Cost of restoring essential public assets to governments of all levels between **2002-2003** and **2010-2011**

4. The economic case for change – national infrastructure investment

Key points

- If resilience is not improved, an estimated $17 billion will be spent rebuilding critical infrastructure after natural disasters between 2015 and 2050
- While this is only a small proportion of total annual infrastructure investment, these costs can be reduced by embedding resilience into infrastructure decision-making processes
- The cost of replacing damaged assets is comparable to the entire cost of establishing other large infrastructure projects. For example, the Inland Rail Project and the Sydney Rapid Transit Project are estimated to cost $10 billion each
- Rebuilding costs are only part of the costs incurred when infrastructure is damaged by natural disasters. Infrastructure service losses can be costly too and add further to the case for building resilient infrastructure based on sound cost-benefit analysis
- Resilient infrastructure is critical in supporting communities to withstand, respond to and recover from the potentially devastating impacts of natural disasters.

Chapter 3 explored the case for change at a project level and demonstrated the potential for better economic outcomes where resilience is considered up-front in planning and approval processes for new infrastructure. This chapter considers the benefits of considering resilience up-front at a national level, specifically by reducing the costs of replacing infrastructure following natural disasters.

It is projected that about $1.1 trillion will be invested between 2015 and 2050 in new critical infrastructure across Australia in present value terms (see Section 4.2). We estimate that about 1.6%, or about $17 billion in present value terms, of this will be needed to rebuild critical infrastructure following natural disasters.

Better resilience planning could reduce rebuilding costs as well as reduce the cost of infrastructure service losses, thereby strengthening vulnerable communities when natural disasters occur.

4.1 Approach

Individual infrastructure projects face unique challenges and specific costs, based on their location, the proximity of communities, their risk exposure and the technical feasibility of different resilience options. Recognising that the net benefits of making infrastructure resilient to natural disasters will vary in each case, this report takes a top-down approach to estimate the magnitude of total rebuilding costs between now and 2050 if resilience is not embedded into infrastructure decision-making.

This process has involved:

- Identifying total infrastructure investment in Australia
- Estimating how much of this expenditure to is spent rebuilding damaged infrastructure after natural disasters
- Projecting the profile of investment and rebuilding expenditure out to 2050.

This section outlines this approach, with further detail on the methodology in Appendix E.

4.2 Infrastructure investment

Annual investment in building critical infrastructure in Australia is substantial. In the past decade, spending on critical infrastructure accounted for between 3% and 5% of gross domestic product (GDP), which was valued at $62 billion in 2014–15 (Chart 4.1).

This includes public and private sector expenditure on infrastructure types including:

- Transport infrastructure: roads and highways, bridges, railways and harbours
- Critical services infrastructure: water storage and supply, sewerage and drainage, electricity transmission and distribution, pipelines and telecommunications
- Buildings associated with education, aged care, health and transport.

The breakdown of expenditure across these infrastructure types in 2014–15 is presented in Chart 4.2. Depending on community needs, the share of investment allocated across these areas varies year to year.

Assuming that total infrastructure spending will increase in line with real GDP growth over time, it is projected that about $142 billion a year will be spent on infrastructure by 2049–50. In present value terms, the value of total investment in infrastructure over this period is estimated to be about $1.1 trillion.

4.3 Infrastructure rebuilding costs following natural disasters

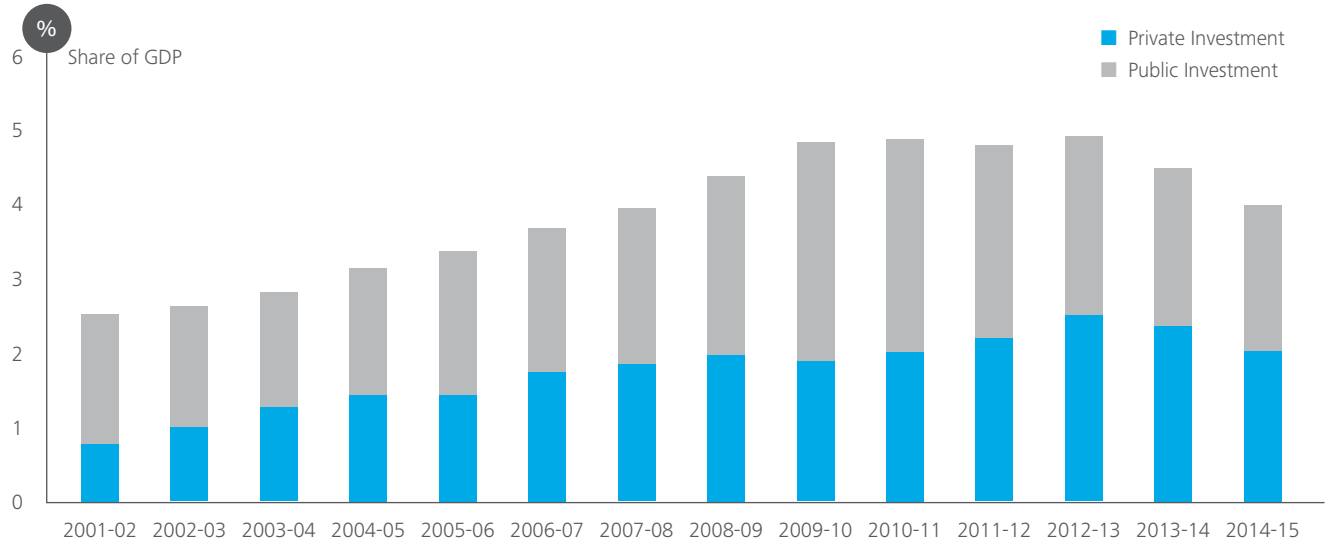
Analysing data from National Disaster Relief and Recovery Arrangements indicates that restoring essential public assets costs governments at all levels about $4 billion between 2002–03 and 2010–11 (Chart 4.3), or an average of more than $450 million a year.

This indicates that government spending on rebuilding infrastructure damaged by natural disasters accounts for about 1.6% of total public infrastructure spending, based on a historical average.

If this ratio remains constant and applies similarly to private sector investment, it can be estimated that of the $1.1 trillion projected future investment in essential infrastructure, about $17 billion will be spent on rebuilding critical infrastructure after natural disasters between now and 2050, in present value terms.

These projections are illustrated in Chart 4.4. As noted, the growth assumptions used in the scenario suggest this estimate may be conservative.

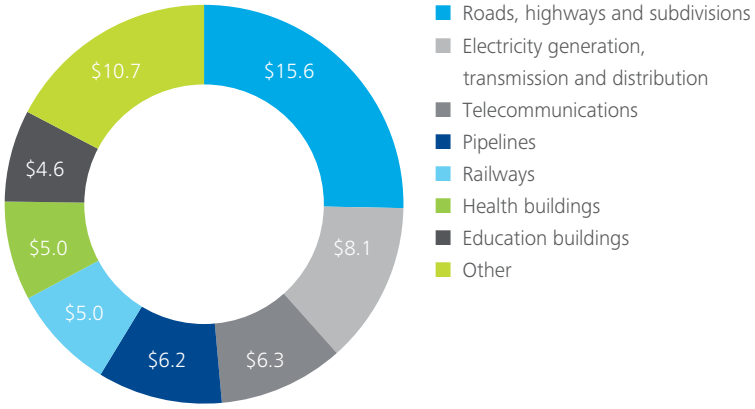
Chart 4.1: Annual investment in essential infrastructure as a share of GDP, 2001–02 to 2014–15



Source: Deloitte Access Economics, derived from the Australian Bureau of Statistics (2015a; 2015b)

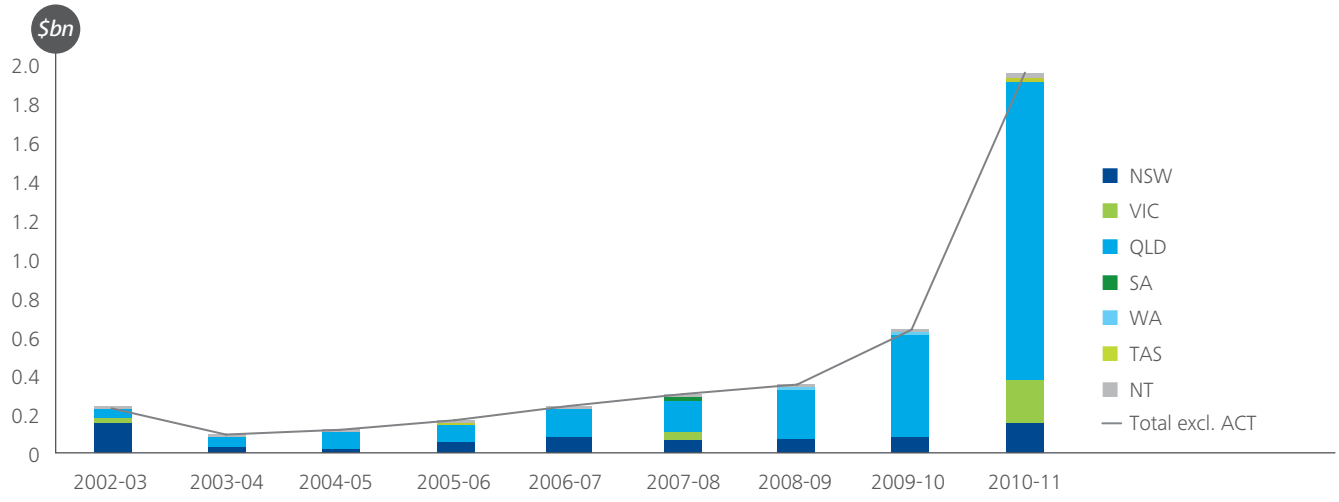
4. The economic case for change – national infrastructure investment

Chart 4.2: Breakdown of total infrastructure investment by type, 2014–15 ($bn)



Source: Deloitte Access Economics, derived from the Australian Bureau of Statistics (2015a; 2015b)
Note: Other includes investments in harbours, water storage and supply, sewerage and drainage, aged-care facilities, transport buildings and bridges

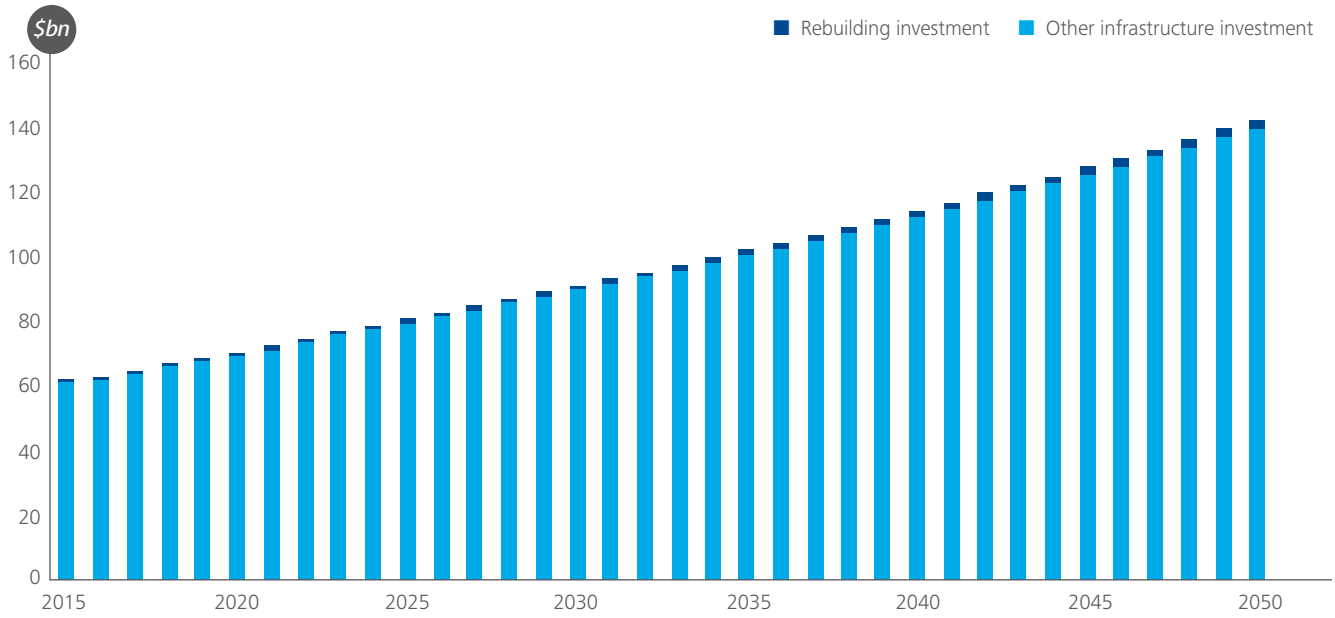
Chart 4.3: Government expenditure on rebuilding essential public assets after natural disasters, 2002–03 to 2010–11



Source: Deloitte Access Economics, derived from the Department of Finance and Deregulation (2012)
Note: More recent data on National Disaster Relief and Recovery Arrangements expenditure on the restoration of essential public assets are not publically available.

4. The economic case for change – national infrastructure investment

Chart 4.4: Government expenditure on rebuilding essential public assets after natural disasters, 2002–03 to 2010–11



Source: Deloitte Access Economics, derived from the Australian Bureau of Statistics (2015a; 2015b) and the Department of Finance and Deregulation (2012)

4.4 Summary

While $17 billion in rebuilding costs is only a small proportion of total annual infrastructure investment, there are opportunities to reduce these costs by embedding resilience into infrastructure decision-making processes. If building infrastructure with a greater level of resilience can lessen the cost of rebuilding infrastructure after natural disasters, this could free up funds to invest in other large infrastructure projects. For example, the estimated costs of the Inland Rail Project and Sydney Rapid Transit Project are about $10 billion each.

Furthermore, as demonstrated in the case studies in chapter three, investments in resilient infrastructure can deliver additional benefits not captured in the value of rebuilding costs saved.

It is well recognised that community reliance on critical infrastructure services intensifies during and after natural disasters. Infrastructure service outages – the loss of electricity, transport routes or communications services – create costs to households, businesses and local economies. This has both immediate and long-term consequences – increasing risk to life and property and hindering the recovery phase.

Recognising and quantifying the value of uninterrupted essential infrastructure service provision help to ensure sufficient levels of resilience are built into this infrastructure, as part of the decision-making process. The following chapter identifies principles to help decision-makers consider resilience upfront in project planning and appraisal for new and replacement infrastructure.

Fires at Four Mile Creek, east coast Tasmania, December, 2006. *(Raoul Kochanowski / Newspix)*

The Kholo Road and bridge over the Brisbane River, was seriously damaged by floodwaters, December 2010, Queensland. *(Tim Marsden / Newspix)*