Appendix E: Top-down approach to forecasting national costs of non-resilient infrastructure

The national cost estimates presented in Section 4.1 were based on data from three key sources:

- Australian Bureau of Statistics (ABS) data on selected building and engineering construction activity in 2014–15
- Department of Finance and Deregulation data on historical National Disaster Relief and Recovery Arrangements (NDRRA) expenditure associated with restoring essential public assets following natural disasters
- Deloitte Access Economics long-term GDP forecasts to 2050.

This appendix provides further detail on these data sources and the assumptions underlying the projections.

Forecasts of total future critical infrastructure investment

The following data was obtained from 2001–02 to 2014–15:

- Historical selected engineering construction activity – ABS (2015b), based on the total value of work done in the following categories:
  - Roads, highways and subdivisions
  - Bridges
  - Railways
  - Harbours
  - Water storage and supply
  - Sewerage and drainage
  - Electricity generation, transmission and distribution
  - Pipelines
  - Telecommunications.
- Historical selected building activity – ABS (2015a), based on public and private sector value of work done in the following categories:
  - Education buildings
  - Aged care facilities
  - Health buildings
  - Transport buildings.

These categories represent the definition of hard infrastructure used in this report.

To estimate the value of engineering construction work done for the private sector, the difference between the total value of work done in each quarter was subtracted from the estimate of the value of work done for the public sector.

The estimates of the value of work done exclude the cost of land and the cost of repair and maintenance, as well as the value of any transfers of existing assets; the value of installed machinery and equipment not integral to the structure; and the expense of relocating utility services (ABS, 2015b). It is assumed this data is an estimate of annual investment in new or replacement infrastructure, but not the maintenance of existing assets.

A projection of future investment in critical infrastructure was then developed, by assuming that the combined total value of selected building and engineering construction activity (noted above) in 2014–15 would grow in line with real GDP over the period to 2049–50. These annual growth estimates were derived from Deloitte Access Economics' long-term GDP forecasts over this period.

Based on these assumptions, we estimate that the public and private sector will invest about $1.1 trillion in critical infrastructure, in present-value terms, over the period to 2049–50.

Forecasts of future costs of rebuilding critical infrastructure

The Department of Finance and Deregulation (2012) provides estimates of total government expenditure (across the Commonwealth, state and local levels) for restoring essential public assets, as part of the reporting associated with Category B of the NDRRA.

Examining the period from 2002–03 to 2010–11, we estimated that these rebuilding costs were approximately 1.6% of the annual value of selected building and engineering construction work done for the public sector, on average.

Forecasts of the future costs of rebuilding critical infrastructure were then obtained by applying this proportion to the projections of total critical infrastructure investment between 2015–16 and 2049–50. This assumes that on average, private sector investment in rebuilding critical infrastructure is the same share of total annual infrastructure investment (1.6%) as for the public sector.

On this basis, we estimate that total spending to rebuild critical infrastructure following natural disasters could be worth about $17 billion over the period to 2050, in present-value terms.