are signed and which automatically compensate for exchange rate risk.

Box 3.4:
Box Summary of previous OECD/FMM work on access to finance for infrastructure (2017)

Source: [Insert source if citing a third party. If source is Castalia delete the line]

4 Promoting infrastructure development that supports inclusive growth

• Building infrastructure lifts standards of living. However, it can also have negative impacts on the environment and local communities. Structural policies can ensure that negative impacts are effectively mitigated against or
compensated for. Quality infrastructure following the Isa-Shima principles should ensure both job creation, capacity building and transfer of expertise and know-how to local communities, and that social and environmental impacts are addressed. Another issue which

- Infrastructure is essential to the delivery of the services required to build inclusive communities where all people can participate and contribute to society. Structural policies/government budgets must ensure that the benefits of infrastructure services are provided fairly across society.

### 4.1 Greater connectivity through open and fair access to the benefits of infrastructure

- Governments can consider structural policies to promote greater access to, and affordability of, key infrastructure to support social goals. This might include targeted subsidies to end-users, or financial support to projects reaching remote rural communities. Government support should be no more than the net public benefit that will be gained from the project, to make sure the project continues to provide value-for-money (and net benefits to society).

- Open and fair access here refers to consumers’ access to infrastructure. Open and fair access to infrastructure markets such as construction are discussed in section 3.1.

**Why is this important? What is the positive outcome that it enables?**

- Greater access in remote regions can reduce societal inequalities and provide opportunities for more disadvantaged groups to participate in society and enjoy the benefits of development. Policies which ensure access to infrastructure can serve a redistributive role in society, which can be supportive of or a substitute for tax and transfer schemes

- Regulatory tools, such as the Regulatory Impact Assessment, are critical to achieving cost-effective regulation. Regulatory Impact Assessments require government entities to formally define the regulatory problem, identify multiple options to addressing it (including no action), and assess the costs and benefits of each to strike the right balance between delivering quality infrastructure and administrative simplicity. This ensures that regulation does not impose unnecessary administrative burdens and government processes (including procurement) remains streamlined and speedy.

- Services can be considered essential in some societies, such as water, and sanitation access. Government development goals may entail 100 percent provision, and it is unacceptable for access to be out of reach for a proportion of the population.

**How could structural policy support it?**

- Investment planning and determining who pays for infrastructure should focus on determining net social benefits in alignment with the Governments objectives: projects offering the greatest value to society should be prioritised.

- Governments can consider support arrangements to achieve social goals where there is insufficient case for private sector involvement in projects with a net social benefit or communities could not fund an asset themselves, so long as government support is no more than the net public benefit that will be gained from the project.
Examples include:

- Community Service Obligations: CSOs are non-commercial requirements of government business enterprises for achieving identified social purposes which it would not elect to provide on a commercial basis, or which would only be provided commercially at higher prices. An example is a requirement upon a state-owned electricity transmission provider to provide transmission services to remote communities, which might not be commercially viable. Universal service obligations are a type of CSO where the intention is have universal provision. Other terms or related concepts are public service obligations and non-commercial service obligations.

- Government financial support for private providers: Government has access to cheaper financing. In PPPs, government can on-lend funds to private participants to address the limitations of financial markets and to make financing cheaper. Government may also provide guarantees to PPPs to improve their bankability by covering foreign exchange and political risks.

- General infrastructure funds which aim to benefit specific regions or populations which may be deprived. These can be viewed as national 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 organisations to develop plans or feasibility studies. They can also invest in specific sectors which are identified as national priorities. Finally, they can act as a bank for infrastructure projects targeted towards pitched to them by public and private—directly addressing the funding gap.

- Finance up-front costs of connection. This can be achieved through cross-subsidization across a network.

- Government subsidies: Subsidies targeting poor users will make it possible to increase access to strategic and economically feasible projects. This can be effective where infrastructure is not affordable for groups of consumers, but is nonetheless considered essential. It is still determined to be best provided by the private sector.

- Base programs on results-based financing or output-based aid (OBA), which often emphasizes targeting low-income households.

What does a good structural policy look like?

- Subsidies: We will consider case studies received from APEC economies and include other global examples. Many mass transit projects receive public subsidies.

- Government financial support: An example of a facility wherein Government on-lends to PPPs is the India Infrastructure Finance Company Limited (IIFCL).
Box 4.1: The Tuawhenua Provincial Growth Fund

- New Zealand launched the Tuawhenua Provincial Growth Fund in February 2018. This will allocate NZD$3 billion (1.1% of GDP) over 3 years towards regional infrastructure projects. The purpose is to enhance economic development opportunities, create sustainable jobs, enable Māori (indigenous people of New Zealand) to reach their full potential, boost social inclusion and participation, build resilient communities, as well as helping to meet New Zealand’s climate change targets. It seeks to this by targeting three investment tiers: building capability and funding feasibility studies, sector investment across the regions (including the planting ‘1 Billion trees’ programme), and investing in regional infrastructure projects which apply for funding.
- There are important controls to balance the focus on regional development regarding productivity and jobs with ensuring money is effectively invested. The three main cities of Christchurch, Wellington and Auckland are ineligible, and there are several deprived regions identified for special focus.

Source: New Zealand Individual Economy Report

- Programs that focus on providing high-speed internet to rural and remote communities to ensure that they are well positioned to take advantage of the opportunities in the digital age (e.g. Canada’s Connect to Innovate program).

4.2 Job creation and poverty reduction

- By growing the economy, infrastructure contributes towards poverty reduction over the long term.
- Building infrastructure can create jobs directly. Infrastructure projects can be large and continue for many years. Projects can also be remote.
- But more importantly quality infrastructure also boosts productivity, which creates further jobs or higher value-added jobs thus supporting higher incomes.
- Social infrastructure can reduce effective poverty by providing benefits to deprived populations.

Why is this important? What is the positive outcome that it enables?

- Infrastructure can boost productivity and increase economic growth by increasing connectivity. This can be through access to job markets through transport infrastructure, or access to communications infrastructure that enhances participation in job markets. It reduces the frictions or transaction costs which can lead to unemployment and deprivation.
- Infrastructure can increase trade and create better commercial opportunities by increasing access to national and international goods and services markets, producing increased benefits from trade. For example, farmers who can transport their produce more efficiently to a city may be able to get better prices. This would increase their income and also could incentivise them to increase production, and produce more economic growth.

How could structural policy support it?

- A well-executed cost-benefit analysis (discussed in Section 2) should include all costs and benefits of an infrastructure project, including the extent to which the investment give rise to spill over benefits that support growth in the broader economy and therefore assist in poverty reduction and job creation benefits.
Structural policy that ensures economic evaluation analysis is complete and captures all relevant benefits is important to understand the impact that infrastructure has on poverty reduction and job creation.

Structural policy can distribute projects across regions in some cases. This can bring development with it such as roads and communication services and directly employ locals. Local content policies can ensure this outcome occurs.

What does a good structural policy look like?

- Prioritise infrastructure projects which generate employment through second order economic activity.
- Boosting social infrastructure investment can reduce poverty. Canada is a good example of a economy implementing the policies to achieve this, summarised in Box 4.1.

Box 4.2: The Investing in Canada Plan

TBC

4.3 Mitigating the negative impacts of infrastructure development on communities

- Infrastructure can improve living standards, but there can also be negative social and environmental impacts including displaced communities, pollution, habitat loss, inequitable outcomes and economic or social impacts for communities. Structural policies can either mitigate negative impacts, ensure development is within environment limits or provide adequate compensation arrangements to affected groups.

Why is this important? What is the positive outcome that it enables?

- Mitigating or compensating for the negative impacts of infrastructure development reduces the overall costs, thereby increasing the overall value for money (benefit-to-cost ratio) to society.
- Affected communities are at least as well off as they were before the project began, and important environmental outcomes can be achieved, including climate change mitigation, reduction in habitat loss, and lower pollution.

How could structural policy support it?

- A well-executed cost-benefit analysis (discussed in Section 2) should include all costs and benefits of an infrastructure project, including environmental and social costs. Countries should therefore ensure investment analysis is complete, including Social and Environmental Impact Assessments where relevant.
- Countries can establish environmental standards or safeguards, including minimum thresholds that projects must be able to demonstrate achieving before they can go ahead. Examples include minimum river flow requirements for hydropower plants, or protections for endangered species requiring construction to proceed in ways that guarantee habitat availability for minimum populations to continue to thrive.
- Stakeholder engagement with communities where technical details, reasoning for the project and community concerns are discussed. Project can be built or
redesigned in ways which reduce impact on local communities if developers are aware of local impacts and concerns. Communities can better adapt to projects they know the details of projects. Stakeholders may also be more co-operative, and less likely to oppose the project. These are positive impacts both for the social costs of projects as well as the project itself in terms of delivery of the project.

- Compensation arrangements can be used to guarantee that affected communities are at least as well off as they were prior to the project commencing, or that alternative sites are developed for displaced species of flora or fauna.

What does a good structural policy look like?

- Minimum environmental standards: multiple countries have minimum environmental standards and protected species legislation that infrastructure projects must abide by. We will discuss these, and examples of projects that have changed original plans accordingly.
- Compensation arrangements: Several countries have compensation arrangements for displaced communities built into legislation. We will discuss these, and examples.
- A requirement for stakeholder engagement at both the planning and building stages of an infrastructure. These should be meaningful interactions with genuine willingness to change processes and plans in response. The OECD has a strong focus on this topic, producing guidelines and standards for what meaningful stakeholder engagement looks like, and a summary of these is included in Box 4.3.

Box 4.3: OECD Guidance on Social and Environmental Due Diligence

TBC

Source: [Insert source if citing a third party. If source is Castalia delete the line]

5 Promoting resilience

- The United Nations definition for resilience is: “The ability of a system, community or society exposed to hazards to resist, absorb, accommodate to 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.”

- Infrastructure resilience is broader than specific events such as earthquakes, or the technical failure of a piece of infrastructure. Consideration should be given to all potential hazards to a system including the slow-onset impacts of climate change, thinking about interdependencies within and between systems and the impact of events on the level of service. The effectiveness of resilience depends upon the ability to anticipate, absorb, adapt to, and/or rapidly recover from a potentially disruptive event.

---

24 From the UNISDR terminology on disaster risk reduction (2009)
Increasing resilience is not just about building stronger infrastructure. The role of operational changes and community preparedness in mitigating the costs of hazards is vital. All the attributes of infrastructure resilience are summarised in Figure 5.1.25

- Service delivery is the robustness of a system to provide access to infrastructure services in adverse conditions.

- Adaptation is the capacity to withstand disruption, absorb disturbance, act effectively in a crisis, responding appropriately to changing circumstances in the hazards facing society. This may include abandoning pieces of infrastructure as the slow-onset of hazards such as climate change become too great and finding other methods of service delivery.

- Community preparedness is the capability of society to minimise danger and damage from acute hazards such as natural disasters. This can include both formal institutions, warning systems, plans and guidelines, and informal knowledge and behaviour throughout society. It includes the need for consumers and providers to understand infrastructure outage risks and take mitigation measures.

- Responsibility is making obligations clear between different groups: owners, operators, users, policy-makers and regulators. Responsibility gaps must be addressed. This allocates the risk from hazards appropriately, to minimise moral hazard and encouraging the mitigation measures to be implemented.

- Interdependencies is the recognition that resilience in one system may rely on the functioning of another, for example electricity on health and telecommunications services. Therefore, it is insufficient for one system to...

---

be viewed in isolation. Rather, supply chain and weakest link vulnerabilities must be considered.

– Financial strength is the ability of public and private groups to withstand the impact of both loss of revenue from disruption, and the cost of rebuilding. Financial capacity to deal with new investment and changing circumstances is important to reduce the long-term impact of both shock and long-term hazards.

– The continuous attribute is that efforts need to be on-going. This provides assurance and draws attention new issues, recognising that infrastructure resilience will always be a work in progress.

– Organisational performance is simply that leadership and institutional culture are conducive to constantly improving resilience

Why is this important? What is the positive outcome that it enables?

- Disruptions to infrastructure services due to emergent and shock events reduce the benefits that infrastructure provides over its lifecycle. The period after shock events may also be the time infrastructure is most valuable or necessary, for example transportation systems which fail in extreme weather events such as hurricanes will slow down the recovery period after the event. Infrastructure which this applies to is called ‘Critical Infrastructure’:

“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”

This includes transport systems, electricity, water and communications systems, hospitals and health clinics, and centres 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 a normal time, the ability for it to function effectively during and following a disaster produces a large positive externality for society.

- Resilience can be undervalued or not considered when undertaking an economic evaluation of new infrastructure. The risk of a hazard materialising can be hard to measure, and the consequences of not building for resilience might not be felt until the long term. For example, road investments by the World Bank conventionally must have an internal rate of return exceeding a discount rate of 12%, over a 20-year design life. This implies that the project should pay for itself in 6 years. However, roads may be required to last much longer.

---

26 From the UNISDR terminology on disaster risk reduction (2009)
27 Designing for infrastructure resilience, UK Department for International Development (2016)
https://assets.publishing.service.gov.uk/media/57d6bc5be5274a34fb00002e/Designing_for_Infrastructure_Resilience_July_2016_external.pdf
28 Choice of discount rate in World Bank Transport Projects (2004), World Bank Transport and Urban Department, Transport
Unithttp://lnweb90.worldbank.org/eca/transport.nsf/3b8b3d27260832ec852569fa0059675f/837e2a42673abeb885256ec003d5b27/$File/Choice%20of%20discount%20rate%20in%20World%20Bank%20Transport.ppt
longer than this, and over its life populations come to rely on the transport service it provides.

- Therefore, the economic case and technical design projects are heavily determined by short term outcomes which does not consider risks, especially the true scale of slow-onset climate change risks. The costs to disruption are large. Resilience is more important than the simple economic evaluation would suggest, so should be considered as an independent desirable quality.

- Climate change is an emergent environmental risk which needs to be actively managed: resilience can allow infrastructure adaptation to climate change and can mitigate any climate-related shock events (like flooding).

- Finance tools to support resilient infrastructure can mitigate expensive cost outlays in the longer term, which might be required to pay for significant repairs following an event.

How could structural policy support it?

- Structural policies can encourage providers to improve infrastructure system resilience on several levels 29:

  - Robustness: the inherent strength or resistance 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 generation and transmission electricity infrastructure can withstand hazards and continue providing electricity normally to consumers. Regulation in minimum building standards can be used to ensure infrastructure remain functional under physical stress. Standards should be location and environment specific to capture the most significant risks to each project. A key is shifting from traditional prescriptive building codes to performance-based codes which define what the tolerable risks are and allow for changes in the use of the infrastructure or environmental risks.

  - Redundancy: system properties that allow for alternate options, choices, and substitutions under stress. For example, in electricity infrastructure this would be having sufficient back up generation, and a grid which is able to withstand a line being broken to prevent large scale blackouts. Standards and regulation are important here too. Policies can aid co-ordination between groups with within sectors and between sectors to provide redundancy, recognising the interdependence of different sectors.

  - Resourcefulness: 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. Therefore, the ability to efficiently repair or provide alternative services is also necessary in providing continuous resilience. For electricity this is having the necessary expertise and parts where they are needed to respond to disruption. A slow onset hazard may require providing 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: the speed with which 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 the contingent liability planning done by the central ministry of finance or treasury, and fiscal buffers (e.g. EQC). Adequate contingency planning by the government ensures that funds can be made available following shock events to rebuild infrastructure quickly.

- Long-term planning should consider current and future risks to infrastructure. Resilience should be assessed with considering the maximum risk over the lifetime of the asset. Planning should recognise that where risk cannot be insured at a reasonable cost, the project should not go ahead – this is a market signal that the risk is unacceptable. This situation may develop over time in response to slow onset hazards. Public subsidies for insurance may encourage the purchase of insurance and increase financial strength, but it can also increase risk by reducing the expected costs of building in risky places.

- Policies can improve the resilience of society by increasing community preparedness. Civil defence institutions can run procedures and campaigns to ensure people are prepared for disasters. There can be mandates for some organisations to hold emergency supplies such as fresh water, fuel such as community buildings and emergency. Campaigns can encourage individuals to hold these, as well as implement mitigation measures.

- While resilience provides many benefits discussed, there are also costs. If costs are too high, then actions to increase resilience simply can’t happen—investments cease to be economically justified, to provide value for money in normal times. Therefore, it is important to provide resilience efficiently, in the most cost-effective way. According to the Global Facility for Disaster Reduction and Recovery (GFDRR),30 cost-effectiveness of prevention will be enhanced where:

  - Governments make information and analysis about hazards easily accessible.
  
  - Governments ensure that property values reflect hazard risks, through land and housing markets and public action where needed. Government also need to expand the choices of the poor, for instance through security of property or targeted availability of land in safer locations coupled with transportation and other services.
  
  - Governments provide adequate infrastructure and services. Effectiveness depends on quality, so spending should be prioritised properly. High-return spending like maintenance must not be deferred. New infrastructure should not introduce new risks. Where a safe location is impossible, multipurpose infrastructure (such as roads that also help drain water) is promising. Higher margins of safety must be applied to critical infrastructure.

---

Governments and donors assess in the specific context each type of financial coping mechanism (insurance, borrowing, dedicated funds, remittances, aid). Assessment should consider benefits but also uncertainties, drawbacks or negative consequences on prevention and cost-effectiveness.

Decision-makers permit public dissent, information, involvement, oversight and experimentation by an array of entities including the media, neighbourhood associations, engineering groups and businesses. Diverse sets of organisations that facilitate collective action by large groups of citizens will be able to press more effectively for information, prevention and cost-effectiveness.

Donors earmark development (rather than humanitarian) aid for prevention.

What does a good structural policy look like?

- Good infrastructure planning considers future as well as present risks to infrastructure. For example, climate change is expected to increase the frequency of extreme weather events and lead to sea level rise resulting in increasing risks for infrastructure.

- Climate change is a particularly complex and significant emerging issue. Therefore, it is worth considering specific structural policies which address the hazard, and hazards associated with climate change. This has been a focus of much recent work by the G20 climate and sustainability working group supported by the OECD. The OECD provides a summary of this in Box 5.1.

New Zealand Box 5.2 provides an instructive example of a structural policy to build institutional capability in resilience, allowing different agencies and groups to come together to understand their interdependencies, agree their responsibilities, and ensure optimal institutional performance to achieve resilience. Box 5.3 looks at New Zealand’s efforts in a particular sector—transport.
The creation of the New Zealand Lifelines Council (NZLC) in 1999 is an example of a structural policy to build institutional capability to "Enhance the connectivity of lifeline utility organisations across agency and sector boundaries in order to improve infrastructure resilience". The council includes critical infrastructure with interdependencies on each other, including telecommunications, electricity and gas, water and roading. It also includes the relevant government agencies.

The NZLC seeks to promote arrangements to improve infrastructure resilience. One theme of this work is to ensure robust physical infrastructure assets, or alternative arrangements to ensure demand for services can be satisfied continuously. Another aspect is to promote effective coordination both before and after disasters to ensure weak points in the interdependent systems are identified. Finally, the NZLC establishes realistic end-user expectations so that users are risk-aware and better able to consider options.

NZLC undertakes several functions to achieve this, including:

- 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 resilience work in diverse government programmes including between the Ministry for Civil Defence and Emergency Management and national infrastructure planning within Treasury.
- Promoting and promulgating resilience-related research. Scientific agencies are members of the Council, including the Earthquake Commission and GNS Science. This ensures not just that information and analysis about hazards are easily accessible, but also active collaboration and contact between infrastructure providers and the agencies most informed on potential hazards.
- Organising the annual National Lifelines Forum. The Forum updates representatives from Lifeline Groups and national utilities on latest developments and develops positions on common resilience-related issues.

Source: New Zealand Individual Economy Report

- Buildings in earthquake prone areas in New Zealand are required to meet structural standards to mitigate the risk of collapse.

The New Zealand government recognised the transport system as critical infrastructure:

- "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."

The Ministry of Transport (MoT) therefore identified transport system resilience as a priority. MoT plays a key role in providing cross sector leadership with the goals of:

- Planning, preparing and responding to events impacting on the transport system;
- Building a longer-term strategy which includes a clear vision and outcomes framework and a cross-modal action plan;
- Encouraging engagement and collaboration with providers across the transport sector;
- Providing clear advice on the appropriate role of government

A policy tool for the government is in its funding choices. The Government Policy Statement on land transport (GPS) is issued by MoT and guides the strategy of how the National Land Transport Fund (~$NZD4 Billion annually) is invested over the next decade and guides the investment decisions of other entities such as local government on transport
Disaster resilience in under-funded, and ‘building back better’ after an impact implies higher costs to meet stricter building standards and more technical solutions. Nevertheless, some studies show that building disaster resilience is cost-effective compared to late humanitarian response. Governments should therefore consider how to finance resilience to avoid greater costs in the longer term, where this is appropriate.

Revisiting risk management plans at scheduled dates – controlling for a changing environment and economy.

Governments can make reforms to fiscal and accounting policy: Governments can explicitly recognise contingent liabilities on their accounts, which allows explicit recognition of known risks and planning. The World Bank Group and OECD developed “Managing disaster risk related contingent liabilities in public finance frameworks” a working paper on policies governments can adopt to manage fiscal risks and especially disaster related contingent liabilities. Key policies identified are:

- Clearly establishing institutional arrangements for disaster related fiscal risk management – whether through a centralised model where a treasury has responsibility, or a decentralised model as in Australia where agencies manage produce their own annual reports, contributing to a Fiscal Risk Statement published in the annual budget.

- Effective identification of disaster-related contingent liabilities both implicit and explicit in law. For example, Japan has the Disaster Relief Act (1947) which establishes central government support of disaster relief and welfare support, including repair of private housing, 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 subsidy, tax and debt measures. The Natural Disaster Victims Relief Law (1998) extended the scope of the government’s financial responsibility and established central governments responsibility for disaster relief to 80%. A series of laws provide government support for insurance (earthquake, agricultural, fisheries, fishing boat, and forest) and establish a contingent liability of central government to pay a portion of pay-outs. 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 cover earthquake losses. This provides financial resilience in a country with concentrated seismic risk. New Zealand has an equivalent scheme in the Earthquake Commission whereby government backs up a long-term fund held to cover a fixed amount of losses.

Quantifying disaster-related contingent liabilities through direct estimation or probabilistic modelling. It is important not to ignore uncertain or difficult to estimate contingent liabilities, as these still need to be accounted. In Australia, the annual Statement of Risks publication within the budget contains a specific category for ‘significant but remote’ contingent liabilities.

Effective mechanisms for disclosing contingent liabilities and integrating these into overall fiscal forecasting. Public financial management law or regulations may assign responsibility for quantifying, collating, monitoring information to a central entity in the Ministry of Finance which makes regular public disclosures of contingent liabilities. The Philippines provides a good example of integrating contingent liabilities, explicitly calculating a debt sustainability analysis in their 2013 Fiscal Risk Statement, see Figure 5.2.

Policies Figure 5.2: which mitigate the contingent liabilities and financing residual fiscal risk. Making explicit and restraining currently implicit contingent liabilities.

Providing incentives for insurance cover where the government otherwise is responsible for the liability. Switzerland provides a good example of how to achieve this while minimising potential moral hazard with risk-related disaster insurance premiums, where customers are informed by insurance companies on investments which must be made in self-protection and if not followed, refuse or reduce the pay-outs.

Managing fiscal risk with ex-ante mitigation tools such as dedicated reserve funds, reinsurance, contingent credit facilities and catastrophe bonds, wherein if a catastrophe occurs, the principle of the bond is forgiven and money used to cover the contingent liability.

Figure 5.2: Philippines Debt Sustainability Analysis with Contingent Liabilities


6 Lessons learned and policy recommendations in relation to structural reform and infrastructure

- [This conclusion section will be a principles-based summary of the sections above, referencing the current APEC policy agenda].